Rethinking South Africa's Small-scale Fisheries Management Paradigm and Governance Approach: Evidence from the Eastern Cape

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ABSTRACT

This thesis presents a first analysis of how the South African fisheries authority (MCM) has utilised its fisheries management toolbox and governance framework in response to the emerging biological, economic and social challenges of post-apartheid fisheries in the Eastern Cape Province. Despite recognition of the socio-economic circumstances of traditional subsistence fishers in the region, the national fisheries management authority implemented a 'target resource orientated' management approach similar to that used for South Africa's rights-based commercial fisheries. Anecdotal evidence of entrenched illegal fishing for abalone, spiny lobster, and species targeted by subsistence fishers however suggested that MCM's management approach was encountering serious problems, as the needs and circumstances of inshore fishers and fishing communities were not adequately being understood and addressed. A review of fisheries management literature therefore shaped the hypothesis that an underlying governance problem was responsible for the symptoms of management failure being observed. In this regard, management is seen as more concerned with the technical and regulatory measures of the day-to-day operations of regulated fisheries, while fisheries governance needs to take account of "the sum of legal, social, economic and political arrangements used to manage fisheries...". Thus, governance includes policy making and management decision-making, with simultaneous recognition of issues outside of the fisheries sector. It thus appeared that the underlying problem was rather one of broader fisheries governance and inappropriate governance objectives with consequent inappropriate resource management arrangements. This thesis set out to gather evidence to test this hypothesis.

In order to understand and analyse the existing governance and management arrangements and suggest alternatives, a holistic analysis of both the social and biological aspects of the fisheries was required. Multi-disciplinary and empirical research was conducted through a series of case studies which investigated the harvesting of high-value inshore marine resources such as abalone (*Haliotis*

midae) and spiny lobster (*Panulirus homarus rubellus*) in both urban areas and rural small-scale fishing communities. A 'fishery system' analytical approach was adopted that i) identified the social and economic drivers and outcomes of fisher behaviour, ii) quantified the resource effects, iii) analysed the appropriateness of MCM's chosen 'target resource' orientated policy and management instruments, iv) documented the institutional challenges faced by MCM staff tasked with managing the respective fisheries, and v) recommended more appropriate approaches to governance and management. 'Action research' was undertaken in the hope that the information would be fed back into the fisheries management and governance framework as events unfolded.

The first case study considered the illegal abalone fishery based in the urban areas of the Eastern Cape, which illustrated governance failure in the form of a "missed opportunity" to institute a rights-based fishery capable of yielding tens of millions of rand. Since 1997, the Eastern Cape had become a major source of supply for the illicit abalone trade as illegal fishers located a substantial abalone (*Haliotis midae*) resource and established a full-scale commercial fishery. By 2005, the scale of the fishery was remarkable: a fleet of 30 purpose-built vessels existed, harvesting 1000-2000 tons of abalone with an export value of 35-70 million USD per year. The uncontrolled fishing effort however had a dramatic effect on the stock: - the average size of abalone decreased significantly and densities declined in the sampling areas. A central fishery management failure appears to have been MCM's limitation of its response to law enforcement, without seriously considering the issuing of fishing rights. This study showed that the fisheries authority has clearly missed an opportunity to develop a legal abalone fishery based on the Territorial User Right Concept (TURF), which is ideally suited to sedentary species such as abalone. A TURF-based fishery, if integrated into an accepted governance framework, might have led to better control of illegal fishing, and might have led to a substantial flow of legal revenue to the local and national economies. Instead the fisheries authority's restricted governance model had failed and illegal fishing remained unabated.

The second case study documented the abalone fishery that emerged in the rural areas of the Eastern Cape, and exposed the mismatch between the local livelihood context and the state-driven fishery governance approach which was based on individual rights. The fisheries authority, mandated by the Marine Living Resources Act (MLRA, Act 18 of 1998) to formalise the newly recognised subsistence fisheries sector, and driven by the policy imperative of extending socio-economic benefits from fisheries to poor coastal communities, issued community members with individual annual 'subsistence' permits to harvest abalone in an attempt to gain control over the growing informal fishery for abalone. This had profound implications in terms of governance as there existed traditions of customary access, as well as fishing practices where fishers harvest a variety of marine resources as part of their many coastal subsistence livelihood strategies. The permits failed to confer exclusive resources access due to the poor contextualisation of the project and limited involvement of the local permitted fishers in the daily management and fishing for abalone. The allocated buyer had in fact contracted commercial divers which in effect made 'paper' quota holders of the small-scale fishers. This cast in question the individual rights framework imposed on these small-scale fishers and the management toolbox employed in this setting. A rights framework incompatible with traditional practice, persistent illegal marketing networks, and a finite inshore resource led to the rapid demise of the initiative in 2004, and no developmental benefits that could promote the long-term upliftment of the community.

The third case study examined the fisheries authority's attempt to formalise the spiny lobster fishery, and not only highlighted the mismatch of the imposed governance framework with the traditional fishing practices, but also its disruption of local tourism-driven markets. Individual annual permits were issued to small-scale fishers in the Eastern Cape on a much larger scale than with the failed abalone fishery. Fortunately, the population dynamics of the lobster resource and the limitation of fishing effort to the shoreline provided the foundation for a potentially sustainable fishery. Since it was believed that the export of the catches would earn the fishers a higher income, and simultaneously direct fishing effort to the legal fishing season only, a limited number of external

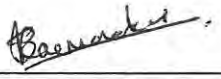
buyers were licensed and controlled by the fisheries authority. This study however not only exposed (i) the lack of legitimacy of the imposed regulations amongst fishers who have traditional practices and access norms, and (ii) the incompatibility of the regulatory framework within the local socio-economic context, but it also highlighted the missed opportunity to tap into existing local economic development mechanisms, and sustainable poverty alleviation through enhancement of the local post-harvest opportunities. While the study was not designed to estimate the total off take of the lobster resource in the Transkei, the catch data gathered between 2005 and 2008 did reveal early signs of overharvesting, as well as associated changes in fishing effort and behaviour. Evidence of increased fishing effort but with limited local economic development, call for an urgent rethink of the governance approach to this fishery which needs to be designed according to the local socio-economic preferences and needs.

The last case study analysed the various governance mechanisms that the fisheries authority employed to increase participation of the Eastern Cape small-scale fishers in management decision and policy-making processes. After eight years, MCM failed to formalise small-scale fishers into a biologically sustainable and socially equitable legal framework due to a combination of poorly implemented co-management arrangements within the 'resource orientated' management paradigm. A critical lack of institutional capacity impeded the fisheries authority from successfully embarking on a co-management process with small-scale fishers and with other agencies mandated to promote development. The process did not succeed in its goal of achieving greater participation by small-scale fishers in fisheries management. The responses of small-scale fishers to MCM's failed small-scale fishery management policies are documented, including the landmark Equality Court ruling that ordered MCM to redraft its small-scale fishing policy in partnership with organisations representing the fishers. It is argued that the Equality Court-driven process could lay the foundation for meaningful participation in the fishery management by small-scale fishers, and a revision of MCM's fisheries management model and governance approach.

In conclusion, this thesis provided clear evidence from the Eastern Cape's inshore fisheries that the fisheries management and governance approach, currently employed by the South African fisheries authority, mandated through the MLRA to manage the marine resources of the country, is failing in its objectives and needs fundamental rethinking. The symptoms observed in this thesis did not only point to the failure of the technical and regulatory management measures but to a much more important and underlying governance problem. A disturbing finding of this study was that MCM management at the time of the study seemed unwilling or unable to conceptualise the problem, and resistant to considering research and management feedback of the symptoms of governance failure. The evidence from this study suggests that the starting point for developing effective governance arrangements should be recognition of the existing traditional community access fisheries in communities where people fish as one of many livelihood strategies– followed by a facilitated process aimed at achieving workable management measures to achieve sustainability and welfare gains. This will require an abandonment of MCM's narrow and ingrained 'target resource' orientation, possibly of review of fisheries legislation, and adoption of a broader "cooperative governance" approach in which MCM works in partnership with provincial and municipal authorities and target communities to promote local economic development based on marine resources.

DECLARATION

I, Serge Raemaekers, declare that this is my own unaided work hereby submitted for the degree of Doctor of Philosophy of Rhodes University in the Faculty of Science. It has not been submitted for any degree for examination in any other university.



Serge Raemaekers

Dated this 12TH day of DECEMBER 2009, at CAPE TOWN.

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This thesis is dedicated to my parents

Philippe Raemaekers & Nicole Ciry-De Schepper

and

André De Schepper & Marianne Maes-Raemaekers

And my sister,

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For their understanding and unwavering support of my decision to pursue a Doctoral degree so far away from my roots in Belgium

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LIST OF ABBREVIATIONS

4X4	Four wheel drive
ANC	African National Congress
ca.	*circa*
CBNRM	Community-Based Natural Resource Management
CPUE	Catch-per-Unit-Effort
DEAT	Department of Environmental Affairs and Tourism
DNA	Deoxyribonucleic acid
EAF	Ecosystem Approach to Fisheries
EEZ	Exclusive Economic Zone
EPV	Environmental Protection Vessels
FAO	United Nations Food and Agriculture Organization
g	grams
H. midae	*Haliotis midae*
HDI	Historically disadvantaged individuals
HH	Households
HLSA	Household Livelihood Security Assessment
hp	horsepower
ID	Identity document
IDP	Integrated Development Plan
IFQ	Individual Fishing Quotas
ITQ	Individual Transferable Quotas
IUU	Illegal, Unreported and Unregulated (IUU)
kg	kilogram
km	kilometres
LSC	Local subsistence committee
LSCC	Local subsistence co-management committee
m	metres

m^{-2}	per metre squared
mm	millimetres
MEY	Maximum Economic Yield
MCM	Marine and Coastal Management
MCS	Monitoring, Control and Surveillance
MDT	Masifundise Development Trust
MLRA	Marine Living Resources Act
MLS	Minimum Legal Size
MPA	Marine Protected Area
MRP	Mussel Rehabilitation Programme
MSY	Maximum Sustainable Yield
NGO	Non-Governmental Organisation
NIA	National Intelligence Agency
NPA	National Prosecuting Authority
NTT	National Task Team
OCU	Organised Crime Unit
ORI	Oceanographic Research Institute
P. homarus rubellus	*Panulirus homarus rubellus*
P. homarus homarus	*Panulirus homarus homarus*
P. perna	*Perna perna*
pers. comm.	Personal communication
pers. obs.	Personal observation
(Pty) Ltd.	Proprietary Limited Company
S. margaritacea	*Striostrea margaritacea*
SAMSA	South African Maritime Safety Authority
SANDF	South African National Defence Forces
SANParks	South African National Parks
SAPS	South African Police Service
SARS	South African Revenue Service
SCD	Sustainable Coastal Development

SCUBA	Self Contained Underwater Breathing Apparatus
SD	Standard Deviation
SFMU	Subsistence Fisheries Management Unit
SFTG	Subsistence Fisheries Task Group
TAC	Total Allowable Catch
TAE	Total Allowable Effort
TURF	Territorial User Rights Fishery
USD	United States Dollar
WWF	World Wide Fund for Nature
ZAR	South African Rand

CHAPTER 1:

Introduction

"Who deserves first bite?"
(The Herald, February 2003)

"Traditional fishermen of the Eastern Cape left high and dry by new government fishing policy"
(The Herald, April 2003)

"Traditional fishers arrested for doing what they have done for centuries"
(Daily Dispatch, April 2003)

"Furious fishermen gaff government on marine policy"
(The Herald, June 2003)

"Clamps on abalone poaching in Eastern Cape ineffective"
(The Herald, August 2003)

"Poachers find an abalone haven in Marine Protected Area"
(Daily Dispatch, February 2004)

"Abalone poaching is getting out of hand"
(The Herald, March, 2004)

"Lawmen tip off poachers"
(The Herald, March 2004)

"Poachers' paradise: Worried officials say the syndicates have the best boats and equipment money can buy"
(The Herald, May 2004)

"A graveyard of empty shells"
(The Herald, June 2004)

...

These statements are just a small sample of newspaper headlines from newspapers in the Eastern Cape Province, South Africa, during 2003 and 2004. They appear to reflect symptoms of fisheries management failure, and allude to the fact that the fisheries authority appeared ill equipped to deal with challenges of managing and controlling inshore fisheries such as the emerging illegal fishery for abalone, and regulating and extending the benefit of marine resource access to small-scale fishers in traditional rural communities.

The socio-political context in South Africa following the demise of apartheid was one of raised expectations and the hope of a new South Africa that would redress past injustices and promote substantive equality. The new Constitution introduced a human rights-based dispensation, which

subsequently played a significant role in shaping fisheries law reform (Witbooi, 2006). The promise of the new government was clear: "the primary objective of fisheries policy is the upliftment of impoverished coastal communities through improved access to marine resources and the sustainable management of those resources through appropriate strategies" (African National Congress, 1994). This placed the fisheries authority in a position where it would need to deal with not only the sustainable management of marine resources, which had been their sole task up to that point, but also to address issues of poverty and underdevelopment by means of extending the potential benefits of marine resources to previously disadvantaged communities. These were issues that the management authority never had to contend with before. However, ten years into the democratic dispensation, the newspaper headlines above suggested that the fisheries management authority was failing in its new mandate. In the light of the symptoms observed in the Eastern Cape, the burning question was: Why is the management authority seemingly so ill equipped to deal with the tasks at hand?

In order to answer this question, and to contextualise the scene in which these symptoms of failure appeared despite government's best efforts, it is necessary to take a step back, and consider the evolution of fisheries management approaches worldwide and more particularly in South Africa, where a new task for the fisheries authority created by the new Constitution was to extend access and benefits of coastal resources. This background will help us to identify possible approaches to analyse the symptoms of apparent management failure observed in the Eastern Cape Province.

1.1. A review of fisheries management and its evolution

This section presents a short review of fisheries management worldwide since the 1950s. As such, the evolution of the main tools currently employed in fisheries management is discussed. The review starts with the need for national fisheries authorities to 'close' access to the oceans, which were perceived in the past as no-one's property, and goes on to discuss new management tools such as co-management, which were introduced to better reflect social imperatives. This outline is necessary in order to contextualise the management 'toolbox' that is currently employed by the fisheries authority in South Africa.

Greatly influencing fisheries management evolution was the famous paper by G. Hardin in 1968. Hardin's 'Tragedy of the Commons' paper argued that in the rule-less 'commons[1]', humans did not act in ways to benefit all. On the contrary, each individual set out to increase his own gains up to a

[1] Many argue that in fact he referred to common property in an open access regime, and not a communal regime (Bromley, 2005; Feeny *et al.*, 1990; see text below).

point where a further increase no longer appeared to the individual as profitable (Hardin, 1968). In fishery terms this meant that every fisher was engaged in a 'race to fish' and did not have the incentive to protect the resource (Hilborn *et al.*, 2005; Grafton *et al.*, 2006; Pearse, 1992).

During the expansion of world marine fisheries commencing in the 1950s, free and unregulated fisheries had depleted valuable ocean fish stocks and frittered away potential economic returns (Huppert, 2005). Following Hardin's arguments, and in an effort to secure economic self-determination, several countries unilaterally extended their political economic jurisdiction from three to two hundred nautical miles from shore (Juda, 1991; Nadelson, 1992). Only in 1982, with the United Nations Convention on the Law of the Sea that codified customary marine law, were states legally assigned with the authority to manage and exploit marine fish stock in their 200-mile Exclusive Economic Zones (EEZs; Mansfield, 2004). In effect, states had the duty to assure that marine stocks were adequately conserved. Coastal waters that were previously under open access regime for everyone became state property, or *de facto* common property of the responsible state and its nationals (Feeny, 1994).

Within this evolution where control had become highly centralised, biological scientists gave advice to management. At the centre of this advice was the mathematical modelling of the resource. The 'bionomic optimisation models[2]' were based on single-species fish population dynamics and calculated the Maximum Sustainable Yield (MSY) of a particular resource (Caddy, 1999; Larkin, 1977). The MSY objective was also the only target reference point referred to in the Law of the Sea Convention (Caddy, 1999; Hilborn, 2007a). This biological science-based approach formed the basis for the calculation of the annual Total Allowable Catch (TAC), obtained from regular stock assessments through the analysis of catch and effort statistics, fishery-independent sampling and modelling of the resource.

Within the common property of the territorial waters, access was still open to all nationals. However based on scientific information, fisher behaviour was controlled through input regulations such as closed seasons, closed areas and gear restrictions, and output controls that restricted aspects of the catch both quantitatively and qualitatively (Cochrane, 2002; Morison, 2004). Examples of these output controls are size limits, protected species, restrictions on sex and maturity stage of the species, TACs, quota's, Total Allowable Effort (TAE), and bag limits. This form of management has subsequently been termed the 'conventional' or 'traditional' management of fisheries (Hilborn, 2007a), and is also what has given fisheries management its technicist characteristic. Controls were aimed largely at conserving the resource. At this stage it was hoped that 'technical measures' would

[2] Such as surplus production models, spawner biomass-per-recruit and yield-per-recruit models.

be sufficient to protect and sustain the stocks (Caddy, 1999). In reality a compromise was often made between achieving MSY and employment (Caddy, 1999; Hilborn, 2007a).

Despite the technical controls, resources were still largely in decline; therefore it seemed that the conventional fisheries management model was failing. Meanwhile, work by economists in the 1950s had also begun to influence fisheries management; in particular, the groundwork in fisheries economics undertaken by H.S. Gordon. His simple bio-economic model of fishing demonstrated why open access fisheries tended to perform poorly in economic terms and why overexploitation was inevitable (Gordon, 1954). This lack of economic effectiveness and resource conservation observed in the declining fisheries was attributed to flaws in the institutional framework that shaped economic incentives and behaviour (Caddy, 1999). Gordon's solution along with the response of Scott (1995), was to create private property rights (Gordon, 1954). Subsequently, the move to extend national jurisdiction to the 200-mile EEZ was supported by economists as a form of state property right (Caddy and Cochrane, 2001), as it provided the foundation from which states could 'close the commons' further (in Hardin's terminology) through limited access (Hersoug, 2006; Mansfield, 2004). As such, Gordon's work and that of his followers (Scott, 1955) had already provided an economist's answer to the paper by G. Hardin in 1968.

The basic economic problem of fisheries was thus seen as the absence of private property rights to the fish stocks. However, there were both practical and principal obstacles to the application of that solution (Hannesson, 2005). Instead, during the 1960s and 1970s, limited access systems were implemented increasingly in fisheries around the world through the use of access or 'withdrawal' controls (Caddy, 1999; Mansfield, 2004). These controls ranged from limited entry through license limitations, to individual harvest allocations such as use rights, exemplified by Individual Fishing Quotas (IFQ; Field, 2003; Morison, 2004). Input controls such as IFQs were preferred as they were aimed at restricting fishing effort, with simultaneous improvement of economic efficiency through the harvesting of the Maximum Economic Yield (MEY)[3] (Hilborn, 2007a). Fishing rights thus replaced the tradition of free and open access to marine fish stocks by the state assignment of use rights of a public good - the claimed territorial waters (Brady and Waldo, 2009; Huppert, 2005). Control and management rights remained largely within state powers.

Many combinations of limited access systems through use rights exist today at different spatial scales, and have formed the basis for quota-based fisheries management of commercial fisheries in both developed and developing countries. These use rights can be given away for free, or auctioned or sold for varied lengths of time, however, the ownership of the resource itself, or the right to

[3] MEY is obtained from the expansion of bionomic models to bio-economic models.

control the access to it, remains in the hands of the government and its agencies. Governments have the role of guarding the resources in the public interest, while industry is given an adequate framework for maximizing economic efficiency, given the exploitation level deemed to be appropriate (Hannesson, 2005).

Within the established 'target resource orientated' and new 'rights-based' fishery management framework, both economists and biologist have sought to improve input and output control measures. Today, a large suite of tools is available to fisheries managers. A summary of the most important fisheries management tools and measures is provided:

(i) Even with use rights such as IFQs, fisheries management goals of resource protection were not entirely met and overcapacity was still evident, therefore, resource economists took the concept of rights and economic efficiency a step further. On-going work through bio-economic optimisation models and concentration on the quality of rights to turn common property fish resources in the EEZ into private property saw the emergence of Individual Transferable Quotas (ITQs). This was a step further towards private property. ITQs have been implemented in countries such as Iceland, New Zealand and Australia (Arbuckle, 2000; Bess and Rallapudi, 2007; Clark, 1993; Grafton *et al.*, 2006; Matthiasson, 2003). ITQs differ to IFQs in that the fishers also hold alienation rights (Ostrom and Schlager, 1996) in addition to withdrawal or use rights (Brady and Waldo, 2009). An ITQ system allocates quota shares of the TAC that are subsequently allowed to be purchased, sold or leased among the fishers. In this manner, less efficient producers tend to sell their quota and leave the fishery, which in turns reduces excess capacity (Degnbol *et al.*, 2006). The transferable catch shares provide a powerful incentive for long-term sustainable use of the stock (Costello *et al.*, 2008; Hilborn *et al.*, 2005).

(ii) Illegal, unreported and unregulated (IUU) fishing has been identified as a major contributing factor to the worldwide collapse of fish stocks (Ainsworth and Pitcher, 2005; Berkes *et al.*, 2006; Le Gallic and Cox, 2006; Pitcher *et al.*, 2002; Sumaila *et al.*, 2006; Vince, 2007). Aside from allocating rights, setting fines and taking legal action against offenders, countries have implemented several strategies to combat IUU. Typically, these measures consist of a Monitoring, Control and Surveillance (MCS) network comprising Fishery Inspection Patrol boats and personnel, Fishery Observers, Port State Control measures, and Vessel Monitoring Systems, to name but a few. In additional measures to deter IUU, many countries are exploring regional cooperation across states to allow for the joint prosecution of offenders

(Erceg, 2006). In 2001, many countries signed the International Plan of Action to Prevent, Deter and Eliminate IUU Fishing (FAO, 2001).

(iii) Marine Protected Areas (MPAs) have long been advocated by biologists and conservationists as effective fisheries management tools (Clark, 1996). Contrasted to single-species conservation using the more traditional input and output measures (size limitations, gear restrictions, etc.), MPAs promote the restoration of natural processes, as well as the sustainability of biodiversity and fisheries resources (Attwood *et al.*, 1997). In this manner, enhanced fisheries resources in such sanctuaries may spill-over into neighbouring areas where exploitation is authorised, effectively leading to improved catches (Degnbol *et al.*, 2006; Roberts *et al.*, 2000). MPAs have rapidly become a mainstream tool for fisheries management, and many forms of MPAs have evolved, ranging from highly protected to multi-use areas.

(iv) Other less commonly employed, although emerging, fisheries management tools are certification schemes (eco-labelling; Jacquet and Pauly, 2007), artificial reefs, stock enhancement and ranching.

Despite the broad suite of contemporary management tools available to fisheries managers for the control of fisher behaviour and motivation, capture fisheries worldwide are perceived to be in more of a state of crisis than ever before (Berkes *et al.*, 2006; Castilla and Defeo, 2005; Jackson *et al.*, 2001; Myers and Worm, 2003; Pauly *et al.*, 1998; Pauly *et al.*, 2002; Worm *et al.*, 2006). The majority of the world's fisheries are suffering from the effects of overinvestment and declining resources (FAO, 2004; FAO, 2007). This, in turn, has resulted in much criticism and debate about the suite of tools employed in both conventional and rights-based fisheries management:

(i) At the end of the previous century, Caddy (1999) observed growing concern for the uncertain effectiveness of most fisheries stock assessment approaches. Modelling and estimation of MSY required too many assumptions and reliable information was difficult to obtain. However, this concern was translated into the introduction of risk analysis and evaluation, the precautionary principle for uncertainty, and target and limit reference points to avoid undesirable states of the stock[4] (Caddy, 1999; Garcia, 1994). Many conservationists have also widely advocated the implementation of more MPAs as fisheries management tools, to serve as a back-up mechanism to the scientific assessments, and to ensure resource recruitment even if the stock was overfished.

[4] The FAO Code of Conduct for Responsible Fisheries adopted the precautionary principle, and shifted MSY to an upper limit which is not a desired target (FAO, 1995).

(ii) Many fisheries still rely solely on catch restrictions and/or limited entry without individual (or group) harvest allocations (e.g. license limitations). Conventional management measures are based on the theory that catch restrictions result in sustainable fisheries. However, given that fisheries resources have been declining, traditional input and output controls such as TACs, TAEs, gear restrictions, size of species, and so forth, have become increasingly stringent in a desperate attempt to conserve the resource. Many have argued that this, in combination with non-existent or very poorly defined limited access systems, has exacerbated the race for fish and has created perverse incentives among fishers (for example: high bycatch, discards and high-grading, habitat damage, etc.; Fujita and Bonzon, 2005; Turner *et al.*, 1999). Furthermore, more traditional input and output controls did not generate economic efficiency. Instead, these measures promoted overcapitalisation and, above all, they did not achieve resource conservation in the country's *de facto* common property: the EEZ (Caddy, 1999; Gordon, 1954).

(iii) Most countries pay the costs of fisheries management from taxpayer revenue rather than charging the users of the resource the costs of administration (Virdin and Schorr, 2001). As a result, large amounts of potential resource rents are dissipated (World Bank, 2008). Many have also highlighted governmental subsidies of fisheries as a primary cause of excess fleet and overfishing (Pauly *et al.*, 2002).

(iv) Despite their widespread acclaim (Costello *et al.*, 2008; Pearse, 1992), progressive rights-based fisheries management using ITQs has received much disapproval from social scientists and fishing communities. The primary reason for this is that the ITQ system can result in the concentration of fishing rights, and thus has the potential to remove an important part of the economic base from communities (Helgason and Palssón, 1998; Jennings, 1999; McCay, 1995). The social justice of the system has been called into question: ITQs would render a public and common property resource – i.e. the fish – as private property (Anderson, 1995; Hannesson, 2005). Supporters of the ITQ system have countered this by charging users for access to the public fish resources; the 'resource rent' that is generated can improve the distribution of income and recover the cost of administration, research and control (Hilborn *et al.*, 2005; Grafton, 1995). As such, ITQs are use rights and not private property rights (Bromley, 2005; Hannesson, 2005).

(v) While non-compliance to imposed fishery regulations has, and still is largely being dealt with by law enforcement, several authors have argued that it is not only the symptoms of IUU

that need to be addressed, but more importantly, the underlying drivers (Hatcher *et al.*, 2000; Hauck, 2008; Nielsen, 2003).

(vi) MPAs have been seen as failing their management objectives (Alder, 1996), and have been opposed frequently by consumptive users. MPAs were being advocated as a successful fisheries management tool, however, concerns were raised that the closure of certain areas would merely redirect fishing effort to neighbouring areas and lead to overexploitation (Degnbol *et al.*, 2006). In addition, the conventional design of MPAs has in the past not been regarded as being effective for the protection of migratory species (Boersma and Parrish, 1999; Robinson, 1992). More importantly, social scientists also questioned the social objectives of MPAs, particularly when proclaimed in areas where fishing communities have a long-standing fishing tradition (Jameson *et al.*, 2002; Jentoft *et al.*, 2007; Sunde and Isaacs, 2008).

Discussions surrounding 'target resource orientated' top-down management through the use of tools such as MPAs, MCS and especially use rights such as IFQs and ITQs have much older origins in fact. Criticism of command and control type management by the state already started several decades ago with a debate initiated by social scientists on assumptions regarding common property and the management of common property resources. In the views of Hardin (1968) and Gordon (1954), and for many authors and fisheries managers after that time, fisheries resources were un-owned common property that required the allocation of private or state property rights for effective management. Resources either needed to be privatised or controlled by central government with access rights to ensure sustainable use (Hauck and Sowman, 2003) and economic efficiency. The oceans were thus considered to be under an open access regime (Bromley, 2005; Feeny *et al.*, 1990; Gibbs and Bromley, 1989). This assumption spurred the development of large body of literature on common property-based natural resource management (Agrawal, 2001; Berkes, 1989; Ostrom, 1990). While it is not the purpose here to review literature on common property theory, in essence, the aforementioned authors and many others recognised that common property resources could be owned collectively by a defined group of people (when under a communal property regime), and managed sustainably without intervention by the state or private property rights (Hara, 2003; Jentoft and McCay, 1995; van der Schans, 2001). Moreover, these authors set out to provide case studies on the management of natural resources in this context. This capacity to self-organise, self-regulate and to manage natural resources locally, including fisheries, was and is still today demonstrated in a large number of case studies typically focused on locally-situated small user groups and communities (Agrawal, 2001; Lobe and Berkes, 2004). In addition, it has also spurred an era of donor funded community-based natural resource management (CBNRM) projects (Leach *et al.*, 1999; Martin, 2001;

Ruddle, 1998; van Mulekom, 1999). Evidence gathered through research and CBNRM projects indicated that success in the regulation of resources was not universally associated with any particular type of property rights regime. Communal property, private property and state property had all been associated with success and failure (Baland and Platteau, 1996).

The mounting research work undertaken in fishing communities had also spurred increased attention to the plight of small-scale fishers. The above mentioned fisheries management tools had been developed primarily to deal with the large-scale commercial fisheries. However, many small-scale fisheries, especially those in developing countries, were still under a 'no-management' approach, in principle, by the state (Béné *et al.*, 2007). Nevertheless, it had become clear that small-scale fisheries provided income or livelihood to millions of people, and that their total catch was close to the total world commercial catch (Béné *et al.*, 2007; Berkes *et al.*, 2001). This provided a particular management challenge to the fisheries authorities (such as in South Africa): how could small-scale fisheries fulfil their potential as engines of social and economic development (Andrew *et al.*, 2007)? New management tools and approaches needed to be developed.

Therefore, in the last two decades, CBNRM has received increased acceptance as a new paradigm in resource management (Hara, 2003). CBNRM was also translated into a fisheries management tool (Degnbol *et al.*, 2006) and absorbed in the overarching rights-based management approach to fisheries. At the same time, the discourse and research around CBNRM also led to the rediscovery of community-based exclusive fishing rights, called traditional marine tenure or Territorial User Rights Fisheries (TURFs). These were subsequently applied in a variety of contexts, predominantly in the management of sessile marine species (Arbuckle, 2000; Defeo and Castilla, 2005). The Chilean 'Areas for the Management and Exploitation of Benthic Resources' are a well cited example of TURFs wherein the local small-scale fishers have exclusive access rights (McClanahan and Castilla, 2007).

The recognition of CBNRM and TURFs by state fisheries authorities in certain cases where control and management rights could be assigned to the community, satisfied many social scientists as fisheries management had now re-gained some social objectives and issues of equity had been put above or alongside economic efficiency. These new types of tools within the fisheries manager's toolbox better reflected the social, socio-economic and institutional context within fishing communities.

However, where it was evident that CBNRM was not working (Blaikie, 2006), and in an attempt to take on the best aspects of state control, private and communal property, new management methods were being investigated. It was recognised that a more dynamic partnership was needed between the state, local fishers and the communities (Anon., 1996). This saw the advent of 'co-management' in the 1980s, defined as the sharing of management responsibility between

government and organisations of resource users (Jentoft, 1989). Co-management is seen as a compromise between government concerns for efficient resource utilisation and protection, on the one hand, and resource users' concerns for equal opportunities, self-determination and self-control, on the other (Pomeroy *et al.*, 2001). Co-management is not as informal as community-based management is; it requires users to establish organisations with formal leadership and an executive staff. But this leadership is participatory rather than hierarchical, and is as far as possible, de-centralised rather than centralised. In this way, co-management differs from management carried out by state agencies (van der Schans, 2001). Co-management thus grants users a formal role in fisheries management and improves legitimacy of the system[5] as participants believe in the system of management (Jentoft, 1989). In combination with the allocation of individual or community property rights, this creates incentives for local protection and monitoring (Berkes *et al.*, 2006). From the state's perspective co-management is eventually anticipated to decrease the cost of decision-making as management responsibilities are outsourced to user groups (Degnbol *et al.*, 2006). However, at first, co-management probably increases costs, as decisions must be facilitated by the state or another agency, and capacity needs to be built at several levels both within government and fishing communities (Nielsen *et al.*, 2004).

Today, examples of co-management have been widely documented, from studies generating lists of conditions under which co-management is likely to achieve sustainability (Pomeroy *et al.*, 2001), to statistical, comparative and case study approaches (Wilson *et al.*, 2006). Even more so than CBNRM, co-management has been added to the fisheries manager's toolbox and applied to the management of various types of use rights such as IFQs, TURFs and Community Quota's (Jentoft, 2005; Jentoft and McCay, 1995; Nielsen *et al.*, 2004; Nielsen and Vedsmand, 1999).

In conclusion, over the last two decades, many resource economists have argued that rights-based management by the state is the solution to fisheries problems, and they have advocated widely for 'fisheries reform' and 'privatisation of the last commons' through IFQs and preferably catch shares such as ITQs. The reason for this is that these use rights provide more secure and predictable access by fishers to marine fish stocks in coastal waters and prevent fisheries collapse (Costello *et al.*, 2008; Hilborn, 2007a; Huppert, 2005; World Bank, 2008). ITQs would provide strong incentives for the fishers and the fishing industry to sustain the resources, as they have an asset-value that is related to the market assessment of the sustainability of the resource (Hilborn *et al.*, 2005).

[5] Both CBNRM and co-management make space for local ecological and fisher knowledge to complement science-based assessment of the resource.

However, this predominantly top-down approach, particularly with its tendency to privatise fishing rights, has been criticised greatly by fishing communities, advocacy groups, and the social science community. Therefore, over the last few decades, fisheries management has been influenced by the contribution of several academic disciplines, each with their own perspectives, concerns and solutions (Degnbol *et al.*, 2006). Use rights such as TURFs and Community Quota's, and alternative management approaches such as CBNRM and co-management were rediscovered and promoted, and have earned their credentials following integration into the contemporary fisheries management toolbox. The inclusion of social objectives in management decision-making was long overdue. Already in 1987, L.G. Anderson stated that 'Fisheries management is about management of people, not just management of fish' (Anderson, 1987).

1.1.1. 'Revitalised' rights-based management as an answer to the fisheries crisis

Reviewers argue that all of these approaches or tools (along with ITQs) are merely ways to dedicate access privileges but differ primarily in the manner in which access privileges are defined (Grafton *et al.*, 2006; Grafton *et al.*, 2008; Hilborn *et al.*, 2005; Hilborn, 2007a). What has thus far been considered as fisheries management failure by some and success by others, has largely reflected the conflicting objectives of different stakeholders, i.e. proponents of economic efficiency, versus those more concerned about jobs, social equity and community impacts (Hilborn, 2007b)[6]. As such, it is possible to interpret the arguments over ITQ programs primarily around the legitimacy of allocation to individuals, cooperatives and communities or other entities:

Proponents of private property rights regimes argue that the contemporary fisheries crisis is a result of the inadequate design of the rights to create incentives among fishers to conserve the resource (Costello *et al.*, 2008). It is argued that only catch shares such as ITQs would create the right incentives (Fujita and Bonzon, 2005). In the opinion of the proponents, ITQs have been the subject of much criticism mainly because they have been given away, rather than auctioned or sold, leading to substantial windfall profits to receiving individuals (Macinko and Bromley, 2002).

Opponents of ITQs support community development quotas in which fishing rights are given to communities rather than to individuals (Grafton *et al.*, 2006; Grafton *et al.*, 2008). Other opponents of ITQs embrace fishery cooperatives, territorial use privileges, and community-based management, as community and group rights can improve management outcomes with collective action (Wingard,

[6] Charles (1992) also noted the three often conflicting fishery 'world views': as the conservation, rationalisation and social/community paradigm.

2000). In essence, many fishing communities and non-governmental organisations (NGOs) oppose ITQs (and even IFQs), as states have allocated these property rights in areas or communities where other types of use rights would have been more appropriate to the socio-economic context.

As a result, the different objectives (biological, social, economic and political) prioritised by different stakeholders, have given rise to the different fisheries management tools known today (Degnbol *et al.*, 2006; Hilborn, 2007a). Reviewers argue that the key to achieving sustainability in a fishery is, in essence, dependent on incentivising the collective – from local communities to national fleets – to participate actively in self-regulation of the resource (Hilborn *et al.*, 2005). The main objective needs to be the elimination of the race to fish, and to bring fisheries into ecological, economic and/or social wellbeing (Hilborn *et al.*, 2005). Reviewers argue that within a rights-based fisheries management framework, this can be achieved through a methodical allocation of withdrawal, alienation and management or exclusion rights. In this context, property rights can be very flexible institutions for balancing efficiency, equity and stewardship issues (Alcock, 2002), and form the basis for successful fisheries management. Rights-based management[7] as an institutional framework can facilitate the integration of various tools originating from different academic disciplines into practical fisheries management (Brady and Waldo, 2009; Hilborn *et al.*, 2005), and rights can take on many forms; from individual harvesting rights, community or group-based rights and territorial user rights (Huppert, 2005).

Rights-based theories have also shaped the manner in which South African fisheries are being managed. Thus, an assessment needs to be made of the individual rights-based framework that the South African fisheries authority has adopted, and for example, the manner in which this framework can address the challenges that need to be overcome in the development and implementation of rights in traditional fisheries.

1.1.2. New understandings: from fishery systems to adaptive governance

Over the last decade, the involvement of various research disciplines (biological, economic, social and political) in fisheries science and management, have also contributed to a growing multi-disciplinary representation of fisheries as 'fishery systems' (Charles, 1995). Charles (2001) describes fishery systems as 'as webs of interrelated, interacting ecological, biophysical, economic, social and cultural components, not as fish separate from the fishers...'. A fishery system can be broken down into three interacting subsystems: (i) the natural system, (ii) the human system, and (iii) the fishery management system (Charles, 2001). The natural system consists of the fish, the ecosystem and the

[7] The Code of Conduct for Responsible Fisheries also emphasises fisheries reform through limited access (FAO, 1995).

biophysical environment. The human system comprises the fishers, the post-harvest sector and consumers, fishing households and communities, and the social/economic/cultural environment. The fishery management system encompasses fishery policy and planning, fishery management, fishery development, and research (Charles, 2001).

Therefore, fishery systems typically face the complexities of: (i) multiple and conflicting objectives; (ii) multiple groups of fishers and fishing fleets and conflicts among them; (iii) multiple post-harvest strategies; (iv) complex social structures and socio-cultural influences on the fishery; (v) institutional structures, and interactions between fishers and regulators; and (vi) interactions with the socio-economic environment and the larger economy (Charles, 2001). A fishery system approach is better at incorporating aspects from across the fishery system and beyond (Charles, 2005). Using a systems approach, McClanahan and Castilla (2007) further go on to say that overfishing has been the result of the interacting economic, technological, legal, political, socio-cultural, and scientific drivers. In turn, the fisheries crisis has resulted in complex ecological, social and economic crisis. While a narrow view of a fishery system as fish stock and a set of fishers (industrial fleet) may be suited to a fishery on a single stock in the open ocean, this is not the case for coastal and/or small-scale fisheries. For the latter, it is certainly as important to understand the human aspects of the system as the biological ones (Charles, 2005).

Two approaches that have been used in attempts to understand and manage fisheries (and other natural resources) as holistic fishery systems are provided as examples:

(i) The work of Charles (2001) on fishery systems and his representation of the 'natural subsystem' stems from an increasing consideration among scientists and environmentalists of the resource as a part of the broader ecosystem. Fisheries science research had made clear that apart from the indirect ecological impact of fisheries through the alteration of the abundance and structure of the target population, fisheries also had direct ecological impacts (habitat destruction, bycatch, trophic cascades, etc.; Cochrane, 2000). Societal concerns subsequently forced fisheries management objectives from the maximisation of yield and employment to increased emphasis on ecosystem protection (Hilborn, 2007a). This gave rise to 'Ecosystem Based Fisheries Management' or the 'Ecosystem Approach to Fisheries' (EAF) as a tool to solve fisheries problems (Garcia and Cochrane, 2005; Pikitch *et al.*, 2004). Contrary to the mere promulgation of additional MPAs (Murawski, 2007), EAF management emphasises the importance of maintaining ecosystem health, and manages both target and non-target species. Within EAF, scientific advice to management expands the precautionary approach and risk analysis to ecosystems. Scientific assessments move away

from single-species MSY determination alone and include ecosystem-based indicators into the analysis and recommendations to managers (Caddy, 1999; Garcia and Charles, 2008; McClanahan and Castilla, 2007). While many countries have adopted EAF in their national fisheries policies, many questions have been raised about the feasibility of implementing EAF, particularly with regard to conflicting social and economic objectives of successful fisheries management. More recently, efforts have been made to provide a better understanding of the role of economic, institutional and socio-cultural components within the EAF (De Young *et al.*, 2008). In a United Nations Food and Agricultural Organisation (FAO) report, De Young *et al.* (2008) argue that 'target resource orientated management' does not allow much consideration of the broader ecosystem, let alone the human aspects of the fishery, in the management decision-making process. It is argued that the application of EAF must be holistic, integrated, participatory and adaptive; and that the human dimensions (political, legal, cultural, social, economic and institutional aspects) of fisheries need to be considered carefully for the development of institutional arrangements for EAF, and the improvement of fisheries management (De Young *et al.*, 2008). The use of both quantitative and qualitative indicators is proposed for the assessment of fisheries. As such, the EAF has become yet another approach to look at fishery systems in a more holistic sense, and to devise management strategies accordingly.

(ii) With their roots in challenging the 'paradigm of MSY' – adopted in natural resources policy and management in general – social and environmental scientists have, over the past 50 years, developed alternative theories of understanding ecosystems as complex, unpredictable, dynamic systems (Folke, 2006). Using theories to further address social issues such as property rights regimes and other socio-economic problems, these scientists began to contemplate human-ecosystem interactions as complex social-ecological systems (Folke, 2006). While the utility of 'command and control' resource management has been limited in "this complex and changing world", it was advocated that only more adaptive styles of management would be able to respond to complex social-ecological systems (Armitage *et al.*, 2008). More specifically, one strategy that explicitly fosters collaboration and learning is 'adaptive co-management'. The term 'adaptive' refers to a structured process of 'learning by doing' and adapting to risk and uncertainty, rather than attempting the often impossible task of quantifying these variables (Mahon *et al.*, 2008; Olsson *et al.*, 2004; Walters and Holling, 1990). As it has been argued that narrow perspectives of fisheries management have created tunnel vision and standardised technical fixes to complex and diverse management problems (Degnbol *et al.*, 2006), authors have increasingly looked at the benefits of understanding and

managing fisheries as complex economic, ecological and social systems (Brady and Waldo, 2009; Gibbs, 2009; Mahon *et al.*, 2008; McClanahan *et al.*, 2008). The adaptive management concept has already been recommended in EAF (De Young *et al.*, 2008); it is likely that this alternative approach to conventional and top-down fisheries management will become increasingly endorsed and adopted in the near future, particularly in the small-scale fisheries arena (Mahon *et al.*, 2008; McClanahan *et al.*, 2008).

Recently, substantial attention has also been paid to the analysis of the 'governance' of fishery systems. In the last century, a top-down fisheries management approach, based on scientific information gathered in a centralised control, was the most common institutional arrangement followed by fishery management bodies. However, as highlighted above, this has been questioned increasingly as its deficiencies were evident (Castilla and Defeo, 2005, McClanahan and Castilla, 2007). Growing recognition of the interaction between the 'human subsystem' and the 'management subsystem' (Charles, 2001), saw the adoption of co-management as an effort to increase participation and decentralisation, and change the paradigm of top-down management. Despite co-management having had a major influence on contemporary fisheries management, it has often only resulted in the revision of the set of 'technical' fisheries management tools employed by fisheries managers in their relationship with the fishers/communities, without meaningful re-evaluation of the manner in which fishery systems are governed. Governance is seen as the whole of public and private interactions taken to solve social problems and create societal opportunities. It includes the formulation and application of principles guiding these interactions and care for institutions that enable them (Kooiman *et al.*, 2005). In the words of Grafton *et al.* (2008) governance is "the sum of legal, social, economic and political arrangements used to manage fisheries...". Thus, governance includes policy making and management decision-making, with simultaneous recognition of issues outside of the fisheries sector. Analysis of fisheries governance in the context of interconnected social and ecological systems and their complexity has seen the emergence of the 'interactive governance' theory and proposal (Kooiman *et al.*, 2005). Whereas the co-management approach is proposed in relation to the delegation of management responsibility to resource users' organisations in particular, the governance proposal has been developed to take governing capacities of societal groups and governments into account more generally (Kooiman *et al.*, 2005). As such, the interactive governance theory aims to transform fishery systems into governance systems that learn, respond and adapt to change (Kooiman *et al.*, 2005) – much like adaptive co-management of social-ecological systems – and promotes principles of stakeholder participation in an informed approach to fisheries reform. While the proposal has already been promoted in the fisheries literature (Jentoft, 2007;

Kooiman *et al.*, 2005), it remains to be seen how it will affect rights-based fisheries management thinking and practice.

1.2. Post-apartheid South African fisheries and the fisheries management toolbox

In 2004, when the research in this dissertation was first conceptualised, it was evident that South African marine fisheries management had been following the 'conventional', 'target resource orientated' and 'rights-based' management paradigms as observed within fisheries management practice worldwide. In the late 1990s, the national fisheries authority in South Africa, a branch within the national Department of Environmental Affairs and Tourism (DEAT) named 'Marine and Coastal Management' (MCM), had the legal authority to manage the marine resources of the EEZ for the benefit of the country under the regulations of the Marine Living Resources Act (MLRA; Act 18 of 1998; Republic of South Africa, 1998a). MCM headquarters were based in Cape Town[8], with few satellite offices in the four coastal provinces of the country that were mainly tasked with MCS duties (Figure 1.1). Within the branch, fisheries scientists, who for the most part were biological scientists, advised management on MSY, TACs, TAEs and input controls such as size limits and bag limits.

Under the MLRA, which is current policy, the Minister of Environment Affairs and Tourism has the power to declare MPAs or areas dedicated for specific fishing regulations (Republic of South Africa, 1998a). The Minister can proclaim these areas for the conservation of biodiversity, the management of fisheries (to rebuild stocks, enhance the abundance of stocks and to provide areas for research) or to reduce any conflict that could arise in an area due to competing fishing activities (Republic of South Africa, 1998a). With the establishment of the Tsitsikamma National Park in 1964, South Africa had already become one of the first countries in the world to implement no-take MPAs. In 2004, South Africa counted approximately twenty MPAs or no-take zones managed by the fisheries authority (Figure 1.1).

During the apartheid era, commercial fishing rights had been vested largely in a small number of white-owned companies and rights had been allocated at little cost to the rights-holders (Sauer *et al.*, 2003). The national fisheries authority was created to manage these fisheries with catch restrictions in a fishery sector with limited players and entrants[9] (Kleinschmidt *et al.*, 2003). However, a large informal and small-scale fishery existed that was essentially unmanaged (Clark *et al.*, 2002). With the new democratic dispensation of 1994 and the enactment of the Constitution in 1996, which

[8] The fisheries authority is based in Cape Town as historically, most commercial fisheries operate in the western and southwestern parts of South Africa's EEZ.

[9] Fisheries management prior to 1994 has been well documented by van Sittert (2002; 2003).

introduced a new human rights-based socio-political environment, many expectations had been raised. Small-scale fishers had expectations of a new South Africa that would redress past injustices and promote substantive equality (Witbooi, 2006). The fisheries authority had to find a way to address the under-representation of 'historically disadvantaged individuals[10]' (HDIs) or companies in the commercial fishing industry while maintaining economic stability and promoting sustainability (Kleinschmidt *et al.*, 2003). One of the objectives of the MLRA was "the need to restructure the fishing industry to address historical imbalances and to achieve equity within all branches of the fishing sector" (Republic of South Africa, 1998a). During the 1990s, negotiations between government and the formal and informal fisheries sector led to the consensus that an individual fishing quota system would form the rights-based framework for achieving the goals of the MLRA (Hersoug and Holm, 2000). As such, ever since the promulgation of the MLRA, the fisheries authority has embarked on a process of transforming the commercial fishing industry through the re-distribution of rights: first through the allocation of yearly fishing rights to individuals or other legal entities who met the new criteria; and in 2001/2, with the allocation of medium-term rights. In 2004, plans were being made to initiate the allocation of long-term fishing rights in the commercial fisheries sector, and render the rights transferable – effectively the implementation of ITQs. Meanwhile recreational fishing with specific bag or size limits was open to anyone who held annual licenses obtained for a small fee from post offices across the country.

The transformation of the commercial fishing sector, which was largely based along the west and south-western coast of the country - except for a few fishing ports along the east coast (Branch and Clark, 2006), had been regarded by MCM as an opportunity for the small-scale fishers in this region to enter the formal fishing sector. Along the east coast, in both the Eastern Cape and KwaZulu-Natal Provinces, large parts of the coast were still inhabited by traditional rural communities, where no larger-scale commercial fishing activity occurred, but where many inhabitants had relied on small-scale fishing as a source of food for several thousands of years (Bigalke, 1973; Feely, 1987; Hockey *et al.*, 1988; Lasiak, 1992). More recently, these communities had begun to sell their catch to the growing tourism market as a source of livelihood (Fielding *et al.*, 1994).

In the MLRA, these fishers had been recognised as 'subsistence fishers': "a natural person who regularly catches fish for personal consumption or for the consumption of his or her dependents, including one who engages from time to time in the local sale or barter of excess catch, but does not include a person who engages on a substantial scale in the sale of fish on a commercial basis" (Republic of South Africa, 1998a). A specific policy for subsistence fisheries was being developed, and

[10] Historically Disadvantaged Individual means a South African citizen who, due to the apartheid policy that was in place, could not vote in national elections.

it had been alluded that those fishers in the Western Cape who did not meet the commercial rights allocations would fall under this category too (Isaacs, 2004). Meanwhile, annual exemptions to the MLRA to undertake subsistence fishing were distributed across the country.

While approaches such as CBNRM had been advocated and adopted in land-based natural resource management projects in communities across the country, only co-management had been envisaged thus far as a possible alternative to top-down management of the newly recognised sector of subsistence fishers (Andrew, 2001; Harris *et al.*, 2002). Co-management was not endorsed in the MLRA; only the need to issue permits to subsistence fishers. However, a co-management process had been recommended by the Subsistence Fisheries Task Group, appointed in 1999 to advise on the management of subsistence fisheries. While the fisheries authority had not yet embraced the concept of co-management, several co-management projects, mainly facilitated by research organisations or nature conservation agencies, and independently from MCM, had been initiated in fishing communities along the coast (Hauck and Sowman, 2001; Hauck and Sowman, 2003). The most successful co-management initiatives were in the province of KwaZulu-Natal, where the provincial nature conservation department had obtained the mandate from MCM to implement a subsistence fisheries programme and several local co-management structures had been set up to assist the identification of fishers, and the monitoring of catches (Harris *et al.*, 2003).

Increasingly MCM had also embraced the need to consult more actively with the fisheries sector. Consultative processes had been initiated during the policy development process in the late 1990s (Hersoug and Holm, 2000), and subsequently with communities and other interested parties when a range of public meetings were held in 2001/2 in order to solicit a proposal for the improvement of rights allocations in the medium-term (Kleinschmidt *et al.*, 2003). Moreover, for certain commercial fisheries, formal co-operation had been sought with industry associations for on-going research and management advice (Hutton, 2003). In 2003, the abalone commercial fishery was also completely re-structured with a policy based on TURFs and a co-management process (DEAT, 2003).

However, despite the process of fishing rights reform, the fundamental management structure and approach of the MCM organisation remained largely unchanged. Both scientists and managers seemed to poorly understand the social, political and global economic forces that were shaping the fisheries sector in democratic South African society. As a consequence, the organisation appeared increasingly unable to deal with the rapid changes taking place in the various fishery sectors. Notably, in the Eastern Cape, a number of new challenges outside the conventional fishery management framework were unfolding that resulted in the newspaper headlines.

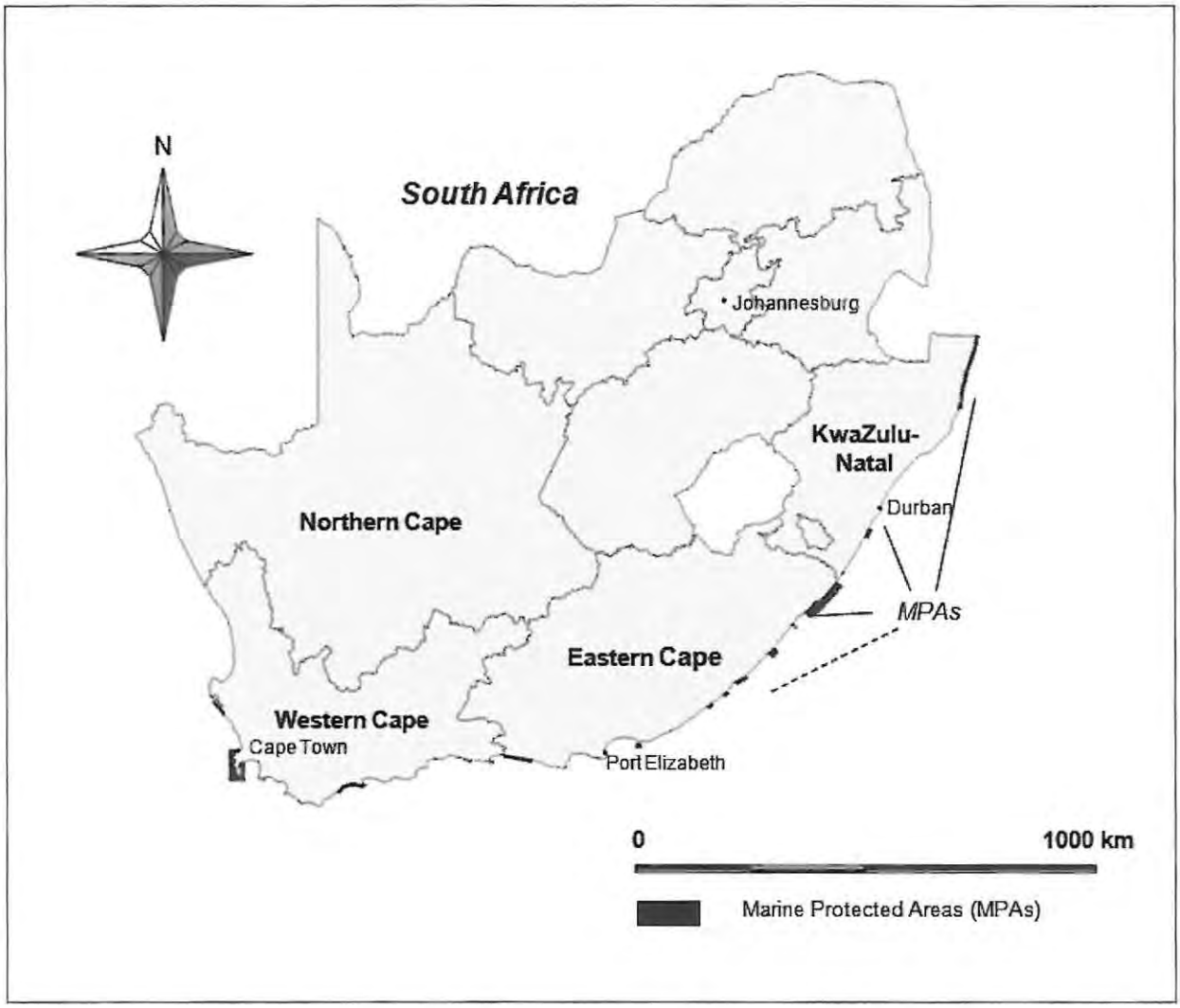

Figure 1.1. **Map of South Africa illustrating the four coastal provinces and the Marine Protected Areas.** The MPAs shown had all been promulgated by 2004. Aside from the traditional line-fishery that operates along the entire coastline, the main in-shore fisheries are situated in the Western Cape. Small-scale fishers occur along the entire coast, with a large concentration along the northeast coast of the Eastern Cape. (Line-fishing is defined as the capture of fish with a hook and line in South Africa, excluding the use of long-lines (Mann, 2000)).

1.3. Problem statement and hypothesis

After briefly reviewing the evolution of fisheries management worldwide and in South Africa, it is now possible to revisit some of the newspaper headings shown at the beginning of this chapter and unpack them:

Firstly, the historical concentration of the established fishing industry and associated management personnel was in the Western Cape Province (Britz *et al.*, 2001), and only small-scale fishers from this area could potentially qualify as commercial operators. The very large number of fishers who could qualify as subsistence fishers within the new sector recognised by the MLRA were located along the east coast of the country, in the traditional rural areas. While in the KwaZulu-Natal Province the provincial authority was implementing its subsistence fisheries programme and experimenting with co-management (Harris *et al.*, 2003), institutional capacity to do the same in the Eastern Cape was lacking. Since MCM had never had to contend with the Eastern Cape small-scale fishers before, but having extended its mandate to the management of small-scale fisheries, it appointed a team of extension officers who were based in the province. They were tasked with identifying fishers, issuing permits and setting up co-management structures. While it was stated that co-management was being implemented, in reality, the implementation capacity on the ground was so low that most extension service efforts went into the allocation of fishing permits. More concerning, was that given MCM's historical focus on quota based commercial fisheries, there were no signs that their managers understood what was required to engage effectively with the small-scale fishers in a co-management process. As with commercial fisheries, their management efforts focused on the allocation of permits for single species, whereas rural fishers along the coast traditionally harvested a basket of different resources as a household livelihood strategy (Clark *et al.*, 2002). MCM and DEAT had also stated that the issuing of permits would provide much needed poverty alleviation while at the same time achieve sustainable resource use (DEAT, 2002), however it was reported that many fishers had not received their permits, and that very little compliance for the regulations was observed.

Secondly, in the urban areas of the Eastern Cape it had been reported that an illegal abalone fishery was developing (Britz *et al.*, 2002). A large illegal abalone fishery had already developed in the Western Cape and had prompted MCM to expand its Monitoring, Control and Surveillance (MCS) network and operations for both inshore and offshore fishing activities (Hauck and Hector, 2000; Hauck and Sowman, 2003; Hauck and Sweijd, 1999). However, in the Eastern Cape Province where

MCS capacity was historically low, IUU abalone fishing activities had even been observed in MPAs[11] neighbouring urban areas.

In summary, the challenges faced by the fisheries authority in the Eastern Cape were numerous:

- MCM management capacity was based in the Western Cape Province, and was set up to deal with large-scale commercial fisheries. MCM did not have the institutional capacity to deal with small-scale fishers and management decision-making had mostly been advised by fisheries scientists.

- There were few commercial fisheries in the Eastern Cape that could be transformed and accessed by HDIs, including small-scale fishers. During the fisheries reform process the fisheries authority was also mostly pre-occupied with the commercial allocations, and very few resources were allocated to deal with small-scale fishers.

- There were many small-scale fishers in the rural areas of the Eastern Cape who were hoping for socio-economic upliftment in the new democratic dispensation. The fisheries authority had adopted an individual rights-based framework for the commercial fisheries, and was extending this framework to subsistence fisheries. The MLRA obligated MCM to identify and issue permits to all classes of fishers, including subsistence fishers in the Eastern Cape. This prove to be a massive logistical task that undermined the effectiveness of the fisheries authority in delivering on its mandate.

- MCM MCS capacity in the Eastern Cape was very low but informal and illegal fishing activity was steadily increasing in both urban and rural areas.

- There was very little knowledge regarding the status of the targeted resources and the behaviour of informal and illegal fishers of the Eastern Cape. However, the scientific arm of MCM had become understaffed as a result of resignations, and no research programme was established to support and inform the formalisation of management arrangements for the Eastern Cape subsistence fishery. In addition, all fishery managers and scientists were based in the Western Cape, with only MCS and extension personnel present on the ground in the Eastern Cape.

[11] MPAs were also proclaimed in remote rural areas and have been contested by local communities and trespassed into at night in order to harvest the rocky shore invertebrate resources such as mussels (Palmer *et al.*, 2002).

Having unpacked these symptoms using an understanding of conventional fisheries management tools and approaches employed worldwide, it was becoming apparent that the 'target resource orientated' and 'rights-based' fishery management framework also employed for South Africa's small-scale fisheries was inadequate. More importantly it appeared that the underlying problem was rather one of broader fisheries governance and inappropriate governance objectives and not merely a failure of the technical and regulatory management measures. As such the following hypothesis was proposed to underpin the research undertaken in this thesis:

The apparent symptoms of failure of technical tools for the management of small-scale fisheries in the Eastern Cape are in fact due to an underlying governance problem.

1.4. Aims and objectives

While many authors had, or were in the process of, reviewing specific aspects of South African fisheries management and governance, such as access rights, compliance, MPAs or co-management and participation, this study set out to understand how the South African fisheries authority was utilising its fisheries management toolbox and governance mechanisms to deal with the emerging biological, economic and social challenges of post-apartheid fisheries in the Eastern Cape Province. While the management of commercial fisheries around the world had already been well analysed, world-over, questions were being raised as to the best manner of bringing the small-scale fisheries into a sustainable use framework. While this was a global challenge, the specific context within South Africa presented an opportunity to contribute to the knowledge base on small-scale fisheries governance.

