OVERVIEW AND ANALYSIS OF SOCIAL, ECONOMIC AND FISHERIES INFORMATION TO PROMOTE ARTISANAL FISHERIES MANAGEMENT IN THE BCLME REGION – SOUTH AFRICA

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FINAL REPORT AND RECOMMENDATIONS (SOUTH AFRICA)

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EXECUTIVE SUMMARY

This study provides an overview and analysis of socio-economic and fisheries information relevant to artisanal fisheries management in the BCLME (Benguela Current Large Marine Ecosystem) region in South Africa. For the purpose of this study, the BCLME coast of South Africa is limited to the western and southern coasts of South Africa, from the Orange River in the north to Cape Agulhas in the south. The first part of the report provides an overview and analysis of the history, legislative framework and socio-economic circumstances relevant to fishers and fishing communities falling under the general category of artisanal fishers. An analysis of socio-economic information relevant to this fisheries sector, especially with respect to the definitions of subsistence and small-scale commercial fishing activities, and issues of access rights and management protocols, is then provided.

The second part of the report focuses on the coastal and marine resources harvested by subsistence, informal and small-scale commercial fishers. It provides a description of the various fisheries and outlines what information is currently collected and available (e.g. total catch bycatch), and what management protocols are in place. The report then highlights some of the problems facing the subsistence and small-scale fisheries sector from a management perspective.

Since there is no formal legal recognition of an artisanal fisheries sector in South Africa, the study focused on the subsistence fishing sector (both formal and informal) as well as those small-scale commercial fishing activities that display characteristics of an artisanal fishery.

Historical records indicate that indigenous people in the Western and South Western Cape have been harvesting intertidal resources for at least 50 000 years, and perhaps for as long as 150 000 years. Despite the disruptions to local populations during the colonial period, there is evidence that over time and with the development of markets, people adapted their resource use patterns and harvesting methods and begun fishing over longer distances and targeting shallow sub-tidal and near shore resources including lobsters, oysters, abalone and various fish species.

During the Apartheid era, the fishing industry was dominated by a few large white owned commercial operations and there were few legal mechanisms for poor black fishers to gain direct access to marine resources. Almost the only avenues of access to blacks were by being employed in the fishing industry or by gaining access to fisheries resources through recreational resource use permits of various kinds. However, despite these restrictions,

indigenous people living in the coastal towns along the BCLME Cape Coast were engaged in informal subsistence and small-scale fishing activities. These individuals and small groups of fishers, mainly used low technology gear such as small rowing boats, and , snorkelling gear or hoop nets for rock lobster, and handlines, drift, gill or beach seine nets for fish. Towards the end of the Apartheid era, these fishers could potentially have gained legal access to marine resources by acquiring recreational or commercial permits. However, there were various constraints including the lack of access to capital and equipment to enter the commercial sector, and restrictive conditions associated with recreational permits particularly with regard to the sale of catches.

The promulgation of the Marine Living Resources Act (MLRA) in 1998 and the identification of subsistence fishers as a legal category of fishers requiring management attention was a positive step towards improving the access of hitherto marginalized and poor fishers to marine resources. The Subsistence Fisheries Task Group (STFG), appointed to advise Marine and Coastal Management (MCM) on the management of this new sector, refined the definition of 'subsistence' and indicated which resources they considered suitable for subsistence harvesting (SFTG Report, 2000). However, the resources identified were largely low value resources and in the case of the Western and Southern Cape coast, have historically not been a major source of food. Surveys undertaken by the SFTG research team also sought to identify who qualified as a 'subsistence' fisher. In terms of their criteria they found that on average only 18% of the households living along the west coast of South Africa could be classified as 'poor' and 6% as 'ultra-poor' (Russell et al*.,* 2000). For the south coast, the findings showed that 28% were 'poor' while 16% qualified as 'ultra-poor' in terms of the criteria used. Consequently, in terms of their categorisation and criteria, only 6% and 16% respectively, of fisher families living in coastal communities along the Western and Southern Cape, qualified as subsistence users. However, this current review and analysis reveals that the number of fishing families within the BCLME coastal region in South Africa that are 'food insecure' and cannot meet their basic food needs, and should thus qualify as subsistence fishers, far exceeds the original figures given in the SFTG report.

Aside from the allocation of subsistence fishing rights in 2000-2001, when approximately 1700 permits for the harvesting of west coast rock lobster were allocated as part of a poverty alleviation pilot project, no other subsistence rights have been allocated on the BCLME coastal region in South Africa. According to Marine and Coastal Management, in view of the resources identified as suitable for subsistence use, there are no subsistence fisheries on the West and Southern Cape Coast of South Africa.

In the course of the SFTG deliberations it was acknowledged that the definition of subsistence fisher excluded a group of fishers who might previously have been considered as subsistence or artisanal but who would prefer to gain commercial rights. The SFTG thus recommended that these fishers be classified as small-scale commercial fishers, and that a policy and management system be developed for this group of fishers. An outcome of the SFTG process was that the term artisanal was removed from the South African policy and legal terminology and the terms subsistence and small-scale commercial were used. Small scale commercial was later modified to limited commercial in terms of the law.

MCM has attempted to provide opportunities to enhance access to historically disadvantaged individuals (HDIs) through the creation of this 'Limited Commercial' category. While these rights have provided opportunities for HDIs to gain access to marine resources and has by all accounts impacted positively on the socio-economic conditions of many of the new entrants (MCM report, 2003), research by Isaacs (2004) and an analysis of information gathered during the current research program has revealed that the limited commercial rights allocation process has largely excluded poor and marginalized fishers living along the Northern, Western and Southern Cape coast. The key reasons for this are summarised below. Firstly, the administrative procedures for applying for these rights are too onerous for many *bona fide* poor fishers. Secondly, the costs of applying for a right are prohibitive and where fishers have grouped together to form legal entities, in many cases the quota allocation has been insufficient to meet livelihood needs and provide a basic income to individual participants. In addition, the application fee is not refundable, and a separate application must be submitted for each fishery type.

A key problem in the new dispensation is the lack of recognition of the heterogeneity of the 'new entrants' amongst the HDIs. Research suggests that organisational entrepreneurs, the emerging black elite and the emerging middle class have been lumped in the same category as the marginalized poor (Isaacs, 2004). Thus although there has been a significant increase in the number of HDI rights holders through the creation of a limited commercial category, especially for abalone and west coast rock lobster, there are concerns that poor fishers in the BCLME coastal region have not benefited from this system. Consequently, there is a group of *bona fide* poor fishers who do not qualify as subsistence fishers because the resources found adjacent to their coastal settlements are not categorised as subsistence, nor can they access resources through the Limited Commercial mechanism, because of the reasons given above.

In addition, South Africa has adopted an individual rights based approach to allocating use rights which is problematic since it fails to recognise the historical patterns of use and socio-

cultural practices that have prevailed in coastal communities, where collection of marine organisms is one of a range of livelihood strategies and is often undertaken collectively. Clearly, the current system of resource rights allocation is deficient. An alternative approach that is sensitive to resource constraints as well as the economic and socio-cultural features of these communities, needs to be investigated in order to ensure equitable access to marine resources, for the poor and marginalized fishers on the BCLME Cape coast.

From a fisheries management perspective, South Africa's offshore industrial resources are well managed by way of a Total Allowable Catch (TAC). Inshore and nearshore resources like abalone and west coast rock lobster, are managed through an annually determined quota system, while other resources harvested by subsistence and small-scale commercial fishers are managed through effort controls such as gear limitations, closed seasons and bag limits.

Although west coast rock lobster stocks are well below historical levels, the trends in the last 10 years are very encouraging and the annual quotas have been revised accordingly. The most important factor impacting on stock availability appears to be a depressed growth rate since 1991. The reasons for this are not clear. Apart from the commercial fishery, there is an active recreational lobster fishery that operates in shallow water either with hoop nets or by means of snorkelling gear.

With respect to Abalone, a major problem has arisen as a result of the widespread illegal exploitation of the resource. Consequently, the long-term sustainability of a fishery that has existed successfully for almost 50 years and which has great potential to contribute to poverty alleviation in coastal communities, is now in jeopardy. However, during 2004, MCM introduced a new approach to managing the resource – a TURF (Territorial User Rights Fishery) system that will include elements of co-management – to help address the illegal activities and aid recovery of the badly overexploited resource. However, it is too early to say whether this new approach has yielded positive results.

Line fishing is currently largely a commercial activity but the resource is common to subsistence and small-scale commercial (limited commercial) fishers. Stock assessments conducted since the mid-1990s have revealed that, with the exception of snoek and yellowtail, most commercially exploited traditional line fish species appear to have been depleted to critically low levels. Drastic reduction in stocks is clearly the result of excess commercial effort, inadequate regulation and poor enforcement. A new Linefish Management Protocol (LMP) has been developed (1999) and requires management of all linefish species. There is a fairly sophisticated data collection and monitoring system for South African line fisheries. These

data are captured and stored on the national Marine Linefish System (NMLS) managed and funded by MCM. The decision by MCM to reduce line fishing effort by up to 70% over the past five years is likely to have significant socio-economic implications. It is thus imperative that MCM collaborates with other government departments charged with addressing livelihood needs of poor coastal communities, so that alternative livelihood activities can be identified and supported.

The net fishery along the West and South Cape Coast includes marine gill nets, estuarine gillnets and beach seine nets. Detailed catch and effort data for the marine and estuarine gillnet fisheries are available, and research suggests that certain stocks may be regionally overexploited. There are major concerns regarding bycatch of the gillnets and consequently management authorities are considering phasing out gillnets. However, given that certain fishing communities are dependent on gillnet fishing for food security and as a contribution to their livelihoods, it is imperative that government work closely with these fishers, and other relevant government departments to ensure that access to alternative marine resources or livelihood opportunities are secured prior to taking such actions.

There are fewer data available for the beach seine fishery on the West and Southern Cape Coast. Mullet (*Liza richardsonii*) comprise the principal catch, and scientists estimate that bycatch species probably comprise less than 5% of catch landed. A permit requirement of net fishers is the completion and submission of catch returns, but MCM scientists believe these returns are largely inaccurate, with up to 90% of effort and catch (particularly bycatch) not being reported. The lack of reliable data results in the management authorities adopting a conservative approach to management. Greater involvement of the fishers in the monitoring and management of the resource should lead to improved understanding of resource sustainability issues and greater stewardship of resources upon which they depend for their livelihood.

Based on this overview and analysis a number of recommendations have been made. Government needs to revisit the criteria and classification system created for subsistence fisheries in South Africa. In view of the policy and legislative requirements to adopt a people-centred approach to environmental resource management, government needs to ensure that historical, socio-economic and cultural considerations are taken into account in defining subsistence fishers. In addition, re-visiting the term “artisanal” would realign South Africa with both international terminology and other coastal SADC countries (e.g. Angola, Mozambique and Tanzania) who recognise an “artisanal” fishery sector.

Government needs to clarify its policies and strategies with respect to addressing the food security needs of the poor. Furthermore, it must as a matter of urgency determine to what extent marine resources can contribute to addressing food security of poor and vulnerable coastal fishers.

MCM needs to explore an alternative system of allocating use rights, such as community based or collective rights particularly in areas far removed from the urban environment. In addition, subsistence fisheries management authorities need to determine whether permits are necessary to manage all subsistence fisheries. It may prove possible to manage a subsistence fishery by for example zonation and gear limitations alone. Such a proposal would require some in depth evaluation by management authorities and may be resource specific. If permits are ultimately deemed a necessary requirement, then management authorities should devote serious attention to streamlining the permit issue process.

MCM needs to identify relevant conservation/resource management agencies at the provincial and/or local level that can assist in managing aspects of subsistence and small-scale commercial fisheries. In addition, MCM needs to be willing to delegate certain decision-making powers and management functions to such relevant agencies and provide the appropriate resources to enable such agencies to fulfil these functions effectively.

In view of the fact that most marine resources are either fully exploited or overexploited, government needs to devote effort to research on stock rebuilding strategies. Rather than simply reducing effort, government also needs to explore other effective mechanisms for rebuilding overexploited stocks such as the declaration of Marine Protected Areas and Closed Areas.

Despite the poverty of most subsistence fishers and their associated communities, fishing controls of over-exploited resources, should be based on resource status and not socio-economic features of the local environment. Management authorities must focus on increasing the awareness of line fishers of the relevant regulations and their understanding of the necessity for the regulations. More importantly, government needs to adopt a holistic multi-faceted approach to the management of coastal resources that sees fisheries as part of a suite of livelihood strategies. Thus MCM needs to work collaboratively with other government agencies, NGOs and fisher organizations to address livelihood needs of coastal fishing communities so that resource use can be maintained within biologically sustainable limits.

MCM needs to increase the number of compliance staff in areas where there are significant concentrations of informal fishers. However, MCM and their compliance staff need to go beyond enforcement and look at creative ways of increasing compliance. There is a need to examine other mechanisms to achieve compliance. This includes awareness raising and education, as well as management partnerships leading to stewardship through co-management arrangements. In addition, considerable effort must be devoted to the design of monitoring programmes for subsistence and limited commercial fisheries.