Research was conducted through a series of case studies looking at the harvesting of high-value inshore marine resources such as abalone and spiny lobster in both urban and rural areas. These fisheries were selected for this thesis as they had been characterised as being considerably data-deficient (both biological and socio-economic), although they were a priority for fisheries management and development (Britz *et al.*, 2002; Fielding, 2001). In essence, this study was motivated by the urgent need for both quantitative and qualitative information, analysis, and feedback into the fisheries policy and governance framework for the Eastern Cape Province. While in every case study the gathering of both quantitative and qualitative data was challenging, and only specific elements of the fishery system that were deemed a priority were looked at, a more comprehensive assessment of the management and governance framework was subsequently undertaken for the province's small-scale fisheries.

Attempts were made to use the various case studies to contribute to the understanding of the observed fisheries problems, and hence to test the hypothesis, as well as to identify new ways of addressing the challenges. As such, the research questions for this research may be summarised as follows (i-iv):

(i) What are the biological and human characteristics of the Eastern Cape's inshore fisheries for high-value resources such as abalone and spiny lobster?

(ii) What is South Africa's fisheries management and governance approach to the inshore fisheries of the Eastern Cape and how is it unfolding? More specifically:
   - Which fisheries management tools are used, and how are they implemented in this setting (inshore, high-value, data-deficient and lack of institutional capacity)?
   - Are the employed tools and the approach that is being followed suited to the context?
   - Is a more participatory governance approach being embraced?

(iii) Is South Africa's fisheries management and governance approach to these inshore fisheries achieving its biological, economic and social goals?
   - What is the effect of the interventions on resource sustainability?
   - What is the response from the markets?
   - What is the effect of the interventions on fisher behaviour, motivations and poverty alleviation?

(iv) How could South Africa's fisheries management and governance approach to the selected inshore fisheries and the small-scale fisheries of the Eastern Cape be improved to achieve biological, economic and social goals?

1.5. Broad research approach

This study was undertaken using an empirical and exploratory case study research approach. As the choice of methodology is context driven for each case study, the various research tools and methods are described in detail in the respective chapters outlined in section 1.6.

In brief, both quantitative and qualitative research methods were utilised in order to understand aspects of each fishery system. The design of the research was therefore largely guided by the understanding of fishery systems as developed by Charles (2001), and described earlier in section 1.1.3. This holistic approach based on systems theory was deemed suitable to test the hypothesis, as it is aimed at looking at fisheries from a biological, human and management perspective and it aims

to highlight the interacting economic, technological, legal, political, socio-cultural, and scientific drivers. Moreover, when employing this approach, one tends to focus on the elements of the fishery system that are deemed essential to solving the perceived challenges and symptoms of ineffective fisheries management. As described above, the 'human' aspects usually lie at the core of these challenges. Therefore, a special emphasis is given to aspects of the human and management subsystem. Moreover, the fishery system approach is also suitable for this thesis since it incorporates elements of two widely used multisectoral research, development or management frameworks: the Sustainable Livelihoods Approach and Integrated Coastal Management (Charles, 2005). In summary, the Sustainable Livelihoods Approach examines human involvement in the fishery within a larger context of households, communities and the broader socio-economic environments (Allison and Ellis, 2001; Charles, 2005). Emphasis is also placed on the institutional process and organisational structures that influence access to livelihood resources. Integrated Coastal Management is an approach or mechanism that is used to manage multiple resources and resource uses (e.g. fisheries and tourism within the wider context of coastal development), and thus highlights the opportunity for economic diversification in fishery-dependent coastal areas (Charles, 2005). The integration of both of these approaches is thus particularly useful when analysing the Eastern Cape Province's small-scale fisheries, as the human aspect seems much more central to managing them. In summary the fishery system theory and approach helps to identify not only the interactions between the resource and the resource users, but it also highlights those interactions from outside the fisheries sector that need recognition when setting policy objectives and deciding on management arrangements. As such it brings the researcher out of the technical fisheries management paradigm, into the fisheries governance realm, which is where this thesis seeks to find evidence for its hypothesis.

While a universal definition for small-scale fishers is still being attempted and no accepted definition has yet been developed (Allison and Ellis, 2001), for this study the broad definition as accepted by the FAO' Advisory Committee on Fisheries Research is used (FAO/Advisory Committee on Fisheries Research, 2004) as it captures the characteristics of the small-scale fishers on both west and east coasts of the country[12]:

> "Small-scale fisheries can be broadly characterized as a dynamic and evolving sector employing labour intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The activities of this subsector, conducted fulltime or part-time, or just seasonally, are often targeted on supplying fish and fishery

[12] In this dissertation, a more specific characterisation is made for the small-scale fishers of the Eastern Cape Province's rural areas.

products to local and domestic markets, and for subsistence consumption. Export-oriented production, however, has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Other ancillary activities such as net-making, boatbuilding, engine repair and maintenance, etc. can provide additional fishery-related employment and income opportunities in marine and inland fishing communities. Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal microenterprises to formal sector businesses. This subsector, therefore, is not homogenous within and across countries and regions and attention to this fact is warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation."

1.6. Thesis outline

In the first case study described in this dissertation, a fishery system approach was used to look at the rapidly growing illegal fishery for abalone based in the urban areas of the Eastern Cape. An attempt was made to quantify fishing effort and understand fishing behaviour, followed by an assessment of the fisheries management tools and strategies employed by MCM and other governmental agencies in their respective efforts to curb the illegal fishery **(Chapter 2)**. The next case study considered the circumstances of rural fishing communities who had begun to shift fishing effort to abalone fishing only, as the sale of their catch on the black market provided them with much needed income. Efforts by government to formalise this fishery under high market demand were analysed, considering that this was also the fisheries authority's first endeavour to actively manage with the province's small-scale fisheries. An attempt at initiating a co-management process was made and is analysed **(Chapter 3)**. The next study documents the process of formalising the lobster fishery in the rural areas. Realising that the abalone resource was limited, and that a much better candidate for poverty alleviation was the sale of the spiny lobster by subsistence fishers, the fisheries authority attempted to formalise this fishery also through catch restrictions, limited access and the licensing of commercial buyers **(Chapter 4)**. Finally, after having looked at management tools employed in both urban and rural abalone fisheries, and the rural lobster fishery, the last case study considers the fisheries governance arrangements in the Eastern Cape. The extent to which participation and co-management were embraced, is analysed. More broadly, this study documented stakeholder responses to MCM's small-scale fishing policy development, and fishers' reaction to the perceived inequity of MCM's management of small-scale fisheries, which culminated in an equity

court order to redraft the small-scale fisheries policy for South Africa **(Chapter 5)**. Following this, general conclusions and opportunities for further work are discussed **(Chapter 6)**.

CHAPTER 2:

Profile of the Illegal Fishery for Abalone (*Haliotis midae*) in the Eastern Cape Province, South Africa: Organised Pillage and Management Failure

2.1. Introduction

Illegal, unreported and unregulated (IUU) fishing has been identified as a major contributing factor to the worldwide collapse of fish stocks (Le Gallic and Cox, 2006; Pitcher *et al.*, 2002). Several abalone fisheries around the world have collapsed or are facing collapse due to unsustainable levels of legal harvesting and increasing levels of IUU fishing for this high-valued commodity. Fisheries departments and management authorities have sought to implement rights-based approaches in the hope of curbing this trend (Vega *et al.*, 2006; Wyner *et al.*, 1977), but with limited success (Mitchell and Baba, 2006). TACs have gradually been decreased in almost every abalone fishery (Heasman, 2006; Huchette and Clavier, 2004; Roberts *et al.*, 2007; Shepherd and Rodda, 2001; Uchino *et al.*, 2004), and some countries with major abalone fisheries have closed their fishery entirely (Daniels and Floren, 1998; Dowling *et al.*, 2004; Karpov *et al.*, 2000; Lessard and Campbell, 2007; Rogers-Bennett *et al.*, 2004). South Africa's abalone (*Haliotis midae*) resource, locally known as 'perlemoen', is under particularly severe pressure from highly organised illegal fishing that has boomed since the 1990s (Hauck and Sweijd, 1999; Tarr, 2000).

For many years, South Africa's abalone commercial and recreational fishery in the Western Cape Province (Figure 2.1) was very stable (Tarr, 2000), but since the mid-1990s traditional management measures to sustain a rights-based fishery have been rendered increasingly ineffective by rampant illegal fishing. Authors such as Tarr (2000) and Steinberg (2005) ascribed the spectacular rise of the illicit abalone trade in the 1990s to numerous factors, including the abolition of restrictive apartheid laws in the early 1990s and the transition to democracy in 1994, which saw the concurrent transformation of state structures including the South African Police Service (SAPS) and the authority responsible for managing fisheries (MCM). Moreover, the weakening of the South African Rand (ZAR) against the United States dollar (USD) in the same period, made the export price of abalone attractive. Contributing to this, weak border control systems allowed illegal product to be exported with ease. Finally, the presence of an established and highly efficient Chinese organised crime network in South Africa promoted the bartering of drugs for abalone.

Aside from measures aimed at combating illegal fishing, the growing illegal harvest also led to measures to reduce legal fishing effort. These included the closure of the recreational fishery in 2003 (DEAT, 2003), the progressive reduction of the commercial TAC, and the closure of the commercial fishery in 2008 (DEAT, 2007a). The introduction of a TURF model in 2003 failed to draw the 302 rights holders into participation in protecting abalone stocks. Furthermore, illegal fishing by members of

the local coastal communities where the rights holders reside, continued to rise. Various state-led compliance efforts failed to halt the rise of illegal abalone fishing (Hauck and Kroese, 2006; Herbig and Joubert, 2002; Steinberg, 2005). By 2007, almost the entire South African abalone catch, estimated to be well over 2000 tons of whole mass (M. Bürgener, TRAFFIC, pers. comm.), was caught illegally – save for the TAC of 75 tons.

In the Eastern Cape Province (Figure 2.1), illegal abalone fishing has followed a similar trend to the Western Cape Province. However, a large-scale commercial fishery was never established as marine resource managers historically believed that the distribution pattern and abundance of the species in the Eastern Cape was too discontinuous and patchy to justify commercial exploitation (Tarr, 2000). A shore-based recreational fishery with daily bag limits did exist and was well established near the urban centres. An initiative in 1998 to allocate experimental commercial quotas in the Eastern Cape coast was halted due to the rising illegal fishing phenomenon. In 2002, a proposed TURF-based management plan was implemented briefly in rural areas where subsistence fishers were targeting abalone. This plan was later terminated due to declining catch rates (refer to Chapter 3). As in the Western Cape, recreational harvesting was halted in 2003. Since 1997, the Eastern Cape has become a major source of supply for the illicit abalone industry as illegal divers have located a substantial abalone resource.

A large illegal and highly organised network developed from the urban centre of Port Elizabeth (the third largest metropole along the coast of South Africa; Figure 2.1), and systematically targeted the species across the entire Eastern Cape for transport inland and export to the Far East. The high Asian demand for abalone fuels this exceptionally lucrative trade, believed to be run by Chinese triads as well as other national and international organised criminal enterprises (Gastrow, 2001; Steinberg, 2005; Willock *et al.*, 2004). The urban centre of East London also experienced an increase in illegal abalone fishing activities, but not to the same extent as Port Elizabeth.

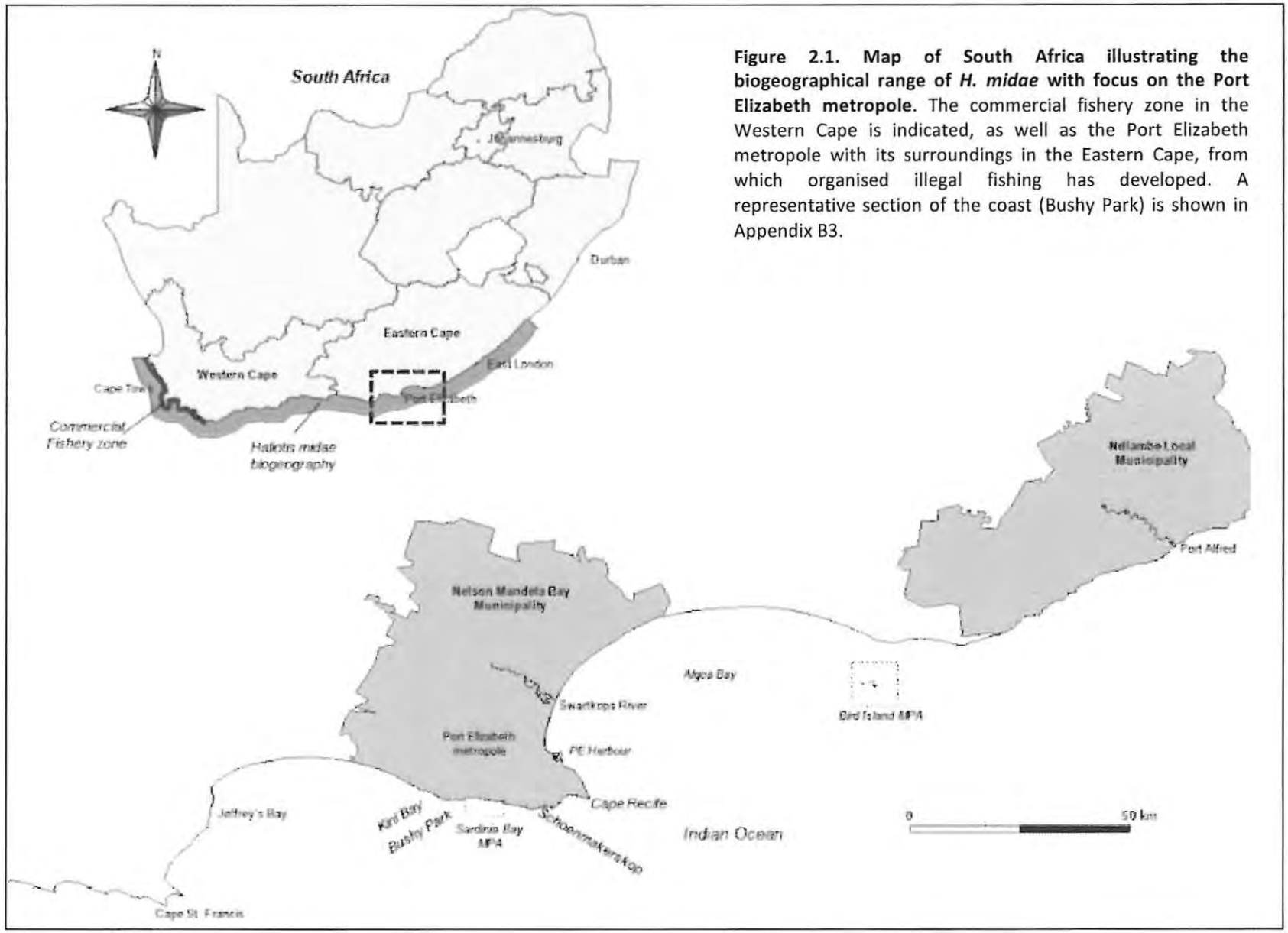

Figure 2.1. Map of South Africa illustrating the biogeographical range of *H. midae* with focus on the Port Elizabeth metropole. The commercial fishery zone in the Western Cape is indicated, as well as the Port Elizabeth metropole with its surroundings in the Eastern Cape, from which organised illegal fishing has developed. A representative section of the coast (Bushy Park) is shown in Appendix B3.

Information on the scale and dynamics of South Africa's illegal abalone fishery is essential to understanding the problem and formulating appropriate management options. This chapter details research undertaken to develop a profile of the illegal abalone fishery based in Port Elizabeth in the Eastern Cape, and to assess its effect on the resource. The study approach combined both social and biological research methods. The demographic and socio-economic characteristics of the offenders were profiled, followed by an estimate of illegal fishing effort and description of fisher behaviour in this effectively 'open access' – free-for-all – fishery. The effect of illegal fishing on the resource is illustrated by means of fishery-dependent and -independent data. The results show that the illegal fishery is of a larger scale and is more sophisticated than previously acknowledged. Discussion is focused on how the lack of appropriate management interventions has allowed abalone fishing to boom rapidly into a full-scale, highly organised industry run by several syndicates. By understanding and assessing the various aspects of this fishery system, it is concluded that the illegal operations and the resultant ecological effects on the abalone resource reflect deficiencies in South Africa's current abalone fisheries compliance and management paradigm, as well as in its fisheries governance approach.

2.2. Material and methods

To understand the nature and the extent of illegal abalone fishing activities in the Eastern Cape a multi-disciplinary approach was adopted, with the employment of a combination of biological and social data-gathering tools. Anecdotal information and quantitative data from a variety of direct and indirect sources were combined. Using a fishery system approach (Charles, 2001), which looks at fisheries from a biological, human and management perspective (refer to Chapter 1), this work was aimed at determining (i) the demographic profile of the abalone fishers and factors motivating them, (ii) the fishery characteristics and their effect on the resource, as well as (iii) the management response to this illegal fishery.

2.2.1. Qualitative data

Consultations were held with a wide spectrum of stakeholders (Table 2.1), using semi-structured interviews where questions were evaluated gradually and refined. Interviews were conducted under conditions of anonymity. Attitudes towards enforcement activities and possible recommendations were discussed, as well as the respondents' viewpoints on the extent of the illegal activities and the possible impact on the resource. A total of 55 semi-structured interviews were conducted, and a number of follow-up discussions were held with selected key informants. Five confessed illegal abalone divers were also interviewed, including the head of a Port Elizabeth-based syndicate - the

openness about their activities stemmed mainly from the hope of one day obtaining a legitimate fishing right. This provided substantial information on the socio-economic status, motivation and the *modus operandi* of the illegal fishing groups. All data were subsequently categorised according to topic and cross-validated.

Table 2.1. List of organisations, institutions and population groups interviewed

Organisation, Institution or Population group	Number of individuals interviewed
Recreational dive operator and shop owner	3
Whale, dolphin and seal watching operator	1
Boat shop owner	1
Spear fishers	3
Illegal abalone fishers:	
▪ Shore-based divers	3
▪ Boat owner	1
▪ Operator of syndicate	1
Coastal Property owner	2
Coastal Conservancy	1
South African National Defence Force (SANDF; Military Intelligence)	1
Environmental Journalist	1
National Ports Authority (Harbour Master)	1
South African Police Services (SAPS):	
▪ Dog Unit	3
▪ Organised Crime Unit	1
▪ Abalone Task Team member	4
▪ Air Support	1
South African Revenue Services (SARS) – Customs Dept.	2
National Intelligence Agency (NIA)	1
National Prosecuting Authority (NPA):	
▪ Public Prosecution and Asset Forfeiture Unit	1
▪ Directorate Special Operations (Scorpions)	1
Department of Justice	
• Ex Eastern Cape Attorney General	1
South African Maritime Safety Association	1
Nelson Mandela Metropolitan Municipality:	
Conservation Services	1
Ex Western District Council Nature Conservation	1
Ndlambe Local Municipality Nature Conservation	3
South African National Parks (SANParks)	2
Marine and Coastal Management:	
Directorate Resources Research	-
1. Inshore Research	3
2. Cross-cutting biological research	1
Chief Directorate Monitoring Control and Surveillance	1
1. Directorate Compliance/Control	5
2. Directorate Environmental Patrol Vessels	3
Total	55

Participatory observation of illegal abalone fishing activity was undertaken with the enforcement arms of MCM and SAPS. These included (i) road patrols along known abalone fishing sites near Port Elizabeth and Port Alfred (Figure 2.1), (ii) observation of suspected fishers launching their boats at commonly used launching sites, (iii) an extended stay in the Bird Island MPA, (iv) witness of arrests and confiscations at dive sites and catch accumulation points[1], and (v) attendance at a court case of suspected illegal abalone fishers.

The illegal abalone fishing activity attracts a great deal of media interest, and reports of illegal fishing operations appear in the South African print media nearly on a weekly basis. Therefore, the archives of local newspapers were consulted to build a picture of the development of the illegal fishery in the Eastern Cape Province.

2.2.2. Quantitative data

Study area

Abalone in the vicinity of the Port Elizabeth metropole are distributed between Cape Recife and Kini Bay, a predominantly rocky coastline approximately 35 km long, interspersed with a few sandy beaches and a small MPA (Sardinia Bay MPA; Figure 2.1). The Bird Island Group of Islands on the eastern edge of Algoa Bay has extensive reefs that support a large abalone population. Eastwards, to East London, and westwards, to Cape St Francis, the coast is characterised by long sandy stretches interspersed by extensive but shallow low-aspect reefs where abalone occur.

Monitoring and estimating illegal effort

Few studies nationally or internationally have attempted to quantify or describe IUU in fisheries (Ainsworth and Pitcher, 2005; Mann, 1995; Sumaila *et al.*, 2006), as illegal fishing activities are notoriously difficult to research. Even less information exists to confirm the size of the illegal abalone catch, or very few attempts have been made to estimate the scale of the illegal abalone fishing operations (Gordon and Cook, 2004; Gorfine *et al.*, 2002; Tailby and Gant, 2002; Willock *et al.*, 2004). Therefore, this study was designed to quantify illegal fishing effort by means of various indicators.

As illegal abalone fishing-related arrests occur almost weekly in the Port Elizabeth area, the weight and size of confiscated or abandoned abalone was used as an indicator of trends in distribution of illegal fishing effort along the coast. Confiscated or abandoned abalone have been sampled regularly and measured since 1997 by MCM and in this work. An intelligence database on illegal abalone

[1] Places where abalone fishers stored their catch until a substantial amount was accumulated prior to processing and export.

fishing activity, maintained by the South African National Defence Forces (SANDF) was used to obtain estimates of the number of suspected abalone fishers. Direct illegal effort data for the Port Elizabeth area were obtained sporadically, based on own observations during sampling trips, or snapshot surveys undertaken by MCM. As illegal fishers use a distinctive class of vessel - typically highly powered (230-500 horsepower (hp)), semi-rigid inflatables known as 'superducks' (see Appendix B1), the boat licensing records at the main launching site on the Swartkops River estuary (Figure 2.1) were used as an indicator of the size of the illegal fishing fleet. Boat registers are maintained and filed at the Municipal Nature Conservation Office (mandated to patrol the river) and Swartkops Ski-boat Club situated at the main slipway in the village of Swartkops (Figure 2.1). Only semi-rigid inflatable boats, with twin engines of a combined minimum 160 hp and with a minimum length of 6 m were included for analysis.

Illegal fishing effort data from the Bird Island MPA[2] were obtained from three sources. Firstly, the logged 'Incident Reports' of suspected illegal fishing activity filed by rangers of the South African National Parks (SANParks) based on Bird Island were consulted. Rangers had been reporting illegal fishing incidents since April 2002, even prior to the promulgation of the MPA. However, the data reported by the rangers were believed to be incomplete (A. Padayachee, SANParks Woody Cape Section Manager, pers. comm.). Therefore, for the purposes of this study, procedures for on-site monitoring of illegal fishing activities were standardised, and the SANParks rangers were trained accordingly to collect data pertaining to observed activities. Monitoring on site began in January 2007 and is ongoing. Lastly, four two-week fieldtrips to Bird Island were undertaken between February 2006 and March 2007 to allow validation of the data recorded by the rangers, and a more thorough observation of the abalone fishing operations.

During 2006, a shift in illegal activity occurred as illegal abalone fishers began targeting new areas outside of Port Elizabeth. The Ndlambe Local Municipality's coastline to the northeast (Figure 2.1) became a 'hotspot' of illegal fishing activity. An intelligence database was designed for the Ndlambe Local Municipality's Environmental Conservation Department. Photographs of illegal activities, taken or obtained by the local Environmental Conservation Officer, were analysed, and vehicles, boats and suspects involved were registered and subsequently classified by individual and by group. These data were continuously updated, as new illegal abalone fishing events were observed. Local Environmental Conservation Officials and SAPS personnel recorded shore-based and boat-based operations on separate datasheets, which were then linked to the intelligence database. Profiles were also cross-validated with suspect profiles obtained from the SANDF Intelligence branch and the

[2] The Bird Island Group of Islands were declared as a Marine Protected Area on 4 of June 2004 (DEAT, 2004).

National Prosecuting Authority's (NPA) Department of Special Operations (also known as the Scorpions).

Indicators of resource effect

Very little substantiated abundance and stock health data existed for the abalone resource near the urban centres of the Eastern Cape, as research was conducted primarily at one particular reef (Daly, 2006; Godfrey, 2003; Wood and Buxton, 1996a; Wood and Buxton, 1996b). Fishery-dependent and -independent data were obtained that could be used to assess the impact of the illegal fishing activities on the abalone stocks. The aim was not to model stock size, but rather to use the different data sources to create indicators of the effect of fishing on the abalone populations. Fishery-dependent data were sourced entirely from confiscated or abandoned abalone sampled since 1997 by MCM and this work (Appendix B2). These samples predominantly consisted of de-shelled (shucked) and eviscerated or whole abalone in fresh or frozen state, originating from bags of abalone that (i) were retrieved following abandonment by fleeing illegal fishers, (ii) were found at sea by fishers, (iii) were washed ashore, or (iv) were hidden in the coastal bush. Alternatively, catches were confiscated during the arrest of suspected abalone fishers. The amount of dried abalone that had been obtained from large seizures at illegal drying facilities was recorded. During 2003 and 2004, few confiscated abalone were measured at the MCM Port Elizabeth Compliance and Control Office due to safety and logistical reasons. Confiscated abalone from as many police cases as possible were counted, weighed and measured to obtain a representative sample from the different areas over time. In cases with large amounts of confiscated abalone a random sub sample of up to 200 units was used for analysis. Of the 481 cases and 81 466 abalone analysed, 99.15 % of abalone were measured in an eviscerated state. Within mixed samples, abalone in shell were converted to eviscerated mass using a non-isometric power regression (Figure 2.2):

Shell Breadth (mm) = 19.0177 Eviscerated mass (after 12 hours) (g) ^0.3480*

(R^2 = 0.9792; p << 0.05; n = 476)

The regression analysis was based on morphometric studies undertaken by MCM to determine the weight loss associated with dehydration and freezing (MCM, 2001; unpublished data). Effects of area and year on mean weight, percentage under the legal size, and mean total catch confiscated were tested using regression analysis and General Linear Modelling functions from the Statistica 8 and R software packages (R Development Core Team, 2007; StatSoft, 2007). Only cases originating from the urban areas of the Eastern Cape were included in the analysis.

The size and density of wild abalone were obtained by means of *in situ* sampling and measurement in two heavily fished areas. In the Bird Island MPA, four sites were chosen that had been sampled previously by MCM in 1986 and 1987, and that were observed as being fished actively by the illegal groups (Appendix B5 - B6). Random collections of live emergent[3] abalone and freshly shucked abalone shells were performed during the four two-week visits to Bird Island. Size frequencies of these collections were analysed. Additionally, fourteen 30 m x 2 m transect counts of emergent abalone were completed at the same four sites, as well as several randomly deployed 1 m^2 quadrats that were counted for cryptic juvenile *H. midae*.

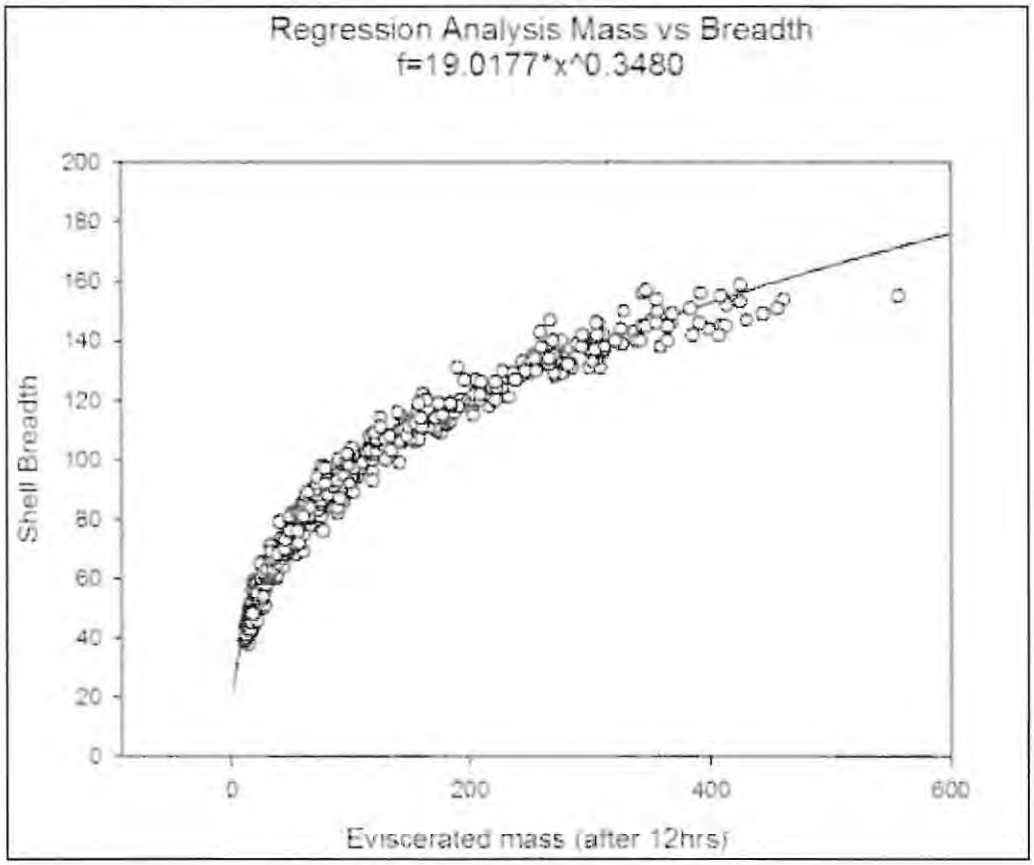

Figure 2.2. **Non-isometric power regression between shell breadth (mm) and eviscerated mass (g) of *H. midae* after 12 hours of dehydration.** $R^2 = 0.9792$; $p << 0.05$; $n = 476$.

At the historically heavily fished Cape Recife (Figure 2.1), a shallow rock pool was used to monitor abalone recruitment, continuing prior research undertaken by Godfrey (2003). The complex microhabitat along the fringe of the rock pool, made up of cobbles and medium sized boulders covered with crustose coralline algae and exposed to all current directions at high tide, attracted regular abalone settlement. Bi-annual destructive surveys were undertaken from mid-2005 onwards

[3] Space limitations and greater food availability cause larger juveniles to move from their cryptic positions into more open or emergent positions, yielding higher reproductive success (Officer *et al.* 2001).

for long-term monitoring purposes. Quadrats were placed haphazardly within a gridded area where rocks were overturned during searches designed to minimise impact on habitat.

Enforcement

To complement the qualitative information gained from the semi-structured interviews, metadata from the confiscations, and arrest records obtained from the SANDF intelligence arm, MCM Port Elizabeth Compliance Section, and the Ndlambe Municipality's Environmental Conservation Department were consulted. These were used to quantify and understand the efficiency of the enforcement efforts by the various government agencies. These data sets were discontinuous over time and across the various enforcement authorities.

2.3. Results

Organised illegal abalone fishing spread from the Western Cape Province to the Eastern Cape Province in the mid-1990s and was well publicised in the local press due to the brazen approach of illegal fishers who openly fished in public areas at Port Elizabeth. The relatively sheltered and accessible Cape Recife area of Port Elizabeth was the first 'hotspot' for illegal fishing (Figure 2.1), and was considered a training ground for aspiring fishers. As they gained experience and inshore stocks showed signs of decline, powerful boats were acquired to access more productive reefs further afield. Progressively, two types of illegal fishing operations evolved: opportunistic, shore-based fishers with a small capital investment and weaker networks (Appendix B4), and highly organised and experienced boat-based fishers with a high capital investment and efficient intelligence and marketing networks (Appendix B5).

2.3.1. Fisher profile

Interviews revealed that abalone fishers from the urban centres of the Eastern Cape were of multi-ethnic origin, but more than 85 % were white Afrikaner males, aged between 16 and 55 years. Adolescents assisted as helpers or 'lookouts', with the potential of becoming divers. Since 2005, there has been a small influx of coloured[4] males into the illegal abalone industry. These individuals, originating both locally and from the Western Cape Province, served mainly as shore-based divers or middlemen. Black African individuals, often indigent individuals, usually worked as helpers or 'runners'.

[4] 'Coloured' is an official term used in South Africa to refer to a diverse group of people of mixed racial origin. These people form the third largest population group in the country after Black Africans and whites.

The majority of abalone fishers were unemployed or had left their jobs to pursue abalone fishing. Many used to fish recreationally for abalone for personal consumption or informal local sale, prior to the dramatic increase in the overseas price for this commodity. Interviews indicated that none, however, had traditional or artisanal fishing links, unlike the situation in the Western Cape Province (Hauck and Sweijd, 1999). Those who were employed were typically involved in blue collar occupations such as panel beating, building or breakdown services. While some interviewees justified their activities by an inability to find regular jobs due to their often low school education levels, the lifestyle was considered desirable as it yielded easy money and a degree of power and status within their social circle. The white Afrikaans-speaking fishers interviewed questioned the legitimacy of the post-apartheid government, and were unwilling to accept the values of the new democratic dispensation. They expressed feelings of marginalisation as a result of the government's transformation policies (such as employment equity and black economic empowerment) designed to promote racial equity within society. As a result, many fishers characterised and justified their illegal abalone fishing activities as a "Robin Hood" type of enterprise that had resulted in the injection of a large amount of money into the local 'white' economy. Drivers behind the fishery were thus not only economic but also socio-political.

The predominantly white abalone fishers from the urban areas of the Eastern Cape considered themselves a "soft community of poachers", in contrast to the more notorious Western Cape gangs who were involved in other more serious criminal activities (Hauck and Sweijd, 1999). Few reported carrying firearms, and many fishers were known to have a sociable attitude towards law enforcers, who were also typically white Afrikaans-speaking males and shared the same cultural background as the fishers. However, media reports and interviews with law enforcement personnel revealed that the fishers employed various forms of intimidation (including threats, physical violence and damage to personal property) to intimidate coastal residents and recreational beach users in the vicinity of their diving operations. Consequently, heavily fished areas were regarded as 'no-go' areas for recreational use.

Among the fishers themselves, competition and secrecy were common when new abalone reefs were discovered, however different fisher groups routinely informed each other of law enforcement activities.

2.3.2. Fisher effort

Modus operandi

Illegal abalone fishing near the urban centres of the Eastern Cape has developed from being a largely shore-based activity in the late 1990s carried out by loosely associated individual divers, to a substantial boat-based fishery conducted by larger, more cohesive, and better equipped groups. Interviewed boat-based divers reported that they would only perform shore dives if their boats were impounded or sea conditions had been poor.

Prior to 1999, hard hulled ski-boats were used for abalone fishing, but as boat-based fishing became more prevalent, groups started using more specialised 'superducks' with a carrying capacity of up to 14 people and equipped with twin high-powered outboard engines. 'Superducks' were preferred for their manoeuvrability and potential for accessing shallower reefs in the surf zone. They were towed with 4X4 vehicles and could be launched rapidly from public slipways in harbours or rivers. The divers and their equipment were often picked up at other localities by the vessel to avoid inspection by law enforcement agencies. Interviewees reported that the boat-based operations were carefully planned beforehand: dive locations were chosen, boats prepared and loaded with dive cylinders, and law enforcement activities monitored. 'Lookouts' were placed at strategic points (harbours, police road blocks, etc.) and were in continuous cellular phone contact with the boat skipper. Illegal fishing groups have also been known to organise decoy divers in a key area, to divert law enforcement efforts from the target area. A single boat could conduct two trips per day.

Upon arrival at the designated dive location, reconnaissance divers using snorkelling gear would be deployed to assess the reefs for abalone. Only then would divers in self contained underwater breathing apparatus (SCUBA; 15 to 18 litre cylinders) be deployed. The divers were equipped with waist bags for the abalone, and torches if diving at night. Abalone were lifted from the rocky substrate using a flat-bladed tool, de-shelled (shucked), and eviscerated in the water. Once the boat was filled with abalone, or in the case of approaching authorities, all abalone bags were transferred to one boat manned only by a skipper and his assistant. Other boats were washed down with fuel, and gloves discarded, in order to remove any abalone tissue and mucous that might provide deoxyribonucleic acid (DNA) evidence of illegal abalone possession. The returning boats carrying the divers then acted as diversion for possible authority patrol boats.

Abalone would be dropped off anywhere along the coast or in estuaries. The choice of site was dictated by law enforcement activities, although preference was given to areas well known by the groups, and that were often close to where the members resided. Using information provided by

'lookouts', 'runners' would swim the bags ashore and carry them to the waiting vehicles, which transported the abalone to catch accumulation points or drying facilities. Several respondents alleged that abalone catches were also transhipped at sea to bigger commercial deck boats equipped with freezers as well as air compressors to re-fill dive cylinders.

In contrast, shore-based diving activities were less organised, and were often considered as an opportunistic outing by the diver groups and their families. Shore-based divers would most often spend the entire day at their familiar dive spots, and dive only when enforcement activity was low. Divers would hide bags in between rocky ledges above or under the surface. From these points, 'runners' transferred them via the dune vegetation to standby vehicles.

Effort

Recreational dive shop owners and dive operators estimated that there were between 150 to 300 active abalone divers based in Port Elizabeth in 2006. This figure was supported by a boat-based diver who estimated that there were about 300 active boat-based divers, 90 % of whom had no other source of income. The number of shore divers was more difficult to estimate accurately since they were a more fluid group and many of them had alternate sources of income. However, the SANDF intelligence database in Port Elizabeth listed a total of more than 1500 individuals who had either been arrested for abalone trafficking, or who had come to the attention of the authorities for involvement in the illegal abalone fishing industry between 1998 and 2006. This figure is higher than the 630 registered in this database in 2002. This database probably includes all involved in the illegal abalone fishery including helpers, 'runners', 'lookouts', drivers and middlemen; this could not be confirmed as access to the database could not be granted.

It was estimated by various stakeholders interviewed that the number of vessels involved in illegal abalone fishing from the urban centre of Port Elizabeth grew from 30 in 2005 to more than 50 boats by June 2007. These boats were almost all large, semi-rigid inflatable 'superducks'. Since 2005, the majority of abalone fishing vessels launched from the Swartkops River estuary. Thus the vessel licensing register at the launch site provided a reasonably complete record of launches by 'superducks' which are used almost exclusively by abalone divers[5]. 'Superducks' first began to launch at Swartkops in 2003, and the number of registered semi-rigid inflatable vessels increased to 34 by

[5] Although recreational dive operators in Port Elizabeth also operate seven semi-rigid inflatable vessels similar to those used by the illegal abalone divers, their owners confirmed that they never launch through the Swartkops River estuary (L. Boshoff, Ocean Diver's International, pers. comm.; L. Van Aardt, ProDive, pers. comm.; C. Thungstead, Thungstead Marine, pers. comm.).

2006. The largest of these registered vessels was a 10.8 m semi-rigid inflatable with twin 250 hp engines (Figures 2.3 and 2.4). The value of a 'superduck' unit including 2 x 200 hp engines, trailer, dive gear and towing vehicle was approximately 1 million ZAR[6], and therefore the capital investment in the 30 'superducks' counted in 2005 was more than 30 million ZAR.

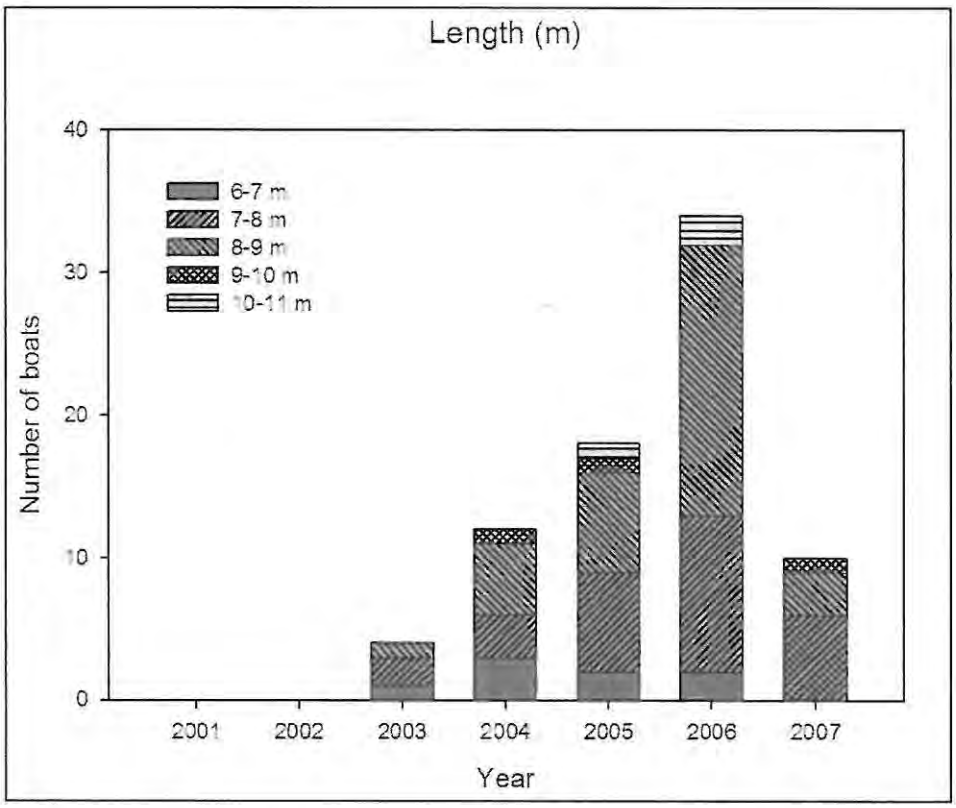

Figure 2.3. **Indication of the size of the illegal fleet from data extracted from the boat licensing records at the main launching site at the Swartkops River estuary.** Boat registers are maintained and filed at the Municipal Nature Conservation office (mandated to patrol the river) and Swartkops Ski-boat Club situated at the main slipway in the village of Swartkops. The location of the Swartkops River Estuary is indicated in Figure 2.1. Only semi-rigid inflatable boats, with twin engines of a combined minimum 160 hp and with a minimum length of 6 m were included for analysis. This figure represents the number of boats with a minimum length of 6 m. Records of the horsepower of boats with a combined minimum 160 hp are represented in Figure 2.4.

[6] The average exchange rate between the United States dollar (USD) and the South African Rand (ZAR) for the study period of 2005 to 2007 was 1 USD = 6.5 ZAR.

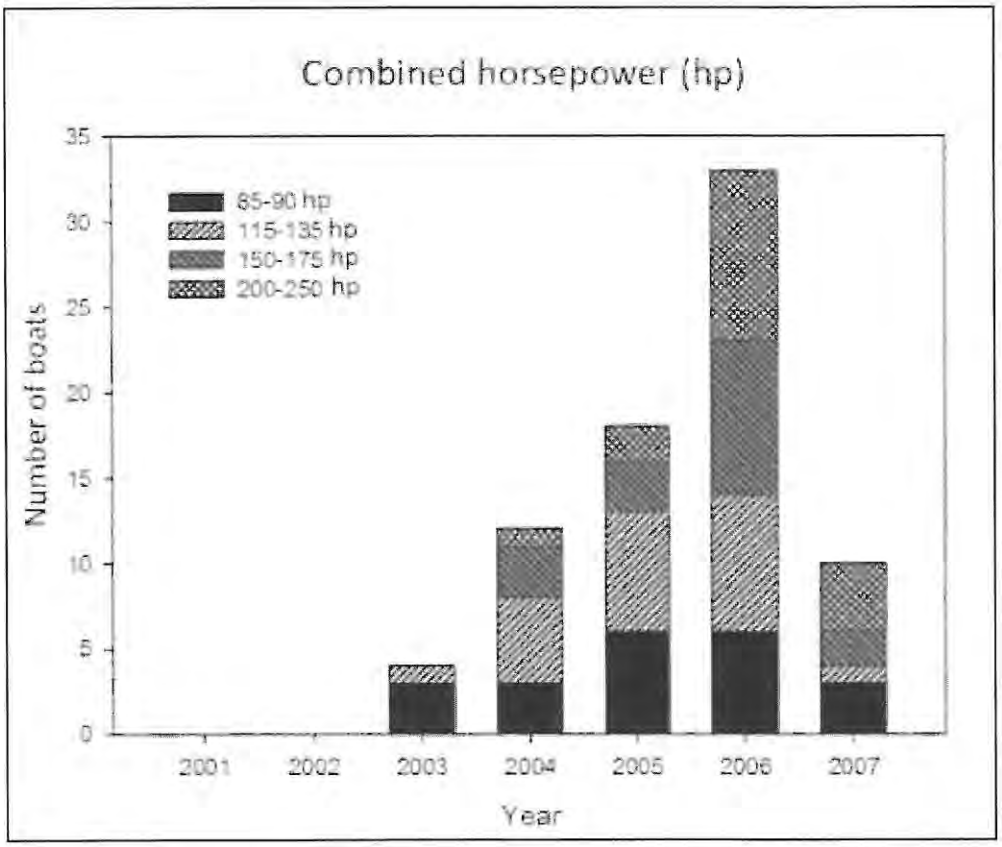

Figure 2.4. **Licensing records at the Swartkops River estuary of twin engine boats with a combined minimum 160 horsepower.**

The abalone fishing grounds for Port Elizabeth-based divers were initially the productive reefs between Cape Recife and the Sardinia Bay MPA. In 2002, a snapshot survey by the MCM Port Elizabeth Compliance and Control branch along this 20 km stretch counted 140 abalone fishers over a 35 hour observation period. However, with the move to boat-based diving, divers rapidly expanded their efforts to the reefs around Bird Island. Although they have been operating there since at least 1999, it was only from 2003 onwards that the abalone stocks around the island were heavily targeted (Figure 2.5). Despite the declaration of an MPA in the waters surrounding Bird Island in June 2004 (DEAT, 2004), illegal diving incidents reported by the SANParks rangers stationed on Bird Island continued to increase with an average of three to four and a maximum of twelve boats present on any diveable day in 2007. Initially, hard hulled ski-boats were used to make the two hour run from Port Elizabeth, but by 2005, 90 % of boats reported fishing at Bird Island were 'superducks', with the majority launching from the Swartkops River. Data from the standardised on-site monitoring revealed an average of four boats per diveable day, an average of 30 boat observations per month and a maximum of 46 boat observations per month between January and July 2007. Sightings recorded included a total of 210 vessels, and a total of 1913 crew entering the MPA over this six month period. During the summer months, the majority of boats arrived between one and two hours

after sunrise, and stayed for four hours on average, or a maximum of ten hours when getting air supply from other boats for supplementary dives. During the winter months, boat arrivals were spread throughout the day, and were more dependent on wind and sea swell conditions.

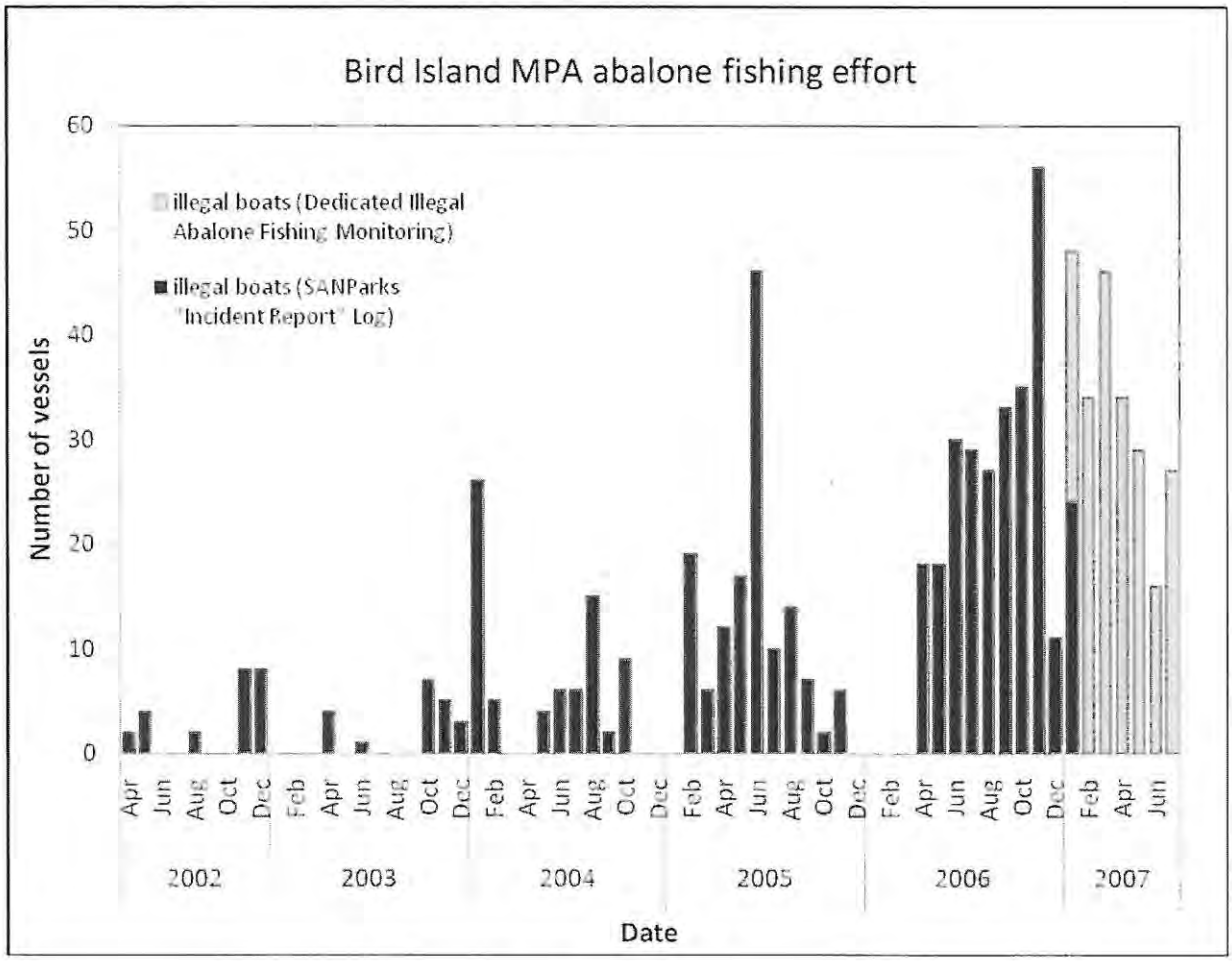

Figure 2.5. **Illegal fishing effort data from the Bird Island Marine Protected Area (April 2002 – June 2007).** The data prior to 2007 are drawn from the log of 'Incident Reports' filed by rangers of SANParks based on Bird Island (SANParks 'Incident Report' log). From 2007 onwards, a separate on-site monitoring form was standardised, and rangers were trained to observe illegal fishing activities and collect each operation's details (Dedicated Illegal Abalone Fishing Monitoring).

Since 2005, a clear shift in effort by the boat-based divers was observed, away from the nearby fishing grounds of Cape Recife to the Sardinia Bay MPA, possibly due to a declining resource. The reefs adjacent to the Bushy Park area became preferred diving sites for boat-based as well as for shore-based divers (Figure 2.1). Boat-based diving was also increasingly reported towards Jeffrey's Bay and Cape St Francis. In the Bird Island MPA, vessels have been reported deploying divers on the South facing sites, exposed to the heavy swells, instead of the more commonly dived, sheltered channel in between the islands. This is possibly an additional indication of stock depletion in the more sheltered areas.

During the first half of 2006, the Ndlambe Municipality, situated eastwards of Port Elizabeth (Figure 2.1) experienced a strong upsurge of illegal fishing activities (Figure 2.6), with up to 41 'superducks' observed a month (a maximum of 11 on 1 April 2006). These vessels were launching from the public slipways of the 3 main rivers in the Ndlambe district, and were observed to target divers to the less exploited reefs of Ndlambe's remote coastline. Eight different groups were observed launching several of their boats (up to five) in the early morning shortly after sunrise. In almost all instances abalone bags were reported to be transported back to Port Elizabeth by sea on the same day, or the next morning, after being loaded onto one of the boats manned only by a skipper and assistant. A slight increase in shore-based diving operations was also recorded (Figure 2.6), although these data might represent an underestimate, given the law enforcement agency's focus on boat-based operations during the same period.

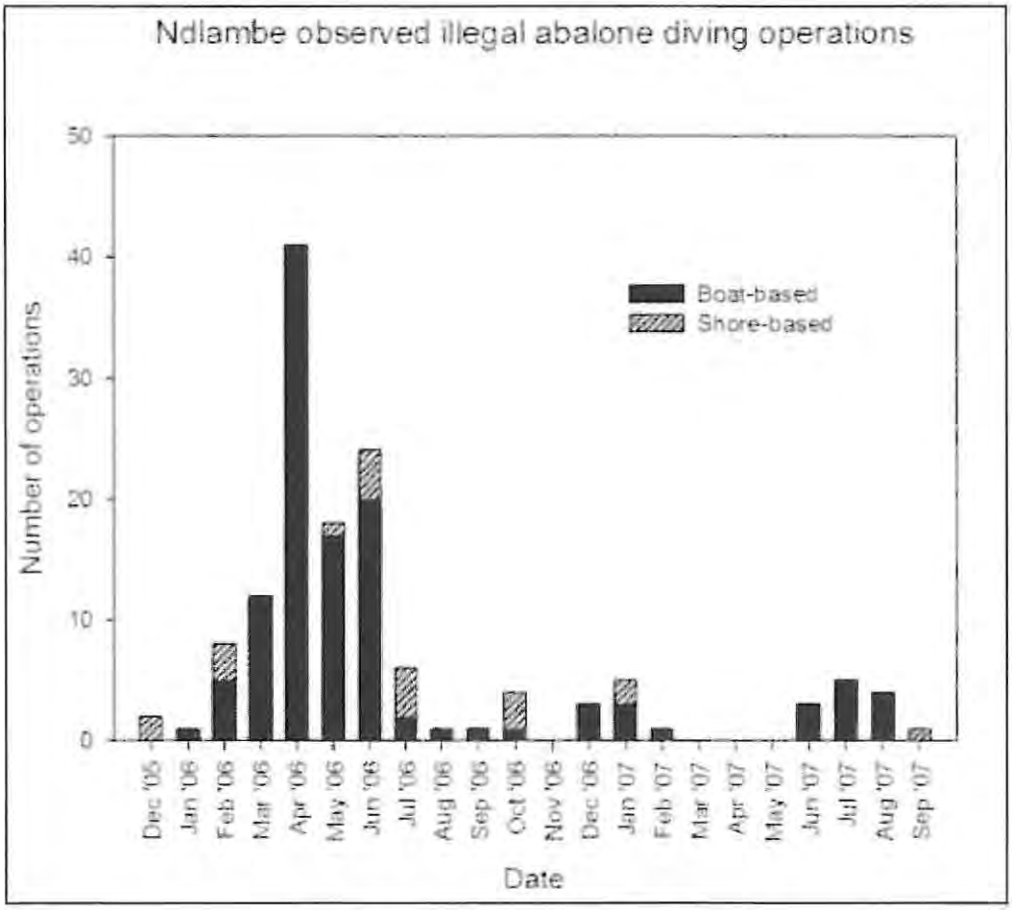

Figure 2.6. **Observed illegal diving activities in the Ndlambe municipality (December 2005 - September 2007).** 'Boat-based' refers to the actual number of vessels observed. Some illegal groups might have been working together using several boats. 'Shore-based' refers to actual groups observed. The following was observed in the Ndlambe area from January 2006 onwards: an influx of at least 3 shore-based groups (with up to 10 observed individuals) and eight different boat-based groups (with up to 25 observed members), using at least 20 different semi-rigid inflatable boats and 80 cars.

The Ndlambe intelligence database listed 49 identified individuals, predominantly white Afrikaner males, of whom 95 % resided in Port Elizabeth. Those individuals were either suspected or previously arrested abalone divers in the Port Elizabeth area, as confirmed by cross-validating the profiles with intelligence databases from the SANDF and NPA. It was also observed that local Ndlambe residents gradually became involved in the illegal fishing operations, acting as skippers or 'lookouts', or repairing and servicing vessels used for the illegal abalone fishing activities.

Yield and revenue

The prime motivation among the organised groups from the urban areas of the Eastern Cape to harvest abalone illegally is the highly lucrative nature of the business. Money can be made quickly as the highly valued abalone are relatively easily accessible, and are in high demand in the Far East. In 2006, abalone divers in the Eastern Cape were paid between 250 and 400 ZAR per kg of de-shelled abalone, but they could obtain up to 500 ZAR per kg depending on demand (e.g. peaks in demand typically occur during Chinese New Year celebrations). In addition, this price is dependent on the fluctuating ZAR to USD exchange rate. Moreover, the more product the divers were able to supply, the more reliable they were perceived to be by the buyers, which resulted in a higher fetching price for their abalone. Notably, this price - also referred to as the beach price – reflects the amount paid to the divers. Abalone sold to exporters in Johannesburg is reported to fetch prices of up to 800 ZAR per kg for fresh abalone meat.

Interviews revealed that each diver paid for his place on the boat with a set percentage of his catch in boat-based diving operations. Alternatively, an upfront fixed fee of up to 3000 ZAR was paid. This fee was typically used to cover the costs such as fuel, maintenance, and cell phone communication. Helpers earned 80 ZAR for carrying diving gear to the watermark, and between 120 and 400 ZAR for running a bag of abalone successfully to the pickup point for the driver. 'Lookouts' earned between 100 and 600 ZAR per day depending on the extent of the operation. Boat-based divers seldom operated individually, but rather affiliated to organised groups known as 'families'. The group leader arranged the sale of the abalone catch to middlemen and drying facilities in the region, or the direct transport to illicit Chinese markets based mainly in Johannesburg. Here, the abalone were canned or dried. Payments were made mostly in cash, or bartered for with other illicit goods such as drugs (Steinberg, 2005).

During the study period, in 2006, a boat-based diver could expect to harvest 60-150 kg of de-shelled abalone on a successful trip, and could thus earn up to 40 000 ZAR per day (at 250 ZAR per kg) before the deduction of running costs. The utilised 'superducks' had a capacity of over 1 ton of de-shelled

abalone with a total value per trip of 250 000 to 400 000 ZAR to the 10-14 divers on board. Shore-based fishers who dived on the relatively depleted reefs between Cape Recife and Bushy Park were reported to harvest between 10 and 15 kg of abalone meat per day. This harvest is significantly reduced compared to the 40 kg of abalone meat reported to be obtainable per dive in the past. Interviews with illegal divers indicated that boat-based groups embark on illegal fishing activities on average between 4 and 6 times per month, while shore-based divers dived more often.

Despite the quantitative information provided above, calculation of the total tonnage and value of illegally fished abalone in the Eastern Cape is elusive. A variety of anecdotal information and proxy indicators was used to develop a credible estimate of total yield and value. Anecdotal reports by law enforcement officials indicated that in 2003, in the region of 130 tons of de-shelled abalone (390 tons of whole mass) was fished illegally from the reefs surrounding Port Elizabeth. However, the illegal fishers who were interviewed in 2006 estimated that 30 to 50 tons of de-shelled abalone had been transported from Port Elizabeth to Johannesburg every month over the preceding few years – amounting to an annual total of 360-600 tons of abalone meat or 1080-1800 tons of whole mass. The fairly regular abalone confiscations by law enforcement agencies also provide some indication of the level of illegal harvest of abalone (Britz *et al.*, 2002). The corresponding amount confiscated in the Eastern Cape between 1997 and 2007 is illustrated in Figure 2.7. The majority of these confiscations were made near the urban areas, and predominantly in the vicinity of Port Elizabeth. The law enforcement agencies believed that they confiscated approximately 5 % of the illegal abalone catch (G. Kant, MCM, pers. comm.). Using this estimate of confiscation efficiency, the total take of de-shelled abalone was calculated to be 335-487 tons per year in the period 2004 to 2006. This is equivalent to 1005-1461 tons of whole mass per year.

Using the 2006 survey data of this study, as estimate was made of the yield of the Port Elizabeth boat-based abalone diving operations. An estimate of 58 tons of de-shelled abalone per month (696 tons per year) was derived using figures determined in this work, of an illegal fishing fleet of 30 'superducks', with an average of 8 divers each, harvesting 60 kg of abalone per diver per trip, four times per month and 1 dive a trip per occasion. This estimate slightly exceeds 2000 tons of whole mass of abalone per year.