There is an urgent need to enhance understanding between government and tertiary institutions regarding the information needs of management authorities. The management agencies need to frame their research questions themselves and then develop these in conjunction with individual researchers or research teams. Regular research prioritisation meetings need to be held between the management agency and tertiary institutions in order to develop proposals that address management concerns.

With respect to transboundary issues relevant to the three participating countries, management issues related to west coast rock lobster and shared line fish stocks should be discussed amongst fisheries scientists and managers from all three countries. Fisheries management authorities in South Africa need to broaden the scope of their management vision so that livelihood issues become an integral part of the management paradigm. They should also consider what lessons they might learn from artisanal and informal fisheries management programs in other African countries with more flexible management regimes. It is recommended that working groups such as those established for rock lobster, abalone and line fish be formed with regular meeting schedules and a budget to liaise at least bi-annually with artisanal fisheries managers from outside South Africa.

Finally, the new fisheries policies currently being drafted in South Africa should seek to align the legal framework relevant to poor historically disadvantaged fishers and fishing communities with regional and international fisheries protocols such as the SADC Fisheries Protocol and the FAO Code of Conduct for Responsible Fishing.

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ABBREVIATIONS

ARTC – Access Rights Technical Committee

BCLME – Benguela Coast Large Marine Ecosystem

CAF – Consultative Advisory Forum

COSATU – Congress of South African Trade Unions

CPUE – Catch per Unit Effort

DEAT – Department of Environmental Affairs and Tourism

EEZs – Exclusive Economic Zones

ESOP – Employee Share Option Plan

FAO – Food and Agriculture Organisation

FPDC – Fisheries Policy Development Committee

GDP – Gross Domestic Product

GP – Green Paper (Coastal Policy Green Paper, 1998)

'HDI' – Human Development Index

HDI – Historically Disadvantaged Individual

LMP – Linefish Management Protocol

MCM – Marine and Coastal Management

MLRA- Marine Living Resources Act (1998) of South Africa

NCPCMP – Northern Cape Province Coastal Management Plan

NEMA – National Environmental Management Act (1998) of South Africa

NGO – Non-Governmental Organisation

PCEAT – Parliamentary Committee on Environmental Affairs and Tourism

PDI – Previously Disadvantaged Individual

RDP – Reconstruction and Development Programme

RVU – Rights Verification Unit

SDI – Spatial Development Initiatives

SFTG – Subsistence Fishers Task Group

SME – Small and Medium Enterprises

TAC- Total Allowable Catch

TAE – Total Allowable Effort

UIF – Unemployment Insurance Fund

UN – United Nations

UNDP – United Nations Development Programme

WCRL – West Coast Rock Lobster

WP – White Paper for Sustainable Coastal Development

1. GENERAL INTRODUCTION

The Benguela Current Large Marine Ecosystem (BCLME) Programme is a multi-sectoral, multi-faceted, GEF (Global Environment Facility) funded regional initiative involving South Africa, Namibia and Angola and is aimed at facilitating the integrated management, sustainable development and protection of this unique eastern boundary upwelling ecosystem which sustains one of richest fishing grounds in the world. The BCLME region experiences strong southerly winds that cause upwelling of cold, nutrient rich water that results in very high levels of primary production of both phytoplankton and macroalgae kelp. This in turn results in high productivities at other trophic levels.

There is an important artisanal, informal or small scale fisheries sector within the BCLME region, particularly in Angola and to a lesser extent in South Africa. In the case of South Africa, these fishers include subsistence, traditional and more recently small-scale commercial fishers. In general these fishers operate outside the large scale industrial sector, with relatively low technology gear, a small capital investment, and are personally involved in the conduct of day to day fishing operations. These fisheries play a crucial role in the lives of poor coastal communities in terms of food security and livelihoods and as such, they warrant special management attention and, where appropriate, further development.

Historically, research and management effort has been devoted to the commercial fisheries sector in South Africa, Namibia and Angola, and the status of artisanal fisheries, as well as the role that this sector plays in the livelihoods of coastal communities has not received the same attention. Various international agreements (e.g. World Summit on Sustainable Development, Plan of Implementation), African plans (e.g. NEPAD), regional protocols (e.g. SADC Protocol on Responsible Fisheries) as well as individual policies guiding coastal management and natural resource use within the participating countries, place an obligation on the countries within the BCLME to address the needs of poor coastal communities and seek ways of enhancing their livelihood circumstances. The Fisheries Ministers in both South Africa and Angola have indicated strong support for the coastal artisanal fisheries sector and have recognised its role in improving food security and livelihood circumstances for coastal communities. The sustainable use, development and sound management of artisanal fisheries resources is imperative if these goals are to be achieved. Gaining a thorough understanding of all aspects of the fishery - the socio-economic, bio-physical and institutional aspects - in all three participating countries, would be an important first step in this process. Identifying information needs and analytical tools to enhance management decisions and the human capacity requirements are other important requirements.

The overall aim of this project is to undertake an overview and analysis of social, economic and fisheries information relevant to the artisanal fisheries sector, in order to contribute to the orderly management of artisanal fisheries in the BCLME region. The specific objectives are to assess the adequacy, utility and appropriateness of the currently available information related to artisanal fisheries in each country so as to identify gaps, and determine information requirements, future research needs and related training needs, so that these fisheries can be managed both sustainably and at levels that maximize social and economic benefits. This report focuses on the artisanal fisheries sector in South Africa.

2. AIMS OF THIS STUDY

This study provides an overview and analysis of socio-economic and fisheries information relevant to artisanal fisheries management in the BCLME region in South Africa. It begins with an overview and analysis of the history, legislative framework, and socio-economic circumstances of the fishers and fishing communities falling within this general category of artisanal fishers. It then goes on to provide information on the resources harvested by these fishers and the management protocols relevant to the different fisheries sectors. An analysis of information relevant to this fisheries sector, especially with respect to the definition of subsistence and small-scale commercial fishing activities, access rights, the state of fisheries resources and management protocols is provided. In terms of the scientific information the focus is on describing the various fisheries and determining what fisheries information is currently collected (e.g. total catch, total effort, catch per unit effort, catch by numbers, catch by weight, age structure, information on by-catch etc.). A second objective of the fisheries science component of the study is to assess the adequacy and usefulness of the type of data collected, the methods of data capture/entry, and the format of the data in terms of its potential to undertake more detailed quantitative assessments and so provide a tool useful for the management of the fisheries concerned. The report culminates in a series of conclusions and recommendations.

3. RESEARCH METHODOLOGY

The information provided is based on a review of the literature (including scientific publications, research reports, unpublished government reports and sector plans, socio-economic surveys, census data) as well as discussions with government officials, lawyers, members of non-governmental organizations (NGOs) and other researchers involved in the

field. Much of the review and analysis of the subsistence fisheries sector is based on information gathered during the Subsistence Fisheries Task Group (SFTG) process.

4. THE SCOPE AND BOUNDARIES OF THE STUDY

In view of the fact that the focus of this study was on artisanal fisheries management, it became apparent at the outset of this research project that the scope of the project had to be re-conceptualised in the South African context as there is no legally-defined artisanal fisheries sector in the country.

As will be seen later, current South African marine and fisheries management policies and legislation only provide for subsistence, recreational and commercial (limited and large-scale) fishing sectors. At the time of the transition to parliamentary democracy in 1994, only commercial and recreational fishers were recognised by law and (black)[1] 'informal' fishers operated mostly as illegal poachers, although some fished using recreational permits. After the drafting of new legislation to deal with living marine resources (finally promulgated as the Marine Living Resources Act (MLRA) in 1998, the Subsistence Fisheries Task Group (SFTG) was appointed by the government to identify and make recommendations on management systems for subsistence fishers, as provisions in the MLRA were found to be inadequate (Branch et al., 2002).

During the research process the SFTG revisited and explored the characteristics of subsistence, artisanal and commercial fishers. One of its final recommendations was that the term artisanal should not be used and that artisanal fishers should either be classified as subsistence fishers or small-scale commercial fishers. The new proposed category of subsistence fishers would apply to those satisfying strictly defined criteria that allowed for their 'food security'. Those fishers that could have previously been seen as artisanal and who now wanted to gain access to resources that the SFTG deemed should be reserved for the commercial sector, should rather fall under a new category of commercial fishers, that of 'small-scale commercials' (Branch et al., 2002), who have become legally eligible to 'limited commercial' fishing rights.

[1]While the authors do not subscribe to the 'racial' classification of people, when necessary the terms African, coloured, Indian and white as defined under apartheid are used in the report due to historical factors in SA. Apartheid created divisions and great socio-economic inequalities between these different population groups that still persist today. Socio-economic analysis and data at present, including those released by Statistics South Africa, are still presented in terms of these population groups. One of the advantages is that it allows SA to plan and implement intervention strategies and to monitor change in the circumstances of those who were discriminated against during colonial and apartheid rule. When used, the term 'black people' includes people who were classified as Africans, coloureds and Indians under apartheid

For the purpose of this report the BCLME coast of South Africa is limited to the western and southern Cape coasts of South Africa, from the Orange River in the north to Cape Agulhas in the south (see Figure 1). Ecologically, the Agulhas Bank must be considered part of the BCLME region because a number of the important fisheries depend to a greater of lesser extent on processes that occur over the Agulhas Bank. However, most fisheries occurring on the Agulhas Bank are industrial fisheries and do not concern this report.

The data presented in this report provide an overview of subsistence and small-scale commercial fishers and fisheries. As different sources were used to obtain the socio-economic data presented in this report, there are slight differences in the ways in which boundaries are defined. However, since the data are used for descriptive rather than predictive purposes, these differences in boundaries are not considered to constitute a major obstacle. A clarification of these differences is presented in Appendix 1.

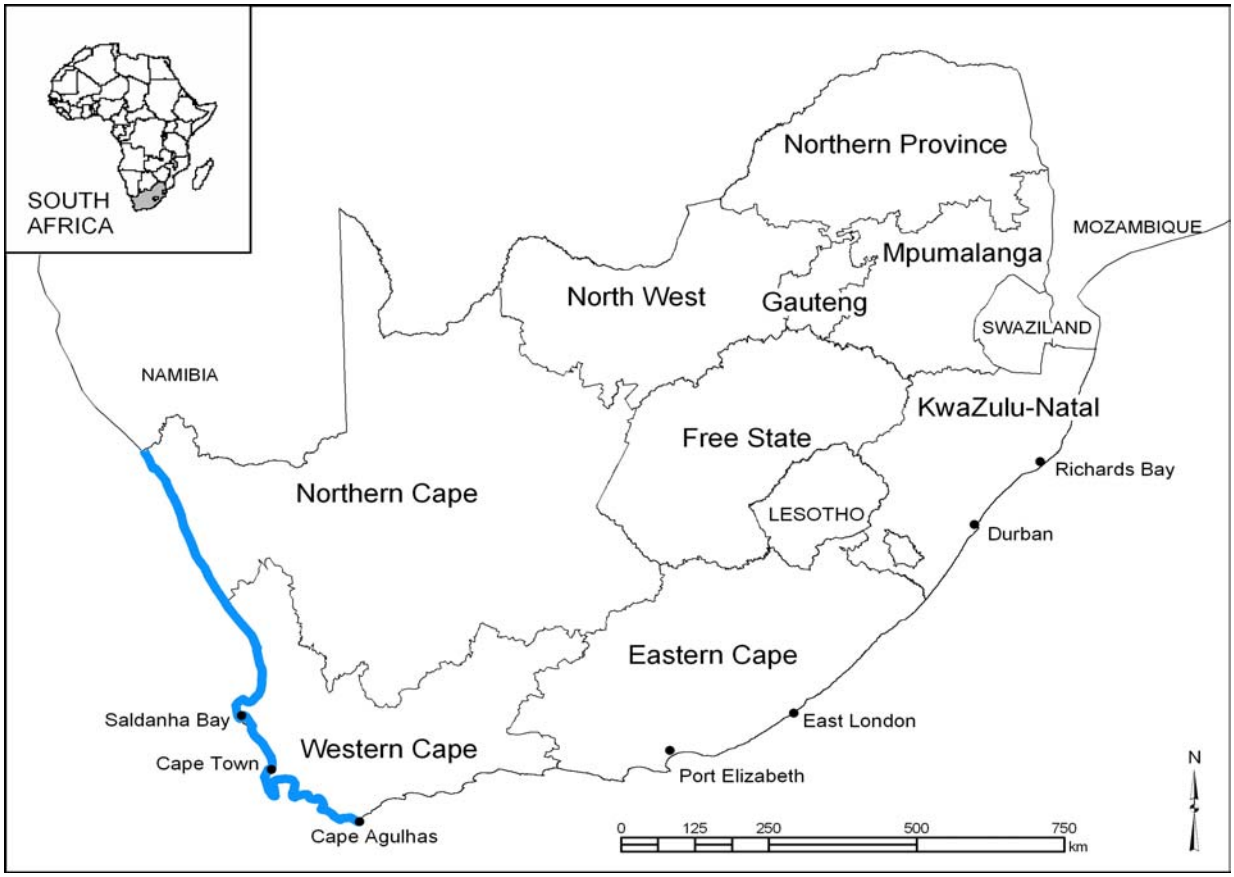


Figure 1: A map of South Africa showing the boundaries of the BCLME coastal region in South Africa as defined in this study.

5. HISTORY OF SUBSISTENCE/ARTISANAL FISHERIES ALONG THE WEST AND SOUTHERN CAPE COASTS OF SOUTH AFRICA

Historical evidence indicates that indigenous people in the western and southern Cape coast of South Africa were harvesting intertidal resources at least 50 000 and perhaps as much as 150 000 years ago. On the coast of southern Namaqualand there are extensive archaeological deposits of past shellfish collectors. During winter hunter-gatherers (the San) migrated to the coast from the mountains in the interior to access protein-rich marine resources, which included fish, crayfish, seals and molluscs (Parkington,1976; Thackeray, 1988). These coastal resources were targeted in the winter months as this is when filter-feeding shellfish are free of the toxicity associated with the harmful algal blooms prevalent along the coast in the summer months.

After the Dutch settled in Cape Town, the Western Cape was the first region of South Africa to be colonised by the Europeans. Penn (1987) gives an historical account of the violent process of colonisation by the pastoralist 'Trekboers'[2] who migrated north along the coastal areas of the West Coast in the period 1700-1740, first searching for flocks and herds, grazing land and water resources. Along the west coast and hinterland they deprived the indigenous pastoralists (the Khoi) of their livestock and exterminated the game upon which the San depended. As competition for land and water increased and the subdivision of land into private farms for settler colonialism occurred, the Khoi-San resistance to colonisation was thwarted. They were deprived of their ability to maintain an independent existence and by the 1740s had largely been forced into becoming a class of labourers on white farms (Penn, 1987, p. 462).

Somewhere between 50-100 years after European colonisation true subsistence utilisation of coastal resources declined to negligible levels and there is currently little subsistence utilisation (in the sense that indigenous people of the east coast regularly utilise the rocky and sandy shore marine organisms) of the abundant marine resources of the west coast. This is partly a result of the low population densities along the arid west coast and partly perhaps because people adapted their harvesting methods and practices to accommodate changing circumstances related to the development of a cash economy and the introduction of new technologies (Parkington 1976; Clark *et al*. 2002). Thus it is possible that coastal residents on the west and southern Cape coast shifted the focus of harvesting towards the harvesting of greater amounts and a wider variety of resources, to be sold or bartered whenever possible.

[2] Penn uses the term to refer to the first white colonists who moved into the interior north of the Berg River. At the time they were predominantly subsistence semi-nomadic pastoral farmers (Penn, 1987, p. 461-462)

Current patterns suggest that with time harvesting shifted away from inter-tidal invertebrates to include shallow sub-tidal and near-shore resources (such as lobsters, oysters, abalone and fish) requiring a boat (Clark *et al*. 2002). This would have also led fishers to operate over longer distances and to travel farther to reach suitable harvest areas and to access markets in urban centres.

Van Sittert (2001a and b, 2002a and b) provides an account of the more contemporary history of fishers and fishing settlements[3] along the west coast of South Africa. His documentation of two typical fishing settlements at Velddrift and Hottentots Huisie (van Sittert, 2001a), illustrates the context and processes through which 'informal' fishers emerged and were sidelined by dominant groups and interests.

Van Sittert (2001a) points out that in general, rural urbanisation and the formation of 'company towns' in South Africa were centred around the exploitation of natural resources (predominantly concentrated on mining) and were shaped by a coalescence of interests between state and industry. In the case of Velddrift, like other coastal settlements along the Western Cape coast, marine natural resources and the fishing industry played a key role in the settlement of an area whose development had been hampered by poor soils and a dry climate. The area initially attracted labour to agriculture and both informal and commercial fishing, which led to competing interests between the agrarian landlords and the fishing industries (in alliance with boat owners and small businesses). The state mediated in the favour of the commercial fishing industry. Both black and white fishers and factory workers were affected by poverty in the area, but when opportunities for economic and social advancement arose, racial segregation (and later apartheid policies) favoured poor whites at all levels, from ownership of land and housing, to access to basic services and economic opportunities. A stable and docile labour force to service the white-owned farms and fishing industries were secured directly and indirectly, through means such as access to housing and the sale of alcohol.

The history of Hottentots Huisie (a settlement that later became a squatter camp in a large urban centre) illustrates how the combined action of restrictions on informal fishing in favour of the fishing industry, and forced removal from the land, altered the lifestyle of a range of people who, for more than a hundred years made a living from inshore fishing activities (Van Sittert, 2001a).

[3] This term refers to settlements which were historically considered to be fishing settlements, due to the high proportion of inhabitants' involvement in fishing. The settlements contain fisher households - groupings of people who fish informally or legally.

Over time, along the western and southern Cape coasts, fishing and marine harvesting activities other than those undertaken by whites for recreational or commercial purposes, became illegal, and this illegality gave rise to an 'informal sector of poachers' which found itself in conflict with authorities and other sectors (Harris et al., 2002). Towards the end of apartheid they could, in theory, have gained legal access to marine resources by acquiring recreational or commercial licenses. In practice however they were still denied legal access to their traditionally harvested resources because their harvesting methods and quantities required did not conform to conditions for recreational permits and they could not afford the recreational license fees (Harris et al., 2002).

Diversification of resource use and the frequent sale of catches have made it difficult to distinguish between subsistence fishers and what have traditionally been viewed as commercial fishers. There is now a fisher continuum from poor people who harvest marine resources mainly for their own consumption to industrial 'fishers' who harvest, process and sell marine resources only for profit (Clark et al., 2002). Within this continuum there are fishers who work part of the time in the commercial sector and operate on a subsistence basis during times when employment is not available in the formal fishing sector.

Although there is limited genuine subsistence use of resources, there is a significant use and sale of marine resources by sectors of the south and west coast populations that have very low incomes, rely on marine resources as a nutritional supplement, have an historical affiliation to fishing practices, and have very limited opportunities for deriving an income other than from those relating to exploitation of marine resources. The definition of what constitutes a subsistence or artisanal fisher is problematic in the South African context and even more problematic when attempting to compare these fishers and their activities across three nations of widely differing socio-economic status and culture. The definition of the terms subsistence and artisanal in the South African context is discussed later in this report (See Section 7).

6. BROAD CHARACTERISATION OF THE BCLME COASTAL REGIONS

6.1 BIOPHYSICAL CHARACTERISATION

This overview is a brief summary of the oceanography and environmental variability of the Benguela Current Large Marine Ecosystem and is derived largely from Shannon & Pillar (1986) and Shannon & O'Toole (1999). The Benguela is one of four major current systems that exist at the eastern boundaries of the world oceans. These eastern boundary currents are

characterized by upwelling of cold nutrient-rich water along the coast, and they are important centres of plankton production. This production supports a global reservoir of biodiversity and biomass of fish such as sardine (pilchard), anchovy and horse-mackerel and also sea birds and marine mammals. Upwelling is a result of the longshore winds which displace warm surface water northwards and, as a consequence of the earth's rotation, offshore. This results in a drop in sea level against the coast. To replace the displaced water, deeper water wells up inshore, and compensatory circulations and longshore currents over and adjacent to the continental shelf are set up. The coastal upwelling area of the Benguela Current ecosystem extends from southern Angola along the west coast of Namibia and South Africa and around the southernmost part of the continent. While the area shares many of the generic characteristics of other eastern boundary currents, it is unique in that it is bordered at both northern and southern ends by warm water systems, namely, the Angola Current and Agulhas Current respectively. These equatorward and poleward boundaries are not fixed in space and in time, but are highly dynamic, and their pulsing impacts on the ecosystem as a whole and on its resources.

The principal perennial area of strong southerly winds lies near Lüderitz (27°S) with a secondary area near Cape Frio (18°S). However, there are several secondary upwelling cells at Cunene, in northern and central Namibia, in Namaqualand, at Cape Columbine and around the Cape Peninsula. Off northern Namibia, the longshore wind which causes upwelling is strongest during autumn and spring. North of about 15°S, the latitude of Namibe in southern Angola, the winds are much weaker than off the Namibian and South African coasts, although they remain longshore on average and reach maximum intensity during winter. Although upwelling does occur along the coast of Angola at times, it is not pronounced, and the water column remains stratified throughout the year. The physical northern boundary of coastal upwelling is marked by the Angola-Benguela frontal zone characteristically between 14°S and 17°S (i.e. close to the Angola-Namibia border). However, upwelling can occur seasonally along the entire coast of Angola

The southern boundary of the Benguela system can be considered as the Agulhas retroflection area, on the south coast of South Africa. The western (offshore) boundary of the Benguela is fairly open ended, but is generally taken as approximately the 0° meridian. One of the major features of the Benguela region is the occurrence of large areas where very low concentrations of dissolved oxygen are found in shelf waters. On occasions at sites such as Walvis Bay the sea can become anoxic at times, particularly at depth. The occurrence of low-oxygen water plays a key role in controlling the distribution and abundance of several marine species – both invertebrates such as rock lobster, and fish such as hake.

Outbreaks of red tide occur both in the northern and southern Benguela and generally occur close inshore. They are most frequent during calm conditions which follow upwelling, or during periods of light onshore winds. The most common red tide organism in the southern Benguela is *Noctiluca scintilans*, a non-toxic dinoflagellate. It also occurs off Namibia. This organism has been associated with fish mortalities, not because it is toxic, but because it depletes the dissolved oxygen in the water during major blooms. It can become dense enough to clog the gills of fish. Zooplankton in the Benguela ecosystem is dominated by small crustaceans, the most important groups being copepods and euphausiids. Of these, copepods are numerically the most abundant and diverse group.

There are a number of physical factors which are important determinants of the structure and functioning of the ecosystem. Of these the wind - and in particular the periodicity in the longshore wind which produce upwelling - is of over-riding importance. Over one third of the Benguela upwelling area and all of Angola's coastal oceanic waters lie within the tropics, and consequently receive high levels of thermal radiation and light. Tides and tidal currents are important in the near-shore environments, especially in semi-enclosed bays. However, in comparison with coastal areas in those parts of the world which experience large tidal ranges, their effects within the Benguela are relatively minor. The tidal range in the Benguela is typically 1-2 m. Detailed information on the dynamics of upwelling and its consequences in the southern Benguela is presented in Volumes 5 and 12 of the South African Journal of Marine Science published in 1987 and 1992.

'Extreme' events are also a feature of the Benguela system. The most obvious of these are listed below.

1. Benguela Niños are a result of major incursions of warm tropical water from Angola and from the west into the northern Benguela. These occur on average every ten years.
2. Large scale hypoxia in subsurface and bottom water on the continental shelf.
3. Anomalous large-scale flooding of the southern Benguela by warm Agulhas Current water.
4. Major intrusions of cold Sub-Antarctic Water in the south.
5. Sustained anomalous upwelling (or the absence thereof) caused by changes in regional winds.

There is a growing body of evidence that suggests that marine ecosystems undergo decadal-scale fluctuations driven by variability in climate. This is most apparent at the higher trophic levels (fish). There is evidence in the southern Benguela, at least, of species alternations or regime shifts between anchovy and sardine. In the northern Benguela the sediment record suggests that both sardine and anchovy undergo decadal-scale fluctuations, at times with

species dominating alternately, at other times with the two species fluctuating synchronously (e.g. Shackleton, 1986). What is also apparent from the sediment record is that there can be long periods (several decades) where both species are absent or only present at a low biomass.

The colonial past, coupled with the distinct distributions of the principal harvested living marine resources has resulted in the countries in the region focusing activities related to resource use within their own EEZs (Exclusive Economic Zones). The civil war in Angola and political problems in the region during the 1970s and 1980s resulted in little attention being given to cross-system boundary environmental issues. Management of the Benguela living and non-living resources has in the past not been integrated adequately either within individual countries or within the region. There has also been a general lack of an ecosystem approach to the management of living marine resources, although attempts have been made to take environmental considerations into account, for example, in setting catch levels in the different countries. Although the Benguela environment displays a high degree of variability across a wide range of time and space scales, there is a growing consensus that major sustained events and changes impact the ecosystem as a whole.

An integrated overview of the major fisheries resources of the Benguela Current region has been compiled by Hampton et al. (1999). Major resources are:

- Small pelagic fish;
- Demersal species of fish caught by bottom trawls;
- Crustaceans;
- Linefish.

The comprehensive report describes the life histories of the major species, the history and current status of the fisheries, changes in the abundance and distribution of the major fish resources and some of the effects of the environment on the distribution and abundance of these major resources. The focus of the report is largely on commercial fisheries and there is little to be gained from repeating the information in this report. However, several of the resources targeted by the big industrial fisheries in the BCLME region are also utilised by artisanal and small-scale fishers either for food or on a commercial basis. Thus management practices related to these fisheries will to a greater or lesser degree impact on small-scale fisheries either from the perspective of stock availability or from the point of view of ecosystem effects of industrial resource use.

Existing Oceanographic and Fisheries Data and Information Systems relevant to the Benguela system are described in Appendix 2.

6.2 SOCIO-ECONOMIC CHARACTERISATION

An overview of coastal regions and localities along the BCLME coast provides an understanding of the contexts under which 'informal'[4] fishers live and work, and what potential economic alternatives are available when restrictions are placed on their current livelihood activities. Socio-economic conditions in these coastal settlements vary substantially. Data on demography, household access to basic services, labour force employment status and income, as well as on the main industries were gathered from the Census 2001 and have been compiled into tables. In the interests of readability, not all the data are included in this report. The complete data are available on request and are documented in an EEU internal report (Cardoso, 2004).