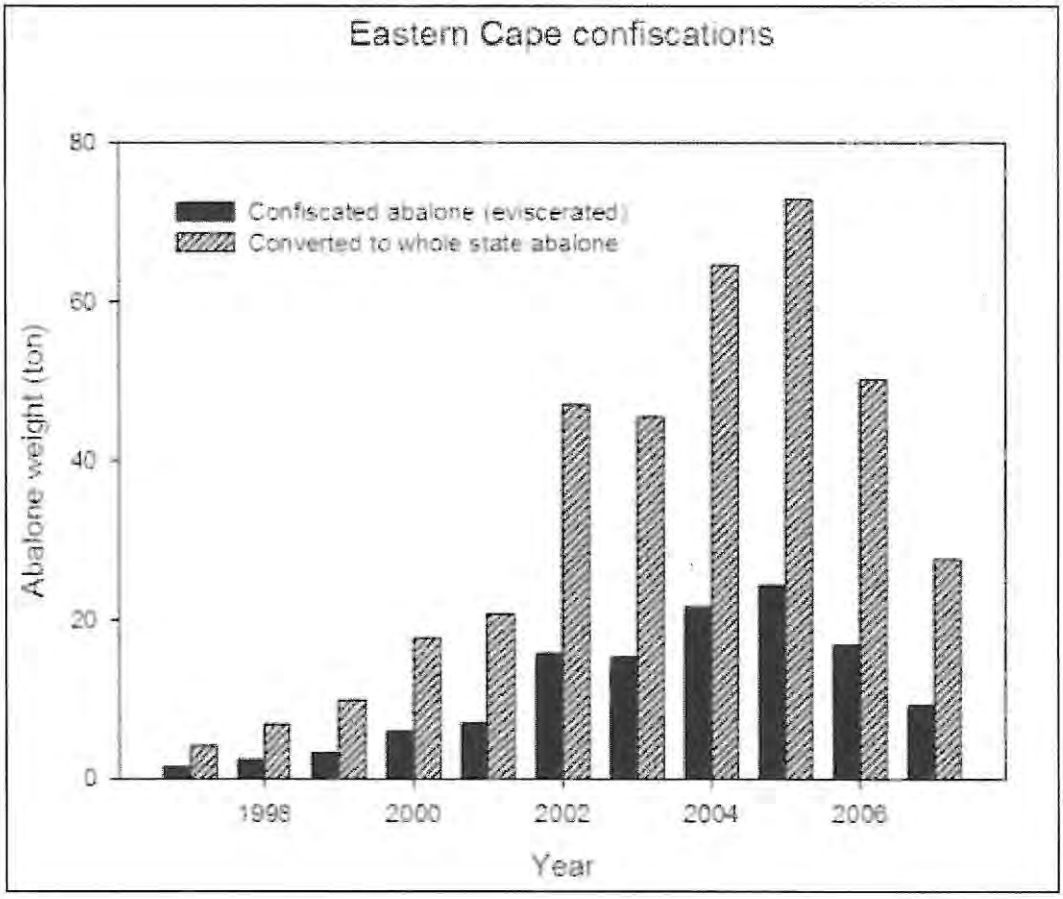

Figure 2.7. **Amount of abalone (in tons) confiscated in the Eastern Cape between 1997 and 2007.**

The total value of the estimated 1000-2000 tons of whole mass abalone harvested in the Eastern Cape per year during the 2004-2006 period was calculated to be between 80 and 170 million ZAR in non-taxable cash income per year to the illegal abalone fisher groups based in Port Elizabeth. Notably, this value was based on a conservative price of 250 ZAR per kg of de-shelled abalone. If the average export price of legal South African abalone is used (ca. 35 USD per kg of whole mass) the value of the illegal Eastern Cape harvest rises to 35-70 million USD per year.

2.3.3. Resource depletion

Confiscations of abalone have risen dramatically since records were first kept in the Eastern Cape Province. From 2002 to 2006, over 15 tons of shucked abalone meat have been confiscated every year, which is equivalent to about 45 tons of whole mass (Figure 2.7). Analysis of the confiscated catches revealed that the very high illegal fishing effort had a dramatic effect on the stock. The mean size (as eviscerated mass) decreased dramatically over the years (Figure 2.8; Box-Cox transformed: $F = 673.5$, $df = 10$, $p << 0.05$), with abalone divers targeting progressively smaller animals. Due to the unbalanced design of the input matrix (several regions had either no confiscations, or were not

sampled for particular years: refer to Appendix A), it was not possible to perform a factorial ANOVA for significant differences over the years and regions together. Univariate analysis of variance and post-hoc tests, however, did reveal significant decreases of mean size for all separate regions, as exemplified by the historical illegal abalone fishing ground at Cape Recife (Figure 2.9). In this area, reduced mean sizes in 1997 already indicated a reduction in the standing stock biomass. A slight increase in mean size during certain years most probably reflects large confiscations of abalone from previously unexploited reefs, seized from transport vehicles or catch accumulation points.

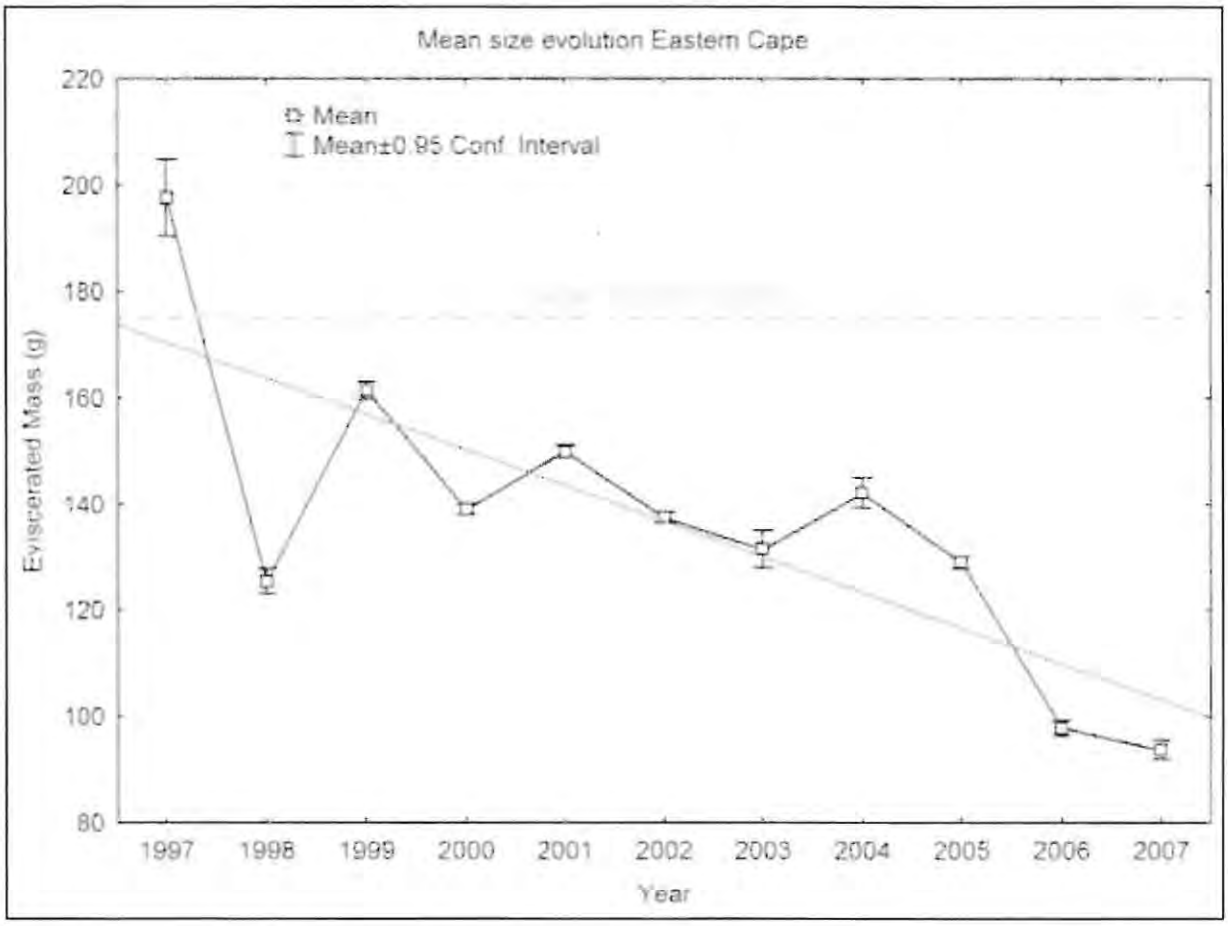

Figure 2.8. **The mean size (as eviscerated mass) of abalone from sampled confiscated catches from the urban areas of the Eastern Cape.** The horizontal line represents the minimum legal size based on the calculated regression curve (Figure 2.2).

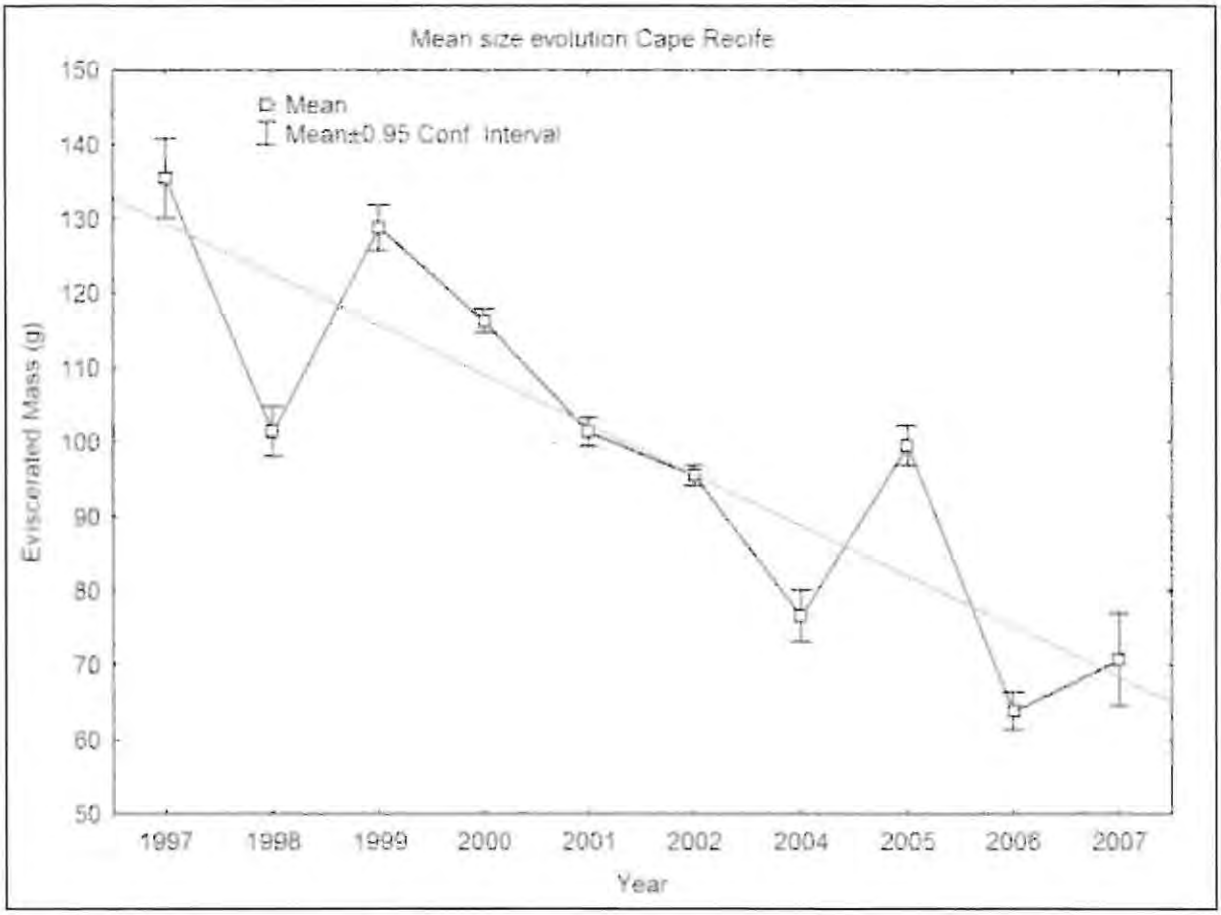

Figure 2.9. **The mean size (as eviscerated mass) of abalone from sampled confiscated catches from Cape Recife.**

Concomitantly, the proportion of abalone below the minimum legal size in the confiscated catches (114 mm shell breadth in the Western Cape commercial fishery, or 176 grams eviscerated mass based on calculated regression curve) increased significantly over the years. This is illustrated in Figure 2.10, where the apparent increase in the percentage of undersized abalone was fitted with a significant linear regression model ($F = 7.269$ on 1 and 9 df, $p < 0.05$) in which the slope parameter was significant ($t = 2.696$, $df = 9$, $p < 0.05$). Interestingly, analysis of the number of abalone units confiscated revealed no significant decrease over the years. Smaller confiscations usually originated from abandoned bags or arrests of shore-based divers, while larger confiscations stemmed from catch accumulation points in and around Port Elizabeth.

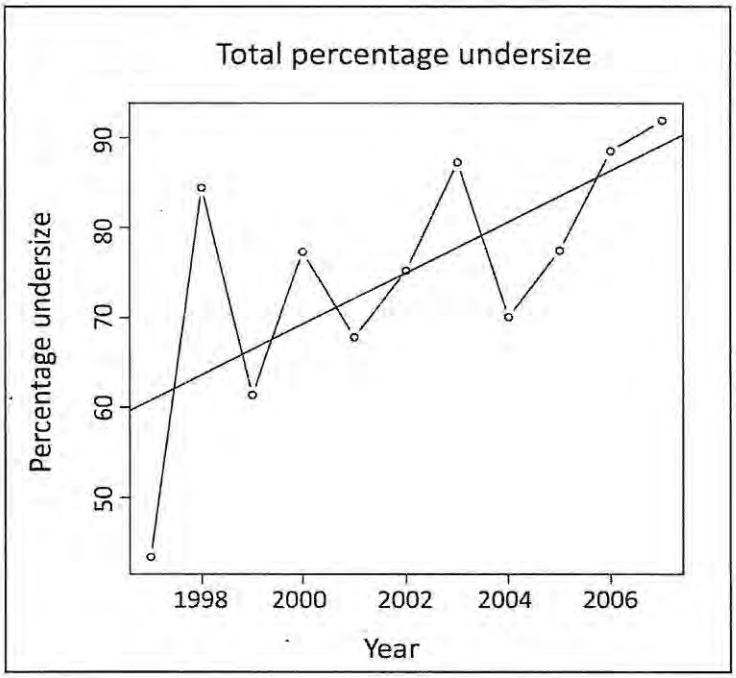

Figure 2.10. **Proportion of abalone below the minimum legal size in the confiscated catches.** The legal size is 114 mm shell breadth in the Western Cape commercial fishery, or 176 g of eviscerated mass based on the calculated regression curve.

Within the Bird Island MPA, *in situ* sampling in 2006 and 2007 revealed that mean size (shell width) of newly shucked abalone (93.6 ± 16.8) from four favoured illegal diving sites was significantly larger ($t = 18.33$, $df = 1677$, $p < 0.05$) than mean size of emergent abalone (75.92 ± 19.38) measured in the same areas. This indicated a preference by divers to collect the larger abalone first. However, as larger abalone have become less abundant over the last 5 years, divers have had to target those of smaller size. This trend is illustrated in Figure 2.11, where population size-frequency diagrams show that 91 % of poached abalone were undersized, compared to 98 % of the live emergent abalone randomly collected, and only 72 % of the emergent abalone sampled by MCM in exactly the same areas in 1986 (Figure 2.12). These apparent changes in population size structures provide a means of assessing changes in emergent abalone abundance and for monitoring the health of the local abalone stock.

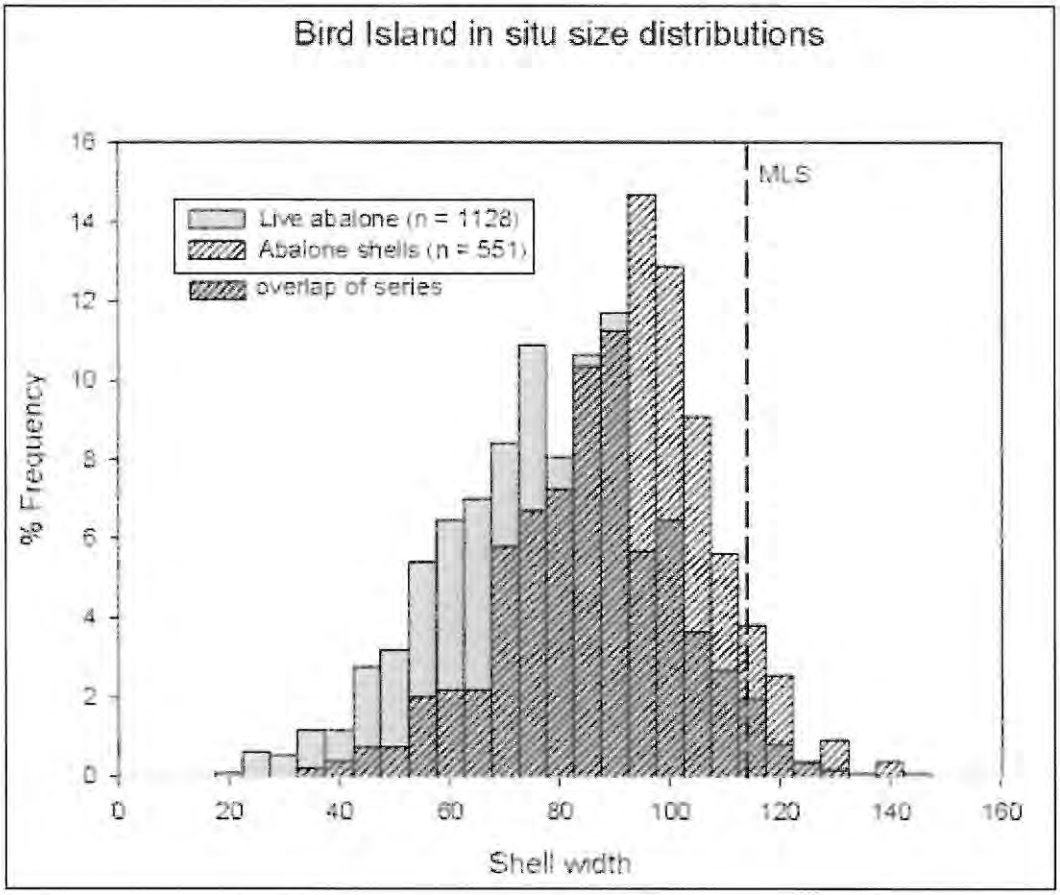

Figure 2.11. **Bird Island *in situ* size distributions and indication of percentage of abalone under the legal size (114 mm shell width).** Samples of live abalone and shells were compared as indicated. Abbreviation used: n - number of samples; MLS – minimum legal size.

Densities of emergent adult abalone in the favoured diving sites at Bird Island, obtained from counts along the 30 m transects, were highly variable, ranging from 0.1 abalone m^{-2} to 3.9 abalone m^{-2}, depending on habitat but also ease of access by the illegal abalone divers. Higher densities were found in the shallower, high profile areas along the transect lines. MCM observed similar densities in their 1986 survey, using the same method in the same areas. This potentially supports the claim made by the boat-based divers that the individual size of abalone in their catches in the Bird Island MPA has decreased, but that it was still worth their while diving around the islands as they could achieve high total catches. Work by Godfrey (2003) and Daly (2006) revealed a decrease in the density of adult emergent abalone at the popular illegal fishing site of Cape Recife, during repeated sampling in 1999, 2001 and 2005 (mean densities: 1.3; 0.8 and 0.2 abalone m^{-2} respectively).

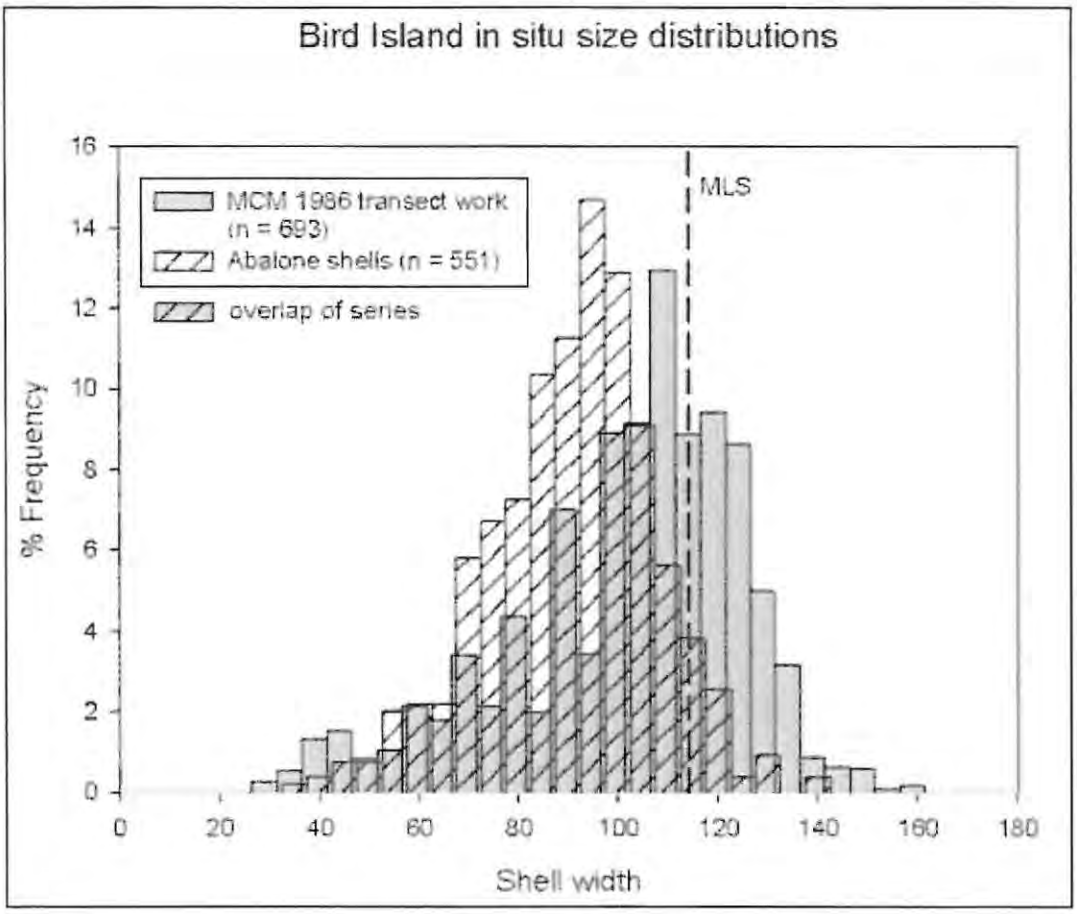

Figure 2.12 **Bird Island *in situ* size distributions and indication percentage under the legal size (114 mm shell width): comparison to data from MCM in 1986.** Comparison of work undertaken by MCM in the 1980s and in this study. The size intervals used in both studies were different as indicated. Abbreviation used: n - number of samples; MLS – minimum legal size.

This suggests a higher level of overexploitation than within the Bird Island MPA, with both sites exposed to continuous fishing effort. Monitoring of abalone recruitment at Cape Recife in this study revealed that larvae were still settling in the shallows despite the local depletion of large abalone. Densities of juvenile cryptic abalone at the rock pool sample site were highly variable, ranging between 2.4 and 13.7 abalone m^{-2}, measured biannually between December 2005 and December 2007. These densities were slightly, but not significantly, lower than the average densities recorded by Godfrey (2003) at the same sample site.

2.3.4. Enforcement

In this section, a description of the enforcement strategies and tools employed by various government authorities in combating the highly organised abalone fishing groups in the Eastern Cape Province is provided based on interviews with members of the law enforcement agencies, other local

stakeholders such as the recreational diving fraternity (refer to Table 2.1), and data collected in this work.

South Africa's fisheries authority, MCM, is the primary agency mandated to undertake fisheries MCS. In response to the escalating IUU fishing in South African territorial waters, MCM restructured and upgraded their Compliance Directorate to a Chief Directorate 'Monitoring, Control and Surveillance' in 1999 (Hauck and Kroese, 2006). This directorate comprised three sub-directorates, including: (i) Compliance/Control; (ii) Environmental Protection Vessels (EPV)[7] and (iii) Monitoring and Surveillance with a Specialised Unit and a Serious Offences Unit (DEAT, 2006b).

However, illegal abalone fishing is not simply a marine resource issue and involves a variety of criminal activities. Therefore other agencies of state have played a role in combating crimes related to illegal abalone fishing, either in partnership with MCM, or independently. These have included the various branches of the South African Police Services (Organised Crime, Crime Intelligence, Border Control, Dog Unit, Endangered Species Unit, Water Wing, Air Wing and others), the SANDF, the NPA (Asset Forfeiture Unit and the Directorate of Special Operations), the NIA, South African Revenue Services (SARS), SANParks, the provincial nature conservation authority and the environmental compliance arms of local authorities.

MCM Monitoring, Control and Surveillance in Port Elizabeth

In 1997 when organised abalone fishing began in Port Elizabeth, the local Fisheries Compliance/Control inspectorate employed eight Marine Conservation Inspectors (D. Mostert, Chief Marine Conservation Inspector, pers. comm.) who were essentially occupied with commercial quota control in the harbour. Realising that their manpower was insufficient to meet the increase in illegal abalone fishing, and under heavy public pressure to react to the problem that had escalated, MCM Compliance/Control initiated a partnership with the SAPS in 2002. This partnership saw the formation and funding of an Abalone Task Team (ATT) based in the Port Elizabeth metropole. The composition of the ATT has been altered several times since its inception, but has generally

[7] The sub-directorate EPV is relatively young, with the acquisition of five new fishery protection vessels since November 2004. The largest vessel called the 'Sarah Baartman' is designed principally to monitor fishing activity on the high seas. Three similar but smaller protection vessels patrol the inshore waters. These smaller vessels are each 47 m long and 8 m wide, and are capable of reaching a top speed of 25 knots. All the vessels equipped with a semi-rigid inflatable boat, allowing the fisheries inspectors to board and inspect fishing boats. MCM's latest asset is a 40 million ZAR, hard-hulled, 14 m long vessel, designed for high speed chases in the inshore waters. This vessel can reach speeds of up to 60-70 knots (source: http://www.environment.gov.za; http://www.mcm-deat.gov.za).

comprised approximately six members of the SAPS Dog Unit (who had been working independently on illegal abalone fishing for a number of years), the SAPS Crime Prevention Unit, and the SAPS Air Wing's ground support policemen. Overtime commitment by the task team members was compensated by MCM, and this together with a 4X4 vehicle provided by the fisheries authority represented a commitment of 1 million ZAR in funds per year. However, despite the ATT's success in making arrests (see section below), the task team was disbanded and reinstated at least three times following its inception, until MCM withdrew completely from the initiative in early 2006. Subsequently, the SAPS independently kept the ATT running, but downgraded it to a two to three member team.

The MCM Compliance/Control section in Port Elizabeth has been the least effective agency in combating illegal abalone fishing. The monitoring of commercial landings in the Port Elizabeth harbour was outsourced in October 2002, potentially freeing the Compliance/Control inspectors to focus on illegal abalone fishing. Despite this, however, the morale of the inspectors had already been hit hard by the apparent lack of dedicated funding from MCM headquarters to upgrade their equipment in order to confront the highly organised abalone fishers, and to remunerate their overtime commitment. Moreover, a high turnover of officials meant that a great deal of time had to be dedicated by senior inspectors to the training of apprentice inspectors. Consequently, enforcement efforts were limited largely to visible policing along the coast, and reaction to complaints received by the public at large. Data obtained from the ATT shows that less than 1 % of abalone confiscated by law enforcement agencies was seized by MCM personnel in 2004 (Table 2.2) reflecting the poor performance of this agency in combating illegal abalone fishing.

MCM provided additional resources and a fresh impetus to combat illegal abalone fishing in 2005 with the stationing of a new EPV in the Port Elizabeth harbour. Six additional Marine Conservation Inspectors were employed to man the EPV on a rotational basis, and to provide ground support and assistance to the existing Compliance/Control section. However, the vessel proved largely ineffective in apprehending abalone fishers as 'lookouts' posted in the harbour and along the coast warned fishers of its movements, and its relatively low speed compared to the highly-powered 'superducks', restricted its strike capabilities. Interviewed abalone fishers reported that the EPV acted as a deterrent when deployed in remote areas such as Bird Island; however, as soon as it left they would return to resume their illegal efforts (see data in section below on the presence of the EPV at Bird Island and observations of illegal fishing vessels).

To match the speed of the 'superducks', MCM invested in a rigid high speed chase vessel, but its effectiveness also proved to be limited as it could not operate at the necessary speed in rough sea

conditions. Furthermore, this vessel could not manoeuvre in the surf zone or river estuaries that were used by the illegal diving groups to escape with their responsive semi-inflatable boats. Lastly, MCM did not initially have sufficient skippers with night rating and thus no vessel operations were undertaken against illegal fishers after dark.

Involvement of other government agencies

The highly organised nature of the illegal abalone fishing groups, and the large public outcry about the problem, led to several other agencies of state becoming involved in 'anti-poaching' efforts in Port Elizabeth.

Through its various branches, SAPS has played the most substantial role in combating illegal abalone fishing and trafficking in the Eastern Cape Province. Data for 2004 indicate that more than 99 % of abalone confiscated was seized by SAPS agencies (Table 2.2). Translated into values using the legal export price of 230 ZAR per kg of abalone, the SAPS were responsible for the recovery of more than 11 million ZAR in 2004. Port Elizabeth SAPS Organised Crime Unit, which has preferred to operate fairly independently of other SAPS departments, the ATT and MCM, has been particularly effective in effecting arrests and build strong cases against organised syndicates.

Table 2.2. Performance of the various law enforcement bodies with respect to the amount of abalone confiscated in 2004

Organisation/branch	kg shucked	% of total	Beach price (250 ZAR /kg de-shelled)	Legal price (230 ZAR / kg whole mass)
ATT	1 1487.1	70	2 986 646	7 839 949
SAPS extern	1313.35	8	341 471	896 363
SAPS PE	3555	21.7	924 300	2 426 287
MCM PE	60.2	0.4	15 652	41 086
Total	16415.65	100	4 268 069	11 203 680

These data were obtained from the Abalone Task Team (ATT).

On several occasions, the SANDF deployed military personnel along the coast to assist the ATT and MCM. While the presence of soldiers was an extremely effective deterrent to the illegal fishers, this level of force could not be sustained for longer than a few weeks at a time as it was a financial burden to the SANDF. Fishers returned as soon as the SANDF presence was withdrawn.

Other short-lived tools have been the use of the SAPS Water Wing patrol boat, and the transfer of SAPS members from other towns, in an attempt to curb corruption (in the form of bribes by the illegal fishers, the use of police vehicles to transport the abalone, or simply the presence of many illegal fishers' relatives in the SAPS).

Additional actions to curb illegal fishing activity have included:

- The restriction of access to the diving 'hotspot' in the Cape Recife Nature Reserve by the Nelson Mandela Bay Municipality.
- A review of by-laws for vessel use on the Swartkops River Estuary with a view of prohibiting illegal fishers from launching their high-powered boats in the municipal rivers.
- Closure of access to the public slipway in the Port Elizabeth harbour in 2005, which was previously used heavily by boat-based divers.
- The drafting of an 'Abalone Action Plan' as part of Nelson Mandela Bay Municipality's 'Draft Coastal Management Programme' (Stewart, 2007). At the time of writing, the document was still in draft form awaiting comments and approval (W. Stewart, SRK Consulting, pers. comm.).

Illegal abalone fishing spreads to other areas: Ndlambe Local Municipality's response

While Port Elizabeth was the base from which the organised abalone fishers operated, their activities began to spread further afield in 2006 as they located off more productive abalone beds. A sudden influx of boat-based divers into Ndlambe Municipality occurred in 2006 prompting the Municipal Environmental Conservation Department to take the lead in countering this new threat (Figure 2.13). With limited personnel (three municipal conservation officers and two local SAPS Inspectors not solely dedicated to combating illegal abalone fishing) and limited equipment (4.7 m semi-rigid inflatable boat with single 65 hp engine), innovative methods were used to disrupt the illegal operations. Diving activity was monitored using a network of informants and divers were confronted when launching their boats or returning from sea in the Port Alfred harbour. At every opportunity, divers were stopped and searched, and repeatedly fined for non-compliance with traffic (road worthiness and annual licenses) and South African Marine Safety Authority (SAMSA) regulations (mandatory life jackets and other safety equipment). Moreover, empty dive waist bags and flat-bladed tools used for abalone harvesting, were confiscated under the resolutions of the Prevention of Organised Crime Act (No.121 of 1998; Republic of South Africa, 1998b) and the MLRA Act (No. 18 of 1998; Republic of South Africa, 1998a). These actions served a dual purpose: disrupting the illegal fishers' activities, and most importantly, building up intelligence information and profiles of the illegal fishers.

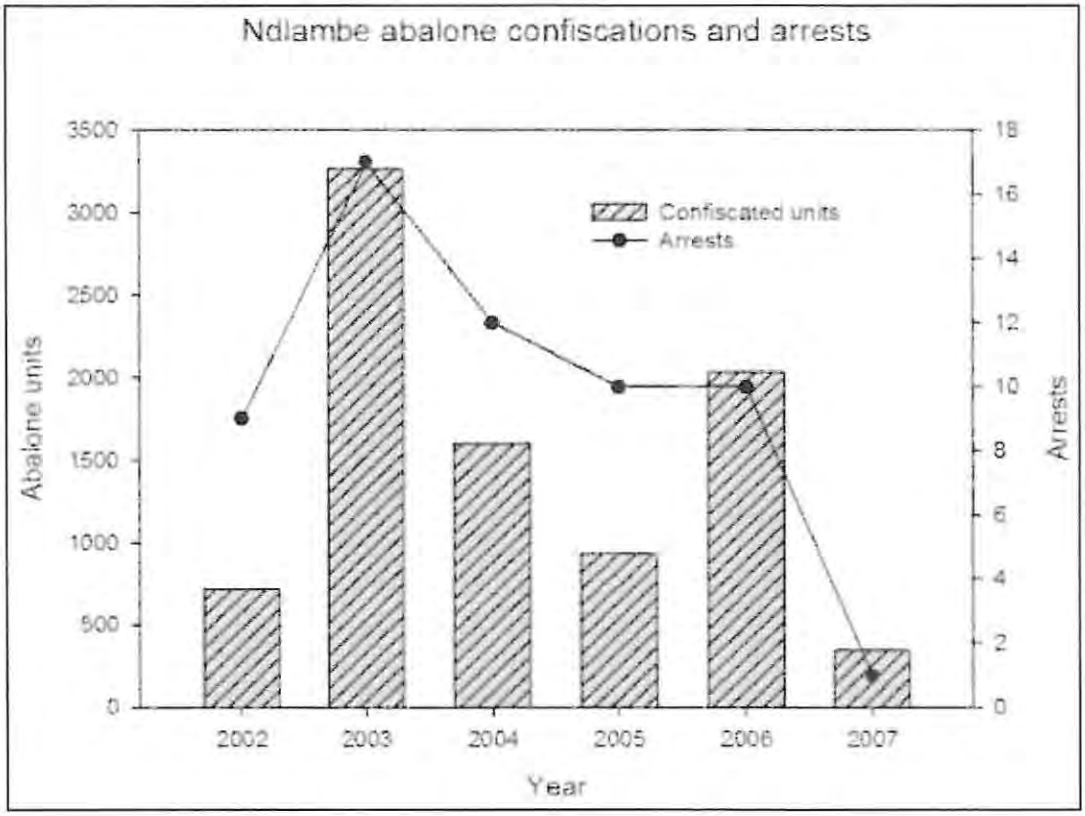

Figure 2.13. **Ndlambe Muncipality's abalone confiscations and concurrent arrests since 2002.** These data do not include the abandoned abalone retrieved. The recording of these data only commenced in 2002.

With the abalone diving activities along Ndlambe's coastline becoming increasingly publicised, the local municipality and the Provincial SAPS formed a local ATT in May 2006 with nine dedicated members. A special telephone 'hotline' was set up for the public to report suspicious activities, and additional equipment was purchased, including a 5.5 m semi-rigid inflatable vessel with twin 60 hp engines. The ATT was disbanded after 3 months due to reallocation of resources by the SAPS. The team thus reverted back to the original enforcement team, championed by the Environmental Conservation Department. Support for the operation by MCM was conspicuously lacking: (i) a Memorandum Of Understanding between MCM and Ndlambe Local Municipality, allocating financial support from the Marine Living Resources Fund was terminated (R. Fox, Ndlambe Environmental Conservation Inspector, pers. comm.), (ii) the local MCM Compliance/Control office's activities were limited to monitoring the harbour landings, and (iii) the MCM EPV Unit provided assistance to Ndlambe on only two occasions during 2006.

Despite the limited manpower, lifespan, support and capacity of the local ATT, shore-based as well as boat-based divers' activities were significantly disrupted: 10 arrests were made, 2035 units of abalone confiscated (over 1 ton of whole mass; Figure 2.13), originating mainly from shore-based

groups. Moreover, the illegal activities of several boat-based groups were impeded by the confiscation of waist bags and tools, or the disturbance of these groups attempting to dive at the targeted dive locations.

Illegal abalone fishers rapidly adapted to the new interventions, circumventing the Municipality by launching their vessels further north, by engaging local recreational ski-boat owners to deliver their waist bags and tools to their vessels at sea, or simply by increasing their intelligence information on the whereabouts of the ATT members. Overall illegal fishing activities along Ndlambe's coastline decreased significantly in 2007 (Figure 2.6), but by the end of 2007, a second upsurge of illegal abalone fishing activities occurred, with boats arriving at night, directly from Port Elizabeth by sea.

Bird Island, MCM and SANParks

The Bird Island MPA is home to a rich abalone resource that was increasingly targeted by boat-based divers from 2003 onwards (Figure 2.5). A period of intensive monitoring of the presence of illegal abalone fishing vessels and law enforcement operations was carried out for six months in 2007 by the SANParks personnel based on the island. This monitoring revealed that the MCM EPV patrolled the MPA 27 times over a six month period, while at least 210 illegal diving boat observations were observed in the MPA during the same period. For a short period of time, a SANDF helicopter was deployed to pursue escaping divers' boats, and the MCM semi-rigid inflatable boat was launched from the EPV on nine occasions. In all cases the MCM EPV arrived too late – an average of 2 hours after the diver groups had left the MPA or the next day. On only one occasion, the MCM EPV arrived at the site within an hour after the divers' arrival, effectively disrupting their operations. During this six month patrol period, no arrests were made of the boat-based divers with their catch out at sea. Nevertheless, on those days that the MCM EPV was stationed within the MPA for longer periods of time, no illegal abalone fishing boats were observed. However, the illegal fishing boats would arrive one hour or more after the MCM EPV had left the area, if the sea conditions were favourable for diving. The ability of law enforcement agencies to defend Bird Island against illegal fishers was further compromised by the opening of South Africa's MPA's for recreational SCUBA diving in 2007 (DEAT, 2006a). It is usually not possible to catch divers in possession of abalone, and thus arrest for illegal diving in an MPA was a useful instrument for combating illegal fishing. The dive ban at Bird Island was reinstituted in 2008 as part of a regulation to protect abalone stocks (DEAT, 2007a).

The promulgation of the Bird Island Group of Islands in 2004 stipulated SANParks as the manager of the MPA (DEAT, 2004), however transfer of jurisdiction over the marine component to SANParks was delayed until 2008 by bureaucracy within DEAT. Since 2006, SANParks has invested substantially in

vessels, personnel and infrastructure on the island. This included the deployment of a crack 'anti-poaching' team of eight personnel equipped with a 'superduck', dive capacity, and weaponry. Following the high profile arrest of 10 divers in the water at Bird Island in January 2008 by MCM personnel, day time abalone fishing activity ceased and shifted to after dark.

2.4. Discussion

The majority (80 %) of interviewees (Table 2.1) in this study were of the opinion that the government had failed to grasp the scale of the illegal abalone fishing problem in the Eastern Cape Province, and was ill-equipped to deal with the organised criminal nature of the enterprise. This view is supported by the data, which show that a well organised, commercial illegal abalone fishery developed in Port Elizabeth despite the involvement of several agencies of government in combating illegal abalone fishing. By 2005, the scale of the illegal fishery was remarkable: a fleet of 30 purpose-built vessels existed with a capital investment of 18 million ZAR, employing at least 300 full time crew and harvesting 1000-2000 tons of abalone with an export-value of 35-70 million USD. The reason for the rapid development of the fishery is obvious – due to the high price of abalone, an individual diver could make in the region of 40 000 ZAR from 100 kg of abalone in a single trip, with minimal capital investment and risk. The survey of government's enforcement response to the problem reveals that while considerable resources were deployed to combat the various criminal activities associated with the problem, enforcement agencies lacked a coordinated strategy. Most 'anti-poaching' operations were short term, and the resources dedicated to combating illegal fishing were no match for the well equipped and highly organised illegal syndicates with their sophisticated intelligence network. Similarly, in the Western Cape Province with a legal commercial fishery at stake, several large-scale law enforcement operations have been designed over the years to combat illegal abalone fishing (Hauck and Hector, 2000; Hauck and Kroese, 2006; Hauck and Sweijd, 1999; Herbig and Joubert, 2002). However, implementation of these operations has also been fragmented, uncoordinated, largely reactive, and above all, unsustained.

With the shift from opportunistic shore-based diving, which almost certainly evolved out of a popular recreational fishery, to more organised boat-based abalone fishing, arrests near the Port Elizabeth metropole dropped (Figure 2.14) and the abalone harvest increased (Figures 2.5 and 2.6). The apparent contrast between the decrease in arrests and the increase in abalone confiscations (Figure 2.7) is also explained by a shift in focus by the SAPS Organised Crime Unit from catching divers to breaking up syndicates. The majority of abalone are confiscated at catch accumulation points or from transport vehicles, resulting in only a few individual arrests. Boat-based divers interviewed in 2007 reported that their risk of arrest and successful prosecution was minimal. They estimated that law

enforcement activities forced them to abandon their catch once every 15 to 20 diving days on average, while shore-based divers would have to leave their bags for later pick up once every 6 to 7 dives. The data and observations of the boat-based diving at Bird Island and within Ndlambe Municipality confirmed that the state had no effective sea-based force capable of halting the fishing operations of the fleet of 'superducks'. The illegal operations were effectively organised pillage of a high-value resource. Similarly, the lack of sea-based compliance capacity to intercept illegal abalone fishing vessels in the Western Cape Province was identified by Hauck and Hector (2000) as a flaw in the 'Operation Neptune anti-poaching' initiative.

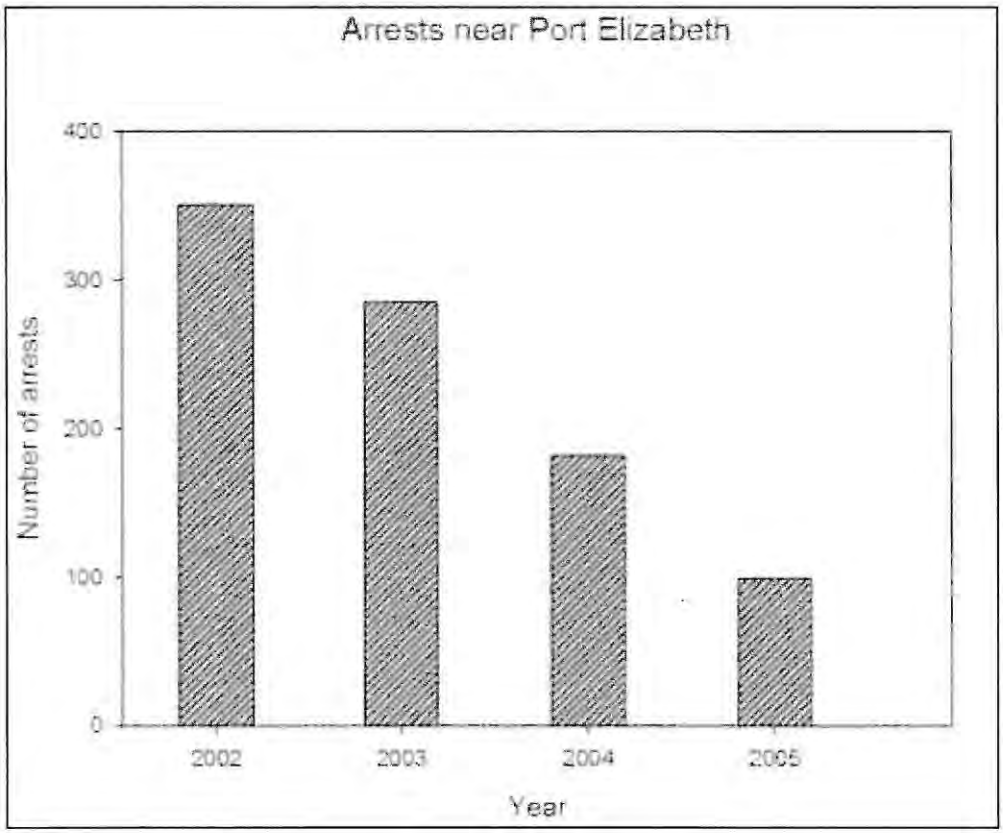

Figure 2.14. **Number of illegal abalone fishing-related arrests near the Port Elizabeth metropole in 2002-2005.**

The high level of illegal fishing effort has had a dramatic effect on the abalone stock, which shows symptoms of decline and even collapse in places. The average size of abalone decreased at all sites monitored, to as low as 80 g of flesh per individual abalone in 2007 at Cape Recife, which has been fished heavily since 1997. Abalone density measured at Cape Recife and Bird Island also reflected a dramatic decline. While indicators showed a decline in the resource, it remains to be determined if the collected data would be able to project abundance trends when integrated into an age-structured production model such as the model developed for abalone resource assessments in the

Western Cape. The latter model takes into account confiscations data that has been recorded in the same manner as performed for this study (Plagányi *et al.*, 2001).

Resource decline was also reflected in diver behaviour with the shift to fishing areas further afield, and the increasing involvement of abalone divers in other activities such as the illegal trade in cycads, parrots, shark fins and rock lobster. Nonetheless, illegal abalone fishing near the urban centres of the Eastern Cape Province continued unabated in 2007/8, even on more depleted reefs. Notably, it takes no more than six abalone per diver (1.5 kg of abalone meat) to cover the running costs of a boat-based operation.

Given the scale of the sea-based illegal fishing operations revealed by this research, MCM's approach of visible policing and reaction to reports of illegal diving was clearly inadequate. By March 2007, the Minister of Environmental Affairs and Tourism still believed that MCM's compliance strategy was effective and that illegal abalone fishing had declined as a result of the fishery authority's interventions (van Schalkwyk, 2007). Therefore, we recommended a military-style enforcement approach to MCM whose vessels and manpower were no match for the abalone fishers (Raemaekers *et al.*, 2007b). This would comprise a strike force, (i) capable of simultaneous 24/7 deployment along the coast, (ii) equipped with the right tools (vessels with similar capability to the 'superducks'[8], air support, etc.), and (iii) staffed with the appropriately trained personnel (diving skills, experienced skippers, weapons training, etc.). While MCM was slow to react, a number of successful arrests of illegal fishers at sea were carried out in January 2008 with combined operations involving patrol vessels, helicopter air support and shore-based teams to intercept the fleeing fishers. In addition, SANParks deployed a dedicated team of eight skilled personnel equipped with suitable vessels, dive capability and weaponry to protect the Bird Island MPA. A further useful tool for combating abalone fishing operations was the prohibition of any kind of diving, and the possession of prohibited diving gear on board any vessel in selected areas, specifically MPA's (DEAT, 2007a). For the Eastern Cape, only the Bird Island MPA has been listed.

While this study has focussed primarily on the illegal abalone fishing operations, the criminal activity associated with the other aspects of the illegal trade requires a much wider institutional response. Other analysts have reported on the involvement of international organised crime in the abalone trade and the South African state's response to it (Gastrow, 2001; Steinberg, 2005). There is growing recognition of the need for a coordinated, multi-agency approach if the state is to be effective in dealing with the problem (Y. Vosloo, NIA, pers. comm.). This stems from the need to cooperate in the

[8] With the budget that MCM had allocated to its high speed chase vessel several 'superducks' could have been bought and strategically deployed.

assembly of incriminating evidence, including the interchange of intelligence data on illegal fisher profiles and whereabouts. Hauck and Hector (2000) even go as far as to state that while the large-scale enforcement initiative 'Operation Neptune' in the Western Cape had a positive impact on curbing illegal fishing activity along its jurisdiction, it's uncoordinated approach had been a contributing factor to the shift of organised syndicates and fishing effort to the Eastern Cape. Unfortunately, during the study period (2004-2007) MCM centralised enforcement efforts and broke partnerships that it had developed with agencies such as the SAPS and local municipalities. For example, agreements to support the relatively successful 'anti-poaching' programmes of the Ndlambe and Overberg (Western Cape) municipalities were terminated on the grounds that municipalities were "inappropriate agencies" for conducting marine compliance (M. Mayekiso, MCM, interviewed on SABC TV's 'Special Assignment' programme, 2007). A further blow in 2006 was the suspension of the dedicated environmental courts that had been highly effective in prosecuting abalone cases. In their place, an Environmental Management Inspectorate was established by DEAT to prosecute environmental cases in existing courts.

The preceding discussion highlights the lack of a national vision, and concomitant strategies describing roles and mandates of the collaborating institutions, as well as the tools to be used, as the most important causes underlying the mismatch between the law enforcement activities and illegal fishing effort levels observed near the urban centres of the Eastern Cape.

The escalation of illegal abalone fishing operations, the ineffective and centralised enforcement attempts, and the resultant ecological effects on the abalone resource described in this paper using a fishery system approach also reflect a broader management failure within MCM, South Africa's authority responsible for fisheries management and compliance. Despite the demonstrated presence of a substantial abalone resource in the Eastern Cape Province by the illegal fishing activity, MCM's strategy to date focussed primarily on law enforcement and neglected the obvious opportunity to develop a legal and sustainable fishery. A 'Management Plan for the Eastern Cape Abalone Resource' that was drafted for MCM in 2002 (Britz *et al.*, 2002) was not implemented, effectively leaving the resource to the illegal fishers to harvest. The management plan recommended that abalone fishing rights be allocated using a TURF management system, which has shown promise in several other marine benthic invertebrate fisheries around the world (Arbuckle, 2000; Bernal *et al.*, 1999; Defeo and Castilla, 2005). The concept of managing the abalone resource as TURFs found some currency within MCM, as abalone fishing rights were allocated as 'TURFs' in the Western Cape Province in 2003. However, this rights-based model was flawed as divers from areas with depleted abalone stocks were allowed access to neighbouring 'TURFs'. In the Eastern Cape, the TURF-based

management plan was never implemented – save for a failed attempt to establish 'small-scale commercial TURFs' in traditional communal areas (refer to Chapter 3). The reasons MCM managers did not implement the management plan included (i) that they did not want to increase fishing effort in the face of the illegal fishing boom, (ii) the lack of compliance capacity in the Eastern Cape, (iii) the lack of knowledge regarding the abalone stock status within the different TURFs, and (iv) the failure of the TURF system in managing the abalone fishery in the Western Cape Province. In 2007, in the light of the serious resource depletion demonstrated at Cape Recife, MCM in principle approved a plan reseeding the site with hatchery-reared juvenile abalone by a commercial entity – effectively a 'rehabilitation TURF' as defined in the management plan.

2.5. Conclusions

Illegal exploitation of abalone in South Africa is believed to be the most criminalised wildlife trade in Africa today (M. Bürgener, TRAFFIC 2006, http://www.traffic.org). As illustrated in this study, the Eastern Cape Province has become a major source of supply for the illegal abalone trade due to the failure of the state to implement (i) effective sea-based compliance and (ii) an accepted fishing rights regime and legitimate governance framework. This, combined with the other incentives to fish abalone (high price, low cost, ease of access) created the conditions for the shore-based, relatively informal fishing operation to evolve into a sophisticated and efficient sea-based operation. Although the resource is facing serious decline, illegal abalone fishing will remain profitable, undiminished and unhindered for several more years if the current enforcement capacity and fisheries management approach remains unchanged.

The large illegal catches demonstrate a missed opportunity to develop a legal fishery in the Eastern Cape that might have led to better control of illegal fishing efforts. Even though biological indicators suggest that abalone stocks are in serious decline in the more accessible areas, significant catches are still being made and larval recruitment has not been impaired to such an extent as to result in complete population collapse. Legalising a fishery might thus still be a worthwhile consideration, although significant effort will be necessary with regards to the institutional arrangements and the rehabilitation of depleted stocks, by means of effort control or reseeding. It is concluded that the lack of compliance capability in combating boat-based illegal abalone fishing has been a 'missing link' in South Africa's otherwise quite substantive, albeit poorly coordinated and centralised, response to illegal abalone fishing in the Eastern Cape. While enforcement arms have done their best to combat abalone linked criminal activity on shore, the unrestricted market supply of product from the abalone fishing fleet meant that the state would always be reactive to the illegal abalone trade and one step

behind the fishers. This has also come at a great economic loss to the country, in the range of 35-70 million USD per year.

Although progress in combating illegal abalone fishing has been made over the years, the 'counter-poaching' measures suggested here and by others[9] will only be effective in halting the demise of the abalone resource if they are integrated into a coordinated, holistic and adaptive management strategy. In addition, the underlying socio-political and economic factors that are driving the illegal trade near the urban areas of the Eastern Cape Province will need to be understood and addressed within an acceptable governance framework.

[9] Britz *et al.* (2002); Cederrand (2003); Enviro-Fish Africa (2001); Godfrey (2003); Hauck (2005); Hauck and Hector (2000); Hauck and Kroese (2006); Hauck and Sweijd (1999); Herbig and Joubert (2002); Raemaekers *et al.* (2006); Raemaekers *et al.* (2007); Snijman (2005); Steinberg (2005); Tarr (2000); Willock *et al.* (2004).

CHAPTER 3:

Regulating Harvesting Fever for Abalone (*Haliotis midae*) in Rural Communities of the Eastern Cape Province, South Africa: Permits for Poverty Alleviation

3.1. Introduction

Rural inhabitants of the Eastern Cape coast of South Africa have relied on subsistence fishing as a source of food for several thousands of years (Bigalke, 1973; Feely, 1987; Hockey *et al.*, 1988; Lasiak, 1992). However, it was only in the 20th century, with the advent of holiday makers and the establishment of holiday resorts, that the commercial value of local marine resources became apparent. Since the 1950s, this demand has been satisfied by the traditional coastal communities, whose growing population has become increasingly reliant on marine resources as part of their subsistence livelihoods (Robertson and Fielding, 1997). Over the last two decades, however, remote sources of high-value natural products have increasingly been targeted by buyers to fill the growing supply-demand gaps within the rapidly globalising economy (Garcia and Charles, 2008; Marshall *et al.*, 2001). People from traditional rural communities in the Eastern Cape have begun to sell resources such as line-fish, lobster and abalone to buyers of high-value marine products for national and international markets (Fielding *et al.*, 1994; Robertson and Fielding, 1997).

Prior to the dramatic increase in Asian demand for abalone that started in the late 1990s (refer to Chapter 2), abalone was not specifically targeted by small-scale fishers in the Eastern Cape. Rural small-scale fishers, traditionally mainly Xhosa women and young children, would typically harvest a basket of intertidal resources including abalone (locally known as 'ingquba') by wading at spring low tide, for personal consumption or for occasional sale to holiday makers. However, as will be shown in this chapter, an awareness of the high value of abalone developed in the late 1990s, and many realised that the sale of this resource on the black market could generate an immediate source of disposable income for their poverty stricken households. Encouraged by external demand from the organised abalone trading syndicates operating from the urban areas, the coastal villagers from the rural areas – increasingly men attracted by the instant cash return – shifted their fishing effort towards targeting abalone only. By 2000, reports of increased abalone harvesting along the coastline of the former homelands[1] of Ciskei and Transkei (Figure 3.1) had become widespread, and in some instances this harvesting took on characteristics of a 'gold rush' with hundreds of people targeting abalone in certain localities at spring low tide. In 2004, fisheries control officers had arrested women and children harvesting abalone at night (D. Mostert, fishery inspection officer, pers. comm.), and it was clear that the financial incentive to harvest abalone was so high that law enforcement alone

[1] Homeland or Bantustan was territory set aside for black inhabitants of South Africa, as part of the policy of the apartheid regime. The Ciskei and Transkei were declared as self-governing territories (independent homelands) in 1981 and 1976 respectively, and only re-incorporated into the Republic of South Africa with democracy in 1994. These terms are still used to refer to the region in the Eastern Cape Province directly west and east of East London (Great Kei River), where people still traditionally live on communal lands (refer to Figure 3.1).

could not halt the illegal fishery that had spontaneously developed. It was suggested that the fishery should be legalised and fishing effort controlled (P. Britz, Rhodes University, pers. comm. to the Deputy Director General of Marine and Coastal Management, 2004).

The fisheries authority, guided by the mandate of the newly enacted Marine Living Resources Act (Act No. 18 of 1998; Republic of South Africa, 1998a) to "utilise marine living resources to achieve economic growth and human resource development", was in favour of extending fishing rights to coastal communities, but their challenge was: could the growing abalone harvest by traditional rural communities be legalised and conducted on a sustainable basis? An urgent decision had to be made despite the lack of biological information, and high risk to the resource, because it was clear that harvesting would continue regardless of whether the fisheries authority issued some form of fishing right or not. It appeared that the risks of issuing rights outweighed the certainty of resource depletion if the fishery remained illegal.

Dealing with individual fishers in a poor traditional community represented a completely new management context for the fisheries authority, who had historically only dealt with industrial fishers of empowered companies. Guided by the 'Eastern Cape Abalone Management Plan' prepared by Britz *et al.* (2002), and the Subsistence Fisheries Task Group recommendations (see Chapter 5), MCM initiated a co-management process, whereby government and resource users would share responsibilities and decision-making powers in order to manage a resource in partnership (Hauck and Sowman, 2003). Therefore, in 2001, the Hamburg community was selected as the first co-management pilot site in the Eastern Cape, and members were issued with 'exemptions in terms of the MLRA to undertake subsistence fishing of abalone' (hereafter called permits). In 2003, annual permits were also issued in three communities of the Transkei region (Figure 3.1).

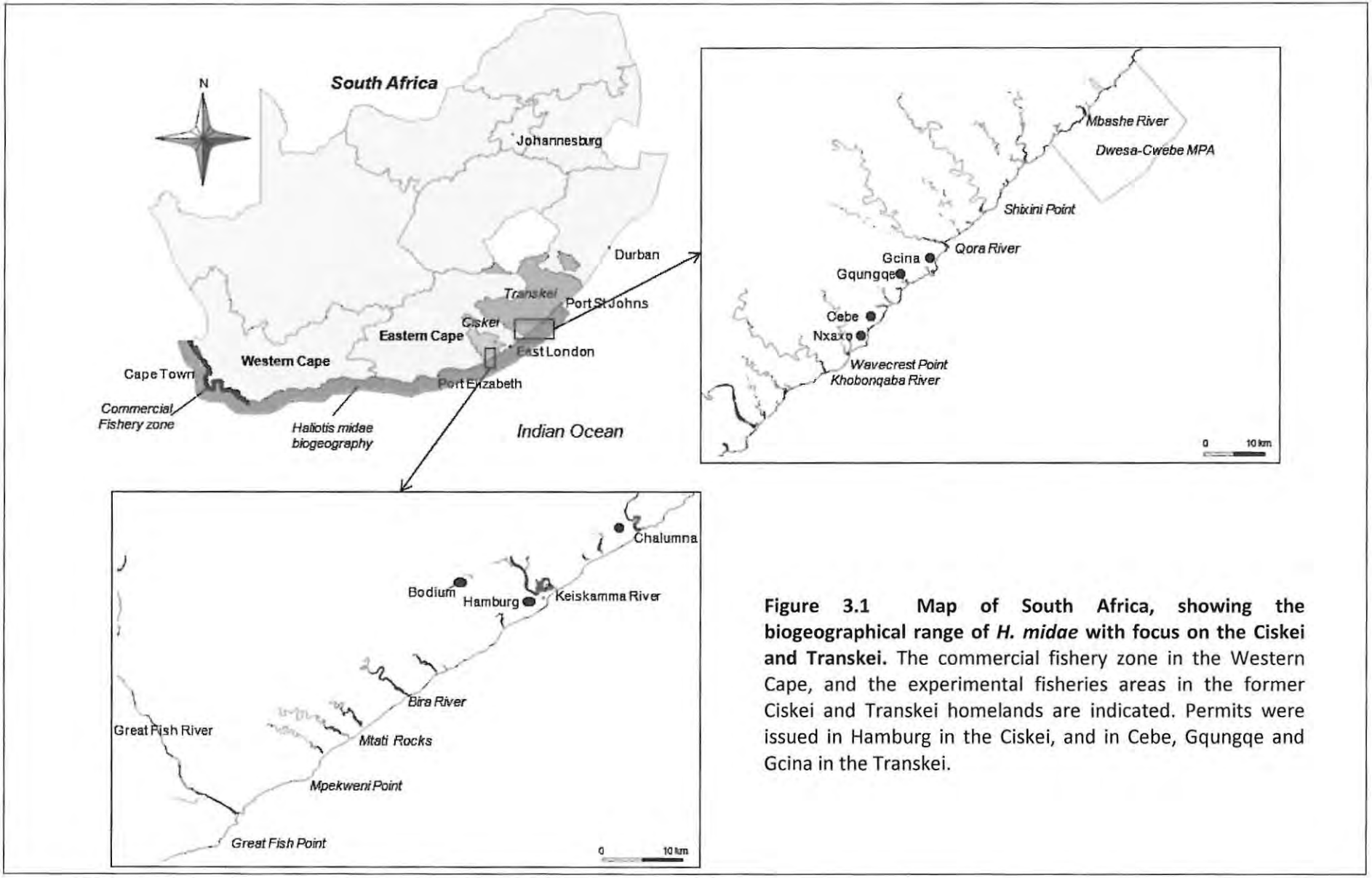

Figure 3.1 Map of South Africa, showing the biogeographical range of *H. midae* with focus on the Ciskei and Transkei. The commercial fishery zone in the Western Cape, and the experimental fisheries areas in the former Ciskei and Transkei homelands are indicated. Permits were issued in Hamburg in the Ciskei, and in Cebe, Gqungqe and Gcina in the Transkei.

The goal of the experimental fishery was to provide the community with long-term small-scale commercial TURFs once the fishery was proven viable (Britz *et al.*, 2002). The small-scale TURFs were to be managed by a local community structure. The rationale behind the implementation of these TURFs was based on common-property theory which proposes that property rights create institutional incentives among fishers for long-term resource use (Ostrom, 1990). Even though 'subsistence' permits allowing the harvest of four abalone per person per day were initially issued, it was envisaged the fishery would develop into a 'small-scale commercial 'fishery. This was in line with the recommendations of the government-appointed Subsistence Fisheries Task Group (SFTG; see Chapter 5) for high-value resources, and subsequent management plans developed for the Eastern Cape abalone resource (Britz *et al.*, 2002; Britz *et al.*, 2003). By relying on a co-management process, it was foreseen that securing community members with individual user rights to abalone, together with the establishment of local committees to facilitate communication with law enforcement arms of the fisheries authority, would instil a sense of ownership of the resource among the permit holders. In return for the secured rights and income that would stimulate sustainable use, permit holders were anticipated to assist in the MCS activities of 'their' stock. This in turn was anticipated to benefit the fisheries authority that had very little MCS capacity along this stretch of the coast.

Since there was scant knowledge about the abalone stock status, and therefore no means of determining whether current fishing effort was sustainable, MCM provided funding to carry out a one-year diving and fishery monitoring survey (Godfrey *et al.*, 2005[2]). Given the financial and logistical constraints, and the universal difficulty of accurately estimating abalone abundance (Breen, 1992), the goal of the project was not to provide a formal stock assessment study, but to monitor possible changes in size and density owing to the increase in fishing effort in the experimental fishing areas. The goal of the experimental fishery was to achieve sustainability, but given the 'gold rush' character of the fisher behaviour at the time, it was clear that a traditional, biological stock assessment could only paint an incomplete picture for management, and the information would be out of date by the time decisions were made. Realising that if effective resource management decisions were to be made, and a system of co-management implemented, information about the status of the resource, and factors motivating fisher behaviour was urgently required.

As the only researchers in the field, our challenge was to design appropriate indicators for rapidly appraising the resource status and fisher behaviour. The MCM-commissioned study was thus extended to understand fisher behaviour and to determine the socio-economic conditions of the rural fishers (Godfrey *et al.*, 2005; Raemaekers *et al.*, 2007b). It was recognised that fisher behaviour

[2] This contract formed the basis for the research presented here.

could provide additional insights into the stock status and trends, such as the decline in fishing activity in overharvested areas and the shift of fishing activity towards virgin areas. Moreover assessment of fisher behaviour would also provide information on how to manage fishing effort by means of incentives. Given the data-poor context of the Eastern Cape Province (see Chapter 1), this study was conducted using a wide array of quantitative and qualitative data-gathering tools (Table 3.1), and by adopting a fishery system approach.

The aim of this study was to understand the rapidly evolving fishery and analyse the outcomes of the experimental fishery. This was achieved by understanding (i) the broader socio-economic context of targeted rural communities, (ii) the traditional livelihood of harvesting marine resources and adaptive fisher behaviour to target abalone, (iii) the expansion of illegal networks targeting abalone, and (iv) the lack of management support from MCM. This study provided an opportunity to undertake action research and evaluate MCM's implementation of co-management and its TURF policy. The information was therefore fed back to MCM managers and scientists as it was gathered.

3.2. Material and Methods

3.2.1. Study area

Research was undertaken at two sites where experimental permits were allocated: one village is situated in the Ciskei, and three villages – which were managed as one by the fisheries authority – are located in the Transkei (Figure 3.1).

The Hamburg village is situated at the mouth of the Keiskamma River. It can be characterised as a coastal peri-urban village, and is situated within the former Ciskei homeland. Coastal boundaries of the Ciskei were delineated by the Great Fish River in the south, and the Chalumna River in the north. This coastline is approximately 50 km long and characterised by dune fields and long sandy stretches interspersed by extensive but shallow aspect rocky reefs (wave-cut platforms or rocky headlands) where the abalone are found. There are few pronounced points which means that the abalone habitat is almost always subjected to wave action. The Hamburg village qualifies as the only settlement directly situated along the Ciskei coast, except for holiday accommodation at several other estuaries. Other rural villages are situated further inland, and access points to the shore are usually located near the estuaries.

In the southern region of the Transkei, the target communities are known as Cebe, Gqungqe and Gcina (Figure 3.1). All three communities are, in fact, traditional administrative areas, each comprising several villages. The three administrative areas were included within the Mnquma Local Municipality (as a single ward) after the amalgamation of the Transkei Republic into the Republic of

South Africa. Nowadays, this entire region is often referred to as the 'Wild Coast', due to its remoteness and persisting traditional rural character. The coastline is characterised by short sandy stretches interspersed with low aspect rocky reefs. Numerous perennial and non-perennial rivers occur here and there is a distinct lack of pronounced embayments. Reefs are very patchy and shallow. Fielding *et al.* (1994) found abalone only in very shallow areas (less than 5 m) with most occurring less than 2 m deep. This makes the southern Transkei abalone easily accessible to wading harvesters. Populations of abalone extend only as far eastwards as Port St. Johns; however their occurrence is very sparse north of the Mbashe River mouth (Fielding *et al.* 1994; Figure 3.1).

Research in both the Ciskei and southern Transkei communities started only in January 2004, when the experimental fisheries were already underway.

3.2.2. Quantitative data

Fishery landings (both legal and illegal) and resource effect

Data from the experimental fishery were collected at the processing factories, where the permit holders' catches were processed for export. Measurements of abalone size were made on the day of processing. Alternatively shells were kept for later measurement, however those were often pooled resulting in loss of specific data from different fishing areas. Data from a historic Hamburg fishery, although incomplete, were obtained from MCM. Few catch records had been disaggregated by harvesting location, and hence the data were pooled by year, and tested for evolution in average size using the Statistica 8 software package (StatSoft, 2007). All measurements were converted to shell width using a non-parametric regression curve (Figure 3.2) constructed using abalone morphometrics collected since 1997 (see also Chapter 2 and Appendix A).

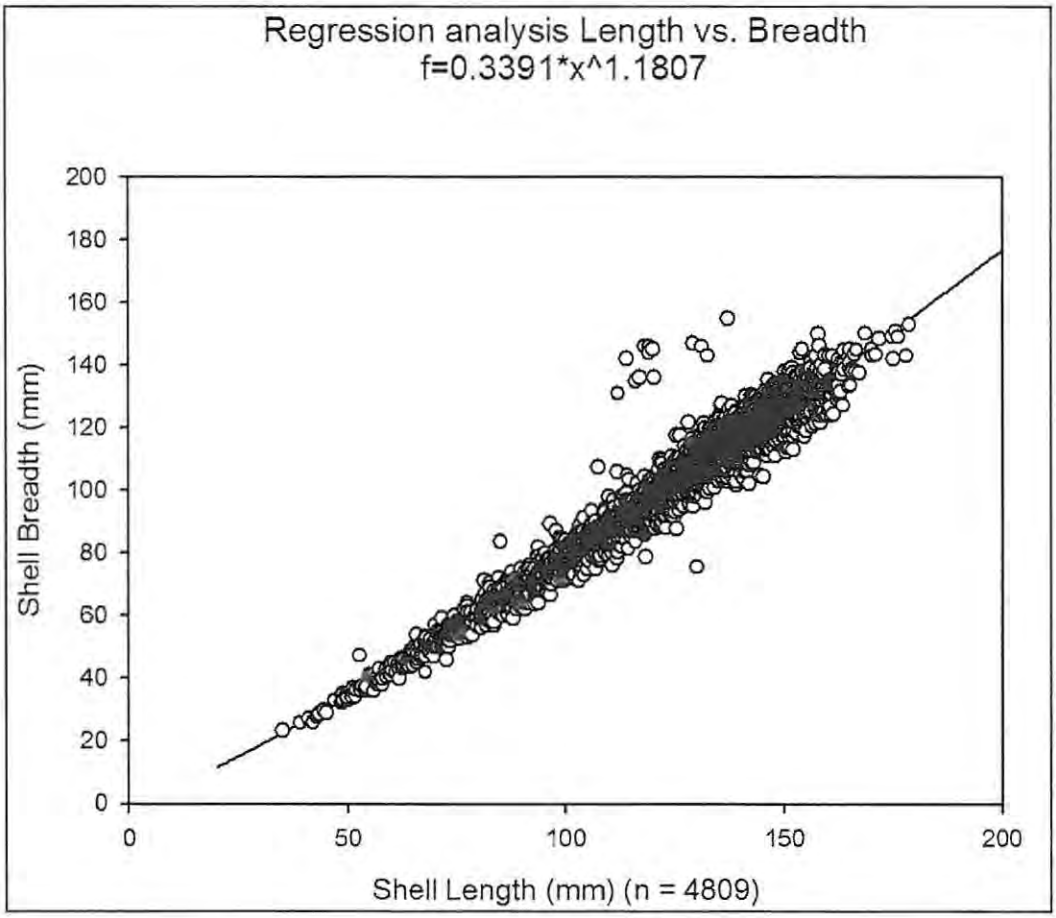

Figure 3.2. **Non-isometric power regression between shell breadth (mm) and shell length (mm) of *H. midae* from the Eastern Cape.** $R^2 = 0.9550; p << 0.05.$

Confiscated or abandoned abalone catches that had been sub-sampled as a part of the research undertaken for Chapter 2 (see section 2.2) were re-analysed. Only 31 of the 481 cases sampled originated from the rural areas and dated as far back as 2000. The low number of cases could have been attributed to the lack of enforcement capacity in the rural areas, but also to poor recording of cases. The samples that had been recorded were predominantly de-shelled (shucked) and eviscerated or whole abalone in fresh or frozen state. As described in Chapter 2, mixed samples, with abalone in shell, were converted to eviscerated mass using a non-isometric power regression (Figure 3.3; see Chapter 2). Given the paucity of data, samples originating from the Ciskei and Transkei regions were pooled, with the aim of comparing trends with data from the urban areas of the Eastern Cape. Effects of year on mean eviscerated weight were tested. Additional shell length data from the illegal abalone fishery were obtained from abalone shell middens at harvesting localities. These were found in the coastal forest based on information provided by key informants (community members and SAPS Officials).

Given that abalone occurred in very shallow waters in the high energy wave zone this made diving difficult even in the calmest conditions. Poor sea conditions and visibility during 2004 precluded the undertaking of fishery-independent stock surveys using transect or quadrat counts, however, on several occasions, dives were performed in areas identified by local community members or other stakeholders during participatory mapping exercises. Both research divers did have expertise in abalone stock assessment research, and the reconnaissance dives were intended to gauge resource availability in the Ciskei and Transkei regions.

Profile of the harvesters

In order to gain more in-depth knowledge about resource use and livelihood strategies of local fishers, anonymous questionnaires were administered to local small-scale fishers by means of a beach survey during late 2005 and early 2006 in the communities of Cebe, Gqungqe and Gcina in the former Transkei (Figure 3.1). Prior to the survey, community meetings were held with the local fishers, and the goal and process of the survey was explained. Slightly different questionnaires were administered to harvesters and fishers (those using rod and line and targeting line-fish only). The questionnaire was first piloted in order to acquaint the local villagers with the sight of the researcher while they would be harvesting or fishing. They had never been exposed to academic research, and as such this activity was necessary in order to gain trust that the researcher was not a law enforcement officer who would arrest them for fishing illegally. For the following three months, the beach survey was undertaken in each community during spring low tide periods. The sampling technique required walking the section of coast to interview all the fishers and harvesters along the beach and rocky shores over the five-day period before, during and after spring tide. Harvesters or fishers were given the choice to participate in the survey. A total of 66 questionnaires was administered.

Socio-economic and livelihood data for the Hamburg small-scale fishers were obtained from a beach survey undertaken by Rhodes University's Department of Zoology (Kaehler, 2003). Raw data were accessed and analysed and several focus group discussions were held in 2005 to update and validate some of the findings. In addition, Census 2001 data for both wards were queried (Statistics South Africa, 2003).

3.2.3. Qualitative data

In both the Ciskei and Transkei regions, qualitative research included semi-structured interviews with experimental permit holders and key informant interviews with local stakeholders including hotel and other holiday accommodation owners or managers. Interview and focus group questions were

aimed at (i) evaluating the experimental fisheries and the co-management process from a broad stakeholder perspective, (ii) gaining insight into the *modus operandi* of both legal (experimental) and illegal fisheries, and (iii) obtaining oral histories of harvesting patterns, cultural beliefs and economic factors that affected harvesting. Several focus group discussions were held with permit holders and non-permit holders, and exercises were undertaken with fishers and other stakeholders to map marine resource-use patterns, to collect perceptions about resource status, and to solicit opinions of local community members with regard to management of marine resources. During the interviews with permit holders, basic demographic data were also collected. All interaction with local fishers was facilitated by local key informants or an isiXhosa-speaking research assistant.

Table 3.1. Overview of quantitative and qualitative data collected

Information collected	Tools used	Sites
Resource status: Changes in abalone size and density	Measure fishery landings at processing facilities (2004)	Catches from Ciskei and Transkei regions. Factories based in East London and Port Elizabeth.
	Historic fishery records (1990s)	Ciskei
	Confiscations database (31 cases, 3407 abalone) (2000-2005)	Ciskei and Transkei
	Shell middens (2004/5)	Ciskei and Transkei
	Reconnaissance dives after participatory mapping exercises (2004/5)	Ciskei and Transkei with focus on 'hot-spots' in determined fishing areas
Fisher profile: Socio-economic, socio-cultural and fisher behaviour	Semi-structured interviews (2004-2006) Key informant interviews (2004-2006) Focus group discussions (2004-2006) Beach survey (66 questionnaires) (2005/6)	Cebe, Gqungqe and Gcina in Transkei
	Beach survey (86 questionnaires) (Kaehler, 2003) Focus group discussions (2004-2006) Semi-structured interviews (2004-2006)	Hamburg
	Census 2001 (Statistics South Africa, 2003)	Hamburg and Mnquma Municipality
Management: Fisheries authority and local abalone management institutions	Focus group discussions (2004-2006) Key informant interviews (2004-2006) Semi-structured interviews (2004-2006)	Ciskei and Transkei

3.3. Results

3.3.1. Overview of the experimental fisheries

Hamburg

Hamburg villagers were allowed to collect abalone legally for the first time in April 2001, when 137 people from the community received individual abalone harvesting permits with a TAE of three

abalone per day, during weekdays only. Additional regulations set by MCM included a minimum legal size limit of 100 mm shell width[3] and a fishing zone extending between the Chalumna and the Great Fish Rivers. Permit holders were required to harvest the abalone themselves, which they did by wading from the shore at spring low tides, as they did not possess any diving gear or skills (Appendix B7). Marine Conservation Inspectors from the East London- and Port Alfred-based MCM Compliance/Control Inspectorate were tasked with the monitoring of the permit holders, and the measuring and recording of the catches.

From the outset, the 137 permit holders had formed two separate groups, each with their own proposed buyers, including a Chinese buyer from East London and a Port Elizabeth-based business man (X. Mdabula, Into the Future (Pty) Ltd.) who had played an important role in lobbying MCM to initiate the pilot project. Although the Chinese buyer was supported by the local mayor, he did not obtain a buying and processing license from MCM, resulting in the affected group not being able to harvest their allocation during the first season. The second group, consisting of approximately 29 permit holders, commenced harvesting in the close proximity of the Hamburg village, but, since it was found that those reefs were already severely depleted of abalone, the buyer organised the permit holders to be transported by means of a tractor along the beach to more productive reefs, further away from the village. The total catch was weighed and recorded in the Hamburg village, and then transported to the sub-contracted factory, Dried Ocean Products (Pty) Ltd., in Port Elizabeth for processing. A local committee was set up by the buyer and the permit holders to facilitate payment logistics and communication with MCM. Despite this, MCM terminated the season after only two months, as the buyer and permit holders had breached the permit regulations by employing several professional divers from East London who could access the deeper stocks, while the permit holders themselves were working the shallow areas.

Permits were subsequently re-issued only in October 2002. Several capacity-building workshops on sustainable marine resource use and co-management had meanwhile been organised in the village (Q. Rouhani, Rural Fisheries Programme, pers. comm.), and it had been agreed by MCM that professional divers would be allowed to dive on behalf of the permit holders. However, this would only be an interim measure until such time that the permit holders obtained the necessary training to dive themselves. An 'Eastern Cape Abalone Management Plan' that would guide the fishery had been prepared (Britz *et al.*, 2002) and the development of a more specific implementation plan for

[3] In 1991, the former Ciskei government commissioned a study of abalone populations along the coast. Growth of Ciskei abalone was found to be faster than that of abalone off the southwestern Cape, probably because of the higher water temperatures of the Ciskei coast. Size of the Ciskei abalone at sexual maturity was also considerably smaller. The study suggested that the national MLS of 114 mm shell width may be inappropriate for abalone fisheries on the East Coast, and recommended a MLS of 100 mm shell width (Wood, 1993).

the harvesting of abalone in the rural areas had been commissioned by MCM to Rhodes University. Co-management was the recommended approach and local co-management structures needed to be developed. Considering the fact that researchers were largely uncertain about the sustainable yield for the area, a conservative TAC estimate of 5 tons was made from a precautionary approach (Britz *et al.*, 2002). In addition, the minimum legal size was increased to 114 mm shell width in order to prevent the sale of illegal and undersized abalone from other areas through this fishery.

The allocation of permits received substantial media attention, with the Deputy Minister of Environmental Affairs and Tourism opening the fishery officially[4] in Hamburg during 'National Marine Awareness Week' and re-issuing 133 permits (Appendix B9 – B10). Management recommendations had suggested the approval of only one buyer, and Into the Future (Pty) Ltd. was reappointed; this time, for all permit holders. Since no SCUBA diving gear was allowed to be used, two well-known free divers from Cape Town were employed to harvest the abalone on behalf of the permit holders. The local committee, which had previously been established by the buyer, became recognised by MCM as the formal co-management structure. The committee also nominated two permit holders as monitors who were to accompany the Marine Inspection Officers and the divers to the various fishing areas. The fishing season lasted until the end of April 2003.

The following season commenced late; in December 2003, instead of October which had always been the start of the recreational fishing season. A large number of permit holders were unsatisfied with the payment arrangements and the price paid by Into the Future (Pty) Ltd. Conflict had also arisen involving the chairperson of the local committee. Several permit holders subsequently split from the committee; they suggested a different buyer and elected their own committee, however, this was never sanctioned by MCM. Meanwhile, MCM had contracted extension officers to facilitate the allocation of permits and to initiate a co-management process. Several training workshops were held in the community[5]. Permit holders had, however, not yet received any training to enable them to perform the diving themselves, so once again, the buyer employed professional divers to complete this task. However, this time, these divers could not be escorted onto the beach due to the recently proclaimed beach driving ban (DEAT, 2001), and concerns had been raised about the participation of

[4] On 14 October 2002, the Deputy Minister of DEAT issued the subsistence permits and said: "the goal is to allow subsistence fishers to obtain food, or food security, through harvesting marine living resources in an orderly, equitable and sustainable manner. The issuing of permits to the subsistence fishing community of Hamburg is seen as an important part of the overall transformation of the fishing industry in South Africa" (DEAT, 2002).

[5] The Environmental Evaluation Unit (EEU), in partnership with the Programme for Land and Agrarian Studies (PLAAS) was engaged to implement a 'Subsistence Fisheries Co-management Training and Capacity Building Programme' in several coastal communities. Workshops and training sessions were held in 2004 in Hamburg.

the Marine Inspection Officers in the fishery through the transport of the divers and permit holders to the dive locations. Therefore, the professional divers needed to access the reefs by foot. These working conditions and the typically poor sea conditions during the season resulted in a high turnover of divers, poor monitoring of the dive operations by the nominated community monitors, and allegations against certain divers that they were offloading part of the catch en route to the processor. Moreover, the catches were not weighed in the Hamburg village anymore, but at the processing facility. As a result, a forensic audit of the buyer was instigated, and the fishing season was closed at the end of May 2004. Since then, no abalone permits have been issued due to significant resource decline.

Southern Transkei

An experimental fishery was also initiated in the southern region of the Transkei, based on the perceived success of the 2002/3 season in the Ciskei, and the uncontrolled illegal harvest that was occurring. In December 2003, 115 permits were issued by the Deputy Minister of Environmental Affairs and Tourism to villagers of the Cebe, Gqungqe and Gcina communities[6] to 'undertake subsistence fishing for abalone'. Permit conditions stipulated that only 3 abalone per day could be collected during weekdays, and the minimum legal size was set at 114 mm shell width, similar to the Hamburg permit conditions. A conservative TAC of 3 tons had been estimated by Fielding *et al.* (1994) and was subsequently increased to 6 tons in the 'Management plan for the Eastern Cape abalone resource' developed by Britz *et al.* (2002).

Interestingly, the individual permit conditions did not set boundaries for the fishing area, nor specify the upper harvest limits for the areas. Three outside divers were contracted at the outset to harvest the abalone on behalf of the rights holders, and the same buyer was appointed as in Hamburg: this time as Ulwandle Management (Pty) Ltd. Processing was achieved at the buyer's factory in East London (Inkala Fish Processors (Pty) Ltd.). A local committee was also elected by the permit holders, and monitors were appointed to accompany the divers. This was facilitated by the newly appointed MCM extension officers who were tasked to initiate the co-management process.

After only two months, 57 permit holders from Gcina requested that their own buyer (a community member) be approved by MCM. Ukhanyiso (Pty) Ltd. was sanctioned in March 2004, together with three professional divers, and Dried Ocean Products (Pty) Ltd. contracted as a processor. This time, boundaries of the fishing area were set between the Qhora and Khobonqaba Rivers (Figure 3.1).

[6] This area was reputed to have a large stock of abalone. Fielding *et al.* (1994) encountered the highest densities of abalone for the southern Transkei region during their surveys in the early 1990s.

Fishing for both groups lasted until May 2004, and no permits have since then been issued due the rapid depletion of the resource.

Allocation criteria

The selection criteria that were used to allocate abalone permits in both Hamburg and southern Transkei were based primarily on the socio-economic status of the applicants. Several meetings were held between the Subsistence Fisheries Management Unit within MCM, its extension officers and the community. However, meetings were organised at short notice, resulting in many affected individuals not obtaining notice about the meetings. At these gatherings, it was explained to the community members to which harvesting regulations they would need to adhere, and to which buyer they were allowed to sell. People who had been arrested for harvesting any marine resources without a permit could not apply. Villagers were then asked to register for an abalone permit with their name, identity number and address if they considered themselves as traditional fishers, and had no other source of income. Only 137 and 115 people from Hamburg and the southern Transkei villagers respectively were eventually allocated permits although interviews indicated that many more people fished for abalone or had applied. Moreover, a thorough verification was never done, resulting in more than 20 people from the adjacent communities of Chalumna and Bodium, close to Hamburg, and the community of Nxaxo, neighbouring Cebe, obtaining permits (Figure 3.1). Focus group discussions and interviews conducted with permit holders also revealed that many permit holders had other sources of income, including state grants or teaching jobs in the local school. Other permit holders obtained jobs during the experimental fishery period. An attempt to rectify this and allow new entrants was never made by MCM, creating significant conflict among villagers. Nevertheless, details of the permit holders showed a fair representation of the demographic structure of the community, with 58 % of the Hamburg permit holders being women, and permits being allocated equally among the different age groups. The minimum age of permit holders was 20 years in Hamburg and the southern Transkei, and the maximum age was 67 years.

Catch and revenue

During the first season of the experimental fishery in Hamburg (2001), 760 kg of whole mass (in shell) abalone was landed over a period of two months by the 29 permit holders who had contracted Into the Future (Pty) Ltd. as their buyer (Figure 3.3). Even though the minimum legal size of the abalone was set at 100 mm shell width, permit holders complained that legal size abalone had become scarce on the reefs closest to Hamburg. As a result, these permit holders were escorted by the Marine Inspection Officers to more remote reefs along the coast in search of legal size abalone. For the

following season, which started in late 2002, the professional divers were allowed to catch 402 abalone per day on behalf of the 134 permit holders (3 per permit holder). This was achieved for 60 % of the diving days. With a MLS now set at 114 mm shell width, professional divers also needed to travel further away from Hamburg to find productive reefs. Conservative estimates of total catch for that season accrued to 13 tons of whole mass abalone (Figure 3.3), although a TAC of 5 tons, as a cap above the TAE, had been recommended by Britz *et al.* (2003) to senior MCM management based in Cape Town. MCM had, however, not inserted this TAC limitation in the permit conditions. In the last season, where only a small group of permit holders stuck with Into the Future (Pty) Ltd., a total of 1.4 tons of whole mass abalone were caught within 23 diving days. Diver groups consisting of two to three divers caught 61 kg of whole mass abalone (100 abalone) on average per day.

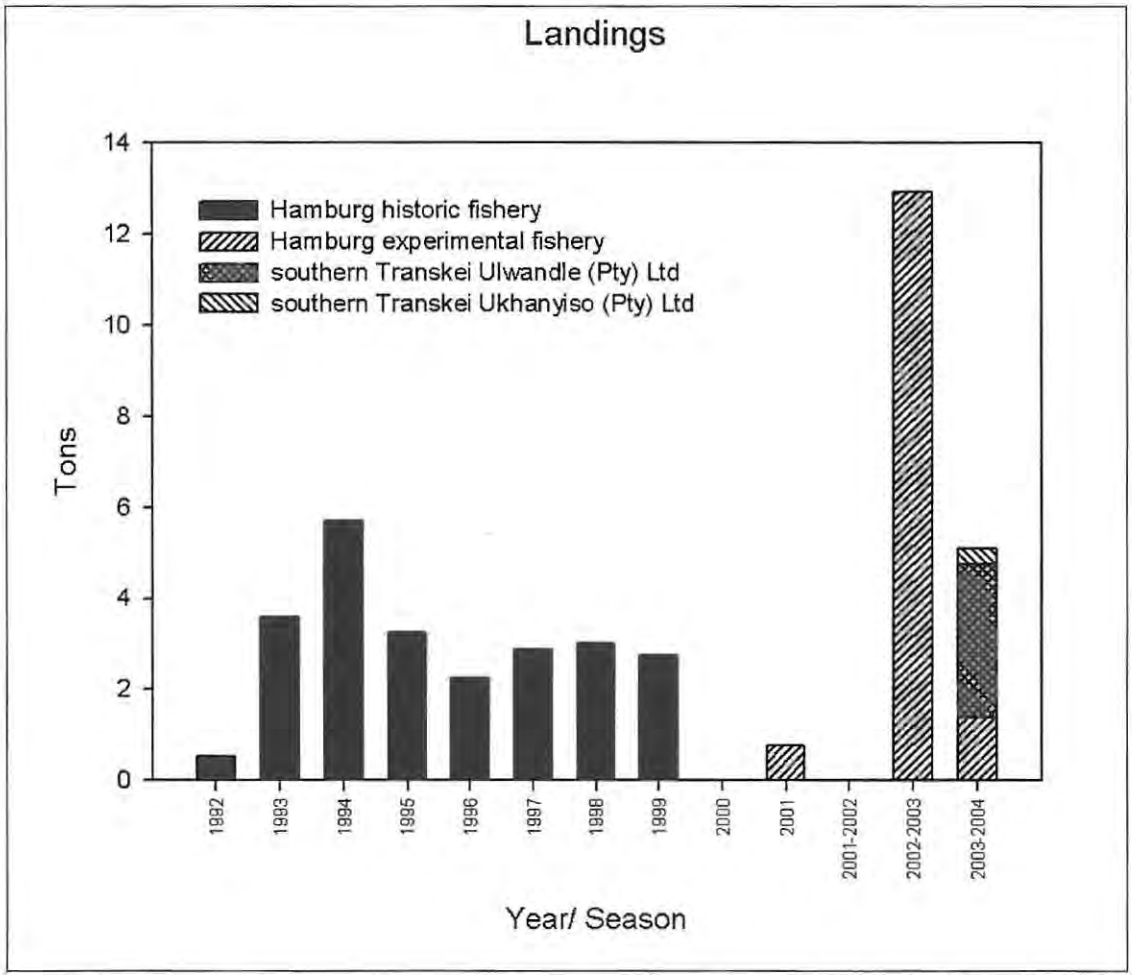

Figure 3.3. **Catch in tons from the historic Ciskei abalone fishery, the experimental fishery in Hamburg, and the experimental fisheries in Cebe, Gqungqe and Gcina.** Catches for the Transkei region are separated for the two buyers (Ulwandle (Pty) Ltd. And Ukhanyiso (Pty) Ltd.). Historic commercial and recreational Transkei fisheries were not included as available data were sporadic.

The experimental fishery in the Transkei saw the Ulwandle (Pty) Ltd. divers catching a total of 3.4 tons of abalone during 25 diving days (Figure 3.3), with professional diver groups harvesting an average of 140 kg of abalone per day. Divers also observed that the reefs adjacent to the target communities had already been denuded severely, and recognised that they needed to access other reefs. The permit conditions did not include fishing area boundaries, and as a result, only 18 % of catches were made in the direct vicinity of the communities who got permits. Divers working for Ukhanyiso (Pty) Ltd. reported that they caught 611 abalone (461 kg of whole mass) in one day. This was their only catch, and was at odds with the TAE and daily catch limit of 171 abalone for the 57 permit holders (3 abalone per day) who had contracted Ukhanyiso (Pty) Ltd. The divers' report to MCM, however, indicated that this catch was harvested over several days.

Since professional divers were employed to harvest the deeper stocks, significant catches were made in both Hamburg and the southern Transkei for a limited number of permit holders. This resulted in immediate income and an improvement of the socio-economic conditions of the permit holders. Permit holders received 130 ZAR per kg of whole mass abalone, of which 20 ZAR was paid to the outsourced professional divers. Over the three fishing seasons, Hamburg permit holders obtained a collective 1.7 million ZAR in revenue from the abalone sold. During the 2002/3 season, when 13 tons of abalone were caught, permit holders received 10 000 ZAR each. Payments were made in bank accounts that the buyer had opened for them. In the southern Transkei, over 400 000 ZAR of income from abalone was divided over 115 permit holders and a period of 6 months. This amounted to approximately 600 ZAR per month per individual, which was considered a substantial income in that community, considering that the average government grant was 600 ZAR per month. Interviews conducted in the Hamburg community revealed that many permit holders had started to purchase assets such as televisions, lounge suites and gas fridges that could previously not be afforded.

3.3.2. Understanding the broader context in the target communities

The experimental fisheries, where the harvesting of abalone from a large fishing area was performed by professional divers, led to a significant injection of cash to those community members who had been allocated permits. However, in order to understand why the experimental fisheries failed to develop into formal small-scale commercial fisheries, it is necessary to describe the socio-economic and cultural context of the communities where the experimental fisheries were implemented.

Rural poverty

Poverty is a concept that has been described in many ways (Béné *et al.,* 2007) and can be defined at different levels (from national poverty through to individual and household poverty). In the Eastern

Cape, rural areas such as the former Ciskei and Transkei are typically characterised by a distinct lack of services and infrastructure, and inhabitants are classified as poor. In 2001, it was estimated that 2210 people resided in the Hamburg community, and 45 % of households had no source of formal income. Other Census indicators of relative poverty revealed that 50 % of people had no schooling or did not complete primary education (Statistics South Africa, 2001). Moreover, more than 80 % of people were using paraffin or wood as primary source of household cooking. In Ward 27 of Mnquma Local Municipality, which comprises the administrative areas of Cebe, Gqungqe and Gcina (Municipal Demarcation Board, 2006), the 2001 Census survey data estimated a population of 9716, where 42 % of households had no source of formal income (Statistics South Africa, 2001). Here, 73 % percent of the population had no schooling or did not complete primary education, and 97 % used paraffin or wood as primary source of household cooking energy. In both regions, the majority of the people also had little or no access to clean drinking water and electricity. In this context of structural poverty, people adopt a range of livelihood strategies including formal and informal employment, pensions, migrant remittances, the use of natural resources (for subsistence and sale), arable production and animal husbandry (Shackleton *et al.*, 2001). Along the coast of the Eastern Cape Province, a large number of rural people are involved in the harvesting of marine resources, as is performed in many poor coastal communities around the world, where fishing is operated seasonally as part of a household-based, multi-activity livelihood strategy (Andrew *et al.*, 2007; Glavovic *et al.*, 2002). The Transkei, for example, is still considered as one of the poorest regions in South Africa, and many households still rely on livelihoods derived from natural resources (Department of Social Development, 2001; Ngwane, 2003).

Small-scale fishing as a livelihood strategy

People interviewed during focus group discussions and beach surveys claimed that their community had been harvesting marine resources for generations, and that they themselves, first started to harvest as children. These individuals were of the opinion that the larger majority of the community would qualify as small-scale fishers, as all would at some stage in time, depending on other income-generating opportunities (e.g. temporary employment), harvest marine resources for sale to local holiday makers. Alternatively, these resources were harvested as an easy source of protein. Popular species such as oysters or line-fish were sold to holiday makers and hotels, while other species were used for household food consumption.

For 27 % of the people interviewed during the beach surveys in Cebe, Gqungqe and Gcina, small-scale fishing was their main individual livelihood, and for 12 % interviewed, small-scale fishing was the main household livelihood. Other important livelihoods were casual or full time migrant work, or

odd jobs in the community. Opportunities for self-employment were virtually non-existent, mainly due to the lack of entrepreneurial skills and lack of access to credit. Many elderly people cultivated their gardens or fields for subsistence and kept cattle. Very few sold their produce on local markets and argued that productivity rates on their fields were low. Younger people interviewed said they had left the community in search of work, but had returned to their home villages unsuccessful. Interestingly, interviews and beach surveys revealed that the state social grants (pension, child or disability) were by far the most important source of income. Pension grants were considered to be the most important livelihood, followed by child grants. Households often comprised family members who did not have jobs either as a result of retrenchment or the lack of suitable skills coupled to poor education. For only 18 % of the fishers interviewed, migrant work by one of the household members was the main source of income. Only 3 of the 66 harvesters and fishers interviewed mentioned the harvest of non-timber forest products (including those from hunting) or the sale of wood as a potential livelihood strategy.

The livelihood strategies of the small-scale fishers interviewed in the Hamburg community were very similar, although observations and focus group discussions did reveal that Hamburg had more income-generating opportunities due to its peri-urban location. Table 3.2 summarises some key socio-economic and livelihood data for both areas.

Table 3.2. Socio-economic characteristics of small-scale fishers in Hamburg, and Cebe, Gqungqe and Gcina

Socio-economic indicator of interviewee or household	Hamburg (Beach survey (Kaehler, 2003); own focus group discussions and interviews, 2005)	Cebe, Gqungqe and Gcina (Beach survey, 2005 and 2006)
Head or wife of Household	54 %	57 %
Unemployed	61 %	67 %
Pensioners	Not asked	21 %
Average schooling level	Grade 5	Grade 6
Household type	Mud and brick	Mud dwelling (100%)
Main livelihood	Social grants and casual labour	Social grants
Average Household size	5	7
Assets:		
Cell phone	Not asked	47 %
Plough	Not asked	34 %
TV	Not asked	20 %
Goats	Not asked	42 %
Cattle	Not asked	53 %

Percentages shown in the table indicate the percentage of people interviewed during questionnaire surveys.

Small-scale fishing behaviour

In both of the study areas, women and children were harvesting rocky shore invertebrates at spring low tides from the intertidal zone, using basic gear such as car leaf springs, knives or screwdrivers, while men[7] were involved in fishing from the rocks or in estuaries with line and rod. They did not use any kind of boats for these fishing activities. This was also observed by Lasiak (1993) and subsequently by Clark *et al.* (2002) in a study by the Subsistence Fishing Task Group.

During the beach surveys undertaken in Cebe, Gqungqe and Gcina – after the experimental fisheries had been terminated – no harvesters or fishers were found along sandy shores or in estuaries, although fishers reported fishing occasionally in the estuaries. Of the 66 people interviewed, 53 were female intertidal harvesters, 4 male intertidal harvesters and 9 male fishers. Their ages ranged between 16 and 85 years, with an average age of 45 years. Fishers tended to fish by themselves, while women always harvested in a group. Interviewees reported that they very seldom harvested along neighbouring communities' coastlines, although fishers tended to do so more regularly to access good fishing spots. They were of the opinion that neighbouring community members did not fish along their shoreline.

Even though subsistence fishers had been recognised by law through the MLRA in 1998 (Act 18 of 1998; Republic of South Africa, 1998a), implementation and rights allocation had been slow. In fact, subsistence permits for abalone were the first permits ever allocated to small-scale fishers in the Eastern Cape Province (see Chapter 5). Still, this meant that small-scale fishers either had to harvest illegally, or purchase an annual recreational fishing permit from the local post office, which forbade the sale of their catch. The survey revealed that none of the observed harvesters or fishers possessed a recreational permit, and only 5 of the 66 reported ever having possessed one. Only 2 small-scale fisher interviewees had never collected abalone, although only 9 people held an abalone permit in the 2003/4 season. This low number might be attributed to the fact that previous permit holders were hoping to have their permits renewed, and did not want to take the risk of being caught harvesting illegally.

Intertidal resource harvesters reported to harvest 4 to 5 days per month on average during spring tides, and would spend between 4 and 6 hours collecting invertebrates from the intertidal zone. Fishers were less dependent on tides, and fished more often and for longer periods of time. Intertidal

[7] In the northern parts of the Transkei, many young men harvest the higher value species such as east coast rock lobster (*Panulirus homarus rubellus*; refer to Chapter 4), and have become increasingly involved in the harvesting of large amounts of oysters or mussels from the shallow subtidal zone over the last decade, for sale to holiday makers and coastal hotels (Calvo-Ugarteburu and Raemaekers, 2007).

harvesters would collect a basket of resources, although red bait (*Pyura stolonifera*) generally dominated the catches (Appendix B11 - B12). This was probably not due to preference, but as a result of the overexploitation of other, more preferred resources such as mussels. Catches that were observed during surveys consisted of red bait, brown mussel (*Perna perna*), winkles, limpets, whelks, oysters (*Striostrea margaritacae*), and the occasional abalone.

Historic abalone fishing pressure

Apart from the centuries-old local traditional harvesting livelihood strategy, where abalone was caught within the basket of resources targeted for subsistence or local sale, limited commercial exploitation of abalone by outsiders had taken place, both at Hamburg and in the southern Transkei, in some years prior to the experimental fisheries.

In 1992, a harvesting permit was granted by the Ciskei government to a commercial venture with ties to Hamburg. One of the permit conditions stated that the company needed to employ people from the village to assist with harvesting. Local women, of whom many subsequently became permit holders during the experimental fishery, recalled how they used to wade in the shallow waters on the reefs adjacent to the community, where the abalone resource was 'rich'. Size limits were set to 100 mm shell width, based on Wood's recommendations (Wood, 1993) and the fishing area was demarcated between the Bira and the Chalumna Rivers (Figure 3.1). Divers from outside of the community were employed to assist the local villagers. In 1995, a TAC of 3 tons was introduced. Historical catch records are represented in Figure 3.3. For the Hamburg villagers, of whom many were harvesting a variety of intertidal resources at spring low tides, this was their first exposure to a species-specific fishery for a high-value resource. The fishing license was suspended in 1998 when the owner decided that he could no longer financially sustain this venture.

In the southern parts of the Transkei, three white-owned fish factories were established during the late 1980s, with licenses from the homeland government to harvest abalone and other high-value resources. No size limit was set and abalone were harvested by contracted divers. Fielding *et al.* (1994) estimated from payments made to divers that at least 80 tons of whole mass abalone were harvested in 1990 from the exact localities where experimental permits were later allocated. Interviews with divers who had been involved at the time, substantiated the assertions that fairly high catches were made during this period (T. Botha, professional diver, pers. comm.). It has also been estimated that prior to the closure of the recreational abalone fishery in 2003 (DEAT, 2003), visitors to the Transkei coast removed approximately 1.7 tons of abalone per year (Robertson and Fielding, 1997).

Harvesting fever for abalone

Historic fishing activity, as described above, and the subsequent expansion of illegal networks from the urban areas (refer to Chapter 2), increased awareness of abalone as a source of income in rural areas. This was further encouraged by illegal buyers providing basic diving gear and gas fridges to the rural communities (Dave McGregor, Organised Crime Unit, SAPS, pers. comm.).

By 2000, illegal harvesting had become widespread in the rural areas of the Ciskei and Transkei. Many people with no prior involvement in the harvesting of marine resources became involved, and many traditional fishers shifted their fishing effort to targeting abalone only. Given the socio-economic conditions in which they lived, the harvesting and sale of abalone on the black market was an attractive livelihood option. For example, villagers from Cebe recalled how hundreds of villagers were seen on the coastline at spring low tide, harvesting abalone of any size, during 2002 and 2003, prior to the experimental fishery.

The experimental fisheries in both the Ciskei and Transkei regions therefore achieved little in diminishing the level of illegal harvesting. Abalone marketing networks had already been established, and permit holders could not physically patrol their allocated fishing zone, nor were they equipped to stop outsiders and non-permit holders from accessing 'their' resource. MCM Monitoring, Control and Surveillance capacity was very low, with only two Marine Inspection Officers mandated to patrol 90 km of very inaccessible coastline in the southern parts of the Transkei. In addition, many family and community members, who were not successful in obtaining a permit, were also harvesting abalone illegally, and permit holders felt that they had no right or power to enforce an exclusive right to the resource through the local abalone committee or by informing MCM and the local police. In the face of the rapid decline in abalone abundance, permit holders, and later professional divers, travelled to more remote reefs in order to catch their daily bag limits.

By the time the experimental fisheries were closed in 2004, a large informal network had developed in the rural areas, harvesting abalone as far north as the Dwesa-Cwebe MPA. Wading activity had declined in the areas of the experimental fisheries, probably due to severe resource depletion in the shallow sub-tidal zone. Moreover, fewer people - including previous permit holders - were active, although they had become more organised and connected with other groups along the coastline. The dramatic rise in abalone price in the late 1990s had acted as a driver of the extension of abalone buying networks into the rural areas. On several occasions during the beach surveys undertaken in Cebe and Gqungqe, groups of young men equipped with snorkel gear and ropes, were encountered along the coast. However, they did not want to participate in the survey. All harvesters and fishers

who were interviewed did admit to collecting abalone if they found some while harvesting or collecting bait, even though they were aware that it was illegal to do so.

According to the Nature Conservation Inspectors from Port Alfred in the Ndlambe Municipality – the closest urban centre south of the Great Fish River (Figure 3.1) – organised groups of up to 60 people from the Ciskei had been reported to be systematically harvesting from different reefs along the coastline during 2003 and 2004. These groups would set up camps in the dune forests, and harvest at night during full moon phases. By using ropes attached to rocks or held by accomplices who also acted as lookouts on the shore, these harvesters searched for abalone using waterproof torches and rudimentary diving gear. Several arrests were made at the time, but the networks had become increasingly organised, and connected to the urban syndicates operating in Port Alfred and Port Elizabeth (see Chapter 2). It was to these syndicates that the harvesters would sell their catch. Numerous middens with large numbers of abalone shells (Appendix B8) were found along the coast at these 'hot-spots' identified by law enforcement officials or key informants.

Resource status

Analysis of the various quantitative sources of data available indicated a declining trend in the abalone resource in both the Ciskei and Transkei areas. Fishery data available from the historic fishery in the Ciskei (1997-1999) showed a significant and annual declining trend in average shell size (Figure 3.4; $F = 22.2$, $df = 2$, $p << 0.05$). Experimental fishery data showed no significant differences between the 2002/3 and 2003/4 seasons ($F = 0.935$, $df = 1$, $p = 0.334$) although reports from the contracted professional divers indicated that abalone above the 114 mm MLS were increasingly difficult to find. Average sizes from the 2003 and 2004 season are nevertheless substantially bigger than the 114 mm MLS, contrasting the declining trend observed in the historic fisheries. This might be attributed to the fact that abalone caught during the historic fishery originated from reefs closer to Hamburg. The slightly higher average size of abalone caught during the 2003/4 season might indicate that the professional divers were accessing more remote virgin reefs as they were not accompanied by the Marine Inspection Officers and community monitors. Disaggregated fishery data from the Transkei experimental fishery showed a slight significant difference in mean shell size between the harvesting locations ($F = 3.996$, $df = 1$, $p = 0.046$). Abalone caught in areas further away from the experimental fishery locations were larger (data not shown).

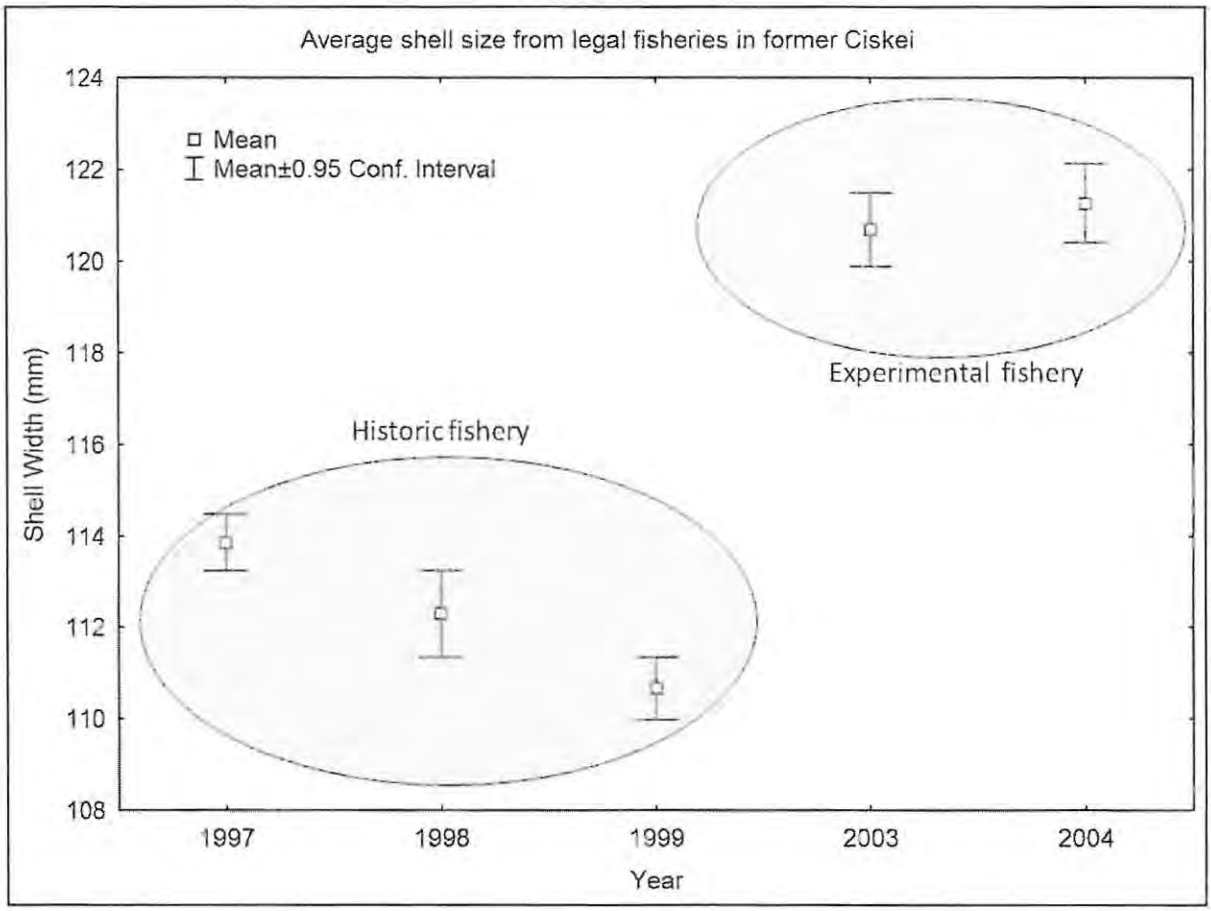

Figure 3.4. **Average shell size (shell width) of landings from the historic Ciskei fishery.** Minimum legal size was 110 mm shell width compared with landings from the experimental fishery in Hamburg where the minimum legal size was 114 mm. Data were only available for the represented years. Data from 2003 correspond to the 2002/3 season.

Several middens that were encountered during 2004 and 2005 near harvesting 'hot-spots' did provide indicators of the exploitation pattern as average size between middens differed significantly (see below). The different average sizes of abalone found in the shell middens also reflected statements made about resource trends by hotel owners and permit holders from both Ciskei and Transkei who were interviewed throughout the project. These interviewees stated that illegal harvesting had expanded from those communities that had been exposed to commercial abalone harvesting first; from the historic fisheries until the experimental fisheries. There was a correlation between the average size of the abalone found in the middens and the distance from sites[8] where history of exploitation was older (Figure 3.5 and 3.6): higher average sizes were observed in middens further away from Hamburg in the Ciskei, and the most southern areas of the Transkei (Khobonqaba and Cebe; see Figure 3.1). Differences in shell size for both regions were significant ($F = 52.3$, $df = 2$, p

[8] The abalone habitats of these localities have similar physical and biological characteristics.

<< 0.05 for Ciskei[9] and F = 23.8, df = 4, p << 0.05 for Transkei middens). Furthermore, the average sizes from shell middens originating from the Ciskei were below the 114 mm MLS, and even the 100 mm MLS recommended by Wood (1993), while the average shell sizes from the Transkei were bigger (refer to Figure 3.5 and 3.6). Interestingly, abalone at localities such as Wavecrest (Wavecrest point; Figure 3.1) had a higher average size due to the active patrolling by the local holiday resort personnel. This is similar to the size of abalone shells from middens found in Dwesa (Figure 3.1) that were situated within the MPA.

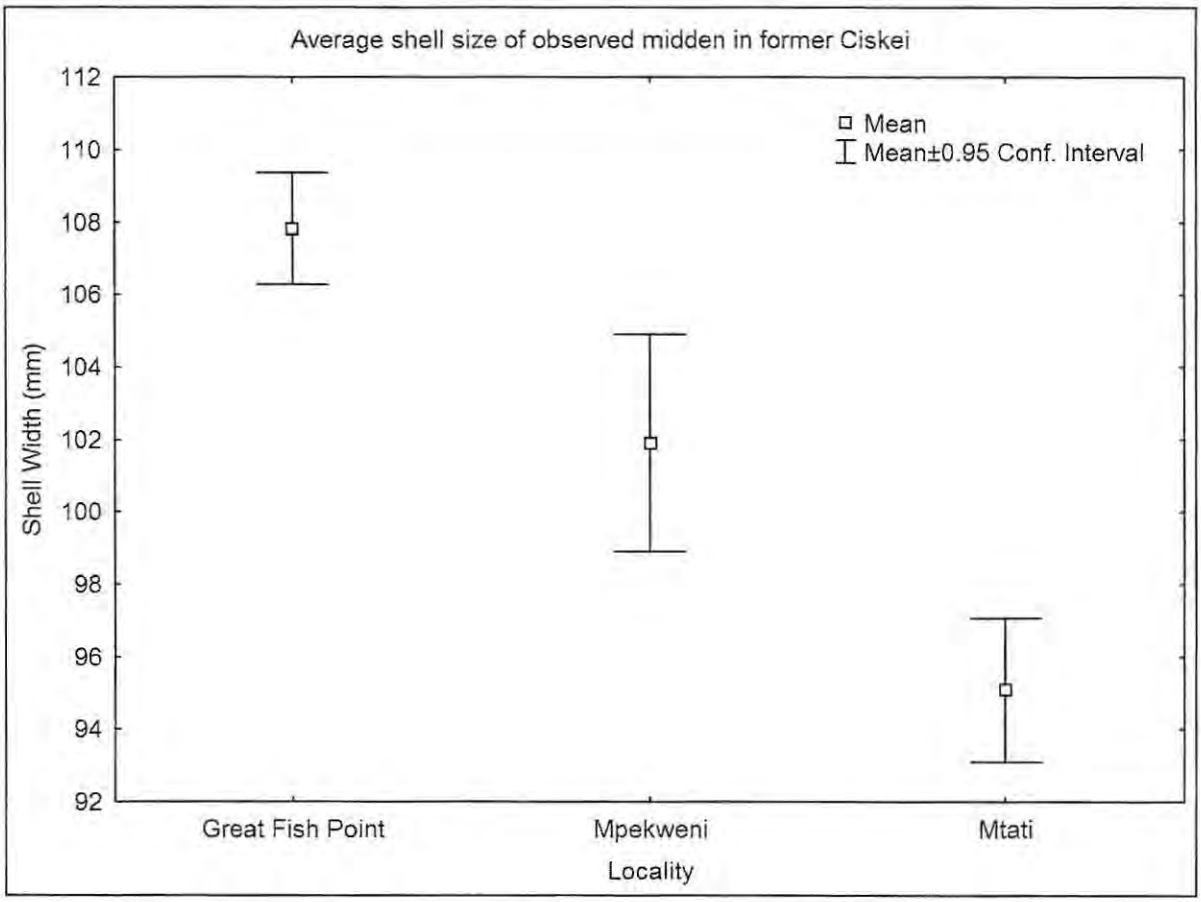

Figure 3.5. **Average shell size (shell width) of abalone found in the middens in three localities of the Ciskei region.** The localities are detailed in Figure 3.1.

[9] Great Fish Point is situated outside of the former Ciskei boundaries, but has been included in the analysis since it has been identified as a preferred 'hot-spot' for organised groups from the rural areas (R. Fox, Ndlambe Environmental Conservation Inspector, pers. comm.).

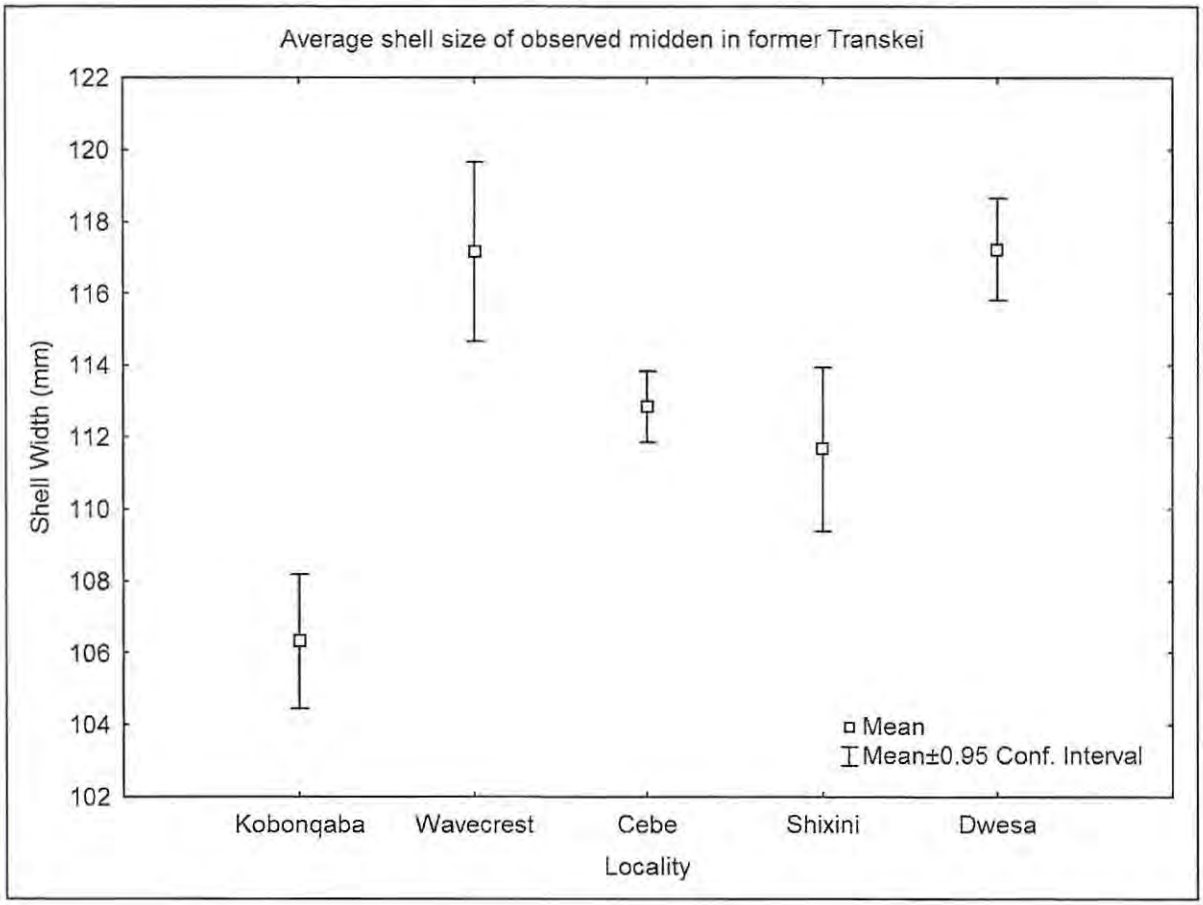

Figure 3.6. **Average shell size (shell width) of abalone found in middens in five localities of the Transkei region.** The localities are detailed in Figure 3.1.

Only 31 cases of arrests and confiscations of illegal catches in both the Ciskei and Transkei were recorded by MCM and the SAPS (see Table 3.1). Sampled confiscations showed a high variance within the different years (Figure 3.7), however, due to the unbalanced design of the input matrix (see Appendix A) it was not possible to perform a factorial ANOVA for significant differences between the years. The low average mass in 2000 most probably reflects the historic inshore depletion by wading harvesters at Hamburg as the majority of confiscations originated from that area. The higher average mass of eviscerated abalone in 2001 is largely attributed to a large confiscation originating from the Transkei region. The exact location where the abalone were harvested is unknown, but given the location of the SAPS where the case was opened, it is highly likely that abalone originated from stocks close to the Dwesa-Cwebe MPA (Figure 3.1). Interestingly, when compared to the mean size of abalone from the urban areas of the Eastern Cape (see Chapter 2, Figure 2. 10), the average sizes of abalone from the rural areas correlate with those observed in the urban areas. The very low average mass of abalone harvested illegally from the rural areas of the Eastern Cape was therefore a sign that that the resource was being overexploited.

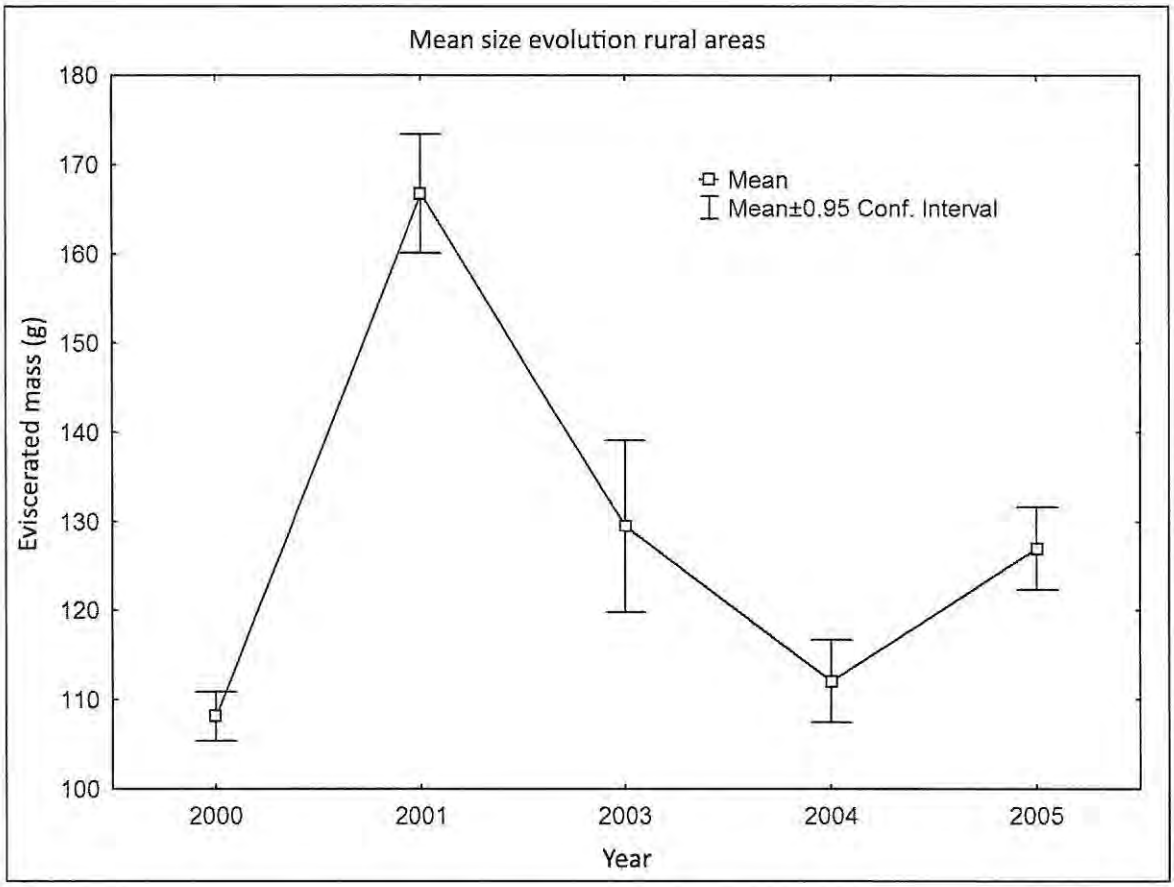

Figure 3.7. **The mean size (as eviscerated mass) of abalone from sampled confiscated catches from rural areas of the Eastern Cape.** A total of 31 cases were sub-sampled (3407 abalone units).