6.2.1 Main formal economic activities

1) The Northern Cape Province's Namaqualand coast

Mining and fishing - Namaqualand has the second lowest economic growth rate in SA. In the past mining (of alluvial diamonds and non-ferrous metals) and fishing have been the main formal economic activities, and were both dominated by large mining (namely, De Beers and Alexcor) and fishing companies (Green Paper {GP}, 1998 & Britz et al., 2000) with few benefits accruing to local communities. However, both the mining and fishing industries are in decline. Although strategies to extend the lifetimes of the mines are being sought, the long term prospects are that the mines will be downscaled and possibly closed down (Northern Cape Coastal Management Plan {NCCMP}, 2004 and Britz et al., 2000).

There are relatively few varieties of exploitable living marine resources, but hake, pilchard, anchovy, seals, rock lobsters, mussels and limpets occur in harvestable quantities. There are also extensive beds of kelp (GP, 1998). Fish stocks and the fishing industry have declined somewhat over the last two decades and lobster landings in the Northern Cape have decreased from a high of 1126 tons in 1969 to 33 tonnes in 1996 (Britz et al. 2000). Seaweed harvesting activities are currently very limited.

[4] In the sections dealing with socio-economic issues, previously disadvantaged fishers will be referred to as "informal" fishers when referring to them pre-MLRA (1998) legislation. Exceptions will be made when referring to publications by the researchers who were part of the SFTG that tried to identify subsistence fishers amongst the "informal" fishers. In these instances "subsistence" (i.e. subsistence in quotes) fishers will be used, because their data included people who subsequently were categorised by the SFTG as both subsistence and small-scale commercial fishers.

2) The Western Cape Province

The framework for the development of the Western Cape Province 2004-2007 states that between 1996-2001 the province experienced higher population and labour force growth than the respective national averages. This, together with a slow down in the economy resulted in stagnant real per capita growth rates between 1996 and 2001. The economy has been restructuring by shifting away from the unskilled and labour intensive sectors towards capital intensive and high skills sectors, where low levels of education prevent participation in the job market and exacerbate the unemployment situation. The same report also highlights that the last ten years of service delivery has not reduced the levels of poverty and inequality in the region. Thus although the Western Cape is one of the wealthiest provinces in the country, it faces large development challenges.

a) The West Coast

- **Fishing:** The West Coast is the centre of South Africa's commercial fishing activities. These are dominated by highly industrialised and capital intensive trawl and purse-seine fisheries and the rock lobster fishery. Fishing is one of the most important sectors of the West Coast economy. It produces approximately 70% of the total fish catch in the country and is the economic base for most coastal towns and settlements. In 1994 the industry contributed R700 million to the region's GGP (Gross Geographic Product) (West Coast District Spatial Plan, Vol. 1, Consultative Draft November 2000, p. 9). Although the rock lobster industry is currently stable, it has declined considerably since the 1970s and 1980s, and experiences poaching problems. Hake and pilchard resources are recovering from past over-exploitation. The decline in the fishing industry in the last few years has caused many socio-economic problems (West Coast District Spatial Plan, Vol. 1. Consultative Draft, November 2000). The port of Saldanha is the centre of the regional economy and caters for recreational, mariculture and industrial activities (GP, 1998).
- **Manufacturing:** Fish processing and associated industries are part of the manufacturing industries in this region. A large proportion of fish caught along the West Coast is landed at Saldanha Bay, St Helena Bay and Velddrif / Laaiplek, where there are a number of fish packing and processing factories. Boat building and fish-net factories are mainly concentrated in Vredenburg and St Helena Bay (West Coast District Spatial Plan, Vol. 1, Consultative Draft, November 2000).
- **The Saldanha Steel Project:** This is one of the government's Spatial Development Initiatives (SDIs) programmes which attracted investment into several cluster industries. Although the project led to job creation, many jobs were temporary and taken up by job seekers with better market-related skills that came from outside the region, creating

conflict between them and locals. Business in the associated construction sector went bankrupt after the initial boom. Overall the project led to an increase in social problems in the area (such as homelessness, crime, unemployment) (Sustainable Coastal Livelihoods Study, 2002, p. 41 -42).

- **Mining:** This activity entails the extraction of heavy minerals (i.e., titanium, zirconium and monazite) from sands near Brand-se-Baai, north of Lutzville (Namakwa Sands project). There is a possibility that the Namakwa Sands project may be extended.The proposed extension includes increasing production at the mine near Brand-Se-Baai and corresponding up-grades at the mineral separation plant at Lutzville and the smelter near Saldanha Bay. Other relevant components of the mining industry are the plant associated with heavy minerals extraction at Saldanha Bay and until recently the extraction of phosphates at Vredendhal (West Coast District Spatial Plan, Vol 1, Consultative Draft November 2000), which has now ended.

b) The Cape Metro

Greater Cape Town has a large and diverse economy based mainly on manufacturing, government and community services, shipping, commerce and tourism (GP, 1998). Although manufacturing makes the greatest contribution to income, the government and the community services sector is the largest employer. There is a high demand for residential housing along the Cape Metro coast. A result of the large urban population is a high demand for all fisheries related products.

c) The south (Agulhas) coast

- **Fishing**: The region is the centre of the abalone industry in South Africa. Commercial abalone fishing is based in the area between Cape Agulhas and Pringle Bay, but the resource has been severely threatened by poaching, The White Paper (2000) also states that increased demand for other resources (offshore, in-shore and intertidal) along the southern western Cape coast has intensified both conflicts and illegal practices.

6.2.2 Tourism

The main tourist attractions along the Namaqualand and West Coast are seasonal, and are based on the natural vegetation and wild flower displays at the beginning of spring. In Namaqualand these are restricted to non-mining areas. The Cape Metro and the south western Cape coasts attract tourists because of their climate and natural scenic beauty (e.g. coastline, beaches, mountains, Cape Floral Kingdom, seal and penguin colonies). Cultural and recreational activities also constitute major tourist attractions around Cape Town.

Except for Namaqualand, where most of the coastal land is owned by mining companies, the other BCLME coastal areas have been subjected to the spreading development of exclusive coastal holiday resorts and holiday homes which has effectively limited access to the coast by locals (GP, 1998). The West Coast District Spatial Plan states that tourism has been the most important growth stimulus in the economic development of the Western Cape Province, with impacts on sub-sectors such as trade, accommodation and catering, manufacturing, recreation, personal services and transport. It emphasises the potential value of eco-tourism in the conservation of certain areas, as a means of generating revenue for the management of these areas and the upliftment of local communities. However it also warns that tourism is one of the most unregulated industries and has the potential to impact negatively on the environment and local cultures. The document states that tourism therefore needs to be managed in a sustainable manner. One of its recommendations is that a "substantial portion of tourism benefits must find its way into the local communities".

6.2.3 Opportunities for and major constraints to socio-economic development

Opportunities for making a living in the Namaqualand coast are limited (GP, 1998). Some of the activities that, according to the literature reviewed, could potentially be explored and bring some economic benefits include mariculture, harvesting of under-utilised marine resources (e.g. limpets, mussels) and the establishment of value-adding fish industries (GP, 1998; Britz et al., 2000; White Paper, 2000). The region has the largest mainland seal colony in the world but in terms of extractive use, seal harvesting is controversial. Together with the establishment of a Coastal National Park between the Groen River and Spoeg River, the seal colony could become a tourist attraction. Along the West Coast the potential for economic development is linked to the development of small-scale industries that add value to fishing, floriculture, mariculture and tourism promotion activities. The following are some of the major overall constraints to socio-economic development, identified in the literature reviewed.

6.2.3.1 Lack of access to employment opportunities

- **Employment and unemployment** – The general employment levels in fishing settlements on the BCLME western coast are relatively low. The highest levels of employment (68% of the workforce employed) occur in Paternoster and Yzerfontein and the lowest levels occur in Atlantis and Lambert's Bay (10 and 9% respectively of the workforce employed; Table 1). On the BCLME south coast employment figures range from 42 to 59%. The relatively low official unemployment figures in some of the BCLME coastal communities reflected in Table 2 (4-29%) need to be assessed in conjunction with the category "others" in each locality. For example, while

unemployment in Lamberts' Bay seems to be very low (4%), the level of employment is also very low (9%). Most of the economically active population (87%) fall into the category "others", of which only 3 % are students/scholars. The data set under-estimates unemployment rates as official unemployment figures are based on the official definition of unemployment, which excludes those that have not looked for work for the four weeks immediately prior to the survey. Employment figures represent an overestimate as they also include those that are working in the informal sector. The SFTG data for fisher household (discussed in section 9 of this report) showed that 15% and 11% of household members on the BCLME west and south coasts (respectively) had regular employment and 16% and 23% (respectively) were unemployed (Table 12 – Box A), suggested that employment figures amongst fisher households are on the lower spectrum and unemployment is on the higher spectrum of the overall ranges found in these coastal settlements (Table 2).

- **Broad employment trends:** Employment figures (for 1996 and 2001) in different industries in fishing settlements on the BCLME coast, are given in Table 2[5]. Outstanding features in these data are that, in the BCLME West Coast settlements, the percentages of people employed in most of the formal sectors have decreased between 1996 and 2001, often substantially. The percentages of those who classify under the category "not applicable" have increased dramatically in all the settlements except St Helena Bay. In very few instances has employment increased, and in 4 out of 8 cases these increases are related to "agriculture, mining, hunting and forestry", which generally require low skills and result in low pay, with concomitant limited prospects for mobility. The Green Paper (1998) indicates that in Namaqualand, unemployment has doubled since 1980.

In the three settlements along the BCLME south coast that are illustrated in Table 2 (Kleinmond, Gansbaai and Hawston) no significant changes in employment are reflected in any of the formal sector industries, although there are slight increases in wholesale/retail trade (1-4%), and in community/social services (2-3%). There was a 6-10% reduction in the "not applicable" category, which nevertheless remains high (53-58% of the labour force).

[5] Due to new municipal demarcations comparison between employment figures required some re-calculations and adjustments of the Census 2001 data to the 1996 boundaries. This was done with the assistance of Tracy Daniels and Deon Kleinsmith, researchers in the Statistics and GIS units at the offices of Statistics South Africa in Cape Town. In all instances one must be aware that slight changes in demarcations may have occurred and that the following reflect broad trends rather than strict quantitative measures. Localities mostly affected by new demarcations are: Vredenburg, Saldanha, St Helena, Atlantis, Hermanus, Strand and Gordon's Bay. Re-calculations to assess employment trends were only done for Vredenburg, Saldanha, St Helena and Atlantis, as an illustration. In these instances columns marked "2001-b" in Table 2 should be considered.

Table 1: Labour Force Employment Status: Employment and Unemployment (using official definition of unemployment#)

Locality			Employed %	Unemployed %	'Others' %			Total
					Total	Pensioner/ retired	Scholar/student	
WEST BCLME COAST	N. Cape Province	Port Nolloth	37% (1157)	29% (918) (B=32%)	35% (1073)		8% (262)	101% (3148)
		Hondeklip B	58% (216)	14% (54) (B=38%)	27% (103)		1% (3)	100% (373)
	Western Cape Province	Ebenhaesser	28% (704)	21% (532)	50% (1244		14% (339)	99% (2478)
		Doringbaai	48% (330)	15% (104)	36% (249)		8% (57)	99% (683)
		Lamberts Bay	9% (24)	4% (9)	87% (220)		3% (1)	100% (254)
		Elands bay	41% (210)	10% (51)	49% (248)		15% (74)	100% (510)
		Velddrift	36% (442)	24% (296)	40% (490)		6% (75)	100% (1227)
		St Helena	62% (882)	7% (101)	31% (432)		7% (98)	100% (1415)
		Paternoster	68% (1594)	4% (98)	28% (645)		1% (18)	100% (2337)
		Vredenburg	39% (183)	8% (35)	53% (248)		5% (25)	100% (466)
		Saldanha	37% (414)	17% (186)	46% (518)		11% (122)	100% (1118)
		Yzerfontein	68% (1354)	12% (240)	20% (389)		5% (98)	100% (1983)
		Mamre	32% (4953)	22% (3426)	46% (7013		13% (2024)	100% (15391
		Atlantis	10% (736)	27% (2070)	64% (4936		26% (1984)	101% (7742)
		SFTG: Fisher Households*	15%	16%				
SOUTH BCLME COAST	South West Cape Province	Strand	51% (15681)	13% (3951)	36% (10906)	8 (2373)	10% (3137)	100% (30537)
		Gordon's Bay	59% (1140)	4% (81)	37% (725)	12 (228)	9% (173)	100% (1946)
		Kleinmond	42% (1808)	13% (556)	45% (1630)	16 (704)	4% (157)	100% (4348)
		Hawston	47% (2123)	13% (598)	40% (1748)	4 (187)	9% (422)	100% (4470)
		Hermanus	50% (3373)	17% (1116)	33% (2233)	11 (716)	7% (500)	100% (6723)
		Gansbaai	47% (1500)	5% (175)	48% (1522)	14 (448)	4% (134)	100% (3197)
		SFTG: Fisher households*	11%	23%				

Source: Statistics SA (Census 2001); (B) - Mather et al. quoted in Britz et al. (2000)

 # Based on the official or strict definition: Statistics South Africa (Stats SA) uses the following definitions *official unemployment rate:* the *unemployed* are those people within the *economically active population* who: (a) did not work during the seven days prior to the interview, (b) want to work and are available to start work within a week of the interview, and (c) have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview. The *expanded unemployment rate* excludes criterion (c).