Finally, reconnaissance dives undertaken by the research team in areas previously identified as productive reefs revealed very few emergent abalone.

3.4. Discussion

In parallel with a growing pressure to address the problem of illegal fishing, the political imperative to allocate rights to traditional fishers to access high-value resources such as abalone, prompted to normally cautious MCM to allocate experimental permits to the Hamburg and southern Transkei communities – without sufficient knowledge of the state of the abalone resource, nor with a capacitated co-management support structure. The speed with which MCM allocated rights, given the out-of-control illegal fishery, is understandable, and can be considered a brave management response for an organisation that is more often criticised for not responding timeously to situations requiring fishery management interventions. The 'exemption permits' issued to fish abalone in subsistence TURFs seemed to be a potentially suitable vehicle for legalising and controlling the fishing activity, and extending socio-economic benefit from marine resources to coastal

communities. However, the present results show that the desired outcomes were not achieved. In this section, MCM's first attempt at co-management based on TURFs in rural communities in the Eastern Cape is discussed in respect of resource sustainability and the governance and co-management arrangement.

The experimental fisheries were discontinued in 2004 in the light of data indicating the rapid decline of the resource. Thus, MCM's attempt to achieve sustainable abalone utilisation had failed. Historic fishing pressure and relatively high fishing effort during the experimental fisheries had affected resource sustainability, and in some places, the resource had collapsed. Given that this area is also within the very end of their biogeographical range, the subpopulations are particularly vulnerable. Analysis of various sources of biological information indicated that the abalone resource in the rural areas of the Eastern Cape has been overexploited. This most probably began with the 'unregulated' commercial fisheries in both the former Ciskei and Transkei in the late 1980s and 1990s. In the 2002/3 season in Hamburg, a further 13 tons of abalone were harvested despite the precautionary recommendation of 5 tons. Divers were forced to dive in more remote areas to locate sized abalone. This trend was also observed by Proudfoot *et al.* (2006) who performed stock assessment work in shallow subtidal sites along the Ciskei coast, and found that abalone were of lowest density, and sized smallest, near the population centres. In addition, widespread illegal fishing by organised groups who were targeting abalone of any size has had a dramatic effect on stock: the small average size of confiscated abalone is similar to the trend observed in the urban areas of the Eastern Cape. In the Transkei, the research team observed very few emergent abalone on the reefs that were previously considered as the most productive areas. The abalone resource along the coast of the communities of Cebe, Gqungqe and Gcina appeared to have collapsed, even prior to the start of the experimental fishery at the end of 2003. This forced the professional divers to harvest in more remote locations, followed by the organised illegal groups who were systematically proceeding along the coast towards the Dwesa-Cwebe MPA - which also marks the end of the abalone biogeographical range. The high price of abalone had stimulated the extension of the network of illegal buyers from the urban areas into the more remote rural areas.

MCM's attempt at achieving co-management and a sense of ownership over the resource had also failed due to a number of reasons. Firstly, the allocation process had not been able to include all *bona fide* fishers. From the onset, meetings in the community to organise permit allocations had been organised at short notice by MCM officials. Considering the persistent traditional and very hierarchical governance arrangements in the target communities, this meant that those who were socially and politically better connected to those in positions of power had a better chance of being notified of meetings. This resulted in several *bona fide* fishers that were interviewed during the

beach surveys, not being present to register. Additional research workshops held in the community suggested that many established fishers did not obtain permits, while many non-fishers from further inland, who had become aware of the opportunity, did. Moreover, the criteria used to register the small-scale fishers and subsequently issue them with permits, were vague and without input from the local fishers. Verification and subsequent monitoring of rights holders' *bona fides* were also never undertaken by MCM. Registration on MCM's permit application list required the presentation of a South African Identity Document, which many rural fishers did not possess (Calvo-Ugarteburu and Raemaekers, 2008). The exclusion of many abalone harvesters from the permitting process, combined with the inclusion of many non-fishers with other sources of income in the allocation of 137 and 115 permits in the Ciskei and Transkei communities respectively, also created significant conflict within the recipient communities.

Secondly, the local management structures had not been established properly. At first, the locally elected committees had been created to meet the logistical needs of the buyer, but were subsequently formalised by MCM as co-management structures without additional training and capacity building. Even though some members aspired to manage the fishery in partnership with MCM, they had not been equipped with the necessary skills to do so. The limited training that had been undertaken had been aimed at increasing the understanding of the imposed technical input and output regulations which came with the permits. As a result, conflicts that arose such as issues surrounding preferred buyers could not be mediated by the newly elected structure. More importantly, with regard to MCM's anticipated vision of committees performing an MCS function, the committee did not have the capacity or the tools to sanction offenders and to respond to the growing illegal networks targeting abalone in their allocated 'TURFs'. In reality, the drive to harvest abalone was so strong, that local co-management structures were not sufficient in achieving sustainable resource use by all the villagers.

Lastly, many factors had arisen that had been overlooked in the design of the experimental fisheries, but which were deemed essential to achieve co-management. Fishing boundaries had been set very broadly, most probably to account for the decreased abundance of abalone on the reefs closest to the communities allocated with experimental permits. Further consequences of the large fishing areas were the inability of community appointed catch monitors to keep an eye on the professional divers in order to record the catches. Moreover, there was mounting conflict with neighbouring communities who argued that they also had a right to 'their' abalone resource. Interviews also revealed dissatisfaction with the imposed permit conditions, in particular with the increased MLS to 114 mm shell width for abalone, which was never explained to the Hamburg permit holders. Fishers questioned the conditions of the permits, such as 1) the daily bag limits that did not account for days

when sea conditions were too rough to allow harvesting, and 2) legal harvesting times set between 8 am and 5 pm, as these times did not account for the moon phases and the low tides occurring prior to 8 am or after 5 pm. These fishers also expressed discontent at the irregular start of each fishing season, and the weighing of abalone caught by the professional divers at the processing facilities - and thus the loss of weight en route due to dehydration.

The above mentioned problems were further exacerbated by the lack of active follow-up and daily management by MCM, and the lack of consultation with community structures. A dedicated project manager was never appointed, and the management plans developed by Britz *et al.* (2002; 2003) were largely ignored. Management effort was devoted to allocating access rights rather than other imperative management functions (Sowman, 2006). Consequently, the buyer and the permit holders were left to operate within conditions set out in the permit. As a result, fishing operations moved rapidly from being shore-based artisanal-type harvesting by the rights holders, to the contracting of professional divers harvesting off deeper reefs. This was due to the depletion of stocks accessible by wading from the shore. Professional divers were employed to harvest abalone on behalf of the permit holders while the permit holders themselves would stay at home and collect their regular payments. The anticipated goals of instilling a sense of ownership among the permit holders by involving them in the daily harvesting of the resource and the MCS activities within their 'TURF' were therefore not realised. Instead, professional divers had become unsupervised, harvesting on one occasion three times the recommended TAC, and illegal networks were given free rein to systematically harvest abalone along the coast.

However, what seemed at first glance to be symptoms of a flawed implementation of the project, pointed towards an incompatible fisheries management and rights model after re-examination. The fisheries management intervention was doomed to failure, from the outset as:

- Both permit and non-permit holders questioned the legitimacy of the permit allocation and the imposed regulations. Permits had been issued without prior consultation or involvement of local community structures in registering the *bona fide* small-scale fishers. Moreover, a genuine co-management process between the fisheries authority and the community had not been initiated.

- While poverty in both the Hamburg and Transkei communities was rife with very limited income-generating opportunities, only a small number of individual permits were issued. In addition, no other projects had been facilitated by MCM in collaboration with poverty alleviation and development departments at other national, provincial or local levels. This would have been an ideal opportunity for MCM to connect with other departments such as

the local municipalities who are mandated to promote development (refer to Chapter 5), but who often lack the know-how or support to initiate projects particularly related to marine resource use. Other poverty relief projects could have catered for applicants who did not meet the criteria set out by MCM, and could have looked at increasing post-harvest benefits or trained the community members to operate a workable umbrella cooperative investing some of the revenue from the sale of the high value abalone to the development of better schools or the micro-financing of agricultural and tourism related projects.

- Black market channels had become well established, giving the opportunity for non-permit holders to generate an income from the sale of abalone as well. A dedicated special operation unit was needed to crack down on the organised syndicates buying from the local communities.

- The traditional regard for marine resources as an inexhaustible common property that is renewed with each moon cycle and is to be used by any community member as a safety net - meant that neither the local committee nor the permit holders could deny anyone a right to fish. The importance of consultation and community buy-in in the formulation of rules had thus not been recognised by MCM, and undermined the legitimacy of the permit system (Hauck, 2008). This meant that MCM's co-management goals of instilling a sense of ownership among the rights holders and eliciting their assistance in MCS activities were unattainable.

Moreover, with the introduction of the experimental fisheries, the fisheries authority strived to increase awareness about the need to possess a permit if one wanted to harvest marine resources. However, at the time of the experimental fisheries, the only permits intended for the small-scale fishers of Hamburg, Cebe, Gqungqe and Gcina were for the abalone resource. No other permits had been issued. If small-scale fishers thus wanted to employ the livelihood strategy of harvesting marine resources, they needed to obtain an abalone permit; which, in itself, changed the focus of the small-scale fishers to the importance of harvesting abalone. This conventional fisheries management model, that disregarded the social context within the rural communities, generated substantial and easy income for the permit holders – albeit short term – through the employment of professional divers to undertake the actual fishing. It also prompted a change in perceptions regarding marine resource utilisation. The pilot projects had been promoted as 'local development' initiatives by DEAT and its MCM branch. During several focus group discussions that were held in the target communities after the experimental fisheries had been terminated, many requests were made by the villagers for the fisheries authority to provide the communities with motorised boats, fishing gear

and professional divers to access resources further offshore. For them, the reason for this was clear: the inshore abalone resource had already been depleted. For us, the reason behind this demand was equally clear: marine resources had for the community not merely become a potential source of easy cash, but a real avenue out of poverty. Furthermore, the community did not see the need for governmental assistance with regards to their traditional subsistence fishing livelihoods[10]: they had employed this strategy for generations. In their poverty stricken context, jobs that would provide an increased income were what was desired. At the time of the experimental fisheries, these were the only economic development projects being implemented in the target communities. Commercial marine resource harvesting was seen as the new path to alleviating poverty.

The mismatches between the realities in the fishing communities and the management model imposed therefore reveal that the fisheries authority was stuck in a 'target resource orientated management' paradigm (De Young *et al.*, 2008). Using fishery system theory discourse (Charles, 2001; Garcia and Charles, 2008), MCM had predominantly considered a portion of the fishery system in its operational management paradigm, namely the abalone resource, and the biological sustainability of this resource. Since little knowledge existed about the status of the abalone resource, permit conditions had been aimed largely at its protection and conservation, and research had been outsourced to assess its status. Once data showed that the resource was in decline, the fisheries were closed. Data on the socio-cultural, economic, institutional and even political drivers behind the community fisheries were conspicuously lacking, but no attempt was made to address this knowledge gap, and integrate the information into the management framework. MCM had perceived its mandate to be restricted to allocating and enforcing the access rights – albeit with very limited capacity on the ground. A management model based on individual permits for a single resource had been imposed, which ignored the educational level, traditional resource-use patterns, governance constraints, and development needs or socio-economic context of the community. As a result, the legitimacy of the management model had been questioned, the mandate of the local committee became unrealistic and conflict had arisen among various stakeholders.

In addition, MCM had had very little local capacity to engage in a meaningful co-management process. Co-management is defined as the sharing of management responsibility between government and organisations of resource users (Jentoft, 1989). Instead, MCM had issued permits and instituted a local 'co-management' structure, without a supporting capacity development programme and increasing MCM personnel at the local level to facilitate this process. Given the (i)

[10] Beach surveys and focus group discussions with previous permit holders and non-permit holders revealed that very few villagers purchased recreational permits from their nearest post office. Small-scale fishing was done informally, although many villagers expected government to issue them with permits.

high poverty levels within the community, (ii) the low education levels and skills at the local level to set up structures for the management of natural resources, (iii) the lack of locally-based MCM management personnel, and (iv) the organised black-market networks with which any functional local structure would have to contend, a situation conducive to co-management was not achieved. Many of these have been identified in the wider co-management literature as key conditions that need to be addressed in order to achieve success (Napier *et al.*, 2005; Pomeroy *et al.*, 2001). In South Africa, 'training and empowerment' have been seen as absolutely essential conditions (Hauck and Sowman, 2005; Napier *et al.*, 2005). In the light of indicators of resource decline obtained from this research, and the perceived failure of the experimental fisheries by MCM in curbing the illegal fishery, the fisheries authority discontinued the experimental fisheries in 2004. A 'post-mortem' analysis of all of the aspects that had led to this failure, including the mismatch of the imposed management model with traditional harvesting livelihood strategies, was never done. Instead, in 2005, MCM decided to issue the communities with permits for other and perhaps less difficult resources to manage, such as mussels and line-fish. In the meantime, the abalone harvest by the illegal networks continued unabated.

3.5. Conclusions

Legalising the harvesting of high-value abalone resources in communities of the Ciskei and Transkei provided government with the opportunity to develop programmes designed to improve local capacity and self-reliance, and increase the level of participation of the local community in the utilisation and co-management of inshore marine resources. However, due to a combination of (i) poor implementation of the project, (ii) a small abalone resource already showing signs of overexploitation, (iii) well established illegal marketing networks, (iv) very marginalised and poor communities, and (v) the allocation of individual rights to harvest a single resource within a traditional subsistence fisheries livelihood context, the experimental fisheries did not achieve the dual goals of *sustainable utilisation* and *poverty relief*. In the absence of an appropriate support package based on co-management principles and the development needs of these traditional communities, the establishment of legal small-scale commercial fisheries failed to materialise.

Instead, while permits to harvest abalone had been issued, the overexploitation of the resource in the shallow subtidal zone closest to the target communities forced the buyer and the permit holders to outsource the diving services required for harvesting both deeper and more remote abalone stocks - the permit holders lacked the specialised skills to undertake this task. Significant revenue was being made from an operation that seemed sophisticated compared to the traditional livelihood strategy of harvesting a basket of resources when tides are lowest. Moreover, dynamics had

changed: permit holders did not harvest the resource themselves, and were in effect paper quota holders. As such, this situation was very unusual in a traditional fishing community, and altered perceptions about the use of marine resources. However, the bonanza was short-term, not least due to the inability to counter the illegal networks operating on the same shores.

Even though the legal fisheries were short lived, perceptions about marine resource utilisation as an avenue out of poverty have gained currency in the communities. Individual rights and outside expertise have become entrenched concepts and hopes for commercialisation of marine resources are high. However, this comes at a time when resources, in particular high-value resources such as abalone, are already heavily exploited and dependence on state interventions is high.

This study has highlighted the importance of adopting a fishery system approach when designing fisheries management tools and regulations in such a social context. In particular socio-economic and cultural drivers, as well as local institutional realities need to be understood and acknowledged. Moreover, if the state is to achieve the MLRA goals of sustainable resource utilisation and poverty alleviation in its rural communities, it will require a more careful, participatory and nested design of rights and governance approaches to small-scale fisheries development.

CHAPTER 4:

Formalising Small-scale Fishing for East Coast Rock Lobster (*Panulirus homarus rubellus*) in the former Transkei, South Africa: The Outcomes of Interventions to Regulate Livelihoods and Markets for Poverty Alleviation

4.1. Introduction

The east coast rock lobster, *Panulirus homarus rubellus*, has been fished for several thousands of years by rural coastal communities as a subsistence livelihood strategy, and a source of food for household consumption (Bigalke, 1973; Feely, 1987; Hockey *et al.*, 1988; Lasiak, 1992). Lobster is known locally as 'ikolofish' or 'inkala', and is caught from the shore with poles and baited lures, and more recently also by free diving (Appendix B13). Over the last two decades, the sale of lobster to the growing number of South African and foreign visitors to this remote part of the coast has become the most important source of direct income for the coastal communities (Fielding *et al.*, 2004; Robertson and Fielding, 1997; Steyn *et al.*, 2006; pers. obs.), especially in tourist nodes such as Port St. Johns and Coffee Bay (Figure 4.1). The consumption of relatively cheap lobster - and other fresh seafood - has become a major tourist attraction for the Transkei coast. The high value of the lobster, combined with the imperative to extend the socio-economic benefits of marine resources to coastal communities, prompted the fisheries authority (Marine and Coastal Management – MCM) to formalise the lobster fishery into a rights-based, small-scale commercial fishery with access to international markets. In this chapter, this process is documented and the outcomes evaluated.

The East coast rock lobster is the most the dominant inshore spiny lobster species along the east coast of South Africa (Berry, 1974; Holthuis, 1991). In the Eastern Cape, the species occurs as far south as Port Elizabeth, although densities increase substantially in the former Transkei[1] (Figure 4.1) north of the Mbashe River, and are highest in the shallow waters off KwaZulu-Natal (Figure 4.1; Fielding *et al.*, 1994).

The post-Apartheid fisheries reform process laid the foundation for the recognition of traditional lobster fishers and the categorisation of the fishery as a "small-scale commercial" fishery. In 1998, the policy that guided the restructuring and transformation of South African fisheries, the MLRA, was promulgated (Act 18 of 1998; Republic of South Africa, 1998a). The MLRA aims to conserve marine living resources for sustainable development and for the benefit of the country as a whole (Witbooi, 2006; previously described in Chapter 1). Consequently, the MLRA recognised small-scale fishers for the first time as 'subsistence' fishers (Republic of South Africa, 1998a). Prior to this, small-scale fishing had remained a largely informal activity. Although illegal, it had been tolerated by the authorities in traditional communal areas such as those along the Transkei coast (Hauck and

[1] The Transkei area was regarded as an independent state by South Africa during the apartheid era, possessing its own government and environmental regulatory authority. Today the term is still used to refer to the region in the Eastern Cape, east of East London (Great Kei River), where people still traditionally live on communal lands.

Sowman, 2003; Sowman, 2006). Law enforcement capacity in the Transkei was historically low, and lobster fishers had been able to develop a livelihood strategy in a quasi open-access fishery, based on the sale of their catch to the growing local tourist market. The recognition of subsistence fishing in the MLRA, however, meant that this fishery needed to be formalised by means of individual fishing rights. This created a challenge for the fisheries authority: how would they achieve the MLRA's goals of recognising and formalising the lobster fishery in the Transkei in order to promote equity in access to marine resources for the benefit of local communities, while simultaneously providing social upliftment? For the restructured fisheries authority (MCM) who had historically been set up to deal with commercial fisheries, the 'subsistence sector' was an entirely new management area.

The MLRA was based on what was the prevailing worldwide fisheries 'target resource orientated', 'command and control' and 'rights-based' management paradigm (De Young *et al.*, 2008; refer to Chapter 1). In this framework the fisheries authority limits access to the resources through the allocation of individual[2] user rights to successful applicants, who are then subject to a form of effort control appropriate to the targeted resource. The fisheries management activities thus tend to centre on rights allocation, assessment of individual fish stocks, and defining and enforcing catch restrictions that are aimed at conserving the resource. Although the lobster fishers in the Transkei were recognised in the MLRA as 'subsistence' fishers, the act was very explicit in its requirement for all fishers to be issued with individual annual permits, a daunting task in widely dispersed, traditional rural communities.

MCM's management focus was historically on commercial quota-based fisheries and, recognising the potential difficulties in formalising subsistence fishers into a rights-based framework, appointed a subsistence fisheries task group (SFTG) in 2000 to make recommendations on how to manage subsistence fishers. The SFTG recommended that small-scale fishers harvesting high-value resources such as lobster[3] should not be regarded as 'subsistence' fishers, such as defined in the MLRA, but rather as 'small-scale commercial' fishers (Branch *et al.*, 2002; Cockcroft *et al.*, 2002; Harris *et al.*, 2002). Given the high value of the lobster resource, venture capital companies and particularly the large South African commercial fishing companies, expressed increasing interest in the commercialisation of the small-scale fishery in the Transkei to meet the demand for lobster in other national and global markets. By 1988, three fishing companies had obtained licenses from the former

[2] In the commercial sector rights are allocated to legal entities (companies and individuals).

[3] In KwaZulu-Natal, the provincial government has prioritised the use of this resource for the recreational fishing sector, which has seen between 50 and 150 tons steadily caught annually, mainly by free diving from the shore (Tomalin and Tomalin, 1997). A small-scale fishery does exist but is illegal in this province. A more organised illegal fishery also operates under the guise of the recreational fishery and by sale of the catch as product originating from the Transkei (C. Coetzee, EKZN Wildlife, pers. comm.; Steyn *et al.*, 2006).

Transkei government to purchase lobster from the small-scale fishers for trade elsewhere (Fielding *et al.*, 1994). However, licenses were discontinued in 1991, while the sale to local markets persisted. Interest in the Transkei lobster resource by larger fishing companies faded over the next decade, as South Africa was in its transition towards democracy and the fishing industry and national fisheries authority underwent significant reform (Kleinschmidt *et al.*, 2003; van Sittert *et al.*, 2006). Since 2003, commercial fishing companies based outside of the Transkei again became aware of the potential to commercialise the Transkei lobster resource and lobbied MCM for licenses to purchase lobster from the local communities for export.

Consequently, MCM responded to the SFTG recommendations by licensing 'external' companies who would purchase the lobster from the permitted fishers for export. Adopting a neo-liberal developmental approach that flowed from the government's economic policies, MCM argued that fishers themselves would eventually organise and develop micro-enterprises (M. Silevu addressing the MCM Subsistence Fisheries Workshop, East London, 11-12 October 2004). This in turn was anticipated to trickle-down into the coastal villages, and thus provide much-needed poverty alleviation in the rural coastal communities. Fish processing facilities owned by community trusts, and managed as public-private partnerships, were proposed[4]. In the interim, small-scale fishers would be able to sell their catch at a constant price to the markets provided by the appointed buyers. Under MCM's policy of single channel marketing, the fishers' traditional marketing channels were closed, as local hotels and holiday establishments were not allocated buying licenses. Moreover, fishers were not permitted to sell their catch directly to holiday makers. Thus, an illegal market was created overnight that operated alongside the newly instituted legal marketing channel.

The interventions by MCM to regulate the Transkei lobster fishery have had profound effects, both on the fisher community and on the lobster resource. These effects are largely undocumented and have not been used to evaluate the effectiveness of MCM's management of small-scale fisheries. An analysis of the permit and buyer system has not yet been performed, as well as an assessment of its socio-economic success, its effect on the resource, fisher behaviour and the interaction with broader community development. Thus for the first time, ten years after the implementation of this system, this study documents and analyses the outcomes of the formalisation of the lobster fishery. Using a fishery system approach, this research was aimed at understanding both the resource and human aspects of the fishery and the effects of formalisation i.e. management (Charles, 2001; Charles, 2005; see also Chapter 1).

[4] However, small-scale lobster fishers, who were often illiterate and had low school education levels, did not receive any capacity building such as small business skills training.

The biology, population dynamics and resource status of East coast rock lobster are reasonably well understood as result of previous research. A first resource assessment of the small-scale lobster fishery in the former Transkei homeland was undertaken in 1993 by the Oceanographic Research Institute (ORI) at eight sites along the coast as part of a resource survey funded by the Development Bank of Southern Africa (Fielding *et al.*, 1994). The relative abundance and size distribution of lobsters was determined using underwater censuses. The data were used to construct the first yield- and egg-per-recruit production models for the lobster resource in the Transkei. Subsequent research undertaken by ORI between 2003 and 2005 was aimed largely at updating information collected in the 1994 survey. Newly collected sex ratio and size distribution data of the lobster resource were used to fine-tune biological reference points of ORI's '1994' models, and to develop a spawner-biomass-per-recruit model for the estimation of the MSY (Steyn *et al.*, 2006). In addition, market surveys and a variable fishing effort model allowed estimates of total off-take for the Transkei small-scale lobster fishery, and an estimation of the number of permits that could be issued to small-scale fishing communities (Fielding, 2005a). Research focused on the Transkei lobster fishery had thus far largely been directed at assessing resource status, fishing effort and to some extent fishing behaviour. The research had provided the fisheries authority with the necessary scientific basis to allocate individual permits, and hence to control effort[5]. However, from 2005 onwards, 'external' companies had been licensed to buy lobster from the permitted fishers and plans were being approved to set up community-owned fish processing factories along the coast. This had raised concerns about increased fishing effort in a fishery that had already attained its MSY[6]. An assessment of the situation and its effect on the resource was therefore required.

As previous research on East coast rock lobster focussed largely on the resource aspects of the fishery system, few data existed on the socio-economic, cultural and market factors driving the small-scale lobster fishery. This information was essential to understanding the changes in fisher behaviour and resource utilisation introduced by MCM's interventions to formalise the fishery. Therefore, the present study concentrated specifically at the human component of the fishery system (Charles, 2001). The research approach was to understand the poverty context within the rural communities, and their adopted livelihood strategy of catching and selling the relatively high-valued lobsters. The small-scale lobster fishery in Coffee Bay (Figure 4.1) was used as the main case study. Secondly, the various marketing channels and changing market dynamics were analysed, including the sale to

[5] In this research, no evidence could be gathered to suggest that this scientific information has been included in the management decision-making process (further discussed in the text).

[6] Prior research undertaken by Steyn *et al.* (2006) between 2003 and 2005 determined that fishing effort was high, and the resource was estimated to be exploited at optimum levels. This study was undertaken prior to the licensing of 'external' buyers.

'external' buyers. For the latter, catch records from the entire Transkei coast were included, whereas for the local markets, the catches as supplied to a typical backpacker's lodge were analysed.

Lastly, many mismatches between imposed fishing regulations and socio-economic and fishing behaviour realities had already been exposed early on in the process (Fielding *et al.*, 1994; Fielding, 2001; Steyn *et al.*, 2006). Despite the early indicators of problems with the regulatory framework, they had not yet been fed back into the management decision-making process. Using the data of this study, an evaluation was performed of the management framework, which is based on limited resource access through individual permits.

In concluding discussion, I argue that the traditionally resource focussed fisheries authority needs to formulate its small-scale fisheries management and development framework in terms of a fishery system. This, *inter alia*, requires an understanding of the social context of coastal community livelihoods, development and poverty alleviation, and the integration of this knowledge into the management process.

4.2. Material and Methods

In order to understand the Transkei lobster fishery, its drivers, and the current regulatory processes, multi-disciplinary case study research was undertaken using a combination of quantitative and qualitative data-gathering tools.

4.2.1. Study area

Information was gathered for the entire northern part of the Transkei, north of the Mbashe River, where the small-scale lobster fishery operates and densities of *P. homarus rubellus* for the Eastern Cape are the highest (Fielding *et al.*, 1994). Several other species, including *P. homarus homarus*, are also found in this area; however they occur in much lower abundance, and are not targeted specifically by the fishers, as they fetch a much lower price. Lobster catches by the small-scale fishers were observed to comprise more than 98 % of *P. homarus rubellus* by Fielding *et al.* (1994) and Steyn *et al.* (2006).

The case study field research was undertaken primarily in Coffee Bay and its surroundings (Figure 4.1). Coffee Bay is, after Port St. Johns, the most important tourism node in the Transkei, and consists of several hotels, backpacker's lodges and private holiday cottages. The rural villages surrounding Coffee Bay - hereafter referred to as the 'Coffee Bay community' - answer to the KwaTshezi-Mqan

tribal authority and are situated within the King Sabata Dalindyebo local municipality. Coastal boundaries are the Mthata River in the North, and the Mthonjana River in the South (Figure 4.2).

Coffee Bay was chosen as a case study site for in-depth field research due to its importance as a tourism node and the well established small-scale lobster fishery supplying the local tourism market. In addition, the local community has been involved in a 'Mussel Rehabilitation Programme' (MRP)[7] since 2000, which has generated considerable socio-economic information about the area and has enabled the establishment a co-management structure. The programme works with 10 villages from the tribal authority (Figure 4.2) involved in the harvest of marine resources (Calvo-Ugarteburu and Raemaekers, 2008). In 2005, I was elected as a member of a project steering committee for the World Wide Fund for Nature (WWF) funded[8] phase of the programme, which - *inter alia* - aimed to assess different marine resource-use patterns by the community. This provided the opportunity to undertake lobster fishery research.

[7] The MRP programme, run by Walter Sisulu University, aims to rehabilitate overexploited mussel stocks by re-seeding, develop local co-management arrangements for the sustainable utilisation of intertidal resources, and successfully develop additional livelihood options in the form of community-owned vegetable gardens and a community-managed nursery.

[8] Since 2000, the programme has been funded by various agencies. In 2005, the programme received funding from WWF-Marine Programme and the DEAT Social Responsibility Programme.

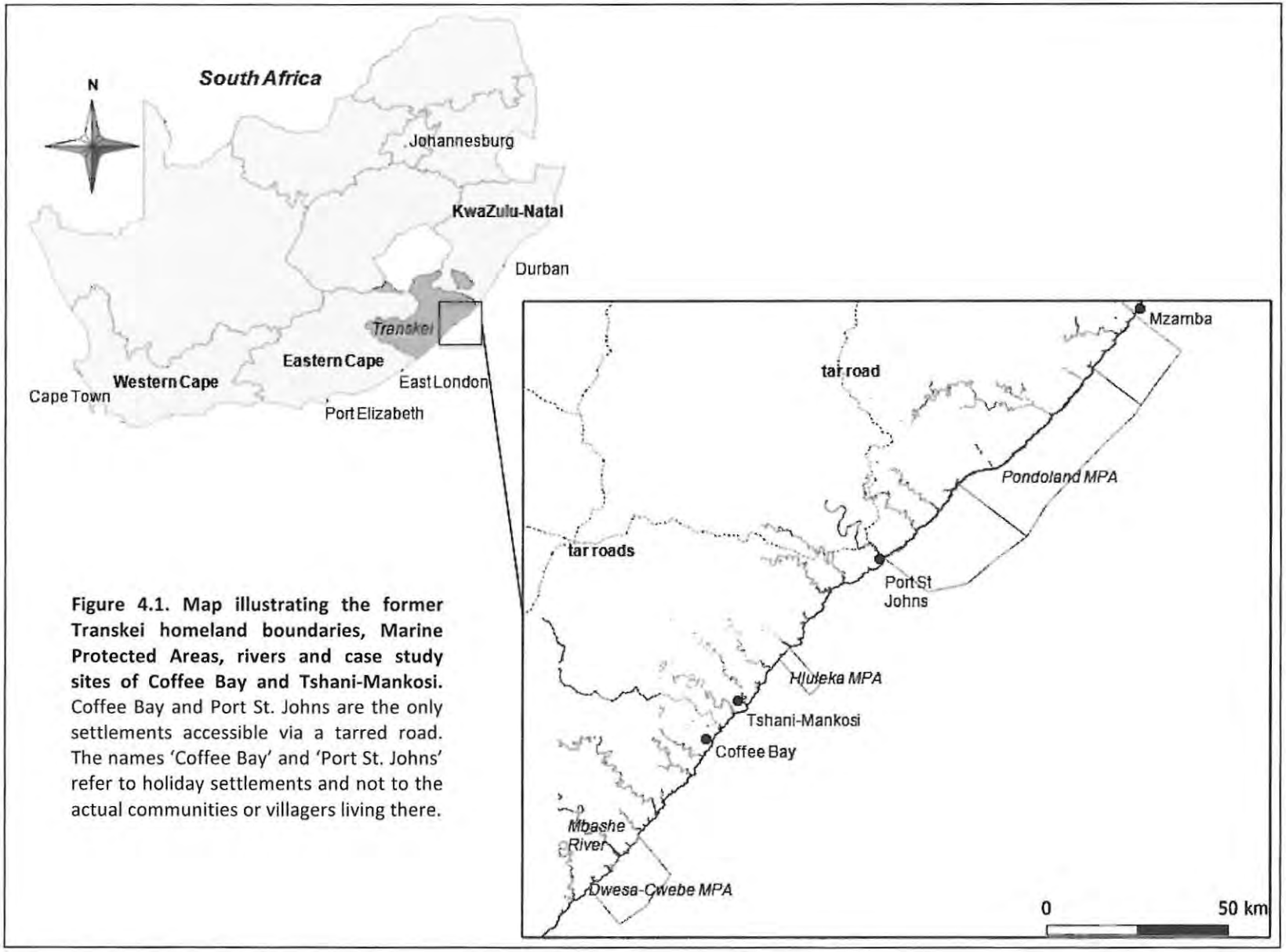

Figure 4.1. Map illustrating the former Transkei homeland boundaries, Marine Protected Areas, rivers and case study sites of Coffee Bay and Tshani-Mankosi. Coffee Bay and Port St. Johns are the only settlements accessible via a tarred road. The names 'Coffee Bay' and 'Port St. Johns' refer to holiday settlements and not to the actual communities or villagers living there.

4.2.2. Quantitative data

Fishing effort and behaviour

Coffee Bay community-catch-monitoring

Since August 2005, several monitors have been employed by the Coffee Bay Mussel Rehabilitation Programme to record resource use along the coast between the Mthata and Mthonjana Rivers (Figure 4.2; Appendix B14). The monitors are supervised by the local committee and its appointed field managers. This ensures that a trust relationship exists between the fishers and the monitors. It is important to note that this community-catch-monitoring programme operates independently from the fisheries authority.

Field managers collect datasheets every month, and ensure that the monitors have the necessary equipment (callipers, tide tables, etc.) for data collection. Two monitors received specific training to undertake a roving creel type survey of the lobster fishery as it was envisaged that one day the local co-management committee for the Mussel Rehabilitation Programme would be expanded to make managerial decisions on the lobster fishery as well. Information on the fishery thus needed to be collected. For this purpose, the Coffee Bay fishing area was divided into two sections that are walked every second day in alternate directions. The monitors begin surveying 2 hours before low tide until 2 hours after low tide (Table 4.1).

Table 4.1. Overview of Coffee Bay community-catch-monitoring technique

Day	Route (see Figure 4.2)	Start time
Day n	Monitor 1: Ocean to Mbolompo Monitor 2: Lwandlana to Mthini	7:00 am (spring low tide at 9:00) to 11:00 am
Day n +1	-	
Day n +2	Monitor 1: Mbolompo to Ocean Monitor 2: Mthini to Lwandlana	8:00 am to 12:00 pm
Day n +3	-	
Day n +4	Monitor 1: Ocean to Mbolompo Monitor 2: Lwandlana to Mthini	9:00 am to 1:00 pm

Monitors recorded information regarding the weather and sea conditions, and particulars of each lobster fisher encountered including: name, gender, age, possession of a permit or not, the manner in which the lobster were caught, and the length of time spent fishing prior to being encountered by the monitor. Catches were counted, measured and sexed, and the reproductive state of the female lobsters was recorded.

The data, which provide the only long-term, high resolution dataset for this area, were analysed up until September 2008 for the purpose of the research presented here, but monitoring is ongoing.

Data were not collected in October 2007 for administrative reasons. Data were captured into a Microsoft Office Access database, and the three-year monitoring period was queried for:

- Demographics of the fishers.
- Analysis of fishing effort and behaviour and estimation of Catch-per-Unit-Effort (CPUE) as number of lobsters caught per fisher per outing (Steyn *et al.*, 2008).
- Evolution of CPUE over time and for different fishing areas. Observed trends were tested for significance using the Sigmaplot 10 software package (Systat, 2006).
- Analysis of fishing behaviour and effort in the light of imposed fishing permit allocations and fishing regulations.
- Comparison of findings to those of Steyn *et al.* (2006, 2008).

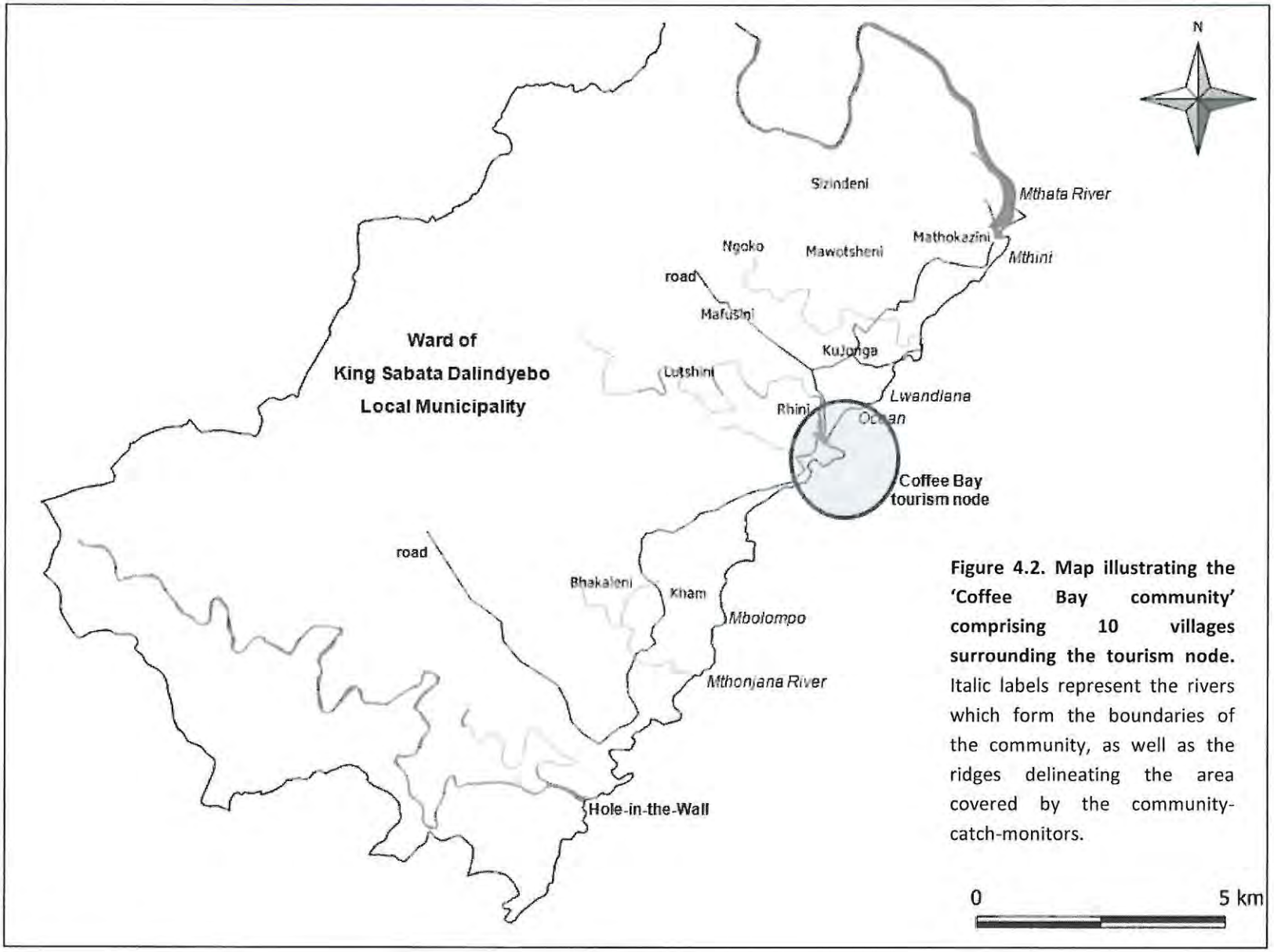

Figure 4.2. Map illustrating the 'Coffee Bay community' comprising 10 villages surrounding the tourism node. Italic labels represent the rivers which form the boundaries of the community, as well as the ridges delineating the area covered by the community-catch-monitors.

Mdumbi backpacker's lodge supply monitoring

In order to gather information on supply to local markets, two members of staff at the Mdumbi Backpacker's Lodge[9] were trained as monitors to record every instance a fisher presented their catch for sale to the lodge and its customers. The Mdumbi Backpacker's Lodge is situated at the Mdumbi River mouth, within the Tshani-Mankosi community that borders Coffee Bay in the north (Figure 4.1). The lodge is located directly on the coast, and represents the first market that small-scale fishers from the area can access in order to sell their catch returning from the fishing area. Fishers typically arrive at the lodge's gate and wait for potential customers. Upon arrival, all catches were recorded by the monitors, even when no lobsters were bought by the lodge's customers. Information recorded included particulars of the fishers (gender, age, fishing method and the possession of a permit) and measurements of their catch. Monitors refrained from asking to see the fishers' permits, and assured the fishers that the information gathered would remain anonymous.

Data-gathering was undertaken during the 2007 and 2008 legal fishing season (see below), although monitors only started data-collection at the beginning of June in the 2007 season. Data were captured into a Microsoft Office Access database, and queried for:

- Demographics of the fishers.
- Analysis of fishing effort and behaviour and estimation of CPUE for the two fishing periods that were monitored.
- Analysis of fishing behaviour and effort in the light of imposed fishing permit allocations and fishing regulations.
- Dynamics regarding market supply.

Fishery records from licensed buyers

Fishery records of the lobster bought by the 'external' buyers were obtained either directly from the licensed companies or from MCM. Data typically included tonnage of lobster per year for each fishing area, as well as total value in South African Rands (ZAR).

Confiscations and arrests

Data on number of arrests and confiscated lobster between February 2006 and February 2007 were obtained from the MCM Compliance/Control office in Port St. Johns. Additional reports of illegal fishing operations were obtained from the Military Intelligence arm of SANDF.

[9] Backpacker's lodges cater for younger, more adventurous travellers and usually consist of a campsite and budget accommodation with communal facilities.

Socio-economic context

Information regarding socio-economic conditions within the Coffee Bay community was accessed through the MRP's research activities. During 2002 and 2003, a socio-economic baseline survey had been undertaken as part of the programme (i-iii). (i) A Household Livelihood Security Assessment (HLSA) was used to gauge the level of dependency on natural resources within the community (Calvo-Ugarteburu, 2002). This was done using a range of quantitative and qualitative tools, including oral histories of small-scale fishers from the community. Following the HLSA, in 2003 (ii) social maps[10] were compiled for each one of the 10 villages, and (iii) a total of 216 in-depth household questionnaires were conducted in the villages. Reports of this research were examined in light of the focus on the lobster fishers, and raw data from the social maps were re-analysed after transfer into a Microsoft Office Access database. Using the MyStat software package (SyStat, 2007), differences were tested in livelihood portfolios between households with harvesters of marine resources, and households where no residents harvested marine resources.

Data regarding the number of fishers registered and allocated with lobster permits between 2001 and 2008 were obtained from MCM for the entire Transkei, including Coffee Bay, as the fishers had been identified by the fisheries authority's extension officers. In addition, similar lists containing basic demographic information were compiled by the Coffee Bay local MRP committee in 2005 and 2007. The data from MCM and the community allowed the identification of the small-scale lobster fishers in the community and those fishers that were allocated permits. An additional 33 short household and livelihood questionnaires were administered during 2008 in households where lobster fishers had been registered by MCM in 2008. The short questionnaires were administered by a trained isiXhosa-speaking member of the MRP team. This dataset provided specific socio-economic information of the small-scale lobster fishers, and insights into the use of the allocated permits.

4.2.3. Qualitative data

To complement quantitative fishing effort and socio-economic data, a series of semi-structured interviews were held with local fishers, holiday accommodation owners and managers, local fisheries inspectors, licensed buyers and other relevant stakeholders between 2006 and 2008. In February 2007, a focus group discussion was held with 12 lobster fishers in Coffee Bay. I subsequently participated in several diving operations with small-scale fishers. This provided insight into perceptions of the current regulations and validations of fishing behaviour recorded by the

[10] A social map represents the arrangement of households in a particular location and highlights demographic characteristics, including the location of the households (HH), the activities and livelihoods carried out, and so forth (Calvo-Ugarteburu, 2002).

community-catch-monitors. From October to November 2008, a series of telephonic interviews were held with hotel owners, tourism associations, Transkei residents and licensed buyers from the entire Transkei coast. The purpose of the interviews was to validate personal observations and to prompt perceptions regarding the current management measures and options for the lobster fishery.

Table 4.2 provides an overview of the information gathered for the entire Transkei, with a particular focus on Coffee Bay and its surroundings.

Table 4.2. Overview of quantitative and qualitative data collected

Information collected	Tool/ method	Period	Location
Fishing as livelihood strategy and fishing effort	Community-catch-monitoring	Aug 2005 - Sep 2008	Coffee Bay
	Local supply monitoring	Jun - Oct 2007 and Mar - Oct 2008	Mdumbi Backpacker's Lodge
Fishing effort for local market	Local supply monitoring	Jun - Oct 2007 and Mar - Oct 2008	Mdumbi Backpacker's Lodge
Fishing effort for external market	Fishery records	2005 - 2008	Inkala (Pty) Ltd., Siyathangana Community Projects, Live Fish Tanks (Pty) Ltd., Wavelengths 150 (Pty) Ltd. and Espadon (Pty) Ltd.
Fishing permit allocation	MCM permit list	2005 - 2008	Transkei
	Community register	2005, 2007	Coffee Bay
	Short HH questionnaires	2008	Coffee Bay
Community profile: socio-economic and livelihoods	HH Livelihood Security Assessment report	2003	Coffee Bay
	HH Questionnaires report	2003	Coffee Bay
	Social maps raw data	2003	Coffee Bay
Fisher and HH profile	Focus group discussions	Feb 2007	Coffee Bay
	Short HH Questionnaire	Nov 2008	Coffee Bay
Fisher behaviour	Participatory diving	Feb 2007	Coffee Bay
	Focus group discussions	Feb 2007	Coffee Bay
Illegal fishing operations	Confiscations and cases	Jan 2005 - Feb 2007	Port St. Johns
Fishery regulation and commercialisation	Semi-structured interviews with stakeholders	2006 - 2008	Transkei
	Interested and Affected Party fish factory development plans	2007	Port St. Johns and Coffee Bay
	WWF Project Steering Committee	2005 - 2007	Coffee Bay

4.3. Results

4.3.1. Fishing for lobster as a livelihood strategy

The following section describes small-scale fishing for lobster as a livelihood strategy. Initially, the broader socio-economic and poverty context of the typical rural community of Coffee Bay is

presented, where small-scale fishing for lobster takes place. This is followed by a demographic and socio-economic profile of small-scale lobster fishers themselves.

The Coffee Bay tourism destination consists of small settlements such as holiday accommodation and grocery shops with basic infrastructure such as running water and electricity (Calvo-Ugarteburu and Raemaekers, 2008). The rural community surrounds the holiday settlements (Figure 4.2) and resides in traditional Xhosa mud dwellings. Homesteads are characterised by a lack of infrastructure such as clean drinking water and electricity (Calvo-Ugarteburu, 2002). In 2003, it was estimated that a total of 1000 households was scattered in the 10 villages surrounding Coffee Bay (Calvo-Ugarteburu and Raemaekers, 2008).

The socio-economic characteristics of the households are highlighted in Table 4.3. Household surveys showed a high dependency on state social grants, in the form of pension, child or disability grants. This had also been observed in the southern parts of the Transkei (see Chapter 3). Social maps and household questionnaires in 2003 revealed that state grants were the main source of income for 68 % of all households sampled (Calvo-Ugarteburu and Raemaekers, 2008). Migrant work by one or more of the household members, and remittances sent to their family also provided an important source of income for the community members. Households with a higher monthly income tended to have one or more household members working outside of the community. However migrant work had become scarce; many villagers had returned to their villages unsuccessful from seeking work in urban areas (oral histories in Calvo-Ugarteburu, 2002). Prior to 1994, many men from the Coffee Bay community had worked in the mines in the north of the country, but had been retrenched after the reform to democracy. In 2003, less than 40 % of households had a resident member with formal employment (Mbizule, 2003).

The baseline research undertaken as part of the MRP showed that Coffee Bay is characterised by very limited income-generating opportunities, especially at the local level. As already highlighted in the previous chapter, in this context of structural poverty, people adopt a range of livelihood strategies including formal and informal employment, pensions, migrant remittances, the use of natural resources (for subsistence and sale), arable production and animal husbandry (Shackleton *et al.*, 2001). People in Coffee Bay cultivate their own gardens or fields, or keep livestock on communal land. In addition products from the forest (timber and non-timber) or inshore marine resources are harvested for own consumption or for local sale (Calvo-Ugarteburu, 2002). As observed in the southern parts of the Transkei women and children typically harvest rocky-shore invertebrates such as mussels and oysters during spring low tide periods (refer Chapter 3), while men fish with line and

rod. In the northern parts of the Transkei, such as in Coffee Bay, many men also harvest lobster[11] (Fielding *et al.*, 1994).

Table 4.3. Socio-economic characteristics of the Coffee Bay community and its households (HH)

Socio-economic indicator		Source	Reference
HH size:		HH Questionnaires 2003 (n = 216)	Mbizule, 2003
Average	6.7	HH Questionnaires 2008 (n = 33)	Own data
Median	7		
Max	16		
Min	1		
Male headed HH	64.3 %	HH Questionnaires 2003 (n = 216)	Mbizule, 2003
		HH Questionnaires 2008 (n = 33)	Own data
Female headed HH	35.7 %	HH Questionnaires 2003 (n = 216)	Mbizule, 2003
Child headed HH	4.2 %	Social maps 2003 (n = 478 HH; Table 4.2)	Calvo-Ugarteburu and Raemaekers, 2008
State grants in HH:		Social maps 2003	MRP raw data analysis and validated by Mbizule, 2003
Pension	38.3 %		
Child	42.5 %		
Disability	10.2 %		
Formal employment in HH:		HH Questionnaires 2003	Mbizule, 2003
Migrant	13.4 %		
Local	3.1 %		
Local piecework	6.9 %		
Monthly income per HH:		HH Questionnaires 2003	Mbizule, 2003
Average	1440 ZAR		
Max	4100 ZAR		
Min	< 200 ZAR		
Education:			
Children in high school	10 %	Social Maps 2003	MRP Raw data analysis
Population below 16 yrs	44.7 %	HH Questionnaires 2003	Mbizule, 2003
Assets:		HLSA 2002 and Social maps 2003	Calvo-Ugarteburu, 2002 and Social Maps raw data analysis
Car	0.83 %		
Livestock	12.92 %		
Garden or fields	62.08 %		

In 2003, in Coffee Bay alone, approximately 27 % of the households depended solely on natural resources (mainly marine resources) to supplement their food and income (Calvo-Ugarteburu and Raemaekers, 2008; based on 2003 social maps raw data). In 1997 and 2004 respectively, Kepe (1997) and Whande (2004) observed that marine resources formed an important source of protein and income in those households in communities north of Port St. Johns that did not possess livestock and/or fields. Interestingly, in 2008, the short questionnaires administered for this study in 33 households in Coffee Bay - where at least one lobster fisher had been registered by the fisheries authority - indicated that none of the households had substantive land to cultivate except for their small household gardens (Appendix B15). Only 11 of the 33 households kept some form of livestock. In Coffee Bay, tenure of land or livestock therefore also seemed to be an important determinant for

[11] In some communities in the northern parts of the Transkei, women also actively fish for lobster (Kepe, 1997; Gqutyana, 2006; S. Raleigh, Siyathangana Community Projects, pers. comm.).

whether households in the coastal villages accessed marine resources as a livelihood. However, social mapping data in 2003, which included 478 households, did observe different trends: the majority of households including small-scale fishers did posses land (Chi-Square = 5.864, df = 1, $p < 0.05$), and no relationship was observed between households with small-scale fishers and livestock (Chi-Square = 1.832, df = 1, $p << 0.05$). Ownership of assets such as land and livestock is thus not clearly defined between households with or without marine resource harvesters or fishers. Moreover, from the 33 households surveyed in 2008, 45 % of households had access to a pension grant, 79 % had child grants (max. 5), and 12 % received a disability grant. All households indicated that grants were their most important source of income. Only 5 households had a migrant worker, and less than 1 % of all residents in the 33 households worked locally. These socio-economic conditions were very similar to the general household conditions observed in the surveys undertaken in 2002 and 2003, which did not focus solely on households with harvesters of marine resources (Calvo-Ugarteburu, 2002; Mbizule, 2003). With this in mind, access to marine resources might have been determined by household tradition and the transfer of fishing skills across generations and within families. Focus group discussions with 15 adolescent lobster fishers in 2007 also revealed that all fishers' mothers and sisters harvested marine resources such as mussels during spring low tide periods. Questionnaires administered in 2008 in 33 households with lobster permit holders also indicated that other marine resources such as mussels were often collected by members of the household. Furthermore, many lobster fishers indicated that they also fished with rod and line for line-fish. Interestingly in Coffee Bay, many young men including some lobster fishers had begun to harvest large quantities of mussels (Calvo-Ugarteburu and Raemaekers, 2008).

Community-catch-monitoring data indicated that the average, maximum and median age of the lobster fishers was 29.5, 56 and 28 years respectively. It was an almost exclusively male activity with less than 1 % of the fishers encountered being female, all of whom were in their thirties. Additional data sources such as the household questionnaires administered in 2008 revealed that many male children also fished for lobster, as part of a household livelihood strategy. Unsold lobster was eaten by household members although preference was given to the sale of the catch. The lobster fishers reported that they could earn between 20 and 200 ZAR per day from the sale of their catch. It was also observed that the fishers operated with variable effort. Data showed that approximately 13 fishers operated regularly up to 5 times per month, while the majority of other divers caught lobster less frequently – which is consistent with the subsistence livelihood pattern comprising various food growing and income-generating activities.

The income derived from the sale of lobster contributed to the household economy. In particular, in many female-headed households, children actively contributed to the household livelihoods, or often had to fend for themselves. Oral histories in 2003 recounted that children lobster fishers needed to pay for school materials and uniforms with income from the sale of their catch (Calvo-Ugarteburu, 2002). In contrast, focus group discussions held in 2007 with adolescent lobster fishers disclosed that the money generated from the sale of lobster to the local tourism market was often used to buy personal assets such as cell phones and clothes, and goods such as alcohol. Thus, income generated did not necessarily accrue to the entire household.

Through the community-catch-monitoring in Coffee Bay, a total of 143 different fishers were recorded between August 2005 and September 2008. Most of the fishers originated from Coffee Bay, and only occasionally from communities further south. While lobster fishing is either performed by shore fishing or diving, community-catch-monitoring only recorded lobster divers, and no shore fishers, as they operate mostly at night (see below). Table 4.4 provides an overview of the estimated number of households in the 10 villages surrounding Coffee Bay, and the number of lobster harvesters estimated by the fisheries authority and by analysis of the community-catch-monitoring data.

Table 4.4. Number of households and lobster harvesters in the Coffee Bay community villages estimated using an array of information sources

Village	# HH (2003) estimate)	# HH sampled in social maps 2003	# lobster fishermen in social maps 2003	MCM permits 2006	MCM permits 2008	Community-Catch-Monitoring data
Rhini	± 250	52	-			
Sizindeni	± 200	54	-			
Ngoko	± 100	49	3			
Mathokazini	± 90	50	33			
KuJonga	87	50	25	No disaggregated data		
Lutshini	77	50	1			
Kham	70	70	-			
Mawotsheni	44	44	-			
Bhakaleni	38	38	9			
Mafusini	21	21	-			
Total	± 1000	478	71 (equals ± 150 when extrapolated using total number of HH)	122 registered	102 registered	143 (divers only)

Abbreviations used: HH - Household. Grey shaded columns represent data collected prior to this study.

Mdumbi backpacker's lodge

Socio-economic conditions in the adjacent Tshani-Mankosi coastal community where the Mdumbi Backpacker's lodge is located were not studied; however, observations in this community suggested very similar characteristics to that of Coffee Bay: a depressed local economy where a large proportion of impoverished households depend on the harvesting of marine resources as a livelihood strategy.

Demographic data from monitoring the supply of lobster at the Mdumbi backpacker's lodge revealed that at least 159 different fishers brought their catch for sale to the lodge over the two fishing seasons surveyed. The village or community from which the fishers originated was not recorded; however, interviews with the monitors and the lodge management suggested that most fishers originated from the Tshani-Mankosi community. Two large rivers, the Mthata and Umdumbi, form this community's boundaries on both sides, and can only be crossed further inland.

During the 2007 and 2008 seasons surveyed, 95 and 105 fishers were recorded respectively. Interestingly, 64 of the 95 fishers observed during 2007 were not recorded again in 2008. This fact highlights the livelihood nature of small-scale lobster fishing: when alternative and more preferred income-generating opportunities arise for the individual fisher or his household, fishing for lobster might be halted temporarily. This phenomenon most probably occurs throughout the year as well.

The ages of the fishers in years ranged as such: average (24), minimum (9), maximum (64) and median age (21). Only 3 % of the fishers were female, and their age ranged between 11 and 57 years. Many more children were recorded at Tshani-Mankosi as the method of monitoring recorded both shore fishers and divers (see below). Data also showed that many children fished during schooldays.

4.3.2. Lobster fishing effort and behaviour

The case study revealed that the small-scale lobster fishery in the communities of Coffee Bay and Tshani-Mankosi was dominated by young male household members, who fished for lobster as a livelihood strategy. The shore fishers caught lobster from the inshore waters, with baited lures (poling) and mainly at night, or by free diving (entering from the shore) during daylight and relatively calm sea conditions (Fielding *et al.*, 1994; pers. obs.). The following section describes the fishing effort and behaviour in the Coffee Bay and the Tshani-Mankosi communities in greater depth.

Coffee Bay

Community-catch-monitoring along the coast of Coffee Bay provided the longest continuous dataset (2005 -2008) of lobster fishing effort data available. Nevertheless, prior to presenting the results of the analysis, the following limitations of the dataset must be taken into account:

- Monitoring only occurred during daylight; consequently, most divers were recorded and the shore fishers operating at night were largely unrecorded.
- Monitoring only occurred every second day.
- Monitoring started at point A and ended at point B. Consequently, diving operations at particular reefs might have been missed as a result of diving commencing after or ending prior to the monitors' arrival. Notably, if diving activity was observed, monitors would wait until the diver finished diving so that total catch could be measured.

Small-scale lobster fishers from Coffee Bay are known to perform both shore fishing and diving for lobster. When monitoring commenced in the early morning, lobster shore fishers returning from the fishing locations were occasionally encountered. Moreover, focus group discussions revealed that many lobster shore fishers operated in Coffee Bay. In addition, divers would also perform shore fishing on certain occasions, when sea conditions were not favourable for diving. Diving was an acquired skill, mostly utilised by adolescent men, who also had gained access to diving gear. Children would first learn how to shore-fish for lobster, and only acquire diving skills when reaching adolescence. Interviews with divers suggested that many had learned to dive from their fathers. However, it was evident that divers had increasing access to better dive gear and were becoming more efficient.

At least 143 different divers were recorded in Coffee Bay. Divers operated mostly in the mornings, and usually in small groups. Divers were equipped with basic diving gear such as goggles and gloves, but a few had wetsuits and fins. Diving would only occur in the shallow waters, less than 3 to 4 m deep, and would last between 30 minutes to an hour. Interestingly, groups operated mostly in different, preferred diving areas. Focus group discussions with lobster fishers and divers also revealed that certain groups had claimed specific fishing spots. Nevertheless, different groups reported that they rotated fishing spots in order to "allow lobsters to replenish" (translated from isiXhosa). In general, for the three years of data that were analysed, over 67 % of diving activities was observed in areas between Ocean and Mbolompo (Figure 4.2) and 74.4 % of all lobster caught and recorded by the community-catch-monitoring programme was caught in these areas.