"Others" – this category has been calculated for the purpose of this report by adding the following categories that appear in census 2001: Home-maker or housewife, Pensioner or retired person/too old to work (it is presumed this applies to women as men are only considered pensioners at 65), Unable to work due to illness or disability, Seasonal worker not working presently, Does not choose to work , Could not find work (only includes people aged 15-64) and Scholar or student (this category is also shown separately as it denotes persons aged 15-64 who most likely are not looking for or wanting to work). Thus, strictly speaking some of these should be included under those classified as unemployed. ( ) – figures in brackets indicate the number of people. In the above table only the categories 'scholars/students' and 'pensioners/retired' are specified separately under "others".

* Please see Table 12 – Box A

Table 2: Employment trends by industry (Figures are the percentages of the working population in the various settlements employed in any particular industry. Numbers are the actual numbers of people employed)

	Northern area of BCLME coast of South Africa									
	Northern Cape Province				Western Cape Province					
	Port Nolloth		Hondeklip Bay		Ebenhaeser		Doringbaai		Lamberts Bay	
	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001
Agriculture, hunting, Forestry & fishing	5% 77	3% 93	-	10% 36		0% 3	73% 137	-	22% 280	1% 3
Mining & quarrying	21.5% 309	9% 276	48% 52	23% 87		4% 102	3% 5	23% 159	1% 16	4% 9
Manufacturing	7% 105	1% 30	-	3% 12		2% 51	0.5% 10	4% 27	10% 129	-
Electricity, gas & water supply	0% 4	0.3% 9	1% 1	-		-	-	-	0.5% 6	-
Construction	7.5% 107	2% 60	1% 1	-		2% 45	2% 4	2% 12	8% 103	-
Wholesale & Retail trade	16.5% 237	7% 231	28% 30	2% 6		8% 187	3% 6	7% 48	12% 145	1% 3
Transport, storage & communication	3% 38	1% 30	3% 3	2% 9		1% 33	-	0% 3	2% 22	-
Finance, insurance, Realestate & business	3% 39	1% 45	2% 2	2% 9		1% 18	1.6% 3	4% 24	3% 38	-
Community, social & personal services	16% 229	6% 198	2% 2	5% 18		6% 157	7% 14	6% 39	16% 198	2% 6
Private households	8.8% 126	5% 143	11% 12	3% 12		3% 64	2% 4	2% 12	11% 137	-
Undetermined *	10.6% 153	1% 42	1% 1	7% 27		2% 45	7% 14	1% 61	13% 160	1% 3
Not applicable **	0.7% 10	63% 1991	4% 4	42% 157		72% 1774	0.5% 1	52% 353	1.3% 16	91% 230
Total	99% 1434	99 % 3148	101% 108	99% 373		101% 2478	100% 189	101% 683	100% 189	100% 254

Table 2: Employment trends by industry (continued)

	Western area of BCLME coast of South Africa										
	Western Cape Province										
	Elands Bay.		Velddrift		Paternoster		Yzerfontein		St Helena Bay ***		
	1996	2001	1996	2001	1996	2001	1996	2001	1996	01-a	01-b
Agri, hunt, forest /fish	31% 707	1% 6	18% 76	5% 57	44% 1048	52% 1209	7% 7	49% 977	19% 500	0% 3	63% 732
Mining & quarrying	0	1% 3	1% 6	2% 24	0	-	0	-	0	28% 398	-
Manufacturing	26% 594	-	12% 51	2% 21	7% 24	0% 6	6% 6	0% 3	60% 1562	7% 93	11% 132
Electricity/gas/ water supply	0.3% 6	-	0	-	0% 6	-	0	-	0% 3	-	0% 1
Construction	9% 201	-	4% 19	1% 15	13% 48	0% 9	7% 7	1% 12	2% 58	3% 42	2% 28
Wholesale/ Retail trade	12% 262	9% 48	25% 107	8% 102	11% 39	0% 6	28% 27	2% 42	5% 127	8% 120	8% 96
Transport/storage/communic.	2% 55	4% 18	9% 37	1% 15	2% 6	-	5% 5	0% 3	1% 29	2% 27	1% 6
Finance/insur/ Real state/bus.	2% 40	2% 12	9% 37	1% 12	4% 15	0% 6	14% 14	0% 6	2% 48	2% 27	4% 45
Comm/social/ Pers/ services	9% 197	12% 63	19% 84	9% 111	5% 18	1% 21	16% 15	6% 117	5% 132	3% 42	6% 75
Private Households	7% 150	7% 36	13% 13	5% 67	5% 18	10% 229	5% 5	8% 167	2% 44	3% 39	2% 24
Undetermined *	2% 36	4% 21	1% 5	1% 18	9% 33	5% 108	9% 9	1% 27	3% 70	6% 90	3% 33
Not Applicable **	0	59% 300	0	64% 785	0	32% 743	2% 2	32% 629	1% 15	38% 533	-
Total	99% 435	99% 510	101% 435	99% 1227	99% 361	100% 2337	100% 97	99% 1983	100% 2588	100% 1415	100% 1171

Table 2: Employment trends by industry (continued)

	Western area of BCLME coast of South Africa											
	Western Cape Province											
	Vredenberg ***			Saldanha Bay ***			Mamre		Atlantis		Atlantis + Mamre ***	
	1996	2001-a	2001-b	1996	2001-a	2001-b	1996	2001	1996	2001	1996	2001
Agric/hunt/ forest & fish	5% 426	14% 66	4% 184	15% 1048	2% 927	11% 379	2% 41	1% 96	1% 156	0% 24	1% 197	0.5% 120
Mining & quarrying	0.5% 39	2% 9	2% 86	0% 24	-	1% 27	0	-	0.2 24	0% 6	0% 24	0% 6
Manufacturing	14% 1132	1% 6	19% 896	29% 1945	1% 6	36% 1241	35% 738	1% 207	39% 5630	0% 18	43% 7106	1% 225
Electricity/Gas/ Water supply	1% 97	3% 12	0% 13	1% 31	-	0% 7	2% 41	0 30	23% 353	-	2% 394	0% 30
Construction	14% 110	3% 15	9% 403	6% 386	2% 24	3% 115	4% 88	2% 305	4% 600	1% 52	4% 688	1.5% 357
Wholesale/ Retail trade	15% 1205	3% 120	16% 753	8% 564	5% 60	**14%** 500	6% 114	6% 965	10% 1436	1% 81	9% 1550	4.5% 1046
Transp/storage /communic.	13% 1024	-	6% 270	5% 317	2% 240	5% 166	3% 57	3% 442	3% 460	0% 36	3% 517	2% 478
Finance/insur/ Real estate/bus	7% 532	-	9% 436	3% 208	3% 33	6% 207	3% 53	3% 520	5% 679	0% 21	4% 732	2% 541
Comm/social Pers/services	13% 1064	6% 27	14% 6362	22% 1510	13% 141	13% 441	16% 331	8% 1165	10% 1500	4% 298	11% 1833	11% 2509
Private households	6% 444	6% 30	2% 114	4% 264	4% 48	2% 63	2% 41	4% 553	3% 412	2% 168	2% 453	3% 721
Undetermined *	10% 804	-		7% 444	5% 51		27 572	4% 670	21% 3092	0% 33	22% 3664	3% 703
Not applicable**	1% 67	61% 283	18% 825	0.7% 45	63% 704	10% 336	0.5 10	68% 10438	1% 124	90% 7006	1% 134	75% 17444
Total	100% 7934	99% 466	100% 4616	101% 6786	98% 1118	100% 3481	100.5 % 2086	100% 15391	100% 14466	98% 7742	102% 16552	103.5 % 23133

Table 2: Employment trends by industry (continued)

	Southern Cape area of BCLME coast of South Africa					
	South western Cape Province					
	Kleinmond		Gansbaai		Hawston	
	1996	2001	1996	2001	1996	2001
Agri/hunt/ forest & fish	1% (58)	4% 180	9% (349)	7% (217)	1% (153)	3% (137)
Mining & quarrying	0% (2)	0% (3)	0% (0)	0% 0	0% (0)	0% (0)
Manufacturing	1% (54)	2% (75)	5% (186)	6% (191)	3% (114)	4% (166)
Electricity/Gas/ water supply	0% (9)	0% (0)	0% (4)	0% (3)	0% (10)	0% (12)
Construction	8% (304)	8% (331)	7% (242)	4% (135)	9% (339)	9% (422)
Wholesale/ Retail trade	5% (176)	8% (357)	5% (187)	9% (294)	6% (224)	7% (322)
Transp/storage /communic.	1% (26)	0% (21)	1% (33)	1% (33)	1% (31)	1% (51)
Finance/insur/ Real estate/bus	2% (66)	3% (120)	1% (30)	2% (57)	1% (58)	3% (126)
Comm./social Pers/services	7% (277)	9% (382)	5% (151)	7% (219)	6% (252)	9% (382)
Private households	6% (216)	4% (180)	4% (140)	4% (121)	6% (221)	6% (289)
Undetermined *	6% (228)	4% (159)	5% (158)	7% (230)	1% (59)	5% (216)
Not applicable **	64% (2464	58% (2540	59% (2154	53% (1697	63% (2502	53% (2347
Total	(3880	(4348	(3674	(3197	(3963	(4470

Sources: Statistics SA, Census 1996 and Census 2001.

* The following categories from the census 1996 data were placed under the category 'undetermined' for the purpose of this research: "extraterritorial organisations, representatives of foreign governments, industry NEC or unspecified". The category 'undetermined' is used in the Census 2001data, and thus is used here for comparison purposes.

** This category includes Home-maker or housewife, Pensioner or retired person/too old to work (it is presumed this applies to women as men are only considered pensioners at 65), Unable to work due to illness or disability, Seasonal worker not working presently, Does not choose to work , Could not find work (only includes people aged 15-64) and Scholar or student (this category is also shown separately as it denotes persons aged 15-64 who most likely are not looking for or wanting to work).

*** To take into account changes in demarcations and to allow comparison of data from Census 1996 and Census 2001the following adjustments were made:

Saldanha: 2001-a: data as obtained from Census 2001; 2001-b: includes 2001- a plus data for White City, Middelpos & Parker's Town, Census 2001, which in 1996 were part of Saldanha;

St Helena: 2001-a: data as obtained from Census 2001; 2001-b: 2001-a plus data for Golden Mile, which in the Census 1996 was part of St Helena;

Vredenberg: 2001-a: data as obtained from Census 2001; 2001-b: 2001-a plus data for Rusfontien, which in the Census 1996 was part of Vredenburg. In these 3 instances the data from 1996 should be compared with those that appear on column 2001-b.

Mamre and Atlantis are considered as a whole (for comparison purposes) since their combined area is similar in the 1996 and 2001 Census, although in relation to 1996 the Mamre area decreased and Atlantis increased in the 2001 Census.

Table 3: Levels of monthly individual income in some of the fishing settlements along the west BCLME coast

		No income	R1-R400	R401-R800	R 801-R1 600	R1 601-R3 200	R3 201-R6 400	R 6 401-R12 800	R12 801-R25 600	R25 601-R51 201	R51 201-R204 800	>R204801	Total	**Below R1600**
N. Cape	Port Nolloth	**(1765) 56%**	(190) 6%	(428) 13.6%)	(358) 11.4%	(218) 7%	(141) 4.5%	(33) 1%	3 (0.3%)	3 (0.3%)	(6) 0.6%	6 (0.6%)	(3148) 100%	**71%**
	Honde klip Bay	**(94) 25%**	(18) (4.8%)	(68) 18.2%	(57) 15.3%	(60) 16%	(45) 12%	(15) 4%)			(18) 4.8%	**-**	(373) 100%	**51%**
West. Cape	Eben-haesser	**(1382) 56%**	(112) 5%	(394) 16%	(284) 11%	(171) 7%	(112) 4.5%	(21) 0.8%	(3) 0%	-	-	-	(2478) 100%	**72%**
	Doring-baai	**(314) 46%**	(36) 5%	(81) 12%	(93) 14%	(78) 11%	(60) 9%	(18) 3%	(3) 0%	-	-	-	(683) 100%	**57%**
	Lamberts Bay	**(154) 61%**	(33) 13%	(48) 19%	9 4%	(3) 1%	(6) 2%	-	-	-	-	-	(254) 100%	**90%**
	Elands bay	**(255) 50%**	(48) 9%	(72) 14%	45 9%	(30) 6%	(42) 8%	(12) 2%	(6) 1%	-	-	-	(510) 99%	**65%**
	Velddrift	**(611) 50%**	(136) 11%	(222) 18%	87 7%	(87) 7%	(51) 4%	(24) 2%	-	(9) 1%	-	-	(1227) 100%	**72%**
	St Helena	**(468) 33%**	(42) 3%	(97) 7%	159 11%	(198) 14%	(225) 16%	(174) 12%	(42) 3%	(9) 0.6%	-	-	(1415) 100%	**31%**
	Pater-noster	**(691) 30%**	(715) 31%	(556) 24%	95 4%	(69) 3%	(76) 3%	(102) 4%	(21) 0.8%	(6) 0%	(6) 0%	-	(2337) 101%	**83%**
	Vreden-burg	**(207) 44%**	(93) 20%	(106) 23%	24 5%	(18) 4%	(15) 3%	3	-	-	-	-	(466) 99%	**86%**
	Saldanha	**(453) 41%**	(180) 16%	(226) 20%	84 8%	(84) 8%	(48) 4%	(30) 3%	(6) 0.5%	-	(6) 0.5%	-	(1118) 100%	**74%**
	Yzer-Fontein	**(606) 31%**	(632) 32%	(447) 23%	113 6%	(66) 3%	(63) 3%	(24) 1%	(24) 1%	-	(6) 0%	-	(1983) 100%	**87%**
	Mamre	**(6867) 45%**	(1437) 9%	(3546) 23%	1157 8%	(1144) 7%	(888) 6%	(279) 2%	(45) 0%	(12) 0%	(15) 0%	-	(15 391) 100%	**72%**
	Atlantis	**(6151) 79%**	(462) 6%	(706) 9%	176 2%	(139) 2%	(62) 1%	(24) 0.3%	(6) 0%	(12) 0%	(6) 0%	-	(7742) 99%	**84%**

Source: Statistics South Africa, Census 2001; ( ) –denotes numbers of people.