The number of divers and number of lobsters caught per month, as observed by the two community-catch-monitors is shown in Figure 4.3. The apparent decrease in total number of lobsters caught per month was fitted with a significant linear regression model ($F = 7.000$ on 1 and 35 df, $p < 0.05$) in which the slope parameter was significant ($t = -2.6626$, $df = 36$, $p < 0.05$). An increase in number of divers was also observed during the 2007 season (see below).

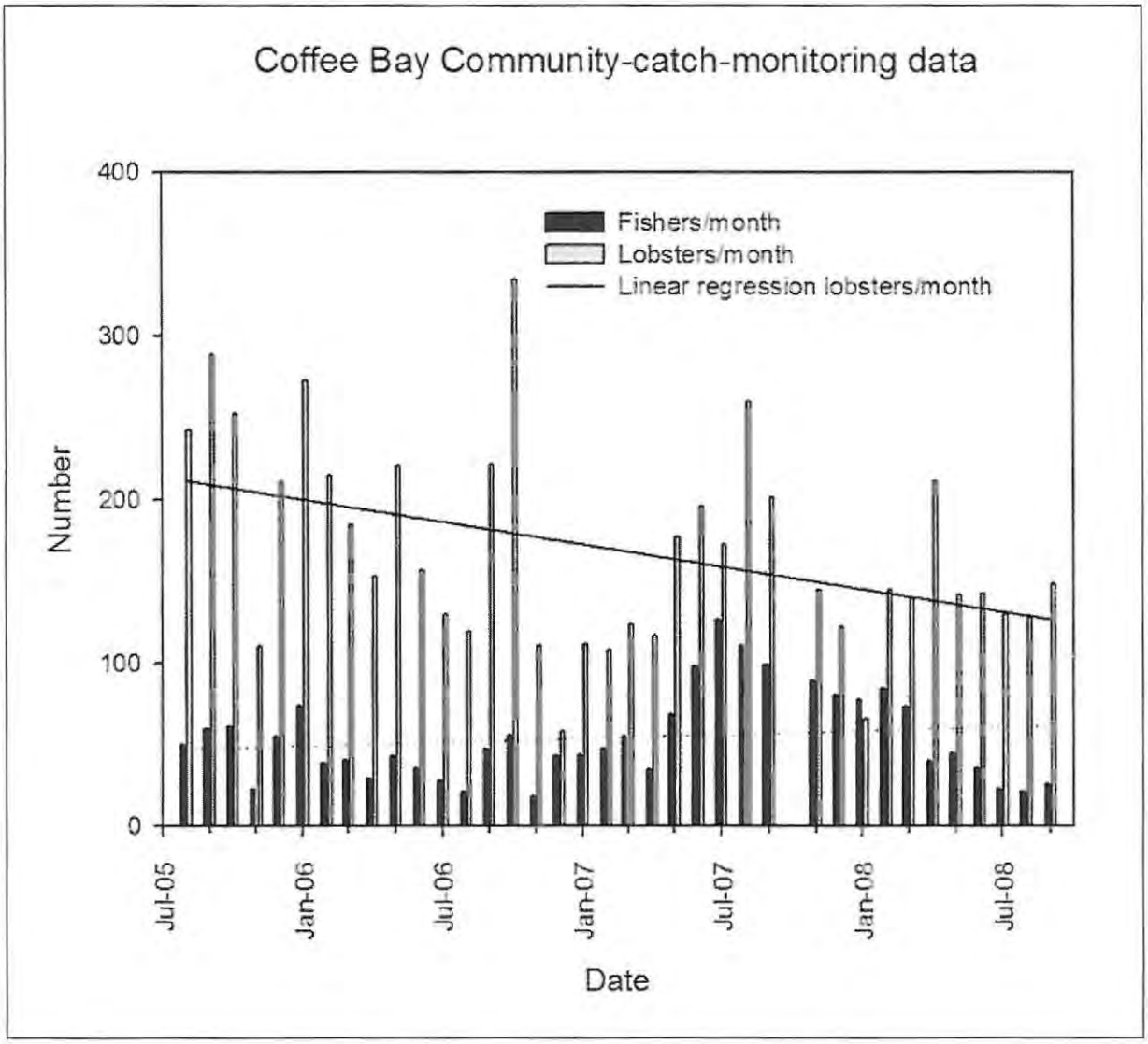

Figure 4.3. **Coffee Bay Community-catch-monitoring data (August 2005 - September 2008).** The total number of caught lobsters recorded per month and the number of divers observed is indicated. Data collection started in August 2005. No data were collected in October 2007.

CPUE was calculated as catch per diver per outing using the raw daily monitoring data, and analysed for differences over the years and areas monitored (Table 4.5). CPUE calculation was possible as all lobsters caught by small-scale fishers are kept for sale, and monitors waited for divers to finish before recording their catch. Data from divers monitored prior to the start of their diving operations were omitted. CPUE was calculated for the entire area between the Mthata and the Mtonjana Rivers,

and for the focus area, where holiday accommodations are centred, as monitoring had observed most fishing activity here (between Ocean and Mbolompo ridges; Figure 4.2). The former area is a 12.1 km long rocky shore interspersed with two larger sandy beaches, each approximately 800 m long. The focus area is 7.4 km of the rocky shore interspersed with only one of two sandy shores. Divers would often only dive once a day, and CPUE numbers shown in Table 4.5 thus approximate the unit of lobsters caught per diver per day.

Table 4.5. Average CPUE of diving operations for the entire observation period, per year and per fishing area

Year(s)	Area	N	Average CPUE ± SD	Regression slope			Comment
				T	df	P	
2005-2008	Entire area	1254	5.0 ± 2.6	5.06	1253	p <<0.05	Slight increase
2005-2008	Focus area	926	5.0 ± 2.5	6.66	925	p <<0.05	Significant increase
2005	Entire area	244	4.5 ± 2.4	-1.20	243	p = 0.04	Very slight decrease
2005	Focus area	187	4.5 ± 2.5	No significant regression model			
2006	Entire area	432	5.0 ± 2.7	4.24	431	p <<0.05	Significant increase
2006	Focus area	339	4.8 ± 2.4	3.80	338	p <<0.05	Significant increase
2007	Entire area	360	4.8 ± 2.2	5.07	359	p <<0.05	Significant increase
2007	Focus area	255	4.9 ± 2.2	2.95	254	p <0.05	Slight increase
2008 (to end of September)	Entire area	213	5.8 ± 3.1	No significant regression model			Observed slight decrease
2008 (to end of September)	Focus area	145	6.2 ± 3.0	No significant regression model			Observed slight decrease

N represents the number of observed diving operations. SD – Standard Deviation. The significance of the regression slope of CPUE vs. the time periods was tested with a t-test using Sigmaplot 10 (Systat, 2006).

Overall, between August 2005 and September 2008, the CPUE increased but showed fluctuations. In the second half of 2005, CPUE averaged 4.5. In 2006, average CPUE was slightly higher than in 2005, and increased throughout the year. During the 2007 legal fishing season, the number of divers and thus fishing effort increased, however average CPUE remained approximately the same as in 2006. The slight increase throughout the year (which was not worth depicting here but which is clearly visible in the dataset) might reflect that divers caught more lobster per outing because of market demand. In 2008, the observed number of divers decreased while average CPUE was much higher than in previous years. Interestingly, CPUE was also higher in the area where most fishing activity occurs (= focus area). Without more long-term fishing effort data and data on stock abundance in

this area, interpretation of these results in the light of resource exploitation is not feasible. However, CPUE observed by Steyn *et al.* (2008) for Coffee Bay divers was 8.1 (SD: ± 4.8). These data were collected between 2003 and 2005 and pooled for analysis. The lower CPUE estimates in the current study might thus reflect a biomass reduction. This is likely in the light of declining total catches. However, differences between Steyn *et al.* (2008) and this study also could be attributed to differences in data collection methods. Catches recorded by Steyn *et al.* (2008) were counted at selling points, prior to the fishers selling their catch. In the case of Coffee Bay, it has been observed that divers hide their catch in the coastal bush, and sometimes dive a second time before offering their catch for sale to the local markets. Since this was not observed on the community-catch-monitoring data, this could not be quantitatively verified. Steyn *et al.* (2008) reported CPUE for shore fishers in Coffee Bay to be 5.9 (SD ± 3.1), a lower mean than that recorded for the divers.

Total catch in kg between August 2005 and September 2008 was estimated based on (i) the data presented in Figure 4.3, (ii) conservative assumptions on the proportion of fishers versus divers in Coffee Bay, and (iii) the size distribution data of lobster catches measured by community-catch-monitors. The following calculations were made:

- Community-catch-monitoring only occurred every second day, and thus data were multiplied by two to reflect total number of lobsters caught by divers per month.
- Throughout the Transkei, many more lobster harvesters performed shore-fishing for lobster at night than diving for lobster. In their studies across the Transkei, Fielding *et al.* (1994), Fielding (2001; 2005a) and Steyn *et al.* (2006) recorded shore fisher ratios of up to 80 % of all harvesters. However, focus group discussions in Coffee Bay indicated a much larger proportion of divers due to easier access to diving gear obtained from visitors. Therefore it was assumed that only twice as many shore fishers operated in the Coffee Bay community.
- Steyn *et al.* (2008) observed CPUE for shore fishers to be lower than for divers, however, for Coffee Bay, CPUE estimates for shore fishers were in the same range as the CPUE numbers for divers. Therefore total catch per month for divers was multiplied by two to represent the shore fishers' catch. This might still represent an underestimate as conditions for shore fishers were favourable more often than for divers.
- Numbers were subsequently converted to kg using conversions calculated by Steyn *et al.* (2006). Size-frequency data of the lobsters measured through community-catch-monitoring were similar to those observed by Steyn *et al.* (see below).

Extrapolations indicated that since 2005, 270 kg of lobster was caught on average per month from a 12 km long fishing area between the Mthata and Mthonjana Rivers. It must be noted that shore fishers and divers did not operate every day due to weather or sea conditions, or the involvement in other household livelihood activities. However, total catches have decreased over the years, as illustrated above in Figure 4.3. In the two completed years in the dataset (2006 and 2007) 3.4 tons and 3 tons were caught respectively (October 2007 was extrapolated). Data for 2005 and 2008 were also extrapolated and are represented in Table 4.9.

Mdumbi backpacker's lodge

Small-scale lobster fishers in the Tshani-Mankosi community also perform both shore fishing and diving for lobster. Of the 159 fishers observed during 2007 and 2008, 104 indicated that they had shore fished for the lobster supplied to the lodge, and 70 indicated that they had dived out their catch (1.5 to 1 ratio). Similar to what was observed in Coffee Bay, divers would shore fish on certain occasions when sea conditions were not favourable for diving. However, a larger proportion of divers was observed when compared to other areas along the Transkei coast, as the lobster harvesters had easier access to diving gear. Women who were recorded supplying lobster to the lodge only shore fished.

Shore fishing took place during the night, while diving mostly occurred in the early mornings. However, both groups would try to sell their catch to the lodge patrons in the mornings, directly after shore fishing or diving. Many divers would dive again if they were able to sell their catch. Moreover, if some groups had been able to sell their catch on a particular day, more groups would be recorded for several successive consecutive days. Success in the sale of a catch of some groups prompted diving by other groups in subsequent consecutive days.

Shore fishers and diver groups were also observed to market their catch separately. Similar age groups tended to operate together; children and adolescents would form small groups, occasionally accompanied by elder fishers. Female fishers were observed to be accompanied by one or two other woman, or were included in a larger group predominantly comprising men.

In the Tshani-Mankosi area, any lobster caught by the fishers was kept for sale. Given that the Mdumbi backpacker's lodge was the first available market for fishers coming from the fishing area, CPUE estimates (as per outing fishing or diving) were calculated based on catch offered for sale to the lodge visitors. A limitation was that CPUE could be underestimated if fishers kept a portion of their catch for sale elsewhere. However, this was never observed during fieldtrips conducted for the purposes of this study. Another limitation of this method of CPUE estimation is that it does not

account for the potential pooling of the fishers' catches. In this manner, the older or more experienced members of the group who may be more fluent in English, may negotiate with possible buyers. This would be valid especially for groups comprising children. Nevertheless, CPUE was 7.2 (SD ± 5.0) on average and a maximum of 33 lobsters per shore fisher or diver per outing; very high values are likely to represent a pooled catch, however, very few of these were evident in the dataset. The average CPUE of the divers and shore fishers was 8.7 and 6.1 respectively, indicating that divers in the Tshani-Mankosi community were slightly more efficient than the shore fishers (given that diving operations take less time than shore fishing and generally occur in the same areas). CPUE estimates for divers and shore fishers based on the monitoring data did not change over the length of time that the survey was conducted, or over each fishing season surveyed (no significant regression model due to high variance). CPUE numbers were thus higher than those determined for Coffee Bay.

On the days where catch was monitored at the lodge, an average of 21.7 lobsters were offered for sale per day. During the 2007/8 fishing season, an average of 215 lobsters were offered for sale per month. This amounts to approximately 56 kg per month caught from a 3.6 km long fishing area[12] between the Mthata and Mdumbi Rivers - although Fielding (2001) observed that fishers of this community travel to more distant fishing areas as well. This catch was caught by an average of 30 fishers per month. An increase in the number of fishers was observed in September 2007 and again at the beginning of the 2008 season, which appeared to be linked to an increase in number of guests at the lodge (Easter holidays). During these periods, the same fishers were often observed to supply lobsters every day. The total catch and number of fishers per month observed through monitoring supply at the backpacker's lodge is represented in Figure 4.4. Catch data were converted to kg (as above for the Coffee Bay data), and extrapolated for the 2007 season (in Table 4.9). In 2008, total catch offered for sale to the Mdumbi backpacker's lodge was calculated to be 420 kg.

[12] The fishing area is predominantly exposed rocky shoreline, and interspersed with 3 small sandy bays.

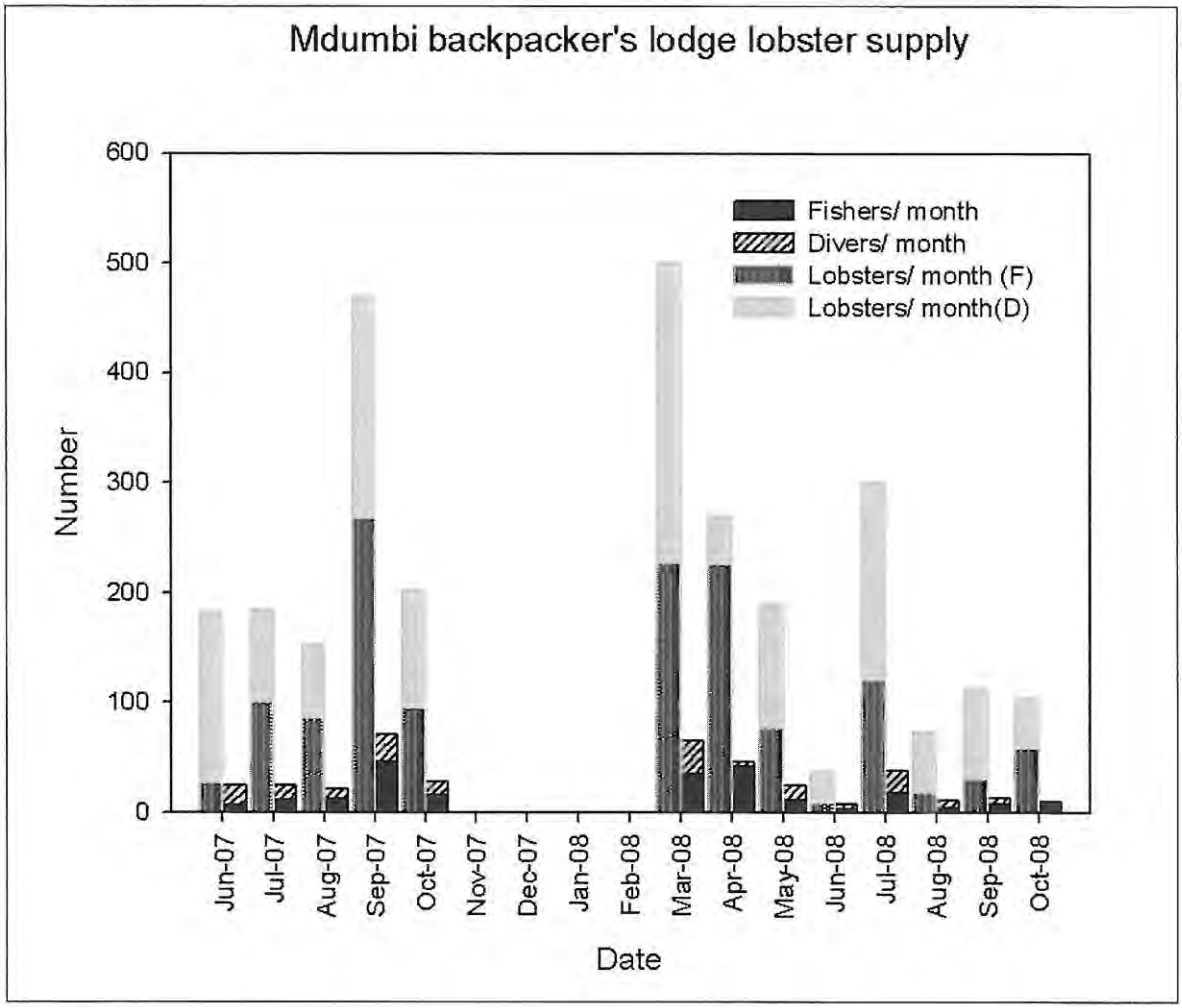

Figure 4.4. **Number of fishers and divers and their cumulative catch per month as supplied to the Mdumbi Backpacker's lodge.** Abbreviation used: F - fisher, D - diver. The closed season runs from November to the end of February.

4.3.3. Regulating small-scale lobster fishing

The previous section highlighted the livelihood practice of shore fishing or diving for lobster, which evolved from methods employed for generations by members of impoverished communities such as Coffee Bay and Tshani-Mankosi. Having provided an understanding of the fishing communities' socio-economic background, and the current fishing effort and fishing practices, the following section describes the attempt by the fisheries authority to regulate this small-scale fishery, mainly via the allocation of individual permits and the implementation of catch restrictions.

Allocation and management

After the promulgation of the MLRA in 1998, the fisheries authority created the 'Subsistence Fisheries Management Unit', a new sub-directorate within its branch, to deal with the newly

recognised sector of subsistence fishers (Harris *et al.*, 2007; Hauck and Sowman, 2003). Subsistence fishers had been recognised in law, but now needed to be identified and issued with permits (this process is discussed in detail in Chapter 5).

With regard to the Eastern Cape lobster fishers, MCM allocated its first permits in the northern region of the Transkei in 2001. Between 2001 and 2003, a maximum of 496 permits were issued per year to 10 communities where fishers had been identified (MCM, 2005, unpublished data). The permit application process was administered by the 'Subsistence Fisheries Management Unit', who had limited manpower in the Eastern Cape to undertake the identification of all fishing communities and to register their fishers. Places such as Port St. Johns were therefore prioritised due the mounting conflict between fishers and law enforcement officials (Bacela, 2004).

From 2002 to 2007, the task of identifying communities and fishers was subcontracted to a private company that deployed extension officers in the Transkei (Kariem and Lunake, 2004; P. Lunake, Sustainable Coastal Development, pers. comm.). In the Transkei area north of the Mbashe River, where the lobster fishery occurs, the extension officers delineated a further 31 communities. Table 4.6 shows the increase in permits issued for lobster in the Transkei since 2001. In 2004, no permits were issued as MCM had hoped to release a 'Subsistence and Small-scale Commercial Fisheries Policy', and grant 4 to 5 year rights to small-scale fishers. However, to date, the policy development process has been stalled, and MCM has issued yearly 'exemption' permits ever since 2001 (see Chapter 5). In 2005, lobster permits were issued to 23 communities, while 39 communities received lobster permits in 2008.

Table 4.6. Number of lobster permits issued to lobster fishers in the Transkei with focus on Coffee Bay and Tshani-Mankosi

Year/ period	Transkei	Coffee Bay	Tshani-Mankosi
2001-2003	496	114	-
2005	1848	102	157
2006	1858	81	65
2007	2325	81	52
2008	2423	81	66

Data originate from MCM, and does not necessarily reflect the number of permits physically delivered to the fishers. Numbers most probably reflect the number of permits printed (see text).

Since fishing rights to small-scale commercial fishers had not yet been defined specifically by law – a small-scale commercial fisheries policy still needed to be developed – permits 'exempting' fishers from certain provisions of the MLRA were allocated. The 'exemption' permits[13] 'to undertake fishing

[13] For the purpose of this chapter the term permits is used. In Chapter 5 the exemptions are discussed from a policy and legal perspective.

of east coast rock lobster on a subsistence/small-scale commercial basis' were thus only valid for a single season (DEAT, 2007b) and fishers needed to re-register every year. Registration was done by the extension officers during meetings organised in every identified community (Kariem and Lunake, 2004). In 2006, 122 villagers from Coffee Bay registered for lobster permits, while in 2008 only 102 people registered (MCM, 2006 and 2008, unpublished data). In both years, only 81 lobster permits were printed by MCM for the Coffee Bay community.

The present research revealed that the majority of lobster fishers fished without permits. The Coffee Bay community-catch-monitoring programme diver observation data revealed that less than 1 % of fishers were in possession of a lobster permit when accosted by the community-catch monitors over the three-year monitoring period. In the Tshani-Mankosi community, supply to the local backpacker's lodge indicated that on only 24 % of occasions, lobster fishers had presented their catch for sale to the lodge when in possession of a lobster permit. The reason for this apparent non-compliance is that many *bona fide* traditional fishers simply never received permits. Reasons for this discrepancy included the following:

(i) Ever since the first permits had been allocated, delivery into the coastal communities had been erratic, both in time and in space. In the Coffee Bay community, lobster permits appear only to have been issued in June 2006, April 2007 and July 2008 (although fishers were allowed to use the 2007 permits until delivery of the new ones). This is despite the commencement of the legal fishing season on 1 March each year. In the Tshani-Mankosi community, permits were only issued in May 2006, and in April 2008. In addition to the belated allocation of the annual permits, many fishers who had registered for lobster permits never received them. In Coffee Bay, 102 fishers registered for lobster permits in 2008. Data obtained from MCM indicated that 81 permits were printed by the fisheries authority, while research in the community indicated that less than 81 fishers eventually received their permits from the MCM officials. Community-catch-monitors counted at least 143 divers alone. In the Tshani-Mankosi community, only 66 permits were printed in 2008 (Table 4.6), while monitoring at the backpacker's lodge recorded 159 divers and shore fishers. Short questionnaires in Coffee Bay indicated that only 11 of the 33 fishers registered on the 2008 list had received their permits. This is most probably attributed to the absence of the registered fishers when the permits were distributed at meetings organised by the MCM officials. Interviews with lobster fishers revealed that this was often the case: meetings were organised at short notice, when not all fishers had been informed. With their limited manpower and with many communities to visit, MCM officials could not return to the

community any time soon following the meetings, and fishers needed to travel to regional MCM offices if they wanted to collect their permits. Very few fishers could afford to do so. Over the years, permit delivery has thus been very unreliable, not least because the process of registration and allocation requires annual renewal.

(ii) The allocation criteria have resulted in many fishers not obtaining permits. Criteria included the need to possess an ID document or birth certificate, and a minimum age of 18 years. Experience through the Mussel Rehabilitation Programme has shown that many people in the rural communities do not have an ID document (Calvo-Ugarteburu and Raemaekers, 2008). Short questionnaires in 2008 indicated that 48 % of all people in the 33 households (n = 212) surveyed in Coffee Bay did not have an ID document and therefore, could not obtain a permit. This figure amounted to 54 % of lobster harvesters in the Tshani-Mankosi community. In addition to not having allocated ID documents and numbers, many of these fishers were underage. However, as previously mentioned, many children fished for lobster at night as part of the household livelihood strategies. Short questionnaires in Coffee Bay showed that at least 11 children from the 33 households where an adult had registered for a lobster permit, also fished for lobster, but could not obtain a permit themselves. In Tshani-Mankosi, 37 % of the fishers wanting to sell their catch to the backpacker's lodge were under the legal age required to obtain a permit.

The Subsistence Fisheries Task Group, which formulated advice for MCM on the management of small-scale fishers, had also recommended that small-scale fisheries be managed with more input from the fishers themselves, and that a 'co-management' approach be developed (Harris *et al.*, 2002). Thus, the extension officers were tasked to set up 'Local Subsistence Fishing Committees'. It was envisaged that these structures would eventually become 'Local Subsistence Co-management Committees', as the permit system would become entrenched and MCM personnel on the ground would increase (Harris *et al.*, 2002; P. Lunake, Sustainable Coastal Development, pers. comm.). Meanwhile, the local structures were intended to function as an institution to identify the local fishers, to register these fishers, and to verify if they were using the permits once allocated. Breaching of the permit restrictions needed to be reported to MCM officials (Silevu, 2004; DEAT 2006c; DEAT, 2007b; DEAT, 2008). In this sense, the newly established local structures were also expected to serve a MCS function. MCM had very little MCS capacity on the ground, with only two Fishery Inspection Officers in Port St. Johns and three in Mzamba. Both offices had access to a vehicle, but patrolling the rugged coastline remained extremely difficult due to the remoteness of

many of the fishing areas. Local subsistence fishing committees were thus seen as capable of fulfilling this MCS role[14].

Compliance with imposed catch restrictions

Permits came with a set of catch restrictions to which fishers had not been subject before. As stock assessment data on the lobster resource in the Transkei were limited (Fielding *et al.*, 1994; Steyn *et al.*, 2006), many restrictions that were imposed were based on the conditions for recreational harvesting of east coast rock lobster in the KwaZulu-Natal and Eastern Cape provinces. Table 4.7 presents the input and output restrictions for the small-scale lobster fishers of the Transkei.

Table 4.7. Input and output regulations for the Transkei small-scale lobster fishery, and status of compliance to regulations

Regulation	2001 – 2005	2006-2008	Degree of compliance observed
Bag limit	8 per day	Same	Fishers ignore limit but resource status (see below) and gear limitations often restrict catches to less than 8 lobster
Size limit	65 mm carapace length	Same	Fishers keep all lobster caught regardless of size
Ovigerous females	No	Same	Fishers keep ovigerous females
Soft shelled (moult) lobsters	No	Same	Fishers don't keep soft shelled lobster due to low market value
Gear	Baited hooks no mention of diving no use of vessel	Same	Small-scale fishers also dive for lobster
Season	1st of Mar to 31st of Oct	Same	Fishers fish throughout the year
Fishing areas	Only designated area	Same	Yes, fishers tend to stay in traditional areas
Fishing time	7:00 am to 4:00 pm	No restrictions	Shore fishers fish at night, divers often dive earlier than 7 am.

The bag limit for lobster permit holders is a catch of 8 lobsters per day. In Coffee Bay, 91 % of divers monitored since 2005 had consistently caught less than 8 lobsters when recorded by the community-catch-monitors. In 28 % of observations in Tshani-Mankosi, however, more than 8 lobsters were offered for sale to the backpacker's lodge by individual fishers. Interestingly, only between 25 and 38 % of lobsters caught in the Coffee Bay fishing area were under the legal size limit of 65 mm carapace length, while in Tshani-Mankosi 70 % of all lobster offered for sale to the backpacker's lodge were undersized. On less than 1 % of all occasions recorded over the two seasons, all animals offered for

[14] Moreover, MCM had no capacity to monitor fishery landings, and thus status of the stocks. From 2006 onwards, extension officers began appointing and training monitors along the coast. At the end of 2008, the appointment of monitors along the Transkei coast was still underway. Refer to Chapter 5.

sale by a diver or shore fisher were above the legal size. Children tended to catch much smaller lobster, with 35 % of their catch smaller than 50 mm carapace length. Similar ratios have also been observed by Steyn *et al.* (2006): between 60 and 85 % of all lobster fishers' catches were under the minimum legal size during 2003 to 2005 at 4 sites along the Transkei coast, including Coffee Bay. For Coffee Bay, this included catches from divers and shore fishers. It thus appeared that divers in Coffee Bay tended to catch fewer lobsters but rather larger lobsters that fetched higher prices. Shore fishers and divers in Tshani-Mankosi appeared to catch more lobster, but those that were often of smaller size. Notably, the variation in skill level in the shore fishers was higher than that of the divers, as many children participated in the fishing operations.

Prior to sale, fishers tended to remove eggs from the female lobsters caught (Fielding *et al.*, 1994; pers. obs.), therefore the exact ratio of berried females could not be calculated in this study. Nevertheless, at least 12 % of female lobsters caught in Coffee Bay, and at least 17 % of those caught in Tshani-Mankosi, were ovigerous. No soft moult lobsters were recorded, as fishers reportedly could not sell them.

Most berried females were caught at the beginning and end of each legal fishing season. The main breeding season is in the summer months (November to March) and larger females may breed more than once a year (Fielding *et al.*, 1994). Therefore, permit conditions included a closed season from 1 November to the last day of February the following year. However, Figure 4.3 shows that fishing activities for lobster continued, although diminished somewhat during the closed seasons in 2006/7 and 2007/8. The harvesting of lobster out of season indicated that these fishers were in possession of a permit to do so, but were unaware of the conditions specified by the permit. In the Tshani-Mankosi community, interviews with the lodge owners indicated that certain fishers did halt fishing when the season was closed. The lodge owners were of the opinion that these fishers halted fishing efforts in the hope of getting their permits renewed. Nevertheless, the demand for lobster is high during the closed season, as this also coincides with the annual summer holiday. This renders the closed seasons exceedingly difficult to enforce.

Extension officers, contracted to the 'Subsistence Fisheries Management Unit' within MCM, attempted to delineate boundaries for each community that was identified (see Chapter 5). Permit conditions for Coffee Bay lobster fishers allowed them to operate between the Mthata River mouth and Hole-in-the-Wall, a well-known geographical feature south of Coffee Bay situated along the coastline of a neighbouring community (Figure 4.2.). However, interviews conducted with lobster fishers and divers revealed that they traditionally only fished in the area adjacent to their community. This was also recorded by Steyn *et al.* (2008).

At first, lobster fishing was only permitted between 7 am and 4 pm. This regulation reflected the working hours of the MCM Fishery Inspectors and the anticipated catch monitors. However, after several years of issuing yearly permits and organising committees in the communities, MCM realised in 2006 that it could not possibly enforce this restriction.

Our research showed that the catch restrictions imposed by MCM were not being observed. This was already noted by Fielding *et al.* (1994) in the early 1990s, when small-scale lobster fishing was largely informal or operating under the regulations governing recreational fishers, who stated: *"fishers retain and attempt to sell everything that they catch, throughout the year"*.

4.3.4. Regulating market access

This section describes the efforts by the fisheries authority to regulate the market, mainly by allowing 'external' buyers to establish contracts with the permitted fishers and by imposing regulations on the existing local market.

Alongside the regularisation of small-scale lobster fishers in the Transkei through limited access and individual permits since 2001, the fisheries authority has also attempted to regularise the market. As a result of this, market dynamics have changed significantly. The regularisation of the lobster market was motivated in part by (i) pressure from venture companies to export more South African lobster for international demand, (ii) the potential for permitted fishers to access a more consistent market and better unit price, (iii) the shift of high demand away from the closed summer season, and (iv) MCM's goal of formalising the small-scale lobster fishery as a 'small-scale commercial fishery, as recommended by the SFTG. Thus from the start, permit conditions have included marketing restrictions. Table 4.8 shows the changes in these provisions over the years, and the resulting situation on the ground.

Table 4.8. Market restrictions for lobster permit holders since 2001 and evolution of licensed buyers

Year	Marketing restrictions on permit conditions	Situation
2001-2005	Only MCM approved buyers can buy directly from permitted fishers with whom they have a contractual agreement. Buyers and coastal holiday resorts need agreement regarding quantities required for local market. Nearby coastal holiday resorts need to obtain authorisation from MCM to keep lobster and have to declare quantities.	First 'external' buyer starts to operate in Tshani-Mankosi in 2005 and exports 100 % of catch. No agreement with coastal holiday resorts is made. Local sale to holiday resorts is illegal. Sale to individual visitors is not prosecuted as the legislation is ambiguous.
2006	Only MCM approved buyer	Local sale to holiday resorts is illegal. Sale to individual visitors is not prosecuted as legislation is ambiguous.
2007	MCM approved buyer who has entered in a contractual agreement with each community. Nearby coastal holiday resorts who hold a processing/ holding facility license can buy as well.	MCM approved 4 additional buyers. No coastal holiday resort has a 'holding facility' license and thus local sale to holiday resorts is illegal. Sale to individual visitors is not prosecuted as the legislation is ambiguous.
2008	Only MCM approved buyer	3 licensed buyers operate. No coastal holiday resort obtains a 'holding facility' license and thus local sale to holiday resorts is illegal. Sale to individual visitors is not prosecuted as legislation is ambiguous.

Local tourism market

The local tourism market along the Transkei coast comprises hotels and guesthouses, backpacker's lodges and private holiday cottages. Few camping opportunities exist. Coffee Bay and Port St. Johns are the most important tourism nodes north of the Mbashe River, however at least 5 hotels and 2 backpacker's lodges are situated elsewhere along this stretch of coast. Private holiday cottages can be found on the banks of nearly every larger estuary. In 1979, Rosmarin Els and Taylor estimated 335 cottages along the entire Transkei coast[15].

Thus, local visitors to the coast and holiday accommodation have historically provided the demand for many marine resources. However, the sale of lobster to the local market was largely informal. During the 1980s and early 1990s, larger holiday establishments such as coastal hotels were required to submit catch returns to the former Transkei government (Fielding *et al.*, 1994), although this was not enforced strictly. Fielding *et al.* (1994) analysed these catch returns from local hotels between 1990 and 1993 and estimated that less than 0.25 tons were bought from the small-scale fishers by

[15] Most of the cottages are situated north of the Mbashe River. Cottage numbers increased drastically in the early 1990s, however DEAT has prosecuted numerous cottage owners since 2005 as they had obtained land in sensitive coastal areas by bribing local traditional authorities.

the local hotels per year. This was probably an underestimate as data were erratic and of short duration. During 1994 and 1995, the first market analysis for the lobster fishery was included in an investigation into patterns and economics of resource use by end-users and tourism along the coast of the former Transkei homeland (Robertson and Fielding, 1997). The consumer surveys included tourists, cottage owners and hoteliers in order to establish the levels of usage of coastal resources, including lobsters, by the tourism sector. Robertson and Fielding (1997) estimated that approximately 44 tons of lobsters were sold annually to the local tourism market, and that small-scale fishers earned collectively approximately 500 000 ZAR annually from the sale of lobster. Prices for lobster in the 1990s ranged between 1 and 10 ZAR given a price of 25-40 ZAR per kg[16] (Fielding *et al.*, 1995; Robertson and Fielding, 1997).

Since 2001, however, when the first lobster permits were allocated to the Transkei lobster fishers, buyers including local hotels and other holiday accommodation needed to obtain licenses from MCM in order to possess more than 8 lobsters per day on their premises (Table 4.8). Interviews with hotel and backpacker's lodge managers between 2004 and 2008 indicated that those licenses were never obtained. In effect, the purchase of lobster from the local fishers without the possession of a 'holding facility' license was regarded as illegal by MCM. As a consequence, some hotels and backpacker's lodges refrained from buying seafood from local fishers, and were obliged to import seafood from outside of the Transkei if they wanted to offer this to their guests. Other hotel managers and backpacker lodges nevertheless continued to buy local seafood such as lobster - albeit they would not advertise it publicly such as on their advertising brochures. This was done (i) out of protest for MCM's apparent lack of effective administration, (ii) because local seafood was their foremost appeal for tourists to stay at the holiday accommodation, (iii) as they believed the holiday resort needed to maximise local benefits to the impoverished community, and (iv) because MCM's law enforcement activity in the Transkei only increased during Christmas and Easter Holidays and chances of prosecution were low. One hotel manager estimated to have purchased approximately 100 lobsters per month from the 15 fishers who supplied the hotel on a regular basis. In this instance, the same price was always paid. The manager of one backpacker's lodge explained that the lodge preferred to purchase large and live lobster, but did not ascertain whether the fishers were in possession of a permit or were of legal age. The manager estimated to have purchased approximately 200 lobsters during the 2008 fishing season. This estimate did not account for the lobster bought by guests staying at the lodge.

[16] Hotel staff would often weigh the catch.

From 2003 to 2005, Steyn *et al.* (2006) found that hotels, guesthouses and backpacker's lodges bought predominantly legal size lobster during the legal fishing season, and made an effort not to purchase berried females. However, cottage dwellers were often found to buy undersized lobster (up to 68 %). This was confirmed in the interviews with hotel managers and backpacker's lodges. Observations in Coffee Bay and Tshani-Mankosi also noted that once-off visitors such as foreigners often did not adhere to size restrictions and closed seasons. In many instances, the backpacker's lodge management did not prohibit visitors from purchasing local seafood; however, they did urge the visitors upon arrival not to purchase out of season and below size limit.

During 2007 and 2008, monitoring at the Mdumbi backpacker's lodge provided evidence that the supply of lobster to visitors to the Transkei was ample. Interestingly, as discussed above, a large proportion of the catch offered for sale was undersized. Over the two seasons monitored and only counting those days that fishers offered their catch for sale to the lodge, an average of 21.7 lobsters were offered for sale per day, with a median of 16 and a maximum of 83 lobster per day. Interviews with the lodge management indicated that lobster fishers attempted to sell their catch out of season as well, however, supply diminished as the lodge owners urged their guests not to purchase.

Focus group discussions in Coffee Bay in 2008 revealed that lobster prices varied depending on the size of the animals and the purchasers. Smaller lobster were sold for as little as 5 ZAR, while larger ones could attain a price of 30 ZAR, especially when sold to foreign visitors in the backpacker's lodges. Hotel accommodation owners would pay a fixed price of approximately 10 ZAR per sized lobster, while prices paid by visitors tended to fluctuate and were generally much higher. Often, the highest prices were paid to fishers who were the first to offer their catch for sale to local holiday makers or hotels on a particular day. Conversely, if the demand for lobster on any given day was saturated, prices were much lower.

Recreational fisheries

Besides the purchasing of lobster from the small-scale fishers, holiday makers to the Transkei coast have harvested lobster recreationally for decades (Steyn *et al.*, 2006). Robertson and Fielding (1997) estimated the recreational catch of lobster in the former Transkei homeland to be 4 tons per year. Steyn *et al.* (2006) subsequently estimated the recreational catch to be 7 tons per year. Conversely, community-catch-monitoring in Coffee Bay between 2005 and 2008 did not record a single recreational lobster fisher. However, personal observations during field trips in Coffee Bay revealed that many tourists preferred to purchase lobster directly from the small-scale fishers. Recreational catch might thus be much less than 7 tons per year.

Licensed buyers for export

Historic commercial fisheries

Commercial trading in marine products in the former Transkei homeland appears to have been fairly limited until 1987 (Fielding *et al.*, 1994). By 1988, however, three fish processing factories were registered to harvest lobster and export frozen lobster tails. At least one of the three factories was also involved in the processing of abalone caught in the southern region of the former Transkei homeland (refer to Chapter 3). Table 4.9 details the quantities of lobster processed by the different fish factories as reported in the catch returns analysed by Fielding *et al.* (1994). Catch returns indicated that no more than 10 tons of lobsters were caught per year, however, this is most probably an underestimate as annual license fees were based on these catch returns (Fielding *et al.*, 1994). Most of the lobster harvesting occurred in the zone between the Mbashe River and Port St. Johns. Lobster were bought from local fishers or caught by commercial divers who were legally not permitted to use SCUBA gear, but could free dive to harvest the lobster. The commercial fisheries were halted in 1991, however, interviews In Coffee Bay with many older villagers who had been employed by the commercial companies, showed that they persisted to fish for lobster to supply the local tourism market.

Inkala Fish Processors (Pty) Ltd.

Even though the lobster permits were first issued in 2001, the first licensed commercial buyer only started operating officially in May 2005. Inkala Fish Processors (Pty) Ltd.[17], which had also been involved in the buying and processing of abalone from the southern region of the Transkei, was the first venture to obtain a buying license from MCM. The company was based in East London, with no shareholders from within the traditional fishing communities. In its first season, lobsters were bought from the 157 permit holders from the Tshani-Mankosi community (Table 4.6), as well as from 3 three neighbouring communities further north. A buying station with freezer facilities was established within the premises of the Mdumbi Backpacker's Lodge. Local villagers were employed to record the catch statistics and manage the accounts of each permit holder supplying the buying station. Lobsters caught in more distant areas were picked up by a 4X4 vehicle each day for several days prior to and following spring low tides. Lobster tails were frozen and transported fortnightly to East London for export (Figure 4.1). Permit holders were paid a fixed rate of 35 ZAR per kg (whole weight lobster). It was estimated that each permit holder earned approximately 1200 ZAR per month during the fishing season. However, many more collectors were recorded in the catch statistics indicating that it was common for several collectors to operate under the same permit. It was not possible to

[17] Under the same ownership as Ulwandle (Pty) Ltd and Into the Future (Pty) Ltd (refer to Chapter 3).

determine if the collectors formed a part of the same household, and it could not be calculated if the supply provided by the different collectors only totalled the 8 lobster per day per permit holder.

Operations resumed despite the permits only being delivered in May 2006 for the following season, and only 65 permits being allocated to the Tshani-Mankosi community (Table 4.6). Plans were also made to begin purchasing lobster from the Coffee Bay and Hole-in-the-Wall permit holders (X. Mdabula, Inkala Fish Processors (Pty) Ltd., pers. comm.). However in June 2006, in collaboration with the SAPS, MCM Fishery Inspection Officers raided the lodge's freezers and confiscated approximately 800 kg of lobster tails. It had appeared to the fisheries authority that Inkala Fish Processors (Pty) Ltd. did not have a 'holding facility' license, although an application had been submitted. Management officials within MCM had allocated Inkala Fish Processors (Pty) Ltd. with a buying license but had omitted the need for the company to have the other licenses required. This had been pointed out by competitors of the company. Fishing operations were thus deemed illegal, and the operations of the buying station at the Mdumbi backpacker's lodge were terminated.

The catch as recorded at the backpacker's lodge for Inkala Fish Processors is represented in Table 4.9. In 2005, an estimated 6.9 tons of legal-sized lobster were bought from 4 communities, while in 2006 only 3.2 tons were bought as the fishing operations were terminated in June.

Live Fish Tanks (Pty) Ltd., Espadon Marine (Pty) Ltd. and other commercial buyers

In 2007, several other commercial companies obtained licenses from MCM to purchase lobster from the permitted fishers. The fisheries authority allowed each company to persuade the different communities – as identified by the MCM extension officers – to supply their lobster exclusively to the selected company. MCM only allowed one company per community. Contracts were then signed between each permit holder of a particular community and the selected company, and often included an exclusivity clause.

Live Fish Tanks (Pty) Ltd., a sister venture of a large commercial fishing company based in the Western Cape Province named the Lusitania Group of Companies, was set up to purchase lobster from small-scale fishers in the Transkei. In 2007, 9 communities, including Coffee Bay and Port St. Johns, entered into an agreement with Live Fish Tanks. Infrastructure was established in several strategic areas along the coast to keep live lobster bought from the fishers. This system typically comprised one or two refrigerated containers with up to 8 holding tanks, organic filters, sea water tanks, and oxygen cylinders for aeration. The system also acted as a buying station where permit holders from the surrounding contracted communities delivered their catch and were paid. Notably, the fishers were paid 45 ZAR per kg for live lobster and 35 ZAR per kg for fresh but dead lobsters.

Catch records for the 2007 season were not obtained. However, community-catch-monitoring data from Coffee Bay showed a sudden increase in the number of divers per day during the 2007 legal fishing season (Figure 4.3). The number of divers observed per month had nearly doubled. Permits had been issued in April, and Live Fish Tanks' local buying station had been established. The observed increase in fishing effort most probably indicates the high interest of small-scale lobster fishers in supplying the new market. Local divers were also escorted by Live Fish Tanks personnel to dive in other fishing areas (pers. obs.).

Catch records from Live Fish Tanks indicated that 1.13 tons of lobster (2525 animals), worth 45 660 ZAR, were bought from at least 81 Coffee Bay permit holders in 2008. Coffee Bay community-catch-monitoring data extrapolation estimates for the same period (April, May, September and October) also amount to over 1 ton of lobster caught by divers alone and thus seemed to corroborate company records. From June to August 2008, no lobsters were purchased as MCM had ordered Live Fish Tanks to apply for 'holding facility permits' for their holding tanks based in Coffee Bay. Nevertheless, 68 % of the estimated total catch from Coffee Bay in the 2008 legal fishing season was sold to Live Fish Tanks.

In 2008, Live Fish Tanks' exclusive purchasing rights expanded to 13 communities, including Tshani-Mankosi, which had had no official buyer since the shutdown of Inkala Fish Processors. Permits were also only issued in April 2008 (although no lobsters were bought by Live Fish Tanks during June, July or August 2008 for the same reasons stated above). Nevertheless, Live Fish Tanks purchased over 1.6 tons (3425 lobsters) worth 71 000 ZAR from Tshani-Mankosi's 66 permit holders during the remainder of the season. Interestingly, monitoring data from the Mdumbi Backpacker's Lodge did not demonstrate a decrease in supply to the lodge due to the 'external' buyer's presence. In 2008, 430 kg of lobster was offered for sale to the backpacker's lodge, which was only slightly less than the previous year's estimate. Furthermore, no proportional decrease was observed of fishers with permits who might have supplied Live Fish Tanks only. Table 4.9 specifies the total catch from 13 communities supplying Live Fish Tanks in 2008. In total, more than 7 tons of lobster were bought from these 13 communities with a local value of 300 000 ZAR.

In 2007, several other companies also obtained buying licenses. Tight Line Fisheries (Pty) Ltd. and Inkoleko Trading (Pty) Ltd. had entered into agreement with 3 to 4 communities; however, they operated only for a short period as their operations did not prove economically viable. It was reported that less than 500 kg of lobster were purchased by Tight Line Fisheries (Pty) Ltd. in 2007. Wavelengths 150 (Pty) Ltd., which started off purchasing from 2 communities in 2007, increased to 5 communities in 2008, when the company was bought over by a large aquaculture venture named

Espadon Marine. At this time, the fishers were paid 35 ZAR per kg for their lobster catch. Catch records for Wavelength/ Espadon Marine were only obtained for 2007 and for one community from which approximately 310 kg of lobsters were purchased.

During the 2008 fishing season, Espadon Marine personnel based in Port St. Johns were found to be in possession of 307 undersized lobsters in their holding facility (A. Maki, MCM Compliance/Control, pers. comm.) and the company's buying permit was revoked. Allegedly, local holiday establishments had informed MCM of the company's possession of undersized lobster. In areas such as Port St. Johns and Coffee Bay with a well established local demand, the advent of external buyers entering into contract with permitted fishers had raised many concerns. Moreover, disputes arose between local holiday establishments who wished to provide their customers with local lobster, and the licensed buyers, who exported the totality of what was bought and paid a higher price to the fishers. During telephonic interviews conducted, the managers of local holiday establishments contended that the restrictions were affecting the tourism market.

Siyathangana Community Projects and Phumalali Crayfish

Aside from venture companies that obtained licenses from MCM, in 2006, a NGO 'Siyathangana Community Projects[18]', based in the Transkei north of Tshani-Mankosi, obtained a license from MCM to purchase, process and transport lobster bought from the neighbouring communities. During 2006, after the operations of Inkala Fish Processors had been halted, the NGO was the only licensed buyer in the Transkei. In 2007, the NGO had established agreements with 5 adjacent communities who would supply lobster exclusively to 'Phumalali Crayfish', the venture then established by the NGO. Fishers were paid fortnightly, at a rate of 40 ZAR per kg for large lobster of good quality, or 20 ZAR per kg for lobster that were smaller or had lost appendages. Lobster were frozen, and then transported out of the Transkei. Initially, lobsters were sold to South African seafood supply chain restaurants in other provinces, but in 2008, all catch was sold to the fish processing and export company Tight Line Fisheries (Pty) Ltd. which had obtained a license in the past as well, but opted to deal through the NGO instead.

Catch records for 2006 were not available, however, catches for the 2007 and 2008 season are represented in Table 4.9. Both seasons only commenced in April due to delayed distribution of permits. In both 2007 and 2008, 5 tons of lobster were purchased from 6 communities, who were paid 204 000 and 214 000 ZAR in total respectively.

[18] In collaboration with the local community trust, Siyathangana Community Projects is implementing the rehabilitation of the local river basin by the removal and eradication of alien invasive vegetation and the replanting of suitable indigenous plants. The project is funded by DEAT's Social Responsibility Programme (which also funds the Coffee Bay MRP) and has trained and employed more than 200 local villagers.

Interviews with the project personnel indicated that financial viability was a key concern for the operation. Catch returns had been estimated based on number of permits issued in each community, the bag limits and the duration of the season. However, lobster fishers often supplied less than 8 lobsters that were not all of good quality, and not every single permit holder supplied the buying station on a continuous basis. The project did provide a steady, although seasonal, income to the small-scale fishers, however, costs of the operation were high (meeting European Union import standards for sanitation and health controls, and so forth).

Fish holding and processing factories

As discussed above, licensed buyers have set up holding and storage facilities at buying stations along the coast since 2005. Facilities have thus far only been owned and managed by the companies themselves. Nevertheless, the fisheries authority's market restrictions and steps towards larger scale commercialisation through the licensed buyers also spurred interest among DEAT itself, as well as other developers, to establish larger fish factories. These factories were anticipated to be co-owned by community trusts or local municipalities, and to allow the purchased marine resources from permitted fishers to be processed and packed for export purposes. This mechanism would move a step further from fisher's simply selling their catch to a stable market. Moreover, this would fit with the recommendations of the SFTG that small-scale lobster fishers along the Transkei coast needed to be formalised as 'small-scale *commercial*" fishers, calling for the fishers to be involved in micro-enterprises.

DEAT's Social Responsibility Programme approved a proposal in 2005 to fund the construction of a 5 million ZAR lobster holding and processing factory in Port St. Johns (CSIR Environmentek, 2005). The project development was to be managed by the Port St. Johns Development Agency, but once established, was to be owned by the local community trust who would rent out the facility to an operating company. Building was meant to commence in 2007, but the project was halted due to community disputes over the location of the site (T. Jayiya, Jaymat Enviro Solutions, pers. comm.). Another DEAT Social Responsibility Project, worth 2 million ZAR, is currently going ahead in the Tshani-Mankosi community (Appendix B16). A disused live holding facility on the river banks set up by MCM in 2001 is being revived to hold live lobster and oysters. Interestingly, the venture had been halted due to concerns over the sustainability in 2006. It had been calculated that the number of permits allocated to Tshani-Mankosi and neighbouring communities, and thus the bag limits for each permit holder, would not make the facility economically viable (T. Shipton, Enviro-Fish Africa, pers. comm.). Nevertheless, construction has gone ahead, and the Lusitania Group of Companies have expressed the desire to enter into a public-private partnership with the community trust (T. Jayiya,

Jaymat Enviro Solutions, pers. comm.). Live Fish Tanks did purchase lobster from the Tshani-Mankosi community that were stored at the buying station in Coffee Bay in 2008. It has also been suggested that undersize lobster, which form a large portion of the catch, could be kept in the holding facilities and fed until they reached a marketable size. Interestingly, monitoring at the Mdumbi Backpacker's Lodge has indicated a high proportion of live lobster in the fishers catch offered for sale to the lodge: 77 % when diving for lobster and 64 % when fishing.

Simultaneously, with DEAT's efforts to increase the participation of communities in the economic activities surrounding the commercialisation of the Transkei lobster resource through community trusts, the 'Wild Coast Fishing Co-Operative' initiated the development of a fish processing factory in Coffee Bay in 2007 (BESC, 2007). The aims of this co-operative were to increase the market value of fish, oyster and lobster caught in Coffee Bay and its neighbouring communities, and to export the processed products. However, the application for this development has been withdrawn due to concerns of financial viability (L. Proudfoot, BESC, pers. comm.).

Illegal organised fisheries

Non-compliance with catch restrictions such as bag and size limits, and fishing without the possession of a permit (subsistence lobster permit or recreational permit) has been considered illegal by MCM. As has been shown above, however, compliance with the regulations was conspicuously lacking even before MCM allocated the first permits to small-scale fishers in the Transkei. In addition, more organised groups of fishers and middlemen have been smuggling larger quantities of lobster out of the Transkei for sale elsewhere. This was already suspected by Fielding *et al.* (1994) in the early 1990s.

Organised networks have allegedly transported large quantities of lobster in small refrigerated trucks for sale to restaurants in neighbouring provinces, or have engaged in boat-based fisheries in the northern parts of the Transkei. Information obtained from the Military Intelligence arm of SANDF, and from MCM Compliance/Control personnel based in Port St. Johns and Mzamba suggests that larger-scale operations take place as follows:

(i) Networks provide gas freezers to households within the community. Groups of fishers fill the freezers with their catch over a period of time. When the total catch has become substantial, middlemen transfer the frozen lobster into the refrigerated trucks and transport the lobster to KwaZulu-Natal for sale to restaurants. Moreover, it has been alleged that local holiday resorts are involved.

(ii) Some groups of fishers have access to vehicles and transport the lobster themselves to nearby cities from where they are sold to other middlemen.

(iii) Recreational fishers or commercial fishers from KwaZulu-Natal fish for lobster by boat, using traps, north of Port St. Johns, in the Pondoland MPA (Figure 4.1). This is also the area considered to be the least exploited as it is inaccessible to small-scale lobster fishers (Fielding *et al.*, 1994).

Data on quantities harvested by the organised illegal sector are not available. However, between February 2006 and February 2007, over 8 arrests were made in the Port St. John's area where large quantities of lobsters were kept or being transported without a permit. Several arrests were made in a local store, where more than 270 frozen lobsters had been kept for delivery to outside buyers.

4.3.5. Total effort

Effort data for the lobster fishery in the Transkei are both temporally and spatially incomplete. Table 4.9 nevertheless collates the available data and effort estimates for the fishery since the 1980s, when the first commercial ventures operated. In the late 1980s and early 1990s, Fielding *et al.* (1994) recorded the catch by commercial ventures to be no more than 10 tons per year, however, this was most likely an underestimate. Several years later the small-scale fisheries catch was estimated to be in the region of 44 tons per year for the entire Transkei, while the recreational catch was 4 tons per year (Robertson and Fielding, 1997). For the period between 2003 and 2005, Steyn *et al.* (2006) estimated the small-scale fisheries catch to lie between 83 and 167 tons annually, while the recreational catch had increased to 7 tons since the 1990s. Thus, this was a significant increase from the 1990s. Moreover, the estimates were made at the time when only Inkala Fish Processors (Pty) Ltd. had started its operations. It was estimated that the total off take was already at optimal levels (Steyn *et al.*, 2006). In their report to the fisheries authority Steyn *et al.* (2006) strongly recommended that effort should not be increased. Taking the large proportion of undersized catches into account, they estimated the TAC to be in the region of 120 tons for the 248 km coastline between the Mbashe River and the northern border with KwaZulu-Natal.

Table 4.9. Transkei lobster fisheries catch records and effort estimates (in tons)

Year	JP	CBF	TSH	IFP	LFT	PC	Others	CB CCM	TM SM	SSF	Recr.
1986	0.11	ND	ND	-	-	-	-	-	-	-	-
1987	1.15	3.10	2.09	-	-	-	-	-	-	-	-
1988	5.31	5.05	ND	-	-	-	-	-	-	-	-
1989	2.80	5.58	1.19	-	-	-	-	-	-	-	-
1990	1.76	4.73	ND	-	-	-	-	-	-	-	-
1991	1.29	ND	2.56	-	-	-	-	-	-	-	-
1992-1995	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	**44**	**4**
1998	-	-	-	-	-	-	-	-	-	-	-
1999-2003	-	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	-	6.91	-	-	-	4.22	-	**83-167**	**7**
2006	-	-	-	3.20	-	ND	-	3.46	-	-	-
2007	-	-	-	-	ND	5.06	0.81	3.00	0.50	-	-
2008	-	-	-	-	7.01	5.35	ND	2.66	0.43	-	-

Abbreviations used: JP - Jakes Packers; CBF - Coffee Bay Fisheries; TSH - Transkei Sea Harvest; IFP - Inkala Fish Processors; LFT - Live Fish Tanks; PC - Phumalali Crayfish; CB CCM - Coffee Bay community-catch-monitoring extrapolations (see section 4.3.3); TM SM - Tshani-Mankosi supply monitoring estimates; SSF - small-scale fishery catch estimates; Recr. - recreational catch estimates; ND - no data available. Historic fishery records, historic and recent estimates of small-scale fisheries catch and recreational off take are obtained from Fielding *et al.* (1994), Robertson and Fielding (1997) and Steyn *et al.* (2006) respectively.

This study has estimated the total catch to be between 2 and 4.5 tons per year for the approximately 12 km long coastal stretch fished by the Coffee Bay community in the period 2005 to 2008, using the community-catch-monitoring data. Using a variable fishing effort model, Fielding (2005a) estimated a total of 8 tons per year caught jointly by the Coffee Bay and Hole-in-the-Wall communities, which is roughly validated by the estimates presented here, as both communities have a similar sized fishing area and population. In areas surrounding Port St. Johns, however, Fielding (2005a) recorded significantly higher CPUE rates and catches, with the latter in the region of 50 tons annually.

4.5. Discussion

Using a fishery system approach, this study has highlighted the changing dynamics of small-scale lobster fishing in two rural communities along the northern parts of the Transkei coast, as well as attempted to assess the magnitude of commercialisation in the entire Transkei lobster fishery. Figure 4.5 overleaf represent the important elements of the fishery and the changes it underwent as a result of MCM's interventions to impose limited access for small-scale lobster fishers with the accompanying market restrictions. Fishing effort and behaviour was quantified and contextualised within the socio-economic context of traditional Transkei communities. Research into the MCM interventions to regularise the fishery revealed that the individual permit system lacked legitimacy,

and that compliance with the imposed input and output restrictions was extremely limited. An investigation of the imposed marketing restrictions and the appointment of licensed buyers revealed that these interventions had a profound effect on fisher behaviour and effort, as well as negative economic implications for the local tourism industry.

With this holistic understanding of the Transkei lobster fishery system, I now discuss the extent to which MCM achieved the MLRA goals of resource sustainability and economic upliftment of coastal communities through limited access and market restrictions.

4.5.1. Effects on the resource

The focus of this research was to document changes due to regularisation from a fishery system perspective, using case studies. It was therefore not possible to determine total effort and to update the estimates derived by Fielding (2005a) and Steyn *et al.* (2006; 2008).

However, based on the increasing number of licensed buyers, and the increasing number of communities that provided the buying stations, it is likely that total effort has risen. In Coffee Bay, CPUE increased slightly between 2005 and 2008 and number of fishers nearly doubled during the 2007 legal season, when Live Fish Tanks (Pty) Ltd. first started its operations. Simply put, more fishers attempted to catch more lobsters. Research in Tshani-Mankosi has shown that despite Live Fish Tanks (Pty) Ltd. purchasing lobsters from the community in 2008, supply to the local backpacker's lodge has not diminished. Although not quantified, this was also observed in Coffee Bay during fieldtrips.

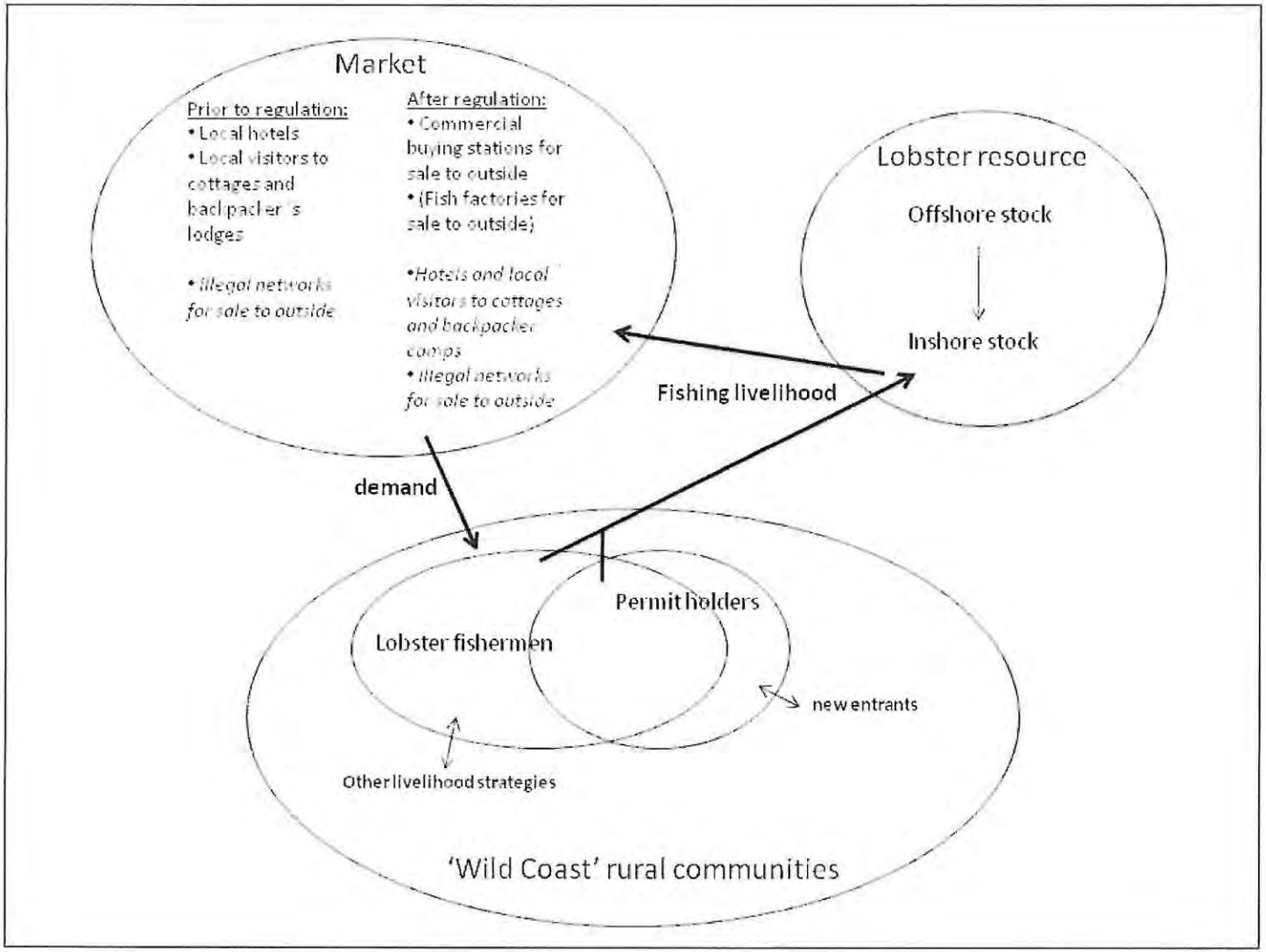

Figure 4.5. **Representation of the Transkei small-scale lobster fishery system with focus on markets, regularisation and its changes.** Market components shown in italics represent what has been considered as illegal by MCM since 2001.

The total catch in Coffee Bay has declined visibly since 2005, and it could be concluded that MCM's intervention through limited access and market regularisation has negatively affected the resource. At the same time, however, this has not been reflected in proportions of undersized catch. For Coffee Bay, percentages of undersized catch did not decrease between 2005 and 2008. Over the study period, percentage of sub-legal sized lobster fluctuated between 25 and 38 %. In addition, no shift away from preferred fishing areas was observed. Thus, at this stage, signs of overexploitation are still hard to detect. This reiterates the importance of maintaining the monitoring of catches using techniques such as community-catch-monitoring or market supply monitoring. Moreover, small-scale fishing along the Transkei is characterised by the use of low-technology gear, and a shore-based fishery only, where even the lobster divers do not access the deeper resource or reefs further offshore. This fact has prompted researchers and managers to argue that those unexploited populations that occur further offshore along very inaccessible coastline and up until a depth of 20 m are inaccessible to the small-scale fishers and potentially replenish the shallow exploited reefs or supply lobster larvae (A. Cockcroft, MCM, pers. comm.; Steyn *et al.*, 2006). This could contribute to the apparent resilience of the shallow stock to maintain catches with such high percentages of sub-legal sized animals. Evidence for this theory is not available, however stock assessments and movement studies are being planned (A. Cockcroft, MCM, pers. comm.). Conversely, no studies looking at the interaction of the lobster and the lobster fishery with the broader natural ecosystem in the Transkei have ever been undertaken.

4.5.2. Effects on the human system

Legitimacy of limited access

Despite efforts by government to implement the provisions of the MLRA, and allocate rights to small-scale lobster fishers in the form of yearly permits, the process has been so erratic that many *bona fide* small-scale fishers never obtained a permit. This, combined with the very strongly ingrained tradition of open access fishing, resulted in a complete lack of legitimacy for the limited access system. In both the Coffee Bay and Tshani-Mankosi communities, the fishers or divers who had received permits were also found to fish in the periods when they did not possess a permit. In many instances, permit and non-permit holders operated together. Fishers stated that the only difference between permit holders and non-permit holders was the fact that the latter needed to "run" whenever Fishery Control Officers were patrolling. In Coffee Bay, interviews and focus group discussions indicated that lobster fishers without permits had been prosecuted and required to pay a fine. However, this had not acted as a deterrent and many fishers would simply hide their catch if there was any noticeable law enforcement activity.

While limited access was MCM's strategy to formalise the Transkei small-scale lobster fishery, it has become evident from this study that the implementation of this fisheries management tool has been flawed. There was no active capacity by MCM to follow-up the distribution of permits, or efforts to seek alternatives to allocation criteria, such as the need to possess an ID document. In essence, many small-scale lobster fishers have not received permits as they either do not employ this livelihood strategy on a regular basis, or they were simply never registered on MCM's database.

An alternative starting point to MCM's top-down the permit/ effort control approach would be to recognise the tradition of open access fishing, and the conditions under which it operates, and begin to work with fishers to ensure that fishing effort is sustainable and that maximal benefit flows to the community. This could have been addressed by gaining community input and validation through a co-management process where the local committee ultimately decides who gets to fish and who does not. Another management decision could have been the temporary closure of particular areas chosen by the fishers but informed by the community-catch monitoring data. This was also the ambition of the Mussel Rehabilitation Project in Coffee Bay, where the local committee had hopes of co-managing all the fishers and fisheries in an integrated way, while simultaneously providing supplementary livelihood options. This has however not yet been achieved as the benefits of the broader MRP project through its supplementary livelihood opportunities have not outweighed the direct economic benefit that the individual lobster fishers obtain.

New action space of market regularisation

Since the advent of holiday makers in the 1950s and the establishment of holiday resorts, the traditional livelihood of fishing for lobster has become predominantly market driven. Fishers became more efficient, and many younger fishers who could access basic diving gear have learned to dive, even though it is still regarded as taboo in Xhosa culture (pers. comm. with fishers during focus group discussions). Notably, consideration for this taboo appears to have been overridden by the considerable poverty of these communities. In particular, diving for lobster has been undertaken in those areas that were well established as holiday destinations. While the markets were not consistent, and demand was highest in the holiday season, a significant livelihood of selling lobster to the local markets had developed. The availability of lobster on the local market in turn became a major tourism attraction for the region.

However, as shown in this study, the market restrictions implemented by MCM have affected existing local markets, and increased sales through the licensed buyers to supply national and international markets. In the past, the demand was highest in summer months, so the fishers did not adhere to closed seasons and berried female lobsters were often caught. The aims of MCM's market

restrictions were thus two-fold: (i) to shift the fishing effort to the winter months, and (ii) to provide a more consistent market for the fishers who could sell their catch at a higher price.

While it is without doubt that the opportunity of selling to buying stations had increased the revenue of the small-scale lobster fishers, and in this sense provided some much needed poverty alleviation, market regularisation had not managed to shift fishing effort to the legal season only. This is clearly shown in Figure 4.3. Given its high value, and high local demand, fishers still supplied the holiday establishments and visitors, albeit informally. Moreover, since 2007, signs had been observed that the socio-economic dynamics among local community members was changing, due to the appearance of buyers, who increased demand and paid a relatively high price for the lobster. Interviews with local stakeholders as well as focus group discussions have indicated that fishers (permit and non-permit holders, including adolescents) 'rent' permits from permit holders who do not fish for lobster, in order to access markets such as the licensed buyers. In some cases, one particular fisher was shown to fish on behalf of 4 permit holders. Given the low enforcement capacity, and the absence of verification that permit holders were actually fishing, many community members attempted to enter the fishery.

After 7 years of obtaining individual annual permits, for which there was very little legitimacy among the fishers, communities have begun to attach a monetary value to the permits that were traded within the local economy. While the trading of individual permits was a phenomenon that was definitely not unique to the Transkei small-scale lobster fishery - for example, Bodiguel (2002) documented the development of an illegal license market in the lobster fishery of Canada's Maritime Provinces - this had not yet been observed in small-scale lobster fishing communities in the Eastern Cape Province of South Africa. Within an imposed management framework and new market opportunities, impoverished rural community members adapted their livelihood strategies to operate within this new action space.

4.5.3. Evaluating the management framework

When evaluating the management framework based on the data presented here, three fundamental flaws have become evident:

(i) While the permit allocation procedure itself was poorly implemented, it became evident that the system of individual permit allocation was not well contextualised within the traditional household livelihood strategy of open access harvesting of marine resources: *different household members, including children, harvest different marine resources, often co-operatively, and contribute to the household food consumption or economy.*

(ii) Top-down imposed catch restrictions did not take fisher behaviour into account, and as a result, very few fishers complied with the regulations. Moreover, the imposed management framework implied that local institutions and fishers had the capacity to partake in Monitoring, Control and Surveillance activities.

(iii) Market regularisation has affected the local market, and has missed the opportunity to make use of the local economic multiplier potential of the lobster fishery for local economic development such as tourism value chain.

(iv) Has MCM's interventions resulted in an increase in fishing effort and decline in CPUE?

The perceived lack of legitimacy for the individual permit was exacerbated by the absence of a fisher education programme to explain how the permit allocation system worked. Our research revealed several misconceptions about permit conditions existed among the community members. At meetings held by MCM extension officers to register fishers, older members often representing the heads of the households, were often the only household members present. This was validated by the household questionnaires administered to the registered fishers by MCM in 2008 in Coffee Bay. More than 64 % of individuals registered for lobster permits were the heads of households. The remaining 36 % were either wives of the household heads or the eldest sons. It thus appears that household heads would register under their name for a permit, as they held an identity document, but that they were under the impression that the permit could be utilised by the entire household. Only 36 % of people who had registered for permits reported that they harvested lobster themselves. What is more, more than 40 % of this 36 % also had other household members (including children) who fished for lobster. Another 27 % of individuals who registered did not fish for lobster themselves, but had other household members who caught lobster. Despite the fact that the permits were not transferable, MCM did attempt to solve this issue by stating in the permit regulations that: "An authorized representative can only be allowed to use the permit if obtained written permission from the Chief Director (of MCM)", and "The exemption shall only be used by household members authorized by the Local Subsistence Co-management Committee in the event of the Exemption Holder being incapacitated". Besides the fact that these provisions had been stated in English on the permit and not in the primary language of the fishers, the expectation that the predominantly illiterate rural households could correspond formally in writing to the head of MCM was unrealistic. In addition, Local Subsistence Co-management Committees had not been formalised and Local Subsistence Fishing Committees had not been capacitated. Thus far, these committees had merely acted as local structures for convening meetings so that the MCM extension officers could

expedite the process of registering fishers (refer also to Chapter 5). Misconceptions regarding the permit system even went a step further: research in Coffee Bay has shown that in many instances, permit applicants were not only under the impression that lobster permits could be used by the entire household, but that they also believed that the lobster permits allowed any member of the household to harvest any kind of marine resource. At the same time that individuals could register for lobster permits, they could also register for line-fish, mussel or oyster permits. However, very few applicants were allocated with more than one kind of permit. Conversely, during the household questionnaires, the women who harvested mussels often mentioned that they possessed permits to harvest this resource, while in fact they did not – only one permit had been issued to another member of the household, and that was to harvest lobster.

As shown in this and other studies, compliance with the imposed catch restrictions has been very limited (Table 4.7) – due to the pre-existing fishing practises, economic incentives not to comply, and ignorance regarding certain catch restrictions. Permits were written in English instead of the first language of the affected individuals, and this problem was coupled to the low education level of these individuals. Moreover, very little awareness was raised about the reasons behind catch restrictions[19]. Further contributing to the lack of compliance was the questioning of the legitimacy of the permit restrictions in light of differences in historical harvesting practices. Notably, sub-legal sized animals were harvested as they could be sold. Finally, the lack of alternative livelihood opportunities forced many fishers to break the imposed regulations. As early as 1997, at the time when the recreational regulations applied to small-scale fishers as well, Robertson and Fielding observed that compliance with regulations was low, as the regulations were poorly enforced. Steyn *et al.* (2008) observed that 71 % of fishers interviewed (n = 68 of which 31 were from Coffee Bay) were aware of fishing regulations. However, during focus group discussions in the study described here, fishers argued that they had not been able to partake in decision-making processes regarding the restrictions imposed upon them through the use of a permit. Community-catch-monitoring data for Coffee Bay did not show any association between those fishers with and those without permits adhering to catch restrictions such as bag, size and seasonal limits.

No effort was made in building capacity among the fishers themselves to market their catch more effectively and to develop the local market. Instead, 'external' companies obtained licenses to purchase the catch of the small-scale fishers for export. This shows that the development framework for the lobster fishery and its potential for local economic development were not considered more

[19] Limited training was undertaken by Steyn *et al.* (2006) on lobster biology and resource management at selected sites during 2003 to 2005, and by extension officers when setting up local committees.

broadly within the context of national and local developmental goals and mandates. In contrast, in other Eastern African countries such as Kenya, Tanzania and Mozambique[20] in the 1960s – where a local tourism market had already emerged a decade prior – small-scale, multi-species and boat-based fishers were stimulated by governmental goals of development to increase the supply of inshore spiny lobster to the rapidly growing local tourism industry. This was seen as a vehicle for broader coastal community and local socio-economic development (Brusher, 1971; Bwathondi, 1980). International trade of the inshore fisheries catch was not the first priority. South Africa's economic policies state that local government must play a 'developmental role', and each municipality is by law (Municipal System Act No. 32) obliged to adopt an inclusive strategic plan for the development of the municipality (Republic of South Africa, 2000a). Along the coastal areas of the Transkei, tourism has been identified as the single most important vehicle for local development (Ntinga O.R. Tambo Development Agency, 2008). However, MCM's licensing of external companies who purchased directly from the permitted fishers has, in effect, bypassed this local developmental mandate, and has affected the existing local tourism market. Instead, economically efficient companies were given preference relieving MCM of any local developmental involvement.

4.6. Conclusions and outlook

The information presented above is largely centred on case study research in the Coffee Bay and the Tshani-Mankosi communities. Results and issues discussed are, however, largely representative of the situation prevailing in all small-scale fishing communities along the Transkei coast, north of the Mbashe River.

In certain East African countries, limited access, catch restrictions and other management measures (closed areas etc.) have been implemented after large-scale commercialisation programmes resulted in overexploitation and there were signs of a decline in the local spiny lobster resource (Anon., 1998 in Marshall *et al.*, 2001; Fielding and Everett, 2000; Marshall *et al.*, 2001). In contrast to this, the South African fisheries authority only began to impose a management framework to its small-scale fishers once they were recognised as a legitimate group in 1998. The first spiny lobster resource assessment in the former Transkei homeland had indicated that the informal fishery seemed sustainable at the time, although further stock assessment work and catch monitoring needed to be undertaken (Fielding *et al.*, 1994; Fielding *et al.*, 2004). However, political expedience to formalise small-scale lobster fishers (and others) from the former Transkei homeland, saw the allocation of over 2400 annual lobster permits in 2008 for shore-based fishing.

[20] Countries such as Madagascar, Somalia, Oman and Yemen also have a substantial commercial fishery for inshore spiny lobster species (FAO, 2008; Fielding and Mann, 1999; Johnson and Al-Abdulsalaam, 1991).

Although a co-management process had been recommended, fishers and other local stakeholders were not included in the decision-making process. Moreover, the capacity of MCM in terms of resources and skills deployed on the ground to initiate a co-management process appeared to be inadequate. This meant that local socio-economic and market characteristics were not taken into account in the management framework that the present study has shown were largely inappropriate to the fishers' socio-economic circumstances. The results were that the imposed regulations lacked legitimacy, and very low levels of compliance were observed amongst both the fishers and the local consumers.

The newly imposed market restrictions, which were designed to channel product to a broader national and international demand, saw the licensing of external buyers. Undoubtedly, this provided a more stable income for fishers who had been allocated permits. However, lobster caught by non-permit holders, or that do not conform to size or other catch restrictions, are still being sold on the local market where demand is high. In addition, permits are being traded. An increase in fishing effort has been observed in localities such as Coffee Bay, and signs of unsustainable fishing are becoming evident. At the same time, high local and external demand in particular, is promoting the use of more efficient gear (boats, traps, etc.), and is placing pressure on the fisheries authority for larger-scale commercialisation accessing the deeper stocks.

With this study, evidence has been presented that the management and development framework has not been contextualised properly within the socio-economic context of the small-scale lobster fishers. The many mismatches highlight that the regulations were conceived in ignorance of important aspects of the fishery system in operation, visibly, a lack of- consideration of: the socio-economic aspects of the fishery, traditional resource access and governance norms, as well as fisher behaviour. One exception might have been the licensing of an NGO as a buyer in an area with a very limited local market. While providing a constant market for the small-scale lobster fishers during the legal fishing seasons, local community members could engage in supplementary livelihoods and income-generating opportunities throughout the year through the project's activities. It remains to be seen if this model is financially sustainable and whether or not the small-scale fishers themselves will develop into micro-entrepreneurs, as was originally recommended by the SFTG.

Although in many cases the local market still operates informally, the ban on sales to local hotels, lodges and backpackers has caused concern as the local tourism market is seen as the main platform for local economic development (Fielding *et al.*, 2004; Ntinga O.R. Tambo Development Agency, 2008). This divergence will need to be addressed by the fisheries authority if it aims to contribute to poverty alleviation in a more integrated way. In the end, 2400 lobster permits for small-scale fishing

communities where approximately 5 % of the coastal population harvests lobster as a livelihood strategy, will not have a significant local economic impact if lobster is sold merely to external buyers who export the resource for national or international benefit. In effect, this calls into question the extent to which the MLRA goal of sustainable use of marine resources to promote socio-economic benefits for coastal communities has been achieved. The SFTG goal of uplifting the lobster fishers along the Transkei coast to become small-scale *commercial* fishers has not yet been achieved, as the present results indicate they still follow a part-time subsistence livelihood pattern, and no interventions to empower fishers to add value to their catch have been implemented. In a context of overarching rural poverty it has become clear that community needs will also need to be addressed if successful management, or even formal limited access, is to be achieved. In a context where (i) resources are limited, (ii) compliance to any top-down regulations is low, but (iii) national mandates are to promote development and 'good' governance, the fisheries authority, in collaboration with fishers and other local stakeholders, will need to design more appropriate and acceptable management arrangements. Another option that could work better might be the issuing of a single permit to deserving households, identified and validated by the community at large. One permit allowing the different household members to harvest a basket of resources within a predefined community fishing area might simplify things and thus not create the confusion among fishers as observed in this study. It would also ease the logistical tasks of the fisheries authority in terms of delivering the permits on time and addressing the issue of lacking Identity Documents and underage harvesters (see also Chapter 5).

In these new arrangements, the harvesting and marketing of high-value resources such as lobster should contribute to the local tourism industry more effectively, and create the right incentives for the small-scale fishers (both frequent and less-frequent fishers) to comply with any regulations aimed at sustaining the resource. The fisheries authority will need to adopt a fishery system approach in order to revisit its current management paradigm for small-scale fishers. As in other East African countries, one of the pillars of a revised management framework will be the need to (i) explore various alternative management arrangements with greater community involvement in decision-making and (ii) develop local capacity both among community members and the fisheries authority (Hauck and Sowman, 2003; Mohammed, 2004; Ochiewo, 2001; Wells *et al.*, 2007). This process might at first entail the need to simplify the harvesting rules: e.g. the closed season and the ban on harvesting berried females given the rudimentary gear that is used that does probably not substantially disturb or damage undersized individuals carrying eggs. This would have to be researched however it has been documented for other species (Arendse *et al.*, 2007), and would not prohibit the fishers to sell during peak season. Rather a system of temporary closures of rotational

fishing could be implemented as is currently practice for the rehabilitated mussel beds in Coffee Bay. Research undertaken for this study has provided evidence that limited access rights and harvesting regulations did not substantially change fisher behaviour and did not achieve the goals of the MLRA. Legitimacy for the imposed rules has remained particularly lacking. On the contrary, the introduction of the buyer has influenced fisher behaviour, albeit perhaps not in the desired goal of redirecting the fishing season and regulating the off take. Managing the various buyers has also proven to be a difficult task. Nevertheless the introduction of external buyers did create new incentives among fishers. Similar incentives more in line with local development opportunities could have a different effect: in areas where local tourism potential is high, the local hotels or lodges, who offer lobsters to their guests, could act as the landing sites where catches are monitored. Alternatively a central place or small market in the community, given the proper training and buy-in by the broader community and the local municipality could act as a micro-enterprise, contributing to community empowerment, and offering the local lobster fishers' catch at a guaranteed quality and price to satisfy the local demand. If the resource is abundant, outside buyers could purchase from these community markets as well. The bottom line however is it is highly likely that the resource will never be sufficient to justify large scale processing facilities as was originally proposed for the Transkei. Rather mechanisms will need to be designed and implemented in order to maximise the contribution of the lobster fishery to local poverty alleviation and sustainable development.

CHAPTER 5:

Small-scale Fishers in the Eastern Cape: The Long Road from Recognition to Participation in Management and Policy-making

5.1. Introduction

The achievement of effective governance of small-scale fisheries, where small-scale fishers are recognised by government and participate in management and policy-making processes, has been fraught with many challenges in the Eastern Cape Province of South Africa. Inhabitants of this region, who have fished for centuries in traditional communities of the rural areas along the coast, or who have, more recently, also harvested inshore marine resources as a livelihood strategy within the province's urban areas, were only recognised as 'subsistence' fishers with the enactment of the Marine Living Resources Act in 1998 (Act No. 18 of 1998, Republic of South Africa, 1998a). Subsequently guided by the recommendations of the Subsistence Fisheries Task Group (SFTG), that had been tasked in 1999 to develop management arrangements for the country's subsistence fisheries, the fisheries authority (MCM) has since 2001 been implementing a nationwide 'subsistence fisheries programme'. In the Eastern Cape Province, MCM embarked on a process of identifying and issuing subsistence fishers with individual permits, which was a requirement under the Marine Living Resources Act (MLRA). Moreover, as one of the key recommendations of the SFTG was the need to adopt a co-management process - which meant that fishers and other stakeholders such as local development agencies needed to participate in fisheries governance – MCM needed to establish local institutional structures that would facilitate co-management. However, the implementation of the subsistence fisheries programme in the Eastern Cape Province presented the fisheries authority with a daunting challenge given (i) the extent of the province, and the associated geographical and logistical constraints in reaching the large number of traditional coastal communities, (ii) the fact that MCM had only allocated limited capital (budget and personnel) to the implementation of the programme in the Eastern Cape, (iii) that the fisheries authority was historically geared towards managing commercial fisheries using a 'command and control' approach, (iv) that MCM was under political pressure to issue subsistence permits and (v) that MCM had never engaged with local government agencies mandated to promote development. Placed together, these factors did not leave much room for capacity-building and development support which were essential elements of the subsistence fisheries programme, and which were necessary in order to achieve a successful co-management arrangement.

Although the subsistence fisheries programme has been in effect for 8 years, an evaluation of the roll-out of the programme in the Eastern Cape has previously not been performed. This is surprising given the challenges specific to this province, and the emergence of a number of serious governance and capacity problems constraining its effectiveness. For example, subsistence permits were often

issued several months after the official fishing season for a particular resource had started. A community-catch-monitoring programme had also been initiated in 2006, however, data were not captured or analysed, and subsequently fed back to inform the management arrangements and catch restrictions. In addition, the limitation of access through individual permits had not been accompanied with alternative or supplementary livelihood options for the unsuccessful applicants. Despite these problems encountered during the implementation of the programme, they were not addressed, and no significant changes were made to MCM's roll-out strategy. An analysis of the programme and the governance arrangements established in the Eastern Cape was thus necessary to understand why MCM was seemingly unable to address the challenges and the problems that were encountered. Meanwhile, an analysis of government's efforts to formalise small-scale fishers in the Western Cape Province, undertaken by Isaacs (2006), had highlighted serious challenges for the fisheries authority in managing small-scale fishers. The recognition through the MLRA of fishers in either the commercial sector or the subsistence sector had resulted in many fishers who operated somewhere in between the two extremes, not being able to obtain legal rights to the resources they traditionally fished. This had also been observed in the urban areas of the Eastern Cape. In contrast, the implementation of the subsistence fisheries programme in the KwaZulu-Natal Province was hailed nationally and internationally as significant progress towards formalising the management of subsistence fishers (Harris *et al.*, 2007). In this province, the provincial nature conservation department had been mandated by MCM to implement its subsistence fisheries programme; it had allocated the required resources to implement the programme, and had expended much effort on capacity-building and the establishment of co-management structures. Moreover, funds had been obtained to identify projects that could provide alternative livelihoods for the fishers, and a central database had been developed to capture the region's community-catch-monitoring data. These had been the attributes that contributed to the perceived success of the programme, and that seemed to be lacking in the Eastern Cape.

The aims of this study were therefore to provide a first analysis of the extent to which the subsistence fisheries management programme met its stated goals of formalising the rights and management of the Eastern Cape small-scale fishers, and evaluate how it addressed the problems that were encountered during the roll out of the programme. Although certain aspects of the subsistence fisheries programme and its management failure were documented for the rural abalone and lobster fisheries in Chapters 3 and 4 respectively, a more in-depth analysis was required that could identify the root causes of the apparent management failure. In order to understand the root causes for these failures it was felt necessary to view the situation through the 'governability

assessment framework[1] developed by Jentoft (2007) and subsequently refined by Chuenpagdee *et al.* (2008). While a governance analysis as described by Chuenpagdee *et al.* (2008) is beyond the scope this dissertation, several criteria such as the 'appropriateness of the governing elements', the 'mode' and the 'quality of the interactions' were found particularly useful in this analysis. The 'appropriateness of the governing elements' refer in this study to the management tools employed by the fisheries authority with regard to small-scale fisheries in the Eastern Cape – viz. the individual permits (from open access), catch restrictions, market regularisation, and so forth. The 'mode' of governance refers to the 'top-down' management approach of MCM and the ability of the fisheries authority to respond to the challenges of the Eastern Cape small-scale fisheries. Lastly, the 'quality of interaction' is in this study centred on the establishment of co-management and participation by small-scale fishers in decision-making processes surrounding marine resource utilisation. In the context of small-scale fisheries governance, where co-management has been widely advocated, these selected criteria imply that the mode of governance needs to be co-operative, with a high level of interaction between the various stakeholders. Simply put, small-scale fishers should be participating in the management, research, development and policy decision-making processes (Béné *et al.*, 2007; refer also to Chapter 1). In addition, and particularly within the South African context, local government, mandated to promote development and to create capacity, need to participate in setting the policy objectives, the marketing arrangements and in exploring supplementary livelihood development options. As such, participation[2] is seen as a key governance mechanism and as the central criterion in the assessment of the subsistence fisheries programme. Using this entry point, this study provides evidence in favour of the argument that MCM has failed to achieve better governance of the small-scale fisheries in the Eastern Cape.

The analysis documents evidence from two aspects of the fishery implementation: the management level, where structures were established for the purposes of implementing the subsistence fisheries programme; and the policy level, where the fisheries authority aimed to consolidate the subsistence fisheries programme into a sector-specific policy.

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[1] This framework builds on the 'interactive governance theory', developed by Kooiman *et al.* (2005). Refer to Chapter 1.

[2] For the purposes of this study, participation is defined as the active, meaningful and influential involvement of individuals or groups in an activity. As such, participation is based on the principles of empowerment (Jentoft, 2005). Moreover, in the specific context of small-scale fisheries, participation refers to the devolved authority and responsibility to be involved in the decision-making and implementation of policies and plans (Campbell and Townsley, 1996).

At the local management level, the study area was considered to be the entire Eastern Cape coast and for all species or species groups deemed suitable for subsistence use by the SFTG process. This broadened scope was necessary in order to gain an understanding of the magnitude of the task undertaken by the fisheries authority. An assessment was made of local institutions, and of structures within MCM that were set up specifically for the purpose of implementing the subsistence fisheries programme.

At the policy level, the analysis documents evidence that the existing legislative framework did not recognise the needs of small-scale commercial fishers appropriately. More unique to this study is the evidence of shortage of capacity within MCM to rectify the errors made, and the eventual alienation of the fishers from MCM. This resulted in them seeking redress using political and legal tools available in the newly democratic South Africa, namely mass defiance and litigation using the new Constitution. The study concludes with discussion on how an Order of Court presented a turning point whereby MCM was forced to allow participation by fishers and other key stakeholders in the policy process, and hopefully in fishery management and governance processes going forward.

5.2. Material and methods

Information for this study was drawn from a variety of sources and processes that provided opportunity for personal observation and direct participation.

5.2.1. Implementation of the subsistence fisheries programme in the Eastern Cape

Data pertaining to the number of fishing communities, fishing boundaries, and the numbers of exemption permits issued over the years to the identified communities in the Eastern Cape were obtained from the SFMU and its extension personnel based in the Eastern Cape.

I provided assistance to MCM during 2006 and 2007 in the development of a geographic information system (GIS) tool for the management of the Eastern Cape subsistence and small-scale commercial fisheries. This provided insights, which I document here, into the process used to delineate fishing zones for each community.

During 2007, I established a one-year research project that was aimed at developing, capturing and analysing the community-catch-monitoring data of MCM's catch monitoring programme that had been initiated in 2006 (Mollat, 2007). Data on resource use and effort are not included in this chapter; however, an assessment of the effectiveness of the catch-monitoring programme is presented.

Qualitative information relevant to the management structures established in the Eastern Cape was obtained from interviews with MCM personnel, fisher groups, NGOs, and provincial and local authorities. Participation in a series of project steering committee meetings for the Coffee Bay Mussel Rehabilitation Programme (described in Chapter 4), and the organisation of a multi-stakeholder workshop in August 2005, aimed at facilitating the development of institutional structures for the management of small-scale fishers in the Eastern Cape (Raemaekers and Godfrey, 2005), provided insight into MCM's implementation of the SFTG recommendations for subsistence fishers.

5.2.2. Small-scale fisheries policy development

Information regarding the policy development process was gathered by attendance at several provincial workshops, 'round table' meetings and national summits to discuss draft policy documents. The meetings were organised by MCM, or by a Western Cape-based NGO named Masifundise Development Trust (MDT), who had been lobbying for the rights of small-scale fishers. In particular, in 2008, I was elected as a member of a National Task Team (NTT), the goals of which were to develop a small-scale fisheries policy through focussed dialogue with multiple stakeholders. The purpose of my participation was to represent academic researchers undertaking work on the small-scale fishers of the Eastern Cape Province and to provide feedback on research findings into the policy process. As such, this study, which evaluates the participation of Eastern Cape small-scale fishers in management and policy-making, can be considered to be an outcome of action research.

5.3. Results and discussion

5.3.1. The legislative framework, the Subsistence Fisheries Task Group, and its implications for Eastern Cape small-scale fishers

South African legislation does not recognise small-scale fishers as a distinct group with special needs in terms of management and development. However, after 1994, which marked the end of the Apartheid era, the democratic government attempted to recognise fishers who could not be classified as commercial or as recreational fishers. In this section, a background is given of the legislative process that was undertaken after 1994, and the development of the subsistence fisheries programme, which was to determine government's approach to the small-scale fishers of the Eastern Cape Province.

As broader law reforms unfolded in the new democratic dispensation, policy and legal developments were underway in the fisheries sector (Witbooi, 2006) - flowing from the principles of the new

constitution. In 1997, the Marine Fisheries White Paper was published after an extensive public consultation process. The goals of the White Paper were clear: to correct the imbalances of Apartheid, and extend benefits from fisheries to previously disadvantaged communities in order to achieve equity. The public consultation process of the Marine Fisheries White Paper, which had included 'road shows[3]' in a number of small-scale fishing communities along the coast (Hersoug and Holm, 2000), had been the first ever consultation with small-scale fishers on policy matters. The process was driven by the Fisheries Policy Development Committee consisting, *inter alia*, of members from the fisheries authority, the commercial fishing industry, and for the first time, representatives of small-scale fishing associations - albeit in conspicuously small numbers (A. Johnston, Artisanal Fishers Association of South Africa, pers. comm.; Hersoug and Holm, 2000; Nielsen and Hara, 2006). Legislative effect to the Marine Fisheries White Paper was subsequently given in 1998 when the Marine Living Resources Act (MLRA) was passed (Kleinschmidt *et al.*, 2003; Witbooi, 2006). With the MLRA, the restructured fisheries authority (MCM), was mandated to (i) ensure the long-term sustainable use of marine living resources, (ii) promote equitable access to marine living resources, (iii) transform[4] the fishing sector accordingly to address historical imbalances and achieve equity, and (iv) promote socio-economic benefits for coastal communities (Branch and Clark, 2006; Hauck and Sowman, 2003). Unfortunately, the MLRA did not define small-scale fishers as a distinct group with special needs, an oversight that was to disadvantage traditional, small-scale fishers greatly, and create conflict in the rights allocation and management process of a number of fisheries. The Fisheries Policy Development Committee, with its bias towards commercial fisheries, had, despite the sincere will and extensive consultation process, overlooked small-scale fishers as a distinct class of fishers. Instead it had categorised these fishers as aspirant commercial fishers that created a structural problem in the legislation, and that resulted in small-scale fishers largely left out of the commercial rights allocation process. All fishers were thus categorised into either the commercial fishing sector, the recreational fishing sector, or for the first time, the subsistence fishing sector. However, the subsistence sector had been defined in the context of fishing for immediate consumption in certain areas characterised by extreme poverty (Hersoug and Holm, 2000), such as along the East coast of the country. This meant that small-scale fishers needed to operate within one of these three sectors if they wanted to obtain legal access to marine resources.

[3] The term 'road shows' has been used by members of the fisheries authority to refer to a series of meetings held along the coast, most often in local town halls or fisheries control offices, where draft policies or regulations are presented and comments solicited.

[4] 'Transformation' is a generic term used in the post-apartheid era to describe processes aimed at achieving racial equity in South African society.

On the back of what seemed to be an extensive consultation process with the various stakeholders, the transformation of the commercial fishing sector was regarded as one of three opportunities for small-scale fishers to enter the formal fishing sector. Moreover, many small-scale fishers had hopes of obtaining quotas and becoming commercial fishers and so did not initially object that they were not recognised as a distinct sub-sector. However, the commercial rights allocation had not been designed to cater for small-scale fishers who typically had a rudimentary education and lacked the business skills to compile a commercial fishing rights application. The application process was rigorous and required (i) the assistance of lawyers, (ii) the extensive business knowledge that was only within the capacity of a commercial enterprise, and (iii) the need for applicants to prove vessel capacity. In addition, no development support was provided to traditional small-scale fishers who lacked the education levels required for the application procedure (Isaacs, 2006). Although road shows held in the Eastern Cape as a part of the fishing policy development process raised the expectations of all fishers (and many non-fishers) who had attended the meetings, realistically, very few prospective applicants for commercial rights could qualify in the Eastern Cape. Small-scale fishers in the Eastern Cape were thus left with no option but to fish under the regulations governing recreational fishing (Hauck and Sowman, 2003; Sowman, 2006)[5], which prohibited the sale of catches, or to obtain a subsistence permit.

Given government's historic focus on the commercial sector, MCM recognised that it was ill-equipped to deal with the newly recognised subsistence fishing sector following the promulgation of the MLRA (Sowman, 2006). Consequently, in 1999, the Chief Director of MCM appointed the Subsistence Fisheries Task Group to advise on the management of subsistence fisheries (Branch, 2002). After a year of extensive research and communication with the various stakeholders, including a series of consultations with fishing communities along the entire coast, the SFTG report was submitted to MCM in early 2000, and accepted as a practical means of applying the MLRA in respect of subsistence fishers (Branch, 2002). The SFTG recommended (Branch *et al.*, 2002; Harris *et al.*, 2002; SFTG, 2000), *inter alia*, that:

(i) Certain species or species groups were only suited for subsistence use, while others with a higher value would be harvested by a newly proposed sector of 'small-scale commercial fishers' that fished for profit but should not be equated to large industrial fisheries. In the Eastern Cape, abalone, oyster and lobster were seen as a small-scale commercial resource and their harvesters were classified as 'small-scale commercial fishers' regardless of whether they would harvest other lower value resources as well.

[5] Various degrees of control by local authorities of small-scale fishing activity along different sections of the coast prior to 1998 have been reviewed by Hauck and Sowman (2003).

(ii) Allocations of subsistence fishing rights were to be area-based and exclusive to individual subsistence communities. The allocation of both individual and community rights was recommended; the latter, in cases where local structures had attained the necessary capacity. In the Eastern Cape no such structures had yet been established.

(iii) A strong case was made for the establishment of co-management. A multi-tiered institutional management structure, with provincial and local structures was recommended by the SFTG. This included a dedicated 'Subsistence Fisheries Management Unit' within MCM, advised by a multi-stakeholder and multi-disciplinary 'Advisory Group'. At the local level, this included co-management committees where MCM personnel, fishers and other local management authorities would make joint decisions.

(iv) A training programme needed to be implemented to build capacity for participation in management. Many fishers did not have the skills to provide management input, and needed to be empowered.

(v) A community-catch-monitoring programme needed to be established.

As such, the SFTG recommendations provided a clear set of guidelines and an implementation plan for formalising the subsistence sector by issuing the fishers with rights and establishing co-management structures (Harris *et al.*, 2007). Along the west and south western coast, the SFTG recommendations resulted in none of the fishers being recognised as subsistence fishers (Sowman, 2006). Instead, it had been envisaged by MCM that traditional fishers would obtain rights in the 'limited commercial fisheries' designed specifically in the commercial sector to accommodate those fishers (Kleinschmidt *et al.*, 2003). In the KwaZulu-Natal Province, the provincial nature conservation department obtained the mandate from MCM to implement the SFTG recommendations (Harris *et al.*, 2007; Sowman, 2006), while in the Eastern Cape, the newly created Subsistence Fisheries Management Unit (SFMU) based at the MCM headquarters in Cape Town in the Western Cape Province, was tasked with setting up the recommended co-management structures, and allocating subsistence rights.

The large majority of small-scale fishers in the Eastern Cape were thus effectively categorised as either subsistence fishers – if they harvested resources that had been indentified for subsistence use – or as a small-scale commercial fishers – if the resource had been classified as being of high economic value (Sowman, 2006). However, small-scale fishers from the rural fishing communities were known to harvest a basket of resources, of both high and low economic value, depending on availability, market demand, and complementary livelihood strategies. This mismatch was to greatly

affect the successful implementation of the subsistence fisheries programme, which was government's main mechanism to formalise small-scale fishers in the Eastern Cape.

5.3.2. MCM capacity in the Eastern Cape to deal with subsistence fishers

This section assesses the capacity that MCM established to formalise the rights and management of the Eastern Cape subsistence fishers. Since MCM had not identified a partner institute in the Eastern Cape Province that could assist in the implementation of the subsistence fisheries programme, the Subsistence Fisheries Management Unit had to first capacitate itself to be able to implement the programme. However, it rapidly became evident that its capacity was not adequate to meet the challenges in this region.

Firstly, the SFMU had only very little personnel to implement the programme in the Eastern Cape, and very few members had prior experience with subsistence fisheries and co-management. The SFMU had thus been established within MCM specifically to manage the newly recognised subsistence fisheries, and its establishment had been welcomed by research institutions, NGO's and the fishers. Unlike in KwaZulu-Natal, in the Eastern Cape, the SFMU had to implement the programme by itself. Thus, a first step was to employ more personnel. The SFMU, based at the main MCM offices in Cape Town, permanently employed three to four young staff members, of whom only one member, employed during 2005, had gained experience with subsistence fisheries as he had worked for several years for the provincial department in KwaZulu-Natal. The distance between the Eastern Cape and the SFMU offices (700-1500km) presented immediate challenges, particularly the difficulty of communicating with the fishers. Therefore, in April 2002, the SFMU subcontracted a company named SAB&T to provide extension services in the Eastern Cape. However, the four extension officers also had no or very little experience with subsistence fisheries, and did not possess skills for the implementation of a co-management process. Moreover, they did not receive training and mentorship from the SFMU. Instead they were required to deliver on their contract's Terms of Reference. Using the SFTG report as a baseline, the four extension officers were tasked with (i) the identification of all the fishing communities along the coast, (ii) the demarcation of their fishing boundaries, (iii) the registration of all the fishers within each community in a database in order to issue them with exemption permits, (iv) establishing 'local subsistence co-management committees' (LSCCs), and (v) initiating a community-catch-monitoring programme within each fishing area (Kariem and Lunake, 2004; see below). The extension service contract ended in March 2004, but was renewed during 2005 for a further two years[6]. Meanwhile, the SFMU also began to extend its

[6] The contract was awarded to 'Sustainable Coastal Development' (SCD), based in Port Elizabeth. The company was comprised of the four extension officers who had previously worked for SAB&T. The extension team

permanent staff base in the Eastern Cape. However, only five extra members were employed who needed to cover a vast area and a large number of communities. The SFMU employed so-called 'environmental officers' who would assist the extension officers with their duties and issue the exemption permits in each community. These personnel were expected to take over all of the duties of the extension service company, but also had no prior experience to undertake the tasks at hand. By December 2008, when the extension officer's contract had expired, one environmental officer was based in Port Elizabeth, two in East London and two officers in Port St. Johns (Figure 5.1).

Secondly, from the start, it was evident that the small team had a very large task ahead that would limit its effectiveness. The SFMU team of extension officers and subsequently the environmental officers needed to cover more than 800 km of coastline, including the 300 km long Transkei coast that was difficult to access [7] with many dispersed, traditional subsistence communities. In contrast, in KwaZulu-Natal, the well capacitated local institutional structure only needed to cover a restricted geographical area with good road access. The vast geographical expanse of the Eastern Cape, and the small number of staff members, imposed significant stress on the extension and environmental officers who were on a very strict timetable of continual meetings with the dozens of communities identified. In an attempt to cope with the large task, the four extension officers divided themselves into two separate teams: one would serve the Transkei coast where the large majority of the subsistence communities had been identified by the SFTG. The other would attend the remainder of the coast, which consisted of mainly urban area (cities, holiday villages, and private farm land).

Thirdly, although the fisheries authority also had approximately twenty Marine Inspection Officers in the Eastern Cape under the Chief Directorate 'Monitoring, Control and Surveillance', limited support was given by these officers to the roll out of the subsistence fisheries programme. The Officers were distributed along the coast, with their main offices in Port Elizabeth, East London and Port St. Johns. Their duties were to enforce compliance with the commercial, the recreational and the newly imposed subsistence fishing regulations. While they were expected to support the roll out of the subsistence programme, this often generated conflict as they were often not informed of the permit allocations, and had not been properly integrated into the programme's objective of achieving co-management. Moreover, they also had tense relationships with the fishers of whom many had incurred fines (Bacela, 2004), which raised the question whether it was appropriate to use them,

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divided into two smaller teams of two officers each. In addition, a general secretary was tasked with data capturing and accounting.

[7] Except for Coffee Bay and Port St. Johns (see Chapter 4; Figure 4.1) which can be accessed by tar roads, all other coastal communities can only be reached by gravel roads or jeep tracks. In addition, neighbouring coastal communities are often separated by rivers which can only be crossed further inland.

given their traditional 'policeman' role. Communication and collaboration between different directorates at MCM was also generally regarded as poor, and thus the Compliance/Control sub-directorate did not often meet and strategise with the SFMU, even though they were the first to detect resources use problems on the ground. In contrast, in KwaZulu-Natal, the provincial nature conservation department was implementing the programme and had developed a specific unit within their department to deal with subsistence fishers that also worked closely with the enforcement and research arms within this department.

Finally, and perhaps most crucially, a SFTG-recommended multi-stakeholder 'Advisory Group' was never established, which could have assessed progress of the subsistence fisheries programme at regular intervals, and identified solutions to the problems encountered. This structure could have also provided the necessary mentorship the SFMU and its team of extension officers. Instead, the only guidance that the team had, was a set of co-management guidelines specific to the South African context developed in 2005 (Hauck and Sowman, 2005). Manuals had been widely distributed among stakeholders such as MCM, and the Eastern Cape extension officers had stated that these guidelines would be followed to set up the LSCCs (S. Kariem, Sustainable Coastal Development, pers. comm.). However, they never received any formal training or guidance on how to establish a co-management process.

In summary, a group of young, newly employed, and inexperienced fishery managers were given the most challenging task ever in MCM – with no mentorship, or a performance feedback loop. In addition to the above constraints, the decision to issue individual fishing permits imposed a massive logistical and organisational burden on the already stretched SFMU and contract staff. They were effectively locked into a fixed formula and structure that was inadequate for the task.

5.3.3. Fishing 'communities' and exemption permits

Although subsistence fishers had been recognised as a legitimate sector in the MLRA, the commercially orientated rights model did not envisage the complexities of dealing with individual rural fishers in remote traditional communities. This section therefore analyses the management implications and the appropriateness of the adopted individual rights model for the Eastern Cape's small-scale fishers. Evidence will be provided suggesting that issuing every single fisher with a subsistence exemption[8] permit for a single species was an inappropriate and overambitious goal -

[8] The fishers were 'exempted' from certain clauses of the MLRA (see below). Exemptions were seen as an interim arrangement until the identification of fishers was finalised with credible lists (H. Kleinschmidt, Feike, pers. comm.)

given the traditional open access use by community members, the logistical difficulty of reaching every fisher, and the livelihood strategy of harvesting a basket of different resources.

The SFTG had translated the MLRA objectives into a subsistence fisheries programme, which provided guidance to MCM on how to approach the subsistence fishery. Although a co-management approach and possible community rights[9] were recommended by the SFTG, the strict legal requirement for individual permits in MLRA meant that the traditional, open access fishing for a basket of resources was not accommodated in the adopted management approach, and MCM proceeded with an attempt to regulate fishing effort by imposing catch restrictions for single species on permitted individual fishers - as it did in the commercial fisheries. Although traditional open access fishing for a basket of resources continued as usual, MCM's persistence with its flawed process of issuing single species exemption permits was to ultimately sour any goodwill that had existed between MCM and the fishing communities, and resulted in the attempt at formalising the subsistence fishery lacking legitimacy in the eyes of the fishers.

Identifying 'communities'

A first step for the MCM extension officers was the need to identify and delineate fishing communities, as individual fishers needed to be issued with permits. However this was a vast task that would take up all the time of the extension officers, leaving no room for other important implementation measures. This undertaking was enormous given the geographical extent of the Eastern Cape, and the difficulty in defining adequate criteria to delineate a 'community'. Within the urban areas, the fishers were dispersed as they lived in different suburbs or informal settlements, but they fished at the same locations. In the rural areas, communities were traditional in character, and villagers answered to a Chief and a Headman. A comprehensive identification of communities along the Eastern Cape coast had commenced with the research undertaken as part of the SFTG process. Within the Eastern Cape, the SFTG research team identified 59 'communities' where subsistence fishers had been recorded (Clark *et al.*, 2002). The extension officers began with the SFTG baseline data on community location, and by 2004, had refined the 'communities' down to 39 'fisheries'[10], of which 7 were located in urban areas, and 32 in rural areas along the coast (Kariem and

[9] Although the SFTG had recommended that a community right could be allocated in cases where local structures had the capacity to manage individual fishers and marine resources, no such structures existed in the Eastern Cape.

[10] The terms 'subsistence community' or 'subsistence fishery' have been used interchangeably by MCM as no criteria had been used to define a 'community'. The identification of the 'communities' required continuous refinement, however, local structures needed to be established rapidly in order to identify fishers and allocate permits.

Lunake, 2004). However, the identification of 'communities' or 'fisheries' had not been based on a set of rigid criteria, and no data existed defining the traditional fishing boundaries for particular communities. As such, the extension officers first delineated the 'fisheries' using anecdotal data from interviews with villagers, traditional boundaries, or natural boundaries such as rivers and estuaries. 'Communities' were defined as either a combination of villages that fell under the same chieftaincy, individual villages, or simply referred to fishers who originated from independent villages but who fished in the same fishing area. By 2008, the number of recognised 'fisheries' had increased to 51 (Figure 5.1; see also Chapters 3 and 4). The increased number of 'fisheries' included areas previously not surveyed, or 'fisheries' that had been divided into smaller units to better reflect the villages, traditional communities, socio-political characteristics or natural boundaries (P. Lunake, Sustainable Coastal Development, pers. comm.; Figure 5.1). Although the identification of communities was a useful foundation with which to work, many villages containing small-scale fishers had by 2008 not yet been reached. For example, many small-scale fishers operate along the coast directly north of the Dwesa-Cwebe Nature Reserve and MPA, yet fishers in this area have not been issued with permits (Bulungula management personnel, pers. comm.; Figure 5.1). In addition many small-scale fishers operate within the urban areas of the Eastern Cape, and while they are not necessarily "traditional fishers", they do employ small-scale fishing as a livelihood strategy. While efforts were made to reach these fishers, they were often so dispersed that it has made the task of identifying them extremely difficult. Nevertheless, after having identified a large majority of 'communities', the extension officers still needed to identify each individual fisher.

Identifying individual fishers, allocation criteria, and the issuing of permits

This was the second step to be undertaken by the extension officers. In each 'community' or 'fishery' a register of fishers needed to be compiled, and permits issued annually - as required by the MLRA. However, this was an even more overwhelming task for the small team of extension officers, and was realistically unachievable. Even though the number of permits issued to Eastern Cape fishers has steadily increased since 2001 (Table 5.1), rising to over 6800 individual exemption permits in 2007, many small-scale fishers had not yet obtained rights to harvest the marine resources that formed a part of their livelihood strategies. Meetings were held in each community and lists were made of all the fishers who attended. An 'internal' screening and validation by the community members present at these meetings was intended for. However; in reality, given their livelihood strategies that did not necessitate the harvesting of marine resources at all times, many community members did not attend these meetings, and as a consequence were not registered on MCM's database (This is further discussed in section 5.3.4). In addition, inevitably local politics crept in and some village members got their name on the list while others did not. Permits also needed to be renewed

annually, which was a huge logistical exercise to be undertaken by the relatively small team of extension and MCM environmental officers. As a result, permit delivery was erratic and often delayed by several months (refer to Chapter 4). Interviews with MCM personnel during 2008 indicated that, in their opinion, the distribution of permits has become the main stumbling block for a successful implementation of the SFTG recommendations in the Eastern Cape. Many fishers who had successfully registered on MCM's database did not obtain a permit. More importantly, many *bona fide* fishers did not obtain exemption permits as they did not meet the criteria set out by MCM. Applicants needed to be in possession of an ID document or birth certificate - which excluded a large percentage of rural villagers, and be at least 18 years of age - which excluded the many children who fished as part of the household livelihood strategies. Research undertaken for the studies presented in Chapters 3 and 4 indicated that up to 54 % of small-scale fishers did not possess an exemption permit as they did not have ID documents or were below 18 years of age. This clearly demonstrated the mismatch between livelihood practices and the imposed individual rights model. As was highlighted in the previous two chapters, it was the imposition of inappropriate allocation criteria that resulted in the permit allocation process lacking legitimacy.

Nevertheless, the issuing of exemption permits in the areas that had been identified by the extension officers, received substantial media attention with the Deputy Minister of Environmental Affairs and Tourism, who officially opened the fisheries on more than one occasion. This sent clear signals among the fishers, researchers, NGOs and civil society in general that government was serious in its political intent to extend access to historically marginalised fishers. Unfortunately, the MCM organisation seemed incapable of recognising the shortcomings of its fishery management approach and implementation process, and it can be argued that the issuing of individual fishing permits in terms of the MLRA has not improved the lives of fishers in traditional communities. On the contrary, it has a resulted in a loss of faith in MCM as an agency that can facilitate implementation of livelihood projects based on the use of marine resource.

Table 5.1. Number of exemptions issued to the registered fishers in the Eastern Cape

Year/ period	Spiny lobster (see Chapter 4)[11]	Abalone (see Chapter 3)	Mussel (incl. selected rocky shore organisms)	Line-fish (incl. bait organisms)	Oyster	Bait organisms
2001/2-2003/4	496	137 & 115	594	-	570	No data
2004	No exemptions due to the intend to publish policy and issue longer-term rights					
2005	1848	-	690	1633	267	56 (for Swartkops)
2006	1858	-	690	1633	267	56 (for Swartkops)
2007	2325	-	1194	1911	1209	647
2008	2423	-	1484	1884	1014	Included in line-fish permit No data for Swartkops

Data originate from MCM, and does not necessarily reflect the number of exemption permits physically issued to the fishers. Numbers most probably reflect the number of permits printed (see also Chapter 4).

Permit restrictions

Input and output restrictions were imposed based on the SFTG recommendations and the national recreational fishing regulations, but permit restrictions did not reflect the livelihood strategy of the fishers. Fishers traditionally harvested a basket of different resources depending on resource availability and market demand. Instead, following the resource-use categories outlined in the SFTG report, MCM went about issuing individual permits to the registered fishers for different resources and resource groups. In many cases permits were issued only for certain species or species groups, but not for all the species that were harvested in a particular area - and fishers could only hold one class of exemption permit at a time.

From the outset, specific regulations[12] were imposed, and fishers were categorised depending on the resource or resource group that they had indicated they harvested on MCM's database. Individual

[11] Research undertaken by Fielding *et al.*, (1994) found very low spiny lobster (*P. homarus rubellus*) densities south of the Mbashe River (Figure 4.1) and no evidence of an active lobster fishery in the southern parts of the Transkei. However, in 2005, exemptions to undertake subsistence fishing of lobster were allocated to residents of the Cebe and Gqungqe communities (see Chapter 3), causing much confusion among the fishers. More importantly, these mismatches clearly illustrated the lack of capacity within the SFMU and its extension officers to spend sufficient time in the communities and with fishers, in order to record the marine resource harvesting practices at each specific local level.

[12] All exemptions restricted gear to be low-technology such as small flat-bladed tools, fishing rods with no more than 10 hooks, and basic diving gear but no use of SCUBA. Exemption conditions also indicated the fishing boundaries within which each permit holder could operate. Regulations of the subsistence permits differed to those of the recreational permits in that the catch could be sold either locally or to MCM approved buyers (refer to Chapters 3 and 4).

'exemptions to undertake subsistence fishing' were first issued in Hamburg in April 2001 for abalone (see Chapter 3). Exemptions were subsequently issued in the same year in other communities to undertake subsistence fishing of 'oysters' (*S. margaritacea*), 'brown mussel' (*P. perna*), 'intertidal bait organisms', and 'lobster' (Table 5.1). The oyster exemptions allowed the fisher to collect a maximum of 25 oysters per day (no size restrictions), the mussel exemptions allowed the fisher to collect 30 mussels per day (no size restrictions), the lobster exemptions allowed the fisher to harvest 8 lobster per day (see Chapter 4), and the line-fish exemptions, which were first issued in 2005, allowed the fisher a wide variety of fish species and bait organisms[13] (shore-based fishing only; maximum 2 rods; cumulative maximum of 10 fish per day). Specific exemptions were developed for bait diggers in the Swartkops estuary (Figure 5.1). However, small-scale fishers, particularly women, harvest a basket of intertidal resources including species of limpets, whelks, red bait and so forth. Yet, if these women wanted to harvest these resources legally, they needed to obtain a recreational fishing license (refer to Chapter 3). MCM attempted to remedy this mismatch by allowing successful applicants to hold two different exemption permits from 2007 onwards (for example, a lobster and line-fish exemption; pers. obs. in Coffee Bay).

[13] This included 30 mussels and 25 oysters which could not be sold.

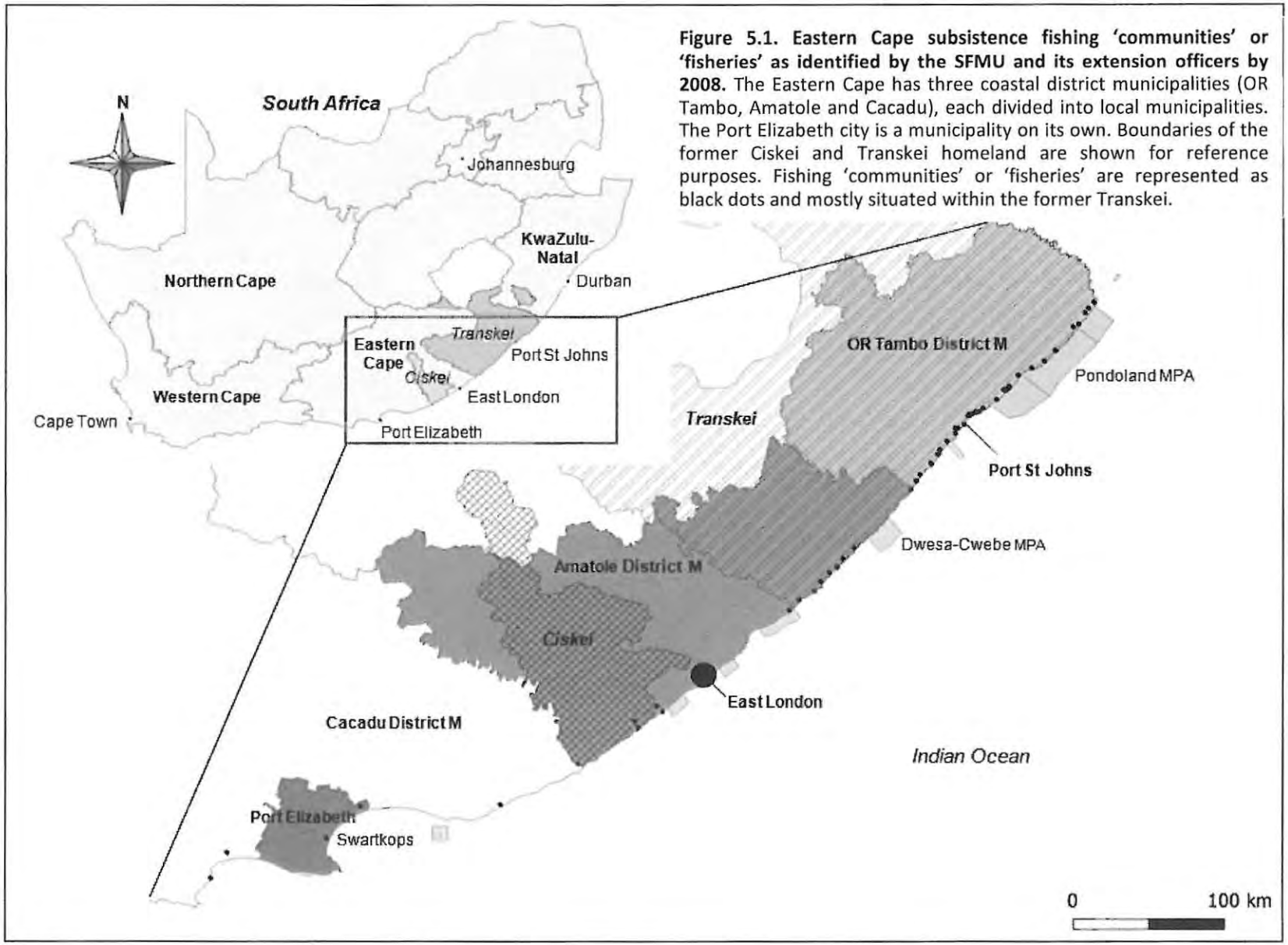

Figure 5.1. Eastern Cape subsistence fishing 'communities' or 'fisheries' as identified by the SFMU and its extension officers by 2008. The Eastern Cape has three coastal district municipalities (OR Tambo, Amatole and Cacadu), each divided into local municipalities. The Port Elizabeth city is a municipality on its own. Boundaries of the former Ciskei and Transkei homeland are shown for reference purposes. Fishing 'communities' or 'fisheries' are represented as black dots and mostly situated within the former Transkei.

5.3.4. Towards participation in management at the local level

Following the SFTG co-management recommendations, effective governance of the Eastern Cape subsistence fisheries required structures that facilitated the participation the fishers in the management process. This section analyses how MCM attempted to formalise such structures through the subsistence fisheries programme. Evidence is presented that MCM did not embrace or properly comprehend the concept of co-management, and did not allocate sufficient resources to establish the required structures and arrangements.

Establishing local subsistence committees

The SFTG report had also recommended that local structures be established that could assist in the identification of the fishers, and the daily management of the fisheries. These structures would function as co-management committees. However, by 2008 the SFMU and its extension officers had only formalised fishers' committees, and not co-management structures, as they did not have enough personnel to attend to all the committees, and had not capacitated the local fishers to assist in decision-making processes. Since the majority of the small-scale fishing communities had never heard of or seen any MCM personnel, and small-scale fishers in the Eastern Cape have traditionally not organised themselves as committees, the extension officers often had to make first contact through the traditional authorities, local councillors, nature conservation officials, or by walking along the coast and engaging with the fishers (Kariem and Lunake, 2004). Meetings were called hastily in each area and the process was started with the election of individuals who could represent the fishers of a particular area on a 'local subsistence committee' (LSC). At first LSCs often represented a cluster of villages in the area (who did or did not belong to the same traditional authority), however, the goals of the extension officers were to use these LSCs as a platform to refine further the 'communities' and their fishing boundaries. The LSCs were tasked with assisting the extension officers in compiling and verifying the lists of fishers who could potentially qualify for an exemption permit. This included fishers' ID document numbers and the type of resources that they harvested. LSCs received basic training in (i) the development of a constitution, (ii) the MLRA and its implications for subsistence fishers, and (iii) the tasks of the LSC that, in essence, were to provide a platform for MCM to engage with the fishers (and to facilitate meetings). LCSs were also given an MCS function and needed to report any infringements of the regulations to MCM.