6.2.3.2 Low levels of income

The percentage of people in the labour force without any monthly income in the fishing settlements under consideration varies between 25% and 79%, but in **all** settlements the 'no income' category is the largest (Table 3).

Even taking into consideration people with a monthly individual income, the proportion who earn less than R1600 per month is very high. Overall, the proportion of the work force that has either no income or an income less than R1601 per month ranges between 63 and 97% (with the exception of St Helena at 54%), but mostly is above 80% in the BCLME settlements (Table 3). This must be seen in the context of a Minimum Living Level (MLL is considered the cut-off point below which people live in poverty) of R1 871 per month for a household of 4,7 people in March 2003, which translates into R1 489 for the year 2000 (Landman et al., 2003).

6.2.3.3 High levels of poverty – trends of increasing poverty and inequality and declining human development

- **Absolute Poverty and the poverty gap:** Using the national poverty line, there was a slight decline in absolute poverty in South Africa between 1995-2002 (Table 4a), although the South African Human Development Report (2003) notes that the total number of poor actually increased since the population also increased. This national trend is reflected in the Northern Cape, but in the Western Cape absolute poverty remained almost the same. Trends in absolute poverty using international poverty lines are also shown in Table 4(a), although the authors recognise the many criticisms levelled at the concept[6]. International poverty line indicators display similar trends as those shown for the national poverty line.

The data presented in Table 4 (a) also indicate an overall increase in poverty gaps, both nationally and within the Northern and Western Cape Provinces over the same time period.

[6] International poverty lines are used to compare poverty rates across countries, assuming that after adjusting for differences in the cost of living, a $1 or $2 a day is the "average minimum consumption required for subsistence in the developing world". But this approach is widely criticised both conceptually and methodologically. For instance: 1) it does not take into account that in a given country people are poor relative to what is available to other citizens (i.e. that poverty is relative and country specific); the translation of international price differences into national currencies are based on 'consumption bundles', based on price of goods that are often not consumed by poor people. Nor take into account price differences between rural and urban areas, nor take into account that poor people often pay higher unit prices as they cannot afford to buy in bulk, etc. – UNDP Human development Report, 2003 – pp. 42.

Table 4(a): Trends in absolute poverty and in the poverty gap in South Africa and the Northern Cape and Western Cape provinces, 1995-2003

TRENDS IN ABSOLUTE POVERTY						
	National poverty line		**International poverty line**			
	Population below the poverty line %		Population below $2 a day %		Population below $1 a day %	
	1995	2002	1995	2002	1995	2002
W. Cape	28.6%	28.8%	6.4%	7.5%	1.3%	2.7%
N. Cape	55.4%	54.4%	20.8%	19.2%	6.4%	8.3%
S. Africa	51.5%	48.5%	24.2%	23.8%	9.4%	10.5%
TRENDS IN POVERTY GAP						
W. Cape	7.5%	8.5%	1.3%	2.8%	0.4%	1.3%
N. Cape	19.0%	19.6%	5.1%	8.4%	1.7%	4.2%
S. Africa	17.8%	18.0%	6.2%	9.6%	2.5%	4.6%

Source: UNDP South Africa Human Development Report, 2003, Tables 2.20 & 2.21, p. 41-43

- **The Gini coefficient[7]:** Income inequality in South Africa since 1995 is worsening, both nationally (1995: 0.596; 2001: 0.635) and in most provinces, including the Northern Cape and the Western Cape. (UNDP SA Human Development, 2003 – see Fig 2).

- **The Human Development Index[8]:** The Human Development Index (HDI) for South Africa increased between 1990 and 1995, but has been declining since then (Table 4b). The same trends are observed at provincial levels in the Northern Cape and Western Cape (South Africa Human Development Report 2003 – see Fig. 2). This decrease is due to a decline in life expectancy, mainly associated with the impact of HIV/AIDS, despite gains in the other variables (ibid).

[7] The Gini coefficient measures the extent to which the distribution of income among individuals or households within a country deviates from a perfectly equal distribution. A value of 0 represents perfect equality, a value of 1 perfect inequality (UN Human Development Report 2002).

[8] The Human Development Index is a composite index measuring average achievements in three basic dimensions of human development – a long and healthy life, knowledge and a decent standard of living. But as the UNDP emphasises the concept of human development is much broader and complex than this and incorporates the 'expansion of capabilities that widen people's choices to lead the lives that they value". They are not included in the HDI because they are difficult to measure appropriately, not because they are any less important to human development (UN Human Development Report, 2002 - p 265; Box 2.2, p. 53). An HDI value of 0-0.499 is regarded as low value of human development, a value of 05-0.799 is regarded as a medium value of human development and a value of 0.8-1 is regarded as s a high level of human development.

Table 4(b): Trends in HDI and life expectancy at birth in South Africa and the Northern Cape and Western Cape provinces, 1995-2003

	HDI				Life expectancy at birth			
	1990	**1995**	**2000**	**2003**	**1990**	**1995**	**2000**	**2003**
N. Cape	0.7128	0.7204	0.6983	0.6856	62.5	62.9	60.5	56.8
W. Cape	0.7869	0.7914	0.7756	0.7708	64.2	64.5	63.4	61.5
S. Africa	0.7201	0.7326	0.6964	0.6675	61.0	61.4	55.5	49.2

Source: UNDP South Africa Human Development Report, 2003, Table 24, p. 278-282

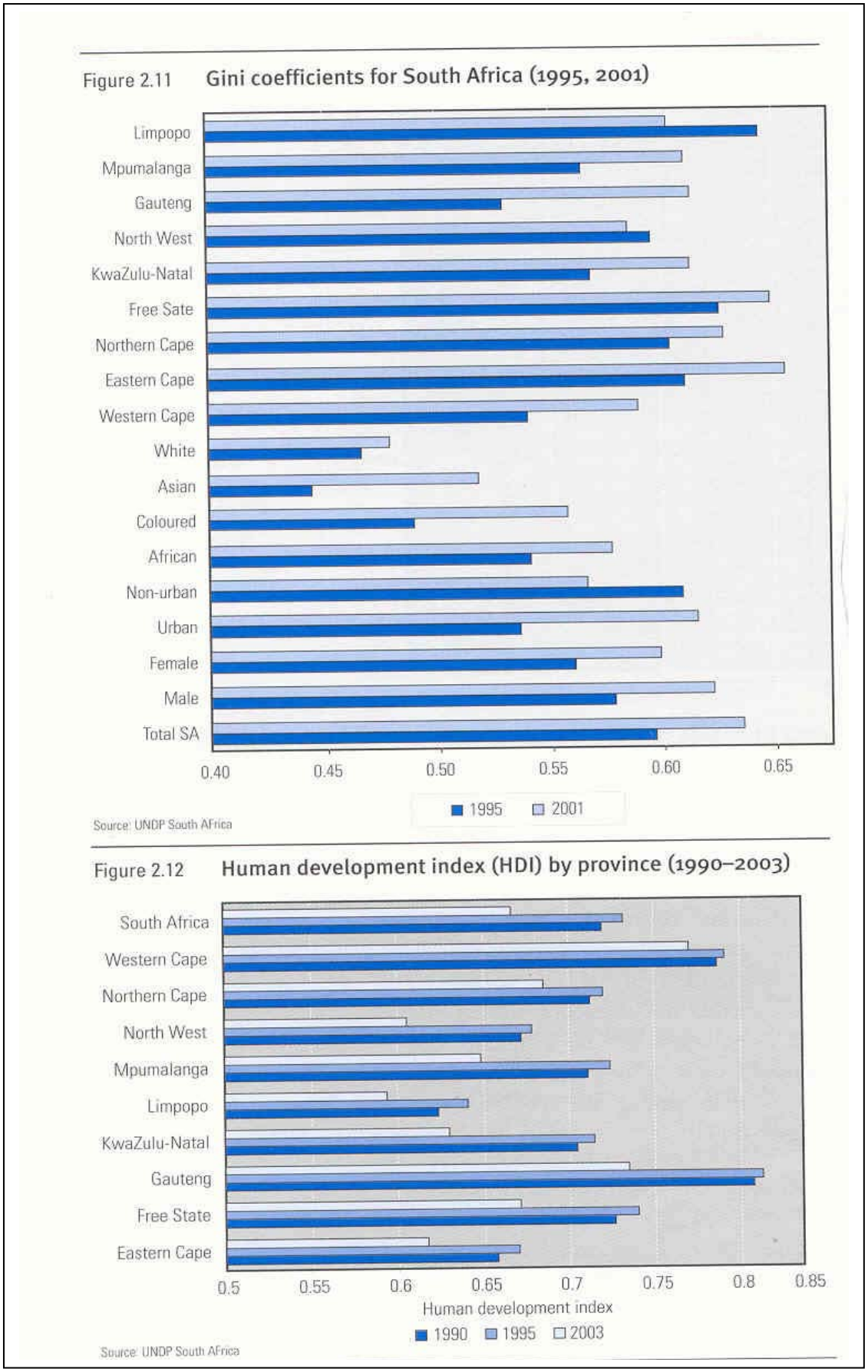


Figure 2: Gini Coefficients and Human Development Index (HDI) for South Africa
(Source: UNDP South African Human Development Report, 2003, p. 44).

6.2.3.4 Limited agricultural potential

As a whole, the BCLME coastal regions have poor soils with poor agricultural potential. Exceptions are the rich soils in some of the valleys and hills around Cape Town and the areas immediately inland along the south coast. These are intensely cultivated. The few areas of productive coastal land in Namaqualand are owned by De Beers who, until recently, used them for stock farming.

6.2.3.5 Land ownership patterns and lack of access to coastal land

In the southern and western Cape, physical access to the coast is restricted by private (mostly second home) development and land ownership patterns, which limit the potential for coastal development. Most of the coastal land from the Orange River to Paternoster in the Western Cape (extending 100 km inland and to a depth of 500 m offshore) is owned by mining companies (Northern Cape Province Coastal Management Plan – NCPCMP). According to the Sustainable Coastal Livelihoods Study (2002) the "slow pace of land restitution, redistribution and tenure reform is a limiting factor" in promoting sustainable livelihoods for the poor and reducing levels of poverty in Namqualand. The lack of access to land in the south coast is also one of the constraints in achieving sustainable coastal livelihoods based on agricultural and other resource dependent activities.

6.2.3.6 Few opportunities for locals in the fishing industry

The Sustainable Coastal Livelihoods Project (2002) mentions that as the fishing industry is 'oversubscribed' there are few opportunities for locals to participate in the industry. Many locals also lack adequate skills to maximise potential opportunities. They also lack access to finance and collaterals that would allow them to access loans.

6.2.3.7 Potential conflict between different groups

Along the entire coast there is potential for conflict between different activities (i.e., industrial development, mining, mariculture, conservation, tourism, recreation and fishing activities) and interest groups (e.g. subsistence, commercial and recreational fishers; current land owners and the local, poor and disadvantaged communities), and their competing interests and goals could present obstacles to socio-economic development (GP, 1998 and Sustainable Coastal Livelihoods Study, 2002).

6.2.3.8 Limited tourism potential

Except for the Cape Metro, tourism is seasonal and in areas such as along the Namaqualand and West coasts it has contributed little to the local economy. Namaqualand attracts on average 15 000 tourists per year, and 95% of these are elderly visitors who pass through the area without contributing to the local economy (GP, 1998; Sustainable Coastal Livelihoods Study, 2002, p. 36). As a whole, tourism related activities are seasonal and not labour intensive, and therefore bring limited benefits to the poor and do not have a significant impact on job creation. Increasing land prices related to tourism demand also marginalise poor people (White Paper, 2000; Sustainable Coastal Livelihoods Study, 2002).

6.2.3.9 Natural constraints

Along the Namaqualand coast, lack of sheltered bays limits the development of small craft harbours. Although the region has 30-40% of the national fish resources, only 0.9% of the national fishing quotas are used by locally-based fishing vessels (Sustainable Coastal Livelihoods Study, 2002, p. 36). The limited availability of fresh water is a constraint on development in general and for agriculture in particular in Namaqualand and along the West Coast.

6.2.3.10 Infrastructure

Overall there is poor infrastructural development in the BCLME coastal area, with the exception of the Cape Metro. Infrastructure provision in the Metro area is not keeping up with rapid population expansion and there is pressure on water and waste disposal systems. Public transport also needs upgrading.

Access to basic services - water, sanitation and electricity: At the household level, access to basic services such as water, sanitation and electricity for lighting purposes varies widely in the Northern Cape and west and south west coasts of the Western Cape. For instance, no households in Atlantis have access to piped water in the dwelling while in St Helena Bay 95% of households have access to piped water in the house. About 1% of households in Atlantis have flush toilets connected to a water-borne sewage system, while 34% have no access to sanitation at all. In St Helena Bay 96% of households have flush toilets and 2% have no access to sanitation at all. Similarly wide variations are seen in the usage of electricity as the main source of energy for lighting. This varies from 0% (in Lambert's Bay) to 100% (St Helena Bay), with paraffin and candles still remaining significant sources of lighting in some

settlements. About 65% of households use paraffin in Vredenburg, About 50% of households use candles for lighting in Atlantis and 95% of households use them in Lamberts' Bay.

Health and education: No detailed information on health and education facilities and on the major health and social problems in these BCLME coastal settlements was gathered for this report. But for example, in Elands Bay, Isaacs (2004) reports a high rate of tuberculosis and a rapid increase in HIV-AIDS. There is also a limited access to education as the local school only goes up to Std 7. The nearest high school is about 100 km away in Piketberg. This factor contributes to high school drop-out rates in the settlement because of an inability to afford transport and school fees. As a result there are high levels of illiteracy. Those who complete school tend to move to urban areas to look for work. Some of the other main social problems in Elands Bay include extreme poverty, high levels of alcohol and drug abuse, chronic unemployment, physical abuse of women, single parenting and teenage pregnancies. There is still racial segregation and the race-based disparity in living conditions, housing, education and access to infrastructure continues.

All of these factors need to be considered as they impact on and influence the socio-economic development of the South African BCLME region.

7 POLICY AND LEGAL CONTEXT OF SUBSISTENCE/ARTISANAL FISHING IN SOUTH AFRICA

7.1 POLICY AND LEGAL OVERVIEW[9]

At the time of the transition to parliamentary democracy in 1994, informal/traditional/subsistence/artisanal fishers were not recognised by South African legislation and they operated mostly as illegal poachers. The Sea Fisheries Act of 1988 established a Quota Board after 1991 that provided for the admission of 'new entrants' into the fishing industry, with the stated intent of promoting economic development in fishing communities. However, 'new entrants' generally referred to community quotas allocated to community trusts by the Quota Board and they lacked credibility as they did not include poor 'informal' fishers and were neither representative of nor accountable to them. The 'community trusts' were often made up of farmers, teachers, school principals and others who did not make a living from fishing. After the 1994 elections, the new government set up the Fisheries

[9] A detailed review of the Legal and Institutional framework governing artisanal fisheries in South Africa has been undertaken as part of the BCLME suite of projects dealing with artisanal fishing in the BCLME region (see BCLME Project LMR/AFSE/03/01/A – South Africa).

Policy Development Committee (FPDC) in 1995 to guide the formulation of a new fisheries policy which would ultimately replace the Sea Fisheries Act (1988). This Committee included representatives from the different fishing sectors (including regional Fishing Forums set up to represent previously marginalised fishers at local level), provincial governments, tourism and environmental groups. However, the FPDC encountered many problems, obstacles and divisions (over representation, legitimacy, access rights, allegations of racial bias, etc) and the Fishing Forums were under-financed and resourced and eventually sidelined (Isaacs, 2004, van Sittert, 2002). To assist in the resolution of some of these problems the FPDC appointed an Access Rights Technical Committee (ARTC) in 1996. The ARTC's main goal was to ensure that a fair and equitable system of access to fisheries stocks was developed while also ensuring the long-term optimal sustainability of the use of resources, both in terms of the interests of conservation and in the interests of current and potential users of these resources.

The ARTC recognised that there would have to be a trade-off between the need to admit 'new-entrants' and the rights of current participants, because, in most cases resources were being exploited close to maximum sustainable levels. Thus 'new entrants' could only be admitted at the cost of removing rights from people who currently harvested those resources. The ARTC also indicated that under the new Constitution removal of allocations from existing rights holders must be accompanied by compensation, and recommended that fishing rights be sold, and long term rights (up to 40 years) be issued. Amongst the suggestions made by the ARTC to deal with potential conflict resulting from allocations to different users the following are highlighted:

- There must be legal recognition of subsistence fisheries as a sector, as well as management, regulation and licensing of its activities
- Licenses for subsistence harvesters should allow larger bag limits than are imposed on recreational harvesters, because subsistence harvesters gather essential food. This consideration should apply only to resources harvested for food.
- As a general rule, new or under-utilised resources should preferably be used to grant access to new entrants, provided they have the capacity to use these resources.
- New entrants may be preferentially admitted, should pay for their rights and may need financial assistance as part of a phase that attempts to correct past inequities, "but after this phase normal market forces should prevail".
- The implementation of any new reallocations should not be such as to threaten established industries because of the adverse effect this would have on their labour force.

While some of the FPDC recommendations (via the ARTC) were rejected by government (see section 12.3), others were later incorporated in the White Paper for A Marine Fisheries Policy for South Africa (1997). The White Paper notes that fisheries play an important economic role in several coastal areas, in particular in the livelihoods of many coastal communities. In order to widen participation in the fishing industry the White Paper (1997) recommended several methods of empowerment to compete for access rights:

- Expanding equity ownership in companies
- Restructuring of the industry in order to move in the direction of larger proportions of the quota being sold to small-scale fishing operators
- Encouraging contracts with fishing-processing companies
- Helping small-scale operators improve efficiency
- Unbundling, mergers and the formation of co-operatives and other forms of formal commercial co-operation.

This lengthy fisheries review process ultimately led to the promulgation of the Marine Living Resources Act No 18 in 1998 (MRLA), which regulates all fishing sectors in South Africa. This Act governs fisheries in South Africa at present and it is the Act that explicitly deals with and mostly affects subsistence fishers. The key objectives and principles that guide the MRLA are that marine living resources have to be managed in a way that ensures sustainability, achieves equity within all branches of the fishing industry and promotes economic stability of the fishing industry. It recognises three fishing sectors in South Africa: commercial, recreational and subsistence. The Act states the intention of protecting the needs of poor people who rely on marine resources as a source of food or for a modest income. A further outcome of the fisheries review process was the classification of different fisheries with respect to the level of technology required to harvest the targeted resource (Table 5). The outcome of this classification was that Types 3 and 4 fisheries were declared suitable for the informal or artisanal sector.

Table 5: Classification of fishery types (according to amount of technology required for harvesting, mobility of stock and ease of harvesting) (Source: ARTC, 1996).

Type 1: Offshore pelagic Deepwater trawling Demersal offshore trawling Midwater trawling Tuna longlining and poling Natal & South coast lobster Offshore prawn trawling Demersal longlining Boat linefish	**Type 2:** Demersal Longlining Demersal inshore trawling Boat linefish Inshore pelagic Squid West coast lobster traps
Type 3: West Coast lobster hoopnets Seals Inshore linefish Abalone Inshore nets (drift, set, trek nets) Whelks, octopus Kelp Specimen collection Biologically active compounds	**Type 4:** Limpets Rock mussels Sand mussels Seaweeds Winkles Bait organisms Red bait

Other important legislation that has fuelled the drive to recognise and assimilate subsistence/informal fishing activities into the mainstream of sustainable livelihoods is:

- **The South African Constitution (1996)** which guarantees socio-economic rights including the right of access to sufficient food.
- **The National Environmental Management Act (NEMA) of 1998** which provides that the State must respect, protect, promote and fulfill the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities
- **The White Paper on Sustainable Coastal Development in South Africa (2000)** whose guidelines for coastal management include the commitment to improve the quality of life of human communities which depend on coastal resources, while maintaining the biological diversity and productivity of the coastal ecosystems.

This provides a very brief background to the history of the policy and legal environment of artisanal/subsistence fishing in South Africa. The current policy and legal context of fishing activities in South Africa and their relevance to subsistence and small-scale commercial fisheries are discussed further in Section 10 of this document.

After the drafting of the MLRA, the Subsistence Fisheries Task Group (SFTG) was appointed by the government to identify and make recommendations for the management of subsistence fishers and fisheries.

7.2 DEFINITION OF TERMS SUBSISTENCE AND SMALL-SCALE COMMERCIAL

The MLRA defines a 'subsistence fisher' as *"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".*

Section 19 of the MLRA contains the core provisions regulating subsistence fishers. It reads:
"The Minister may …

(a) establish areas or zones where subsistence fishers may fish; and

(b) after consultation with the Forum, declare –
   (i) specified community to be a fishing community, from which inhabitants may be declared to be subsistence fishers; or
   (ii) any other person to be a subsistence fisher; or
   (iii) any other fishing or related activity or the exercise of any other right in that area or zone to be prohibited.

The intent of the MLRA was 1) to recognize the needs of subsistence fishers to harvest adequate amounts 2) to legalise modest sales by subsistence fishers 3) to set aside areas for the exclusive use of subsistence fishers if this was necessary 4) and to protect the long term sustainability of resources (Branch et al., 2002).

However the SFTG realised quite early on that one of its principal tasks would be to define the term subsistence fisher, because it considered that the MRLA definition of a subsistence fisher was inadequate and did not allow for identification of who should qualify for subsistence rights (Harris et al., 2002). Besides, it also considered that the definitions in the MLRA for both subsistence and commercial fishers did not sufficiently characterise these users nor provide

sufficient precision for practical or legal implementation. After a lengthy consultative process the SFTG re-defined subsistence fishers as: *"Poor people who personally harvest marine resources as a source of food or to sell them to meet the basic needs of food security; subsistence fishers operate on or near the shore or in estuaries, live in close proximity to the resource, consume or sell the resources locally, use low-technology gear (often as a part of a long-standing community-based or cultural practice) and the kinds of resources they harvest generate only sufficient returns to meet the basic needs of food security."*

The SFTG recommended that the term artisanal fisher be merged with subsistence fisher, but recognised that the definition of a subsistence fisher excludes a group of people who might previously have been considered as subsistence or artisanal fishers, but who would prefer to gain commercial rights. The SFTG thus recommended that these people should be classified as small-scale commercial fishers, a sub-group at the lower end of the spectrum of commercial fishers.

Small-scale commercial fishers were consequently defined as *"Commercial fishers who fish for profit and earn an income that is sufficient to meet more than the basic needs of life, who can employ staff or operate as profit-sharing collective groups, focus on resources that are managed by TAC or TAE and which have high value or can be caught in large quantities, and who may use capital-intensive high-technology gear and methods of processing".*

Criteria that distinguish small-scale from large-scale commercial fishers were fairly generalized and included the conditions that:

- Applicants should live on or close to the coast and must have a history of involvement with fishing, and a reliance on fishing for a living in that they do not have any other source of income generating more than 25% of their total income.
- The owner of the small-scale fishing permit must be involved in the day-to-day running of the enterprise. Specifically, he/she must have a hands-on involvement with the harvesting or processing.

To qualify as a *small-scale* operation, there were also recommendations that there be limits on the size of the group and number of people involved, the amount of capital invested, the economic turnover and the number and size of boats owned, but these limits were not spelled out in any detail.

In many respects, the small-scale commercial fishing category defined by the SFTG encompasses characteristics of an artisanal fishery and would be comparable with artisanal

fishing sectors elsewhere. However, even these seemingly clearly defined descriptions of subsistence fishers, and small scale commercial fishers as opposed to industrial or large scale commercial fishers, do not fully encompass the spectrum of fishers on the west and southern Cape coasts of South Africa. There are communities with a long standing history of involvement in line fishing whose members act as crew on commercial linefish boats on a fulltime or part time basis but who also harvest marine resources from the intertidal and shallow subtidal either for bait or personal consumption (Clark et al., 2002). Intertidal resources can become the main source of food when there are extended periods of rough weather or if fish are seasonally unavailable. Similarly some of the big industrial fisheries on the West Coast are highly seasonal and provide commercial employment for crew for only part of the year, forcing fishers to engage in subsistence type activities for part of the year (sometimes as much as 10 months of the year). The criterion of not having an alternative source of income cannot really apply to these fishers (Clark et al., 2002). Contract workers on coastal projects often turn to subsistence/informal fishing activities once contracts have terminated and while they look for other work, and there are large numbers of coastal communities that engage in activities that fall somewhere between recreational fishing, subsistence fishing and small scale commercial fishing (Clark et al., 2002). For the purposes of licensing fishers it will be necessary to define subsistence fishers fairly narrowly because the needs of the fishers have to be balanced against the limits of resource sustainability. Allowing subsistence livelihoods to act as a safety net for coastal inhabitants to fall back on in times of hardship will almost certainly lead to resource over-exploitation (for a fuller discussion readers are referred to Clarke et al. (2002) and Branch et al. (2002).