The establishment of LSCs along the coast was aimed at providing a platform that would "iron out" some of the issues mentioned in 5.3.3 (S. Sibiya, MCM SFMU, pers. comm.) and facilitate the process of allocating permits. However, the fisheries authority needed to attend to 51 'communities' with

only 4 to 5 staff members divided up into two teams. Given the difficulty of accessing many 'communities', this meant that contact with a particular community and its LSC was restricted to less than once a month (P. Lunake, SCD, pers. comm.). As a result, in many cases, LSCs have not been formally established (Kariem and Lunake, 2004). In other cases where they were established and had drafted a constitution, the LSCs received such limited training on how to operate successfully, that they could not be considered as being operational. In other cases, the LSCs were not regarded as democratic and representative of the wider fisher community. Moreover, elected members were not remunerated and could not see the need of an LSC since permit delivery was so inconsistent. Given that many community members who were considered to be *bona fide* fishers in the community did not receive permits, and given that most often permit restrictions did not match the livelihood strategies of the fishers, very little compliance was observed by the fishers to the imposed regulations. As a result, the LSCs that were anticipated to provide an MCS function, would not report any infringements of the regulations to MCM. To conclude, even though MCM had acknowledged it could not establish co-management in each and every community, the shortcomings as described above greatly hampered any attempt to initiate a co-management process where LSC's were established. Instead the outcomes of this piecemeal approach were a lack of community buy-in, and a loss of credibility by MCM in terms of its stated commitment to establishing co-management.

The community-catch-monitoring programme

In any implementation of a new resource management programme in a rural community, feedback on its performance is essential to evaluating its effectiveness, and adapting management responses to ensure that its goals are being met. This was recognized by the SFTG and MCM consequently put in place an extensive community catch-monitoring programme. The goals of the community-catch-monitoring programme as set up by the extension officers were two-fold: to obtain local resource-use data and indicators of resource status, and to verify the extent of permit possession and compliance amongst observed fishers. The existing catch restrictions were based on research findings at national level, and thus did not necessarily reflect the resource status trends within the 'communities' or 'fisheries'. Resource status and use data at a higher resolution were required to assess the sustainability of the subsistence fishing activities.

This programme represented a substantial financial and logistical commitment by MCM as many 'fisheries' had been identified and required monitors. Implementation of the catch monitoring programme was delegated to the extension officers in collaboration with the SFMU environmental officers in 2006. Through the LSCs, the local fishers were required to put forward a list of local

villagers who had attained the highest school grade[14] levels, from whom monitors who could be selected and trained. There was enthusiasm for the process on the part of the communities, as it provided a rare opportunity for paid employment in the local area. Successful candidates received basic training and were equipped with fish identification booklets, catch data recording sheets, measuring rulers and callipers, identity cards, and identifiable vests and rain suits. In 2006, 100 community-catch-monitors were employed, of whom 72 were based in the Transkei (P. Lunake, SCD, pers. comm.; Figure 5.1). On average, two monitors were deployed in each 'fishery' to work four days a week, several hours before and after low tide (P. Lunake, SCD, pers. comm.). Datasheets were collected by extension or environmental officers. Aside from recording the characteristics of each fisher's catch, the monitors were tasked with educating the fishers about the catch restrictions imposed in the exemption permit conditions, which had been stated only in English. In addition, they were equipped with 'Daily Harvest Registration Forms' that needed to be signed by the fishers. This was a tool that would be used to verify the fishers' database. Monitors were provided with charts that stipulated their monthly working schedules, and the fisher's exemption conditions stipulated that: "fishing activities shall be restricted to the days in which community resource-use monitors operate, as indicated by the calendar issued..." (DEAT, 2008).

The community-catch-monitoring programme was initiated in 2006, but at the time of writing was not functioning properly[15], due to the management failure in an organisational sense by the SFMU. The extension officers did not provide adequate training and follow up. As a result, monitors did not know how to identify different line-fish species, and often did not understand the units of measurement to be used. A further complication was that they often felt intimidated by recreational fishers, who are predominantly white holiday makers, and thus did not monitor the catches of these fishers. Due to the limited capacity of the MCM environmental officers, the extension officers, and the LSCs not being able to supervise the monitors, it became evident during datasheet analysis that monitors often did not patrol the coast in order to measure the fisher's catches. Instead, they would randomly fill in datasheets for several consecutive days at a time (Mollat, 2007). As such, many of the data are worthless for estimating fishing effort and determining resource trends. Datasheets have been forwarded by the SFMU to the research division within MCM, but to date, no effort has been made to capture the backlog or analyse the data (S. Sibiya, MCM, pers. comm.). The lack of

[14] Many rural children do not finish the entire school curriculum.

[15] Efforts were made during 2006 and 2007 to synchronise the efforts of the independent Coffee Bay community-catch-monitor programme funded by WWF as part of the Mussel Rehabilitation Programme (see Chapter 4) and the two newly employed MCM monitors. However, these efforts were not successful resulting in a situation where numerous monitors operated along the coast simultaneously.

collaboration within the research division at MCM, or any other institution for that matter, to capture the data and analyse has in effect defeated the purpose of the costly community-catch-monitoring programme in providing feedback to management decision-making.

The SFTG had viewed the community-catch-monitoring programme as an essential mechanism to create greater participation by rural communities in resource management. Local villagers would, as monitors, provide essential input to the further refinement of catch restrictions that would better reflect resource status and harvesting trends in the local community. The fact that the community-catch-monitoring programme has not been established appropriately is a major shortcoming in the roll out of the SFTG recommendations.

The failure here can be ascribed to nothing other than management incompetence within MCM as the process was properly funded, supported enthusiastically by the community, as well as university-based researchers active in the Transkei subsistence fishery.

No co-management

Co-management had been recommended by the SFTG as the preferred approach to managing subsistence fisheries, and MCM had endorsed this with its stated intention of establishing local co-management structures. However co-management was not achieved. This section assesses why this goal was not realised.

The SFTG had recommended that a co-management process be developed between MCM and the fishers (SFTG, 2000). MCM anticipated eventually transforming the LSCs into 'local subsistence co-management committees' (LSCCs) comprising the fisher representatives, the community-catch monitors, and MCM personnel (SFMU staff and Fishery Inspection Officers), who would jointly implement their local management plan[16] (DEAT, 2006d). Yet, by 2006, there was still not enough MCM capacity on the ground to achieve this. Simply put, there was insufficient manpower to service the communities in terms of both management representation on the LSCCs and the input required to capacitate them to become a meaningful part of the decision-making process. Moreover, fishery inspection officers were often not a part of the implementation process, and since they were not informed of exemption permit delivery delays, these officers were still fining and arresting fishers for not adhering to the regulations. In addition, extension officers had assumed that the LSCs had gained the skills to operate without much input, and perform their MCS duties, however, this was not

[16] Several fishery management plans had been developed by Fielding (2005b;2005c;2005d) which would serve as blueprint plans for the development of local management plans by each community. The management plans had been recommended by the SFTG.

achieved. Finally, the community-catch-monitoring had not yet been analysed and the results fed back into local level decision-making.

Although meaningful participation, conflict resolution and empowerment were all prerequisites to achieve a co-management situation (Hauck and Sowman, 2001; Napier *et al.*, 2005), and had been recognised by the SFTG and MCM in the subsistence fisheries programme, these elements were in reality only addressed in the most rudimentary manner through the LSCs. Essentially, MCM's management focus remained on permit allocation and effort control. In those areas where LSCs were established, they merely became vehicles for initiating meetings when permits needed to be delivered. LSCs and fishers were not provided with the opportunity to make suggestions and changes into the input and output regulations and management model imposed upon them[17]. The SFMU staff was too stretched to be able to attend to the LSCs in an adequate manner. Consequently, very little buy-in from the community members was achieved, there was effectively no compliance with any of the imposed management regulations, and the communities continued with their tradition of open access fishing. Apart from token fines and compliance actions, MCS staff largely turned a blind eye to non-permitted fishing as enforcement actions provoked increasingly hostile reactions from communities, and further soured relationships with MCM representatives.

Aside from the need to establish co-management at the local level between fishers and the fisheries authority, the SFTG had also recommended a multi-tiered institutional management structure including links with local management authorities and provincial agencies (Harris *et al.*, 2002; SFTG, 2000). This was in line with South Africa's developmental policies that gear up local and provincial government agencies with the tools to implement projects. Linkages with local agencies such as local municipalities who are mandated to promote development have, to date, however not yet been made. This is despite the potential for supplementary livelihood projects, or projects that could enhance the benefits from harvesting marine resources (see below), and despite the MLRA's goal of promoting socio-economic benefits for local communities. In reality, the organisational culture within MCM was opposed to cooperative governance, which was urgently required in the management of small-scale fisheries. During the course of 2006, efforts were made to establish a 'provincial steering committee for subsistence fisheries' within the Eastern Cape, which included representatives from various provincial departments of nature conservation, tourism and agriculture (Raemaekers and Godfrey, 2005). The proposal was well received by the various tiers of government; an inception meeting was held, but the initiative rapidly fell apart as the various stakeholders could not commit

[17] Only in the Swartkops community and in Coffee Bay have fishers been able to change catch and gear restrictions, albeit with support from outside agencies (G. Calvo-Ugarteburu, Coffee Bay Mussel Rehabilitation Project, pers. comm.; P. Fielding, Fieldwork, pers. comm.).

sufficient 'will' to the process. MCM had also shown reluctance to work with other government departments and had a history of missed meetings and not honouring commitments with provincial counterparts.

In summary, MCM lacked the institutional culture and personnel skills to initiate a co-management process with the fishers, and establish linkages with other national, provincial, and especially local government agencies. The lack of personnel and the vast task of identifying fishers and allocating permits had left no time to develop a co-management process. Moreover, the narrow 'terms of reference' for the extension officers had made their task mechanical, with no room for the initial experiences and challenges encountered to be evaluated and fed back into the implementation framework. The extension officers' tasks also did not cover aspects such as local development, and the facilitation of other livelihood enhancement projects. MCM efforts were merely centred on the process and the structures required issuing individual permits.

In conclusion, after 8 years of implementing the subsistence fisheries programme, MCM had, in face of serious problems encountered along the way, not achieved effective participation by the small-scale fishers in the management process, or the provision of a livelihood enhancement package, in collaboration with local mandated development agencies. More disturbingly, there was no acknowledgement by MCM that the subsistence fishery programme had failed in almost all aspects, and officials persisted with the annual exercise of issuing permits to the fishers they had identified, with slightly revised conditions. Fishers on their side were left with unmet expectations, questioned the legitimacy of the imposed management framework, and above all, were not empowered to raise their concerns and voices. An opportunity to do so did however arise in 2007, as a result of developments in the Western Cape Province where small-scale fishers took MCM to the equality court, which effectively ruled that MCM's management of small-scale fishers was unfair and that their policy should be redrafted.

5.3.5. Towards participation in policy-making

Drafting policy content and consulting fishers

While MCM had initiated the subsistence fishery programme with *de facto* policy in the form of the SFTG recommendations, and effectively allocated rights in the form of exemption permits, the department wished to formalise the arrangements in the form of a gazetted policy that provided for longer-term subsistence and small-scale commercial rights. Exemptions permits were seen as an interim arrangement, that once lists of *bona fide* fishers were finalized, could be issued as rights. A policy development process was initiated in 2004, which at the time of writing five years later

(January 2009) had not been finalised, largely due to MCM's seeming inability to assess and incorporate stakeholder needs into an equitable and workable small-scale fishing policy and management framework. In this section, the policy development process is reviewed, with an emphasis on the extent of participation by small-scale fishers, and MCM's responses to stakeholder inputs. The policy process is used to highlight the serious management failure within the MCM organisation, and the increasingly militant response of small-scale fishers from the Western Cape who turned to political and legal channels to seek redress.

In 2004, no exemption permits were issued in the Eastern Cape since MCM planned to release a sector-specific policy and allocate rights. This was not achieved because the feedback from the public participation process required extensive redrafting; and as a result MCM again issued "exemption permits" in 2005. The fisheries authority was committed to engagement with relevant stakeholders in a public participation process - much like that used for the development of the MLRA and the allocation of commercial rights. MCM has always honoured its obligation to consult with the public before gazetting new policies; however, gathering effective inputs from fishers in traditional rural communities presented a challenge due their dispersed nature, lack of communication media and low literacy level.

In the Eastern Cape, a first attempt at soliciting policy inputs from the province's small-scale fishers' representatives was made in October 2004, with a two-day workshop held in East London and organised by MCM (MCM, 2004; Table 5.2). This was only the second time senior MCM managers met small-scale fishers from the Eastern Cape in a consultative environment[18]. During the first day of the workshop, a draft policy was presented to Eastern Cape academic researchers and provincial department officials only. The proposed draft policy framework consolidated the model that MCM had been using since 2001: LSCs on the ground would take on the responsibility of identifying fishers, distributing permits and ensuring compliance with the regulations. The applications would be verified by MCM using the proposed monitors; individual rights would be issued to people who met the criteria; MCM would impose the input and output controls and regulate the buyers; and MCM Fishery Control Officers would arrest people for not complying with the regulations. This confirmed MCM's primary focus on allocating rights and controlling fishing effort. The co-management "buzz-word" was used by MCM in its reference to the arrangement where LSCs would identify the fishers, distribute the permits and report non-compliance to MCM. As such it was clear that MCM did not have an understanding of co-management as a process that would help jointly define institutional arrangements and management models.

[18] In 2002, a two-day workshop had been held, also in East London, which aimed to solicit inputs from fishers on permit regulations.

MCM's draft policy and the response of their representatives indicated that subsistence fishery management was still regarded as largely a rights allocation and compliance function, even though serious problems with the roll out of the subsistence fishing rights allocation had been encountered between 2000 and 2004. MCM representatives argued that these were the inherent 'trials and tribulations' of implementing a new programme, and did not question the management model itself, despite the common knowledge that at least an equal number of non-permitted fishers operated quite openly, and that the individual permit system did not appear to be working. Shortcomings in MCM's subsistence fisheries management model were highlighted by several delegates who recommended that MCM should include within the draft policies concepts such as the development of alternative livelihoods and the need for co-management in partnership with other agencies. Moreover, they expressed concerns that the model that was proposed made too many assumptions about the fisher's capacities to manage marine resources as envisaged by MCM, and did not create an opportunity for meaningful participation and empowerment of fishing communities. Following these debates, MCM managers committed to revise the draft policy to accommodate concerns raised at the workshop (MCM, 2004).

During the second day of the workshop, a substantial attempt was made to facilitate participation of representatives from fishing communities, who mainly originated from the Transkei region, as well as selected representatives from the business sector who were interested in purchasing the catch from the permitted fishers (see Chapters 3 and 4). Both business people and fisher representatives were given the opportunity to express their concerns or grievances about the current management model, and make recommendations. Interestingly, the suggestions received from the fishers indicated that MCM's interventions, which had been initiated only four years prior, had contributed to a change in mindsets among the traditional fishers regarding marine resource use (see Chapter 3). Conspicuously, there was no talk about 'subsistence fishing', only a desire to become 'small-scale commercial' fishers. The fishers' grievances focussed on the erratic delivery of the permits, and suggestions to increase the bag limits imposed in the permit conditions. They also requested that MCM provide them with financial assistance to purchase boats, and supply diving gear and diver training (MCM, 2004). This was an interesting indication that the interventions from the fisheries authority had failed to create or unlock the right incentives for resource preservation and sustainable use. Fishers living in poverty are inevitably drawn to developmental interventions that could increase their direct economic return. However, imposed limited access in combination with outside divers allowed to fish on behalf of the small-scale fishers (see Chapter 3) had given the precedence to this kind of request. Fishers felt that they did not need to be regulated by the fisheries authority, but rather they were of the opinion that the new democratic government had a mandate to alleviate

poverty. The fishers felt that not much progress had been made in achieving the MLRA goals of providing socio-economic benefits to impoverished coastal communities, and that the allocation of permits had thus far not met the fishers' expectations. While many had employed a subsistence livelihood strategy for generations, the larger scale commercial use of marine resources and MCM's individual permit allocation model was now viewed by the fisher representatives as "an avenue out of poverty". It had thus become apparent that a 'distortion' had crept into the process: while there were many small-scale fishers, with real needs on the ground, the commercial inputs into the policy process focussed on expectations for commercial rights, i.e. an opportunity for a significant cash income.

During 2005 and 2006, several revised draft policies were circulated, mainly by email, among academics, NGOs, and other stakeholders throughout the country with whom MCM had engaged at meetings and workshops. MCM's efforts to finalise the policy while consulting with a broad range of stakeholders appeared sincere, although a commitment to embrace a co-management approach had not been incorporated into the revised drafts. It was only in November 2006 that a draft policy was first gazetted (DEAT, 2006d; Table 5.2). It had taken a full two years to finalise these drafts, which reflected capacity shortages with MCM and its organisational structure. The draft consisted of two separate policies: a 'Draft Policy for the Allocation and Management of Medium-term Subsistence Fishing Rights' and a 'Draft Policy for the Allocation and Management of Medium-term Small-scale Commercial Fishing Rights'. This was also in accordance with the SFTG recommendations. The policies were published in English, Afrikaans, isiXhosa and isiZulu, which were the four main languages spoken by inhabitants of South Africa's coastal communities. Written comments needed to be submitted by 12 March 2007[19]. In addition, road shows were held along the coast, with the aim to "consult with the general public" (DEAT, 2006d).

In the Eastern Cape, the road shows were planned during January and February 2007 in the 'communities' identified by the SFMU personnel. Since the majority of these communities were situated in the remote rural parts of the province, they had not been able to access the drafts gazetted in November the previous year. The road shows therefore represented a substantive effort by MCM to consult with the fishers, however, in reality, very little meaningful consultation occurred in the communities due to logistical constraints. In the course of two months, MCM extension and environmental officers were required to visit more than 50 communities in the Eastern Cape, and solicit comments from fishers. Visits were of necessity short, lasting no more than 3 to 4 hours, and

[19] At first, the deadline for comments was 18 December 2007, but due to pressure from NGOs and fishers' organisations this deadline was extended.

were often delayed for several days, as MCM personnel were soon behind their strict schedule. New appointments were often announced at short notice, resulting in poor attendance by community members. In effect, the road shows had merely served to distribute the drafts and brief any attendants of their content. Very little meaningful input was obtained, due to the hasty process and insufficient MCM personnel, and the assumptions made by MCM about the education and literacy levels of the fishers.

Despite the constraints in obtaining inputs from the rural communities, by the end of March 2007, the SFMU within MCM had received more than 450 written submissions in the four languages from universities, independent research organisations, development and civil society organisations, individual fishers, government organisations, fishing companies and fishing associations (Jayiya, 2007). While it is beyond the scope of this chapter to detail the content of these inputs, the most comments[20] from universities and NGOs reflected the fact that previous comments and suggestions had largely not been incorporated. Even though several workshops had been organised and substantial input had been given by various stakeholders, MCM had not been able or willing to incorporate them into the policies. The content was very similar to the 2004 drafts with the focus remaining on individual rights allocation and controlling fishing effort. The management model proposed reflected a lack of understanding of the community needs and the requirements of co-management process. Interestingly, many of the 450 submissions and comments were not directly related to the policy content but ranged from descriptions of how difficult socio-economic situations were in the fishing communities, to requests for funds to be awarded by MCM to purchase boats and diving gear, and even applications for rights to commercial fisheries (Jayiya, 2007). Within the traditional communities of the Eastern Cape, comments received during road shows also largely reflected the aspirations from communities for MCM to develop their traditional livelihoods commercially (pers. obs.), echoing the comments documented at the MCM workshop held in East London in 2004. More substantive policy suggestions originated from academic institutions and NGOs, as individual fishers had not been empowered to participate more meaningfully in the policy-making process. MCM had consulted with the fishers with regards to the draft policies, but did not have the skills to find ways to truly engage with the small-scale fishers, and empower them to participate in the policy drafting process.

While little further response was forthcoming from the Eastern Cape small-scale fishers, those in the Western Cape, who can be characterised as more urban based, artisanal fishers, become more

[20] Rhodes University in collaboration with Walter Sisulu University provided extensive comments on the two draft policies in Raemaekers *et al.* (2007a).

organised and would not accept their exclusion from access to traditional resources. Though NGO's such as Masifundise Development Trust, petitions and protests were made at a political level, and a court challenge launched through the Equality Court against the effective exclusion of small-scale fishers from the commercial rights allocations. These developments forced MCM to once again revise their policies for managing the small-scale fisheries, including those in the Eastern Cape.

The Equality Court Order

When it had become apparent that most small-scale fishers in the Western Cape had not qualified for quotas in the commercial rights allocation process[21] of 2000/1, aspirations turned to extreme frustration and disillusionment with MCM's ability to meet their needs. Small-scale fishers began to realise that their particular needs had not been catered for in the commercial rights allocation process, and that there was now no hope of being allocated rights to continue their traditional fishing practises as all TACs were fully allocated. Using strategies reminiscent of those used against the Apartheid government in the 1980s, the fishers formed organisations and networks in order to lobby for their traditional rights. Their actions included a series of large-scale public protests, media statements, policy analysis and a unique class action against the Minister of Environmental Affairs and Tourism. The class action was launched in 2004, facilitated by the NGO, Masifundise Development Trust (MDT), and the Legal Resources Centre, and used the legal space created by the Constitution and the Equality Act to litigate for the right to their traditional livelihoods (Isaacs, 2006). The case was known as *Kenneth George and Others vs. the Minister of Environmental Affairs and Tourism (10512/04*).

While the court case dragged on for several years, fishers in the Western Cape and Northern Cape Province had also become increasingly disillusioned with MCM's stalled subsistence and small-scale commercial fishing policy development process (described in the section above) that had been viewed as second chance to get their rights recognised, following their failure to obtain commercial rights. The release of the revised draft policies in 2007 triggered further actions as they did not cater for the needs of Western and Northern Cape small-scale fishers, nor did they give substance to the SFTG recommendation and stakeholder feedback provided to MCM in the consultation process. In contrast to the fishers from the rural areas of the Eastern Cape, who did not have the means or level of organisation to stage protests, a series of street demonstrations were organised in the Western

[21] The successes (and failures) of transformation within the commercial fishing industry have been extensively reviewed during its different stages (Branch and Clark, 2006; Isaacs, 2006; Kleinschmidt *et al.*, 2003; Nielsen and Hara, 2006; Sauer *et al.*, 2003). Given the long-term rights allocation criteria, fears have also been expressed that the rights allocation will merely become a consolidation of the existing failure to accommodate small-scale fishers (M. Isaacs, University of the Western Cape, pers. comm.).

Cape in 2007 to protest publicly against the draft policies, and mass defiance was staged by fishing openly without permits (Masifundise Development Trust, 2007).

Finally, on 2 May 2007, in a landmark decision, an Order of Court was signed by the Judge in the Equality Court in the High Court of South Africa that would bring change to small-scale fishers. The Order of Court followed an agreement between the Minister of Environmental Affairs and Tourism, and small-scale fishing communities along the west and south western coast of the country, who had "sought relief against unfair discrimination and inequitable access rights to marine resources for livelihoods purposes" using the Equality Act (High Court of South Africa, 2007; Republic of South Africa, 2000b; Table 5.2). The Order of Court stated that 'Interim Relief' permits be allocated to those fishers, and, that a "new policy and legislative process needed to be developed by all parties concerned that would include all traditional fishers in South Africa and accommodate the socio-economic rights of these fishers" (High Court of South Africa, 2007).

By this order, the judge effectively ruled that MCM's rights allocation process was fundamentally flawed as small-scale traditional fishers had effectively been excluded. The Order of Court by implication called into questioned the fundamental principles and definitions of the MLRA, as the Act had only recognised subsistence fishers as a distinct group, and not the larger continuum of small-scale fishers that existed in South Africa. These comprised the inhabitants of traditional, rural communities along the coast, and residents within the coastal urban areas, who employed low-technology fishing gear and labour-intensive harvesting practices, and relied on the harvest of marine resources as either their sole livelihood, or as a part of their multi-livelihood strategies. The Order of Court recognised that small-scale fishers in South Africa had a claim based on their traditional livelihoods, and special needs in terms of fisheries management and development, and thus could not be expected to compete with established firms for commercial fishing quotas. In line with international thinking on small-scale fishers (Béné *et al.*, 2007), and the FAO Code of Conduct for Responsible Fisheries (FAO, 1995), they required a legal dispensation which recognised and protected their traditional way of life.

While the Order of Court provided was unambiguous in its requirement for small-scale fishers to be recognised and catered for as a distinct fishing sector, the process on how to achieve this was without precedent. The Masifundise Development Trust and MCM were tasked with organising a process that would achieve the outcomes directed by the Order of the Court.

Empowering fishers to participate

In an innovative move, it was agreed in deliberations between MCM and MDT to form a joint task team to implement the Court Order requirements. This first led to the organisation of a two-day "National Subsistence/ Small-scale Fisheries Summit" held in November 2007 in Port Elizabeth, opened by the Minister of DEAT (Table 5.2). This was also the first time that MCM had referred to 'small-scale fishers' and the first time that a national summit was held with fisher representatives[22] from every coastal province. Moreover, this process also provided the first opportunity for Eastern Cape small-scale fishers to participate more meaningfully and get their voiced heard at a policy level.

Table 5.2. Towards participation in policy-making: Events related to the small-scale fisheries policy process since 2004.

Date	Event	Organiser/ Source
2002	East London Subsistence Fisheries Workshop (two day)	MCM
Oct 2004	East London Subsistence Fisheries Workshop (two day)	MCM
17 Nov 2006	Release of draft 'Policy for the allocation and management of medium-term subsistence fishing rights', and 'Policy for the allocation and management of medium-term small-scale commercial fishing rights'.	Government Gazette Notice 1679 of 2006
Nov 2006 - Feb 2007	Road shows along the coast for distribution of draft policies and briefing process	MCM
12 Mar 2007	Deadline for comments on draft policies	Government Gazette Notice 8 of 2007
Mar 2007	MCM receives more than 400 submissions, including from the Eastern Cape, and protests are held in Cape Town by Western and Northern Cape small-scale fishers	
May 2007	Order of Court to redraft policies and implement interim relief for disaffected fishers	High Court of South Africa, 2007
Nov 2007	National Summit with presence of Minister of DEAT	DEAT (MCM)
Feb 2008	Eastern Cape Masifundise Development Trust workshop (workshops were held in every province)	Masifundise Development Trust
Mar 2008	National Masifundise Development Trust workshop (culmination of the provincial workshops)	Masifundise Development Trust
Dec 07 – ongoing	Start of Task Team meetings	MCM

Only those events that included representation from Eastern Cape small-scale fishers are shown in the table.

This summit was seen as an opportunity for fishers to exercise their right to participate, and was aimed at discussing the components that a small-scale fisheries policy should include (Masifundise Development Trust, 2007). The summit was perceived by small-scale fishers as being a turning point, as it had succeeded in eliciting their suggestions for a policy and management framework that would govern small-scale fishers. Whereas previous inputs into policy and rights allocations by small-scale fishers had been motivated by hopes of becoming fully-fledged commercial enterprises, this

[22] In the Eastern Cape, fisher representatives were identified through the LSCs and monitors set up by the SFMU staff, and through the Coffee Bay Mussel Rehabilitation Programme.

engagement focussed more meaningfully on the needs, culture, and traditions of the identifiable communities of small-scale fishers. They had been able to participate meaningfully in the policy development process[23]. Firstly, the outcomes of the summit included a joint draft 'statement' by all fisher representatives outlining their vision for a small-scale fishery policy, including the principles on which it should stand. Secondly, the outcomes meant the formation of a 'National Task Team' consisting of elected fishers' representatives, academics, civil society organisations and MCM personnel. The 'statement' was subsequently refined through a series of provincial and national workshops organised by MDT and aimed at engaging fishers in debates surrounding small-scale fisheries governance.

Drafting policy content with participation from the fishers

The NTT met for the first time on 20 December 2007, and included three fisher representatives from the Eastern Cape. Between December 2007 and May 2008, five one-day and one five-day task team meetings have been held at the MCM headquarters in Cape Town. The role of the NTT is to translate the aspirations of the small-scale fishers, which have been articulated at the summit and through the statements, into a workable policy framework. However, the task team process has been fraught with difficulties. Since no platform existed for fishing communities to discuss pertinent and actual issues such as the exemption or interim relief permit delivery, meetings often consisted of fisher representatives expressing their grievances with the fisheries authority. Moreover, the lack of capacity within MCM slowed the process and created a great deal of frustration, as it appeared the MCM managers were unable to understand what was required of them. An independent facilitator who could direct the dialogues towards drafting policy content was required but has not yet been appointed. Many of the members also had no background in policy formulation, or skills to translate their aspirations into policy content. It therefore remains to be seen how this process where fishers and the fisheries authority are jointly drafting policy content, will unfold. Nevertheless, the formation of the NTT, and thus the participation in the small-scale fisheries policy drafting process, has to some extent contributed to instilling a sense of empowerment among the fisher representatives and their constituencies. While the fisheries authority was struggling to step out of its command and control position, the fishers on the other hand were in a position where they could have a significant say in their future.

[23] This was particularly valid for the fishers from the Western Cape and Northern Cape, as over the last several years, and especially in the months preceding the summit, the Masifundise Development Trust had spent a lot of effort in preparing and training the fishers to articulate their aspirations and suggestions for an improved small-scale fisheries policy and management framework. Nevertheless, once preliminary suggestions had been made by the Western Cape and Northern Cape fishers, fishers from the Eastern Cape were granted the confidence to articulate their visions (pers. obs.).

The transition of MCM from merely consulting with the small-scale fishers to actually having their representatives draft policy content and participate more meaningfully did bring out the expected grievances from the Eastern Cape fishers regarding the failed implementation of the subsistence fisheries programme, and their demand for access rights. However, more profoundly, it has also highlighted the inadequacy of the legislative framework, and the adopted management model, to deal with the needs of small-scale fisheries.

The national summit statements and subsequent NTT deliberations have forced MCM to reconsider its management approach for small-scale fishers, and has brought to light the need for the fisheries authority to broaden its definition of subsistence fishers to small-scale fishers (e.g. as defined by the FAO/ Advisory Committee on Fisheries Research; 2004; see Chapter 1). The development of a policy that will cater for 'small-scale fishers' using a broader definition, better reflects the livelihood practices of Eastern Cape small-scale fishers. Research undertaken for the studies in the previous two chapters highlighted that small-scale fishing in the Eastern Cape is one of many livelihood strategies employed by impoverished households. Various quantities of both low-value and high-value resources are often harvested by the same individual or different individuals in the same household, depending on the need in the household, the resource availability, and the market opportunities. It was also observed that the majority of fishers would rather sell their catch, and use the income that is generated to buy preferred foods (discussed in Chapter 3). Using the SFTG's terms they thus move back and forwards from being subsistence to being small-scale commercial fishers depending on what they catch, and how much they catch. In terms of the draft policies gazetted in 2006, the same individual would therefore need to obtain a subsistence right and a small-scale commercial right if MCM wanted to reflect this livelihood practice. The adoption of a broader definition that reflects the socio-economic characteristics of the fishers, and not merely the economic value of what they catch (Sowman, 2006), will better cater for the needs and circumstances of the Eastern Cape small-scale fishers. However, the adoption of a definition for small-scale fishers, much like that of the FAO (FAO/Advisory Committee on Fisheries Research, 2004) will mean that amendments will need to be made to the MLRA. Moreover, the adoption of a small-scale fisheries definition into a policy framework will intrinsically recognise the need to look at the suite of livelihood strategies that small-scale fishers, their households and their communities employ.

This highlights the need to position small-scale fishing within the broader socio-economic development of the coastal area under consideration (Béné *et al.*, 2007; Glavovic and Boonzaaier, 2007; Hauck and Sowman, 2001). This has been a topic of much deliberation during the NTT meetings. MCM does not see their mandate as extending beyond regulatory resource management to explore other economic development initiatives such as increasing the post-harvest benefits or

complementing a limited access system with other livelihood enhancement projects (N. Bacela, MCM, pers. comm. during NTT meetings). The socio-economic development department within MCM has over the last several years funded several development-type projects, however, these have been aimed largely at keeping people away from harvesting declining resources, with the provision of poverty relief, mostly in monetary terms (Environmental Evaluation Unit, 2008). Nevertheless, within local government's integrated development policies (Republic of South Africa, 2000a), and within broader national goals of addressing food insecurity and poverty alleviation, MCM will need to look at the potential that small-scale fisheries represent as engines of social and economic development (Andrew *et al.*, 2007). Within the Eastern Cape Province, tourism on the back of small-scale fisheries has been seen as a platform to create this much needed socio-economic development (Fielding *et al.*, 2004; Ntinga, 2008; refer to Chapter 4). In order to implement this successfully, MCM will need to connect with provincial departments responsible for economic development and, in particular, with local municipalities who are mandated to promote development through their integrated development policies (Republic of South Africa, 2000a). While these linkages were already articulated in the SFTG recommendations to some extent, recognising small-scale fishers as a distinct group will necessitate the adoption of a more integrated approach to development by MCM.

5.4. Conclusions

By the late 1990s, principles of 'participatory democracy', and international trends around the management of marine resources in a community context (e.g. Berkes *et al.*, 2001; Jentoft, 1989) had begun to influence the South African fisheries management paradigm. The 'subsistence fisheries programme' that had been designed to allocate rights to the newly recognised subsistence fishers, and to develop the necessary management structures, placed a strong emphasis on the need to adopt a co-management approach, and to involve the local fishers in daily management decision-making processes. However, within the Eastern Cape, the fisheries authority based in Cape Town, more than 1000 kilometres away, did not identify a local partner institute that could facilitate the implementation of the programme, and that would also have a better understanding of the local challenges and contexts. This proved to become a major gap to achieving any kind of success, as had become apparent when contrasting the Eastern Cape situation with KwaZulu-Natal, where the provincial nature conservation agency claimed to have developed step-by-step co-management arrangements in most of the communities identified to undertake subsistence fishing (Harris *et al.*, 2007). As a result of not having a local implementer, after 8 years of implementation, only a few of the SFTG recommendations have been addressed and very little progress has been made towards achieving the overall SFTG goal of co-management. While MCM resourced the subsistence fisheries programme by first contracting extension officers and subsequently by employing more permanent

staff in the Eastern Cape, their inexperience with co-management, and their small capacity to cater for the large number of small-scale fishing communities has meant that effective co-management structures were not established. On the contrary, given MCM's institutional setup of centralised decision-making, regulations were imposed on the fishers from the top, and fishers were merely informed through 'consultative' workshops and road shows. Very limited training and capacity building had been undertaken on either aspects of co-management or sustainable resource use tools. Restrictions were put in place without community input reflecting livelihood strategies, or community-catch-monitoring data that reflects local intertidal resource trends. As a result, the subsistence fisheries programme as implemented by MCM in the Eastern Cape, has not achieved its intended goals of sustainable resource use and effective participation by small-scale fishers in management decision-making processes.

More importantly however, a root cause of this governance failure has been the conventional 'target resource orientated' and commercial fisheries management paradigm of individual use rights within the MLRA, and which MCM has simply transferred to the small-scale fisheries context. This meant that from the start, the emphasis in the roll-out of the subsistence fisheries programme was placed on the allocation of individual permits and the control of fishing effort. This in itself created significant logistical challenges. Evidence gathered in this study has shown that the issuing of individual permits to the Eastern Cape small-scale fishers was not realistic in terms of logistics, and in terms of the traditional open access nature of resource use in the vast number of rural communities along the coast. Its net effect was to raise expectations among fishers for commercial fishing rights and cash, and to increase fishing effort. Traditional open access fishing continued as usual, albeit as a slightly illegal activity in the eyes of the law, but a legitimate activity in the eyes the community. In combination with a lack of understanding of what co-management was, this resulted in a massive misdirection of government effort and resources.

The failure of MCM to achieve co-management at the local level, and to empower the fishers to make daily management decisions regarding the harvesting of their marine resources, has also meant that fishers have largely been excluded from the policy making process. However, the Order of Court obtained by fishers from the Western Cape and the Northern Cape Province, has been seen as a turning point in the failure of achieve better small-scale fisheries governance. At this stage, much more effort will still need to be channelled into capacitating all of the stakeholders of the NTT into the creation of a common knowledge base between fishers, fisheries scientists and fisheries managers, that can be translated into a workable policy. This will necessitate shift in mindset within MCM. Moreover, this participation at the policy level will also need to trickle down to the local level,

where small-scale fishers will be empowered and participate in the governance of livelihoods. Nevertheless, the NTT is regarded as a step in the right direction and has highlighted the need for MCM to revisit its mandate that has, thus far, mostly been confined to resource management, but that, according to the MLRA, also includes the promotion of socio-economic upliftment. MCM will need to recognise that small-scale fisheries in South Africa are complex fisheries with special needs in terms of fisheries management and development. Moreover, given its limited institutional capacity, the fisheries authority will need to partner with other local and provincial government agencies mandated to promote development, and, interact with the small-scale fishers more significantly. In terms of permits, MCM will have to reconsider its prime role as the allocator of individual permits, and perhaps, rather recognise all fishers from a particular area as small-scale fishers, and act to facilitate sustainable resource use based on the existing resource-use patterns and traditions.

CHAPTER 6:

Reframing the Eastern Cape inshore and small-scale fisheries challenge

6.1. Diagnosis of an underlying governance problem

By using a fishery system approach, the research in this dissertation was set out to understand and evaluate the manner in which the South African fisheries authority (MCM) has utilised its fisheries management toolbox and governance mechanisms in order to deal with the emerging biological, economic and social challenges of post-apartheid fisheries in the Eastern Cape Province. It rapidly became clear however that the symptoms did not only point to the failure of the technical and regulatory management measures, but to a much more important and underlying governance problem.

In the light of growing instances of fishery management failure, symptomised by entrenched illegal fishing for abalone, spiny lobster, and species targeted by subsistence fishers, it was clear that an holistic analysis was required that identified the social and economic drivers and outcomes of fisher behaviour, quantified the resource effects, analysed the appropriateness of MCM's chosen policy and management instruments, and documented the logistical challenges faced by MCM staff tasked with managing the respective fisheries. The commercially valuable abalone and spiny lobster fisheries were chosen as the main case studies, as they were the focus of MCM's efforts to implement its 'small-scale commercial fishing' policy as a means of promoting socio-economic development, and because the illegal abalone fishery had become a fully fledged commercial fishery with a dedicated fleet of vessels. These fisheries also represented examples of where the symptoms of management failure were the most alarming.

The study provided clear evidence from the Eastern Cape's inshore fisheries that the fisheries management toolbox currently employed by the South African fisheries authority, mandated through the MLRA to manage the marine resources of the country, is failing in its objectives. Through a series of case studies, this dissertation has demonstrated that the South African fisheries authority is particularly ill equipped to address the needs of small-scale fishers. Throughout the research conducted, situations were observed where fisheries management tools such as MCS could have been more effective if evaluated on a regular basis and, in the case of the urban based abalone fishery, coupled to a rights-based framework. With regard to the management of the small-scale fisheries of the Eastern Cape, it became evident that the fisheries management tools have not been contextualised within the fishing practices of the target communities.

In a scenario where only a national government department sets the rules, a 'target resource orientated' management approach was imposed which is vested in principles of economic efficiency and wherein non-compliance to regulations is simply addressed through law enforcement. The

national agency imposed conventional input and output regulations on small-scale fishers and fishing communities where people (i) fish as one of many livelihood strategies, (2) have customary rules and practices, (iii) are not empowered and have special needs in terms of education and skills, and (iv) perceive the first and foremost role of the post-apartheid government as to assist them with much needed development and not to regulate their traditional activities. It is exactly the adoption of this governance model without prior input from the primary stakeholders and a good understanding of the local context that has failed to formalise small-scale fishers into a biologically sustainable and socially equitable legal framework, which were the original goals of the Marine Living Resources Act (Act 18 of 1998). Some of the most obvious symptoms of governance failure, which were documented in this thesis, were:

(i) **MCM allocated limited individual permits in a traditional open access context**: By adopting a management framework based on MCM's approach to commercial fisheries, individual permits were issued to small-scale fishers to harvest single species. However socio-economic research in this study has highlighted that the inhabitants of local coastal communities employ fishing as one of many livelihood options and they harvest a basket of resources depending on season, market demand and other livelihood options. Within the customary traditions of these rural communities, any villager or household member is allowed to harvest marine resources if they rely on this for a regular livelihood, or if they need to access marine resources as a 'safety-net' mechanism on a more occasional basis. Research on how these customary rules have evolved in the Xhosa communities of the rural areas of the Eastern Cape has not yet been undertaken. However, it is highly likely that the absence of a more stringent set of access rules is due to the fact that marine resources have never been the socio-cultural focus of the Xhosa communities, who are traditionally cattle herders and cultivate the land. The use of marine resources was regarded as a 'safety net' to access necessary protein, and more recently, to obtain relatively easy income. These social dynamics and their relative importance were not understood by the fisheries authority when designing a governance framework, which, as evidenced in this thesis, has significantly affected the level of legitimacy for the imposed rules as well as the perceptions around marine resource utilisation. Within the communities, both permitted and non-permitted individuals are seen as legitimate fishers. MCM's dogged persistence in its deeply flawed process of trying to issue individual permits to all small scale fishers in the Eastern Cape Province undermined the legitimacy of its authority, and wasted resources that could have been better deployed to recognise fishers' traditional practises, and work with them towards sustainable resource use.

(i) **The fisheries authority formalised the harvest of marine resources in an economically efficient way, without recognising the potential contribution of local fisheries to local tourism and broader community development.** In the case of the high value resources such as lobster, permits were issued to sell their catch to venture companies. Local capacity among the fishers to market their catch more effectively was not created, and local market opportunities that attract tourism were not facilitated by the fisheries authority. Instead, economically efficient companies were given preference. It was argued that the income generated through the sale to external companies would trickle-down into broader rural community development. As highlighted in this thesis, this has not been the case. On the contrary, symptoms were observed indicating that the prohibition for local sale impacted negatively on the local tourism market.

(ii) **Participation in decision-making and management was recognised as necessary, however this governance mechanism was incorporated in a governance model with little room for participation as the rules had already been set by national government prior to implementation and without local contextualisation.** As a result, effective co-management structures were not established. On the contrary, given MCM's institutional setup of centralised decision-making, regulations were imposed on the fishers from the top, and fishers were merely informed through 'consultative' workshops and road shows. As evidenced in this thesis, this was further exacerbated by the lack of capacity within the fisheries authority to meaningfully engage with the fishers, and the fact that the community members were not empowered to challenge the governance model.

6.2. Future perspectives for small-scale fisheries

6.2.1. Recognising the challenge as a governance problem

The process of drafting a fisheries policy and legislative framework for South Africa's small-scale fishers is, at the time of writing, a work in progress. Nevertheless, it has become clear through the 'statements' culminating from the national and provincial workshops, as well as through the deliberations at the National Task Team (NTT) meetings, that fishers will not settle for a policy and governance framework that does not more appropriately reflect their socio-economic realities, their traditional and cultural practices of harvesting marine resources as a livelihood, and their aspirations for socio-economic development and participation in governance.

Given its limited institutional capacity (budget, manpower and skills), structural weaknesses, and the unlikelihood that this situation will change any time soon, the fisheries authority thus far has only

shown reluctance in embracing new governance models and in stepping out of its 'command and control' paradigm. While some members of the National Task Team who are representing the fisheries authority are acknowledging the complexity of small-scale fisheries and their special needs in terms of alternative governance models, the institution in its entirety is still regarding the "problem" as to be solved with technical management measures only. Perhaps evidence gathered in this study will help to persuade the fisheries authority that it is asking the wrong questions. Instead of speculating as to how it should 'control' complex, diverse and dynamic small-scale fishers and fisheries (Kooiman *et al.*, 2005), given its institutional limitations, it could ask itself as a primary question how it could facilitate and 'increase the contribution of small-scale fisheries to poverty alleviation in coastal fishing communities' (Béné *et al.*, 2007) and sustainable resource use by small-scale fishers. This could prompt the institution to re-evaluate the manner in which small-scale fishery systems are governed, and stimulate greater inclusivity and partnership in designing a new governance framework for South Africa's small-scale fisheries. This realisation or 'shift in mindset' is a necessary first step.

6.2.2. Jointly formulating the new governance approach

As reviewed in the introductory Chapter of this thesis, academics have recently begun to look at fisheries problems as governance challenges, and while this thesis primarily aimed to assess South Africa's inshore fisheries management toolbox and approaches such as co-management, evidence gathered here has also concluded the fisheries challenge to be primarily a governance one. Kooiman *et al.* (2005) see governance as the whole of public and private interactions taken to solve social problems and create societal opportunities. It includes the formulation and application of principles guiding these interactions and care for institutions that enable them. More recently Jentoft and Chuenpagdee (2009) have stated that governance is the shared, collective effort of government, private business, civic organisations, communities, political parties, universities, the media and the general public. I argue that this understanding is particularly valid in the South African small-scale fisheries context, where consensus will need to be reached with all the relevant stakeholders on what the appropriate governance framework possibly can and will look like. This is the necessary second step that will probably be the most difficult one to take. The main question is what approach is applicable in the South African context. Six principles however, as already articulated in international (e.g. The FAO Code of Conduct for Responsible Fisheries (FAO, 1995)), and national fora, including the National Task Team deliberations, will need to guide this process:

- The need to adopt an integrated and holistic approach that is based on human rights principles.

- To need to recognise the interdependency of the social, cultural, economic and ecological dimensions of small-scale fisheries.
- To need to promote biodiversity and the sustainable use and management of marine living resources and associated ecosystems.
- To need to recognise, protect and support the rights of small-scale fishers in line with national and international instruments and obligations.
- To need to adhere to the principle of effective participation in policy, management and decision-making.
- The need to adopt an approach that contributes towards food security and local socio-economic development and the eradication of poverty.
- The need to promote an approach of empowerment which builds the capacity of the fishers through education, training and skills development in all aspects of the fishery.

What this governance framework will look like is at this stage still unknown, but will depend on the quality of the process of communication and learning among stakeholders, where norms and values will be played out and where different ethics, ideologies, and epistemologies will be active (Jentoft and Chuenpagdee, 2009). In practice this will probably necessitate a rethink of the Marine Living Resources Act (Act 18 of 1998), which is premised on individual use rights, and mandates the fisheries authority as the sole agency responsible for fisheries management and development. The proposed small-scale fisheries governance framework will most likely require a more comprehensive political, social and institutional reform at various levels of government, and not merely for the fisheries authority. For example, when stakeholders negotiate a more appropriate governance framework, it could become increasingly clear that this might necessitate tough political choices on the part of the fisheries authority and the government in general, regarding e.g. buy-backs of commercial fishing quotas, preferential access in the coastal zone, cooperation with or devolution to local levels of government, or recognition of traditional open access and customary tenure. A process facilitated by experts from the outside might be required to see this process to conclusion and avoid further court action. The evidence of this thesis suggests that the starting point should be recognition of the existing customary access fisheries and the associated fishing practises employed - followed by a facilitated process aimed at achieving workable management measures to achieve sustainability and welfare gains. This will require an abandonment of MCM's narrow and ingrained 'target resource' orientation, and adoption of a broader "cooperative governance" approach in which MCM works in partnership with provincial and municipal authorities and target communities to promote local economic development based on marine resources. It must be said that only the adequate

political will and lobby by the stakeholders involved will allow the accepted governance framework to be translated into a workable management paradigm for small-scale fisheries.

6.2.3. Translating the accepted governance framework into a management model with appropriate tools

The concept of 'management' has been understood and defined in this thesis as the day-to-day, technical measures and operational arrangements. Review of international literature as well as the South African fisheries management paradigm has revealed that the more conventional 'toolbox' utilised in fisheries management is very often inadequate for small-scale fisheries. Jentoft and Chuenpagdee (2009) argue that the conventional fisheries management tools and arrangements rarely have universal application but rather that tools must be developed for a particular problem and in the context within which they are to be applied.

To date very few tools that can be argued to be well contextualised with on-the ground realities have been utilised in the management of South Africa's small-scale fisheries. An exception and local example where one could draw lessons from is the subsistence fisheries programme implemented by provincial nature conservation department, Ezemvelo KwaZulu-Natal Wildlife in the province of KwaZulu-Natal. As discussed in Chapter 5, this programme benefited from significant funding as well as manpower, which were all based in the coastal province, and were able to visit communities on a regular basis in order to identify and address needs and challenges of the affected fishers. Local co-management committees, including fishers, scientist and compliance officers, were setup and discuss, *inter alia*, the results of the community-catch-monitoring data. They then jointly decide on the appropriate actions with regards to bag and size limits. This devolvement of management functions and systems has in this regard been seen as more suitable to respond to local demands than centralised initiatives from far away, such as has been the case in the Eastern Cape. Nevertheless, restrictions to access particular resources or markets have begged the need to urgently develop supplementary livelihoods, and one of the pitfalls of the programme thus far has been the lack of integration with local economic development which is the mandate of local government (J. Harris, comm. at KZN subsistence Fisheries Strategic Workshop, 21st of May 2009 in Durban).

Further afield, in Chile, local artisanal fishers have gained exclusive access rights to benthic resources adjacent to their traditional small fishing harbours in the form of 'Management and Exploitation Areas for Benthic Resources' (McClanahan and Castilla, 2007). This is a form of TURF. What started within only several fishing communities who were working closely with ecologist in ongoing research projects to strive for TURF status has since the late 1990s been implemented at a national level and incorporated into the fisheries policy (Meltzoff *et al.*, 2002). However, although often cited in the

literature and even within South African fisheries policy development circles as 'the' successful example of co-management, discussions with Chilean researchers visiting South Africa did shed light on the implications and often negative socio-economic consequences of implementing this model as 'blanket' approach. (Stotz, W. and Aburto, J., pers. comm. at collaborative workshop, September 2009, Cape Town). A main argument made was the fact that one model suited to a particular context did not achieve the same outcomes when applied in communities with very different socio-economic realities and fishing practices.

This argument is also valid for South Africa's small-scale fisheries, which are very diverse across the various coastal provinces and even within the provinces' rural and urban areas. The translation of the negotiated governance framework into a management model and implementation plan will therefore necessitate a well-funded programme entailing participatory research and monitoring, pilot projects experimenting with a range of management models, and capacity building of national, provincial and local government as well as civil society to effectively participate in the governance arrangements.

6.3. Reflection and contribution of the thesis

Other than anecdotal reports of large scale abalone poaching and ineffectiveness of MCM's exemption permit system in traditional coastal communities, very little quantitative information about these inshore fisheries existed when the research described here was initiated in early 2004. Although initially being funded by MCM to undertake a biological assessment of the abalone fishery, it soon became clear, in the light of the rapidly unfolding events in these fisheries, that a rapid stock assessment and the gathering of indicators of resource status would only paint a small part of the picture of these complex fishery systems. My challenge was thus to devise 'action' type research that could opportunistically capture key quantitative and qualitative information required to formulate an understanding of all aspects of these fisheries. Therefore, socio-economic data, data on fishing effort and behaviour, and information on the institutional arrangements surrounding these fisheries were collected to complement information pertaining to the resource status. This multi-disciplinary methodology was guided by the 'fishery system' approach, and was undertaken via several research projects (of which several were funded by the fisheries authority), in the hope that the analysis of the results would be fed back into the fisheries management and governance framework. To an extent, I succeeded as:

(i) I was in constant communication with MCM managers responsible for the management of the fishery, and my participation on the national policy task team facilitated input of the on-the-ground realities in these fisheries into the policy making process.

(ii) Several recommendations have been put forward in presentations to senior managers of MCM, and letters were sent to the Minister of Environmental Affairs and Tourism.

While it remains to be seen whether the fisheries authority will translate this new knowledge into reconsidering its approach to these fisheries, this study also has the potential to contribute to the knowledge base centred around small-scale fisheries, an arena that has – not only in South Africa - been regarded as the "final frontier" and challenge to fisheries management (Garcia *et al.*, 2008; Garcia and Charles, 2008; Mahon *et al.*, 2007). Furthermore, and in particular, the study presented in Chapter 2 has combined both quantitative and qualitative indicators to obtain a credible estimate of IUU activity in the urban areas of the Eastern Cape. This methodology of tying together anecdotal information and quantitative data from a variety of direct and indirect sources could easily be refined, transferred and adopted to identify IUU trends in other inshore fisheries.

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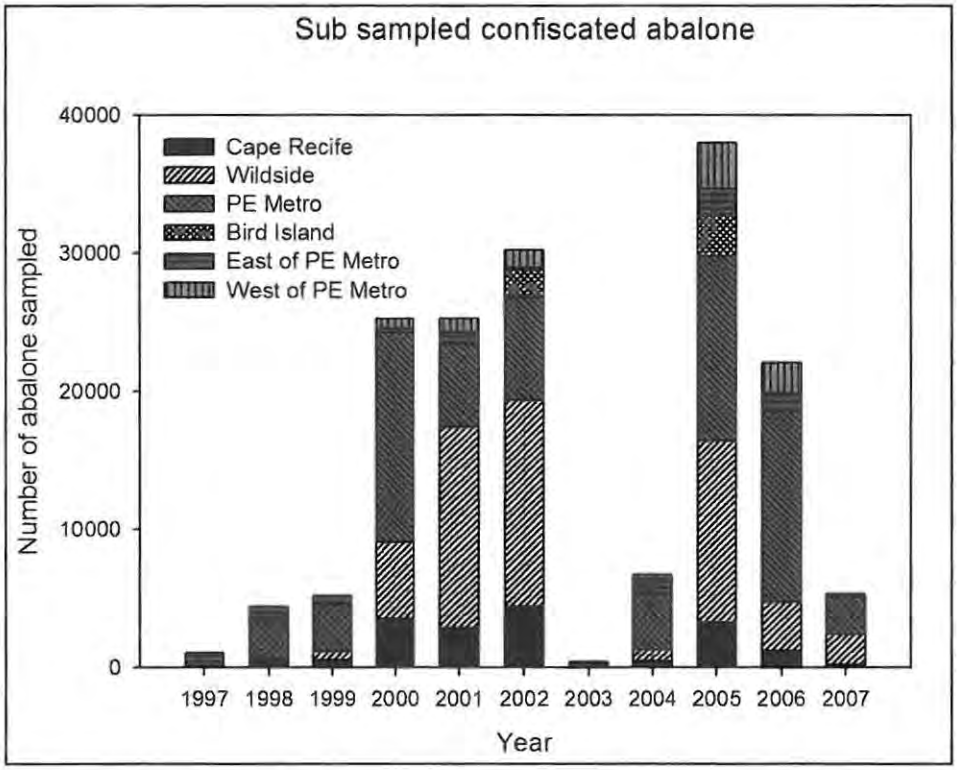
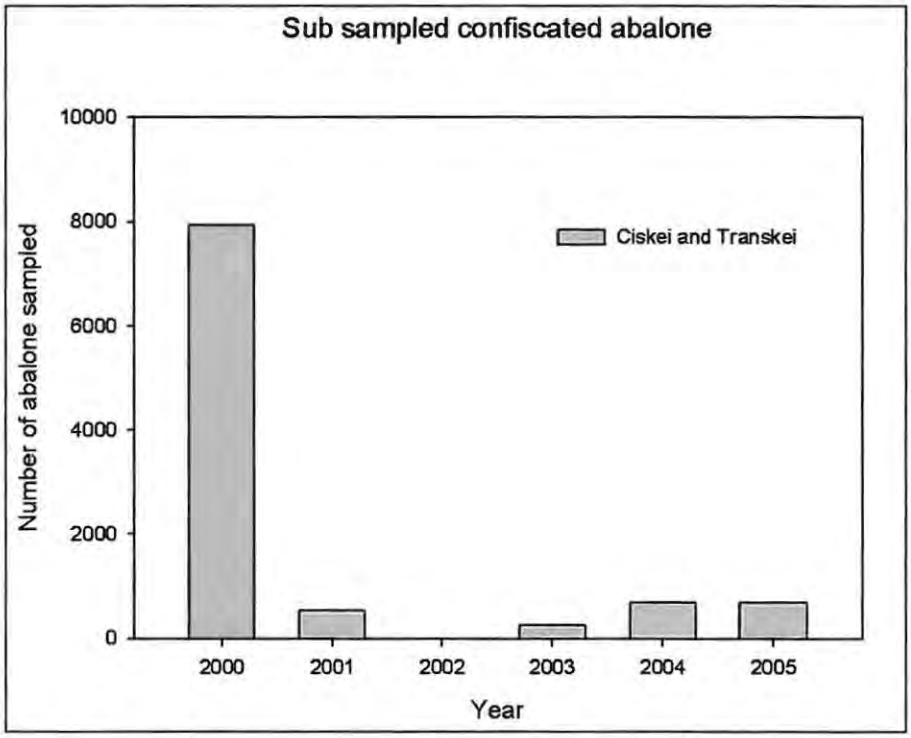
APPENDICES

APPENDIX A

Unbalanced design of the abalone morphometric data



A1. Number of abalone in the sampled confiscated cases from the urban areas of the Eastern Cape. These samples predominantly consisted of de-shelled (shucked) and eviscerated or whole abalone in fresh or frozen state. During 2003 and 2004, few confiscated abalone were measured at the MCM Port Elizabeth Compliance and Control Office due to safety and logistical reasons. Confiscations originating from unknown areas were omitted in the analysis of average size evolution and % undersize. In large cases, a random sub sample of 200 abalone was taken.



A2. Number of abalone in the sampled confiscated cases from the rural areas of the Eastern Cape. These samples predominantly consisted of de-shelled (shucked) and eviscerated or whole abalone in frozen state.

APPENDIX B

Supplementary Figures (Chapter 2)

B1. Purpose-built semi-rigid, inflatable, 'superduck' used by organised illegal abalone divers. The vessel has a carrying capacity of up to 14 people, is equipped with twin high-powered outboard engines (up to 250 hp per motor) and is capable of speeds of up to 50 knots.

B2. Confiscated de-shelled abalone catch from boat-based divers. The abalone are typically de-shelled by the divers while diving, and stored in large waist bags.

B3. Typical abalone habitat along the coast of the Port Elizabeth metropolis. Here, the Bushy Park area is shown.

B4. Shore-based abalone divers transferring their catch into plastic bags which are hidden in the coastal bush for later collection (picture supplied by G. Kant, MCM).

B5. Boat-based abalone diver groups operating in the Bird Island Marine Protected Area.

B6. Boat-based abalone diver groups preparing to dive within the Bird Island Marine Protected Area.

Supplementary Figures (Chapter 3)

B7. Hamburg permit holders wading in the intertidal zone, and searching for abalone.

B8. Typical midden of abalone shells found in the coastal bush.

B9. Female community member from the Hamburg village showing her abalone exemption permit (picture supplied by R. Tarr).

B10. Hamburg villagers receiving their abalone permits from the Deputy Minister of Environmental Affairs and Tourism (dressed in yellow). The picture was supplied by Rob Tarr.

B11. Typical basket of intertidal resources harvested by small-scale fishers in the Transkei.

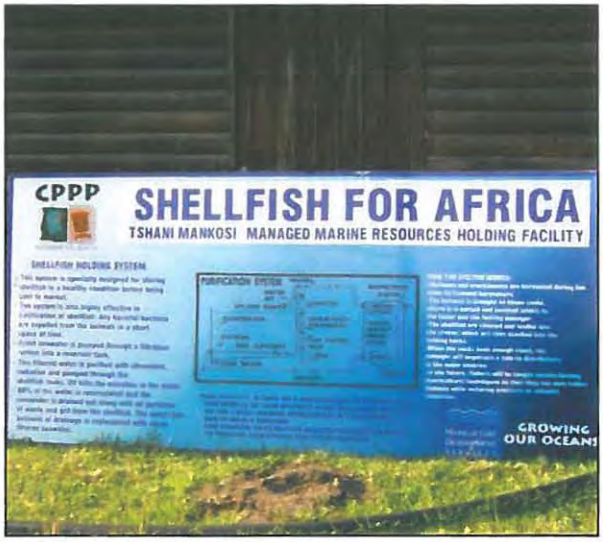
B12. Catches observed in the harvested basket of intertidal resources typically consisted of red bait, brown mussel, winkles, limpets, whelks, oysters, and the occasional abalone.

Supplementary Figures (Chapter 4)

B13. Young male from the Coffee Bay community, diving for spiny lobster in the Transkei.

B14. Community-catch-monitor of the Coffee Bay Mussel Rehabilitation Project.

B15. Representation of typical rural households in a Xhosa village in the Transkei, indicating the subsistence gardens.



B16. Project advertising panel for the revived lobster holding facility in Tshani-Mankosi, Transkei.