8. SUBSISTENCE OR INFORMAL FISHERIES IN THE BCLME COASTAL REGION OF SOUTH AFRICA

8.1 OVERVIEW OF FISHERS IN STUDY AREA

Section 8 presents data extracted from various publications based on the initial SFTG national survey. As stated in section 4 of this report, the BCLME region in South Africa is considered to extend from Cape Agulhas in the south to the Orange River in the north. The classification used by Clark et al. (2002) in the initial identification of subsistence fishing communities in South Africa, divided the coast into eight regions, of which the western three would be considered to fall within the BCLME. Region A extends from the Orange River to the Olifants River, Region B from the Olifants River to Hout Bay and Region C from Hout Bay to the Breede River (Figure 3). The Breede River is 109 km east of Cape Agulhas, but in the

interests of simplicity and for reference purposes it is wise to utilise this original regional demarcation. There is no distinct biogeographical border at Cape Agulhas and the eastern most community (Arniston) identified by Clark et al. (2002) is only 35 km east of Cape Agulhas. Communities investigated in each of the region are listed in Appendix 3

In the initial SFTG survey, trained field workers identified 'subsistence' or informal fishing communities by conducting interviews with informants (researchers, authorities and community leaders), and attempted also to determine the nature of the fisher community activities, and their socio-economic status. The survey was designed to obtain a broad overview of subsistence fishing activities throughout South Africa.

There were 34 communities between the Orange River and the Breede River that professed to engage in 'subsistence' or informal fishing activities. These communities comprised 2438 households and 2373 informal fishers (Table 6). The number of households in each area is approximately equal to the number of fishers. The mean number of households per community was 82 in Region A, 42 in Region B and 71 in Region C.

Table 6: 'Subsistence'/informal fishers along the BCLME coast between the Orange and Breede Rivers (Source: Clark et al., 2002 - SFTG survey)

BCLME coast	No of communities	Urban	Rural	No. households	No. subsistence fishers
Region A	5	1	4	411	458
Region B	16	4	12	675	643
Region C	13	7	6	1352	1272
Total	**34**			**2438**	**2373**

8.2 RESOURCES HARVESTED BY SUBSISTENCE/INFORMAL FISHERS

Information presented in this section is only a brief summary of information gathered by the SFTG research process (Clark *et al.,* 2002). Section 13 provides a more general review of the resources harvested by 'subsistence' and informal fishers. Most 'subsistence' or informal fishers harvest marine rather than estuarine resources. However, in Region A, a significant proportion of fishers (30%) also harvest estuarine resources (Table 7); the latter are accounted for by the communities of Ebenhaeser and Papendorp that live near the Olifants River. The main marine resources harvested are fish, rock-lobster and rocky shore intertidal invertebrates, with the most important being fish. Abalone and estuarine invertebrates are

important resources in the south (Region C). Seaweed is currently not an important resource (Table 7) (Clarke et al., 2002).

Table 7: Relative use of marine and estuarine habitats by fishers and percentage of fishers using various resources (Source: Clark et al., 2002)

BCLME Region	Marine (M) Estuarine (E) fishers	Percentage of fishers using various resources							
		Fish	Rocky shore intertidal invertebrates	Sandy beach invertebrates	Rock lobster	Abalone	Seaweed	Estuarine invertebrate	Oysters
A	70% M 30% E	100	58	12	69	0	3	0	0
B	98% M 2% E	96	48	37	70	19	0	0	0
C	98% M 2% E	88	100	41	68	68	12	41	15

It is anomalous that there appears to be negligible use of estuarine resources in Regions B and C despite the fact that these zones contain some quite extensive estuarine habitats. For example, Region B contains the Berg River with rich fish resources and Region C includes the Bot, Klein and Breede rivers, all of which form large estuaries with considerable fish populations. Only in Region C do fishers target estuarine invertebrates. It is also somewhat anomalous that only 2% of the people interviewed in Region C claimed that they utilised estuaries but 41% claimed that they harvested estuarine invertebrates (Table 7). The data on "percentage of fishers using various resources" (41%) are probably a more accurate reflection on actual resource usage rather than the data on percentage usage of marine and estuarine habitats (2%).

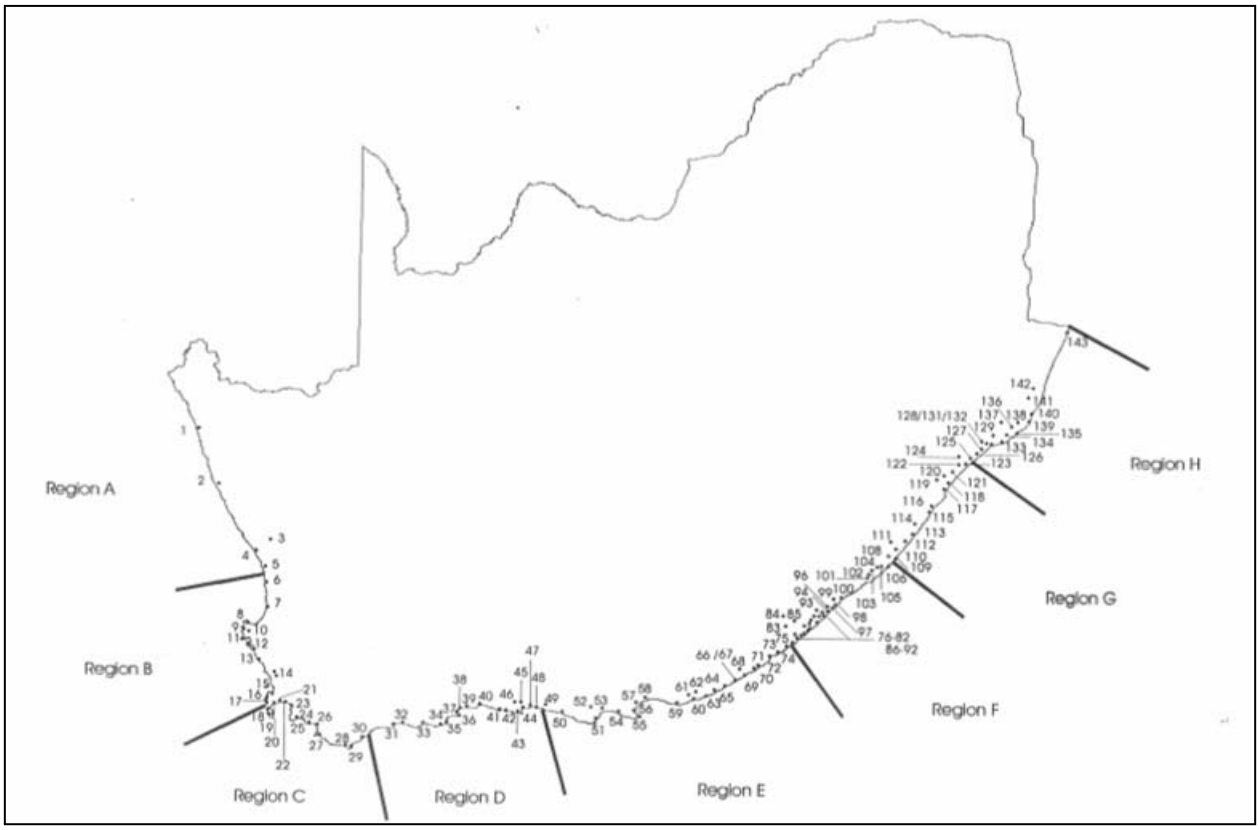


Figure 3: Location of 'subsistence' or informal fishing communities in the BCLME region of South Africa identified in the SFTG survey (Clarke et al., 2002)

Clearly many of the fishing activities in all three regions are carried out with the use of boats, most of which are motorised in the southern areas (Table 8). In the area immediately south of the Orange River a third of respondents indicated that the boats used are not motorised and there is an associated marked reduction in the range of the fishers. South of the Olifants River, almost all the boats used appear to have engines. Between 44% and 56% of respondents indicated that harvest activities take place from boats in the near-shore region (presumably as a result of the targeting of fish and lobsters; Tables 7 and 8). Approximately a quarter of the people interviewed used intertidal and/or shallow subtidal resources. Interviewees indicated that they operated over considerable distances of coastline in the southern areas, but the mean distances from home to harvest point indicate mainly single day trips (Table 8). It is worth noting that the possession of a motorised vessel would immediately disqualify a fisher from subsistence status in KwaZulu-Natal, but such fishers clearly fit into a category of informal fishers in the Western and South Western Cape.

Table 8: Percentage of fishers utilising different harvesting areas, proportion of motorised vs non-motorised vessels, distances between home and harvesting points and maximum length of coastline over which 'subsistence fishers' operate (Source: Clark et al., 2002)

BCLME Region	Percentage using Harvest Areas			Proportion Motorised vessels			kms from home to harvest point	kms of coastline used	
	Inter-tidal	Shallow subtidal	Nearshore (from boats)	None	<50%	>50%		Mean	Max.
A	24	20	56	33	42	25	2	13	30
B	28	24	48	0	8	92	11	66	200
C	26	30	44	0	3	97	15	108	700

8.3 HISTORICAL INVOLVEMENT IN FISHING

The great majority (>81%) of 'informal' fishers along the BCLME coast have been involved in fishing for more that 50 years and none for less than 20 years (Table 9). Only in the region that includes a major urban environment (Cape Town) did the majority of respondents have alternatives to fishing as a source of income. Most alternative employment opportunities are seasonal (Table 9).

Table 9: Historical involvement in fishing, alternative sources of income and employment. Values represent percentage of respondents interviewed by SFTG fieldworkers (Source: Clark et al., 2002)

BCLME Region	Historical involvement (years) in fishing			Alternative sources of income through employment opportunities		Type of employment opportunities		
	< 20	20-50	>50	No	Yes	Part-time / sporadic	Seasonal	Full-time
A	0	19	81	64	36	9	82	9
B	0	4	96	36	64	30	65	5
C	3	6	91	74	26	58	35	8

9. THE SOCIO-ECONOMIC CONDITIONS OF 'SUBSISTENCE' FISHER HOUSEHOLDS AND FISHERS

Bearing in mind the limitations of integrating data derived from various publications based on the SFTG national survey, which used slightly different geographical boundaries, an overview of these findings is presented below as follows:

9.1 The socio-economic conditions of 'subsistence' fishers[10],

9.2 Assessing poverty according to the SFTG

9.3 Criteria recommended by the SFTG to identify subsistence fishers

9.1 THE SOCIO-ECONOMIC CONDITIONS OF 'SUBSISTENCE' FISHERS, ACCORDING TO THE SFTG

According to Clark et al. (2002) there are 21 localities along South Africa's West Coast of the BCLME project region, where approximately 1 101 'subsistence' fishers (representing 1 086 households[11]) fish and harvest marine resources. In the south coast of the BCLME region there are fewer (11) localities where 'subsistence fishers' are found, although the numbers of households and fishers are of similar magnitude (Table 6)

The SFTG household survey **(**the basis of the SFTG Draft Report No. 2, 2000 and Branch et al., 2002), provides information on some of the socio-economic characteristics and conditions of the these 'subsistence' fishers, although it must be borne in mind that what is designated as the South coast in that survey extends further east of Cape Agulhas (to include Port Elizabeth) than the southern boundary of the BCLME (Cape Agulhas) described in this report Thus, when looking at the data that follows we must bear in mind that the data for the southern portion of the BCLME coast incorporates but does not necessarily typify 'subsistence' fishers in that portion of the BCLME coast.

On the basis of self-classification 97.7% of the 'subsistence' households surveyed on the west BCLME coast self-classified the resident fishers as subsistence and only 2.3% as commercial fishers (Table 10 - SFTG Draft Report 2, 2000, p. 30-31). In contrast, on the south BCLME coast, the majority of households classified the resident fishers as commercial (54%) rather than subsistence (46%).

[10] According to the SFTG report the study could not employ a probability sampling methodology; thus the results can only be taken as indicative trends, especially in metropolitan areas, and can not be used for predictive purposes (SFTG Draft Report 2, p. 22; Branch et al., p. 442-443).

[11] Household is defined as "those who pool resources and share consumption", SFTG, Draft Rep 2, 2000, p. 22

Table 10: Demographic profile of 'subsistence' fisher households

Portion of BCLME coast	Type of fisher (Self-definition)- (SFTG Table 10)		Residency status[12] (SFTG Table 6)	Av. House-hold size (SFTG Table 8)	Dependency ratio (SFTG Table 17)	Mean age (SFTG Table 13)		
	subsistence	commercial				Male	Fem.	Total
West	97.7%	2.3%	98%	4.2	0.46	33	30	31.7
South	46%	54%	97%	3.5	0.42	30	28	29

Source: SFTG Draft Report 2, Tables 10, 6, 8, 17 and 13)

In both the west and south BCLME coasts the average households are very stable (99% and 97% residency status, respectively), have an average of 4.2 and 3.5 residents respectively and an average dependency ratio (ratio between those <15 and > 64 years of age, and others) of 0.46 and 0.42, respectively (Table 10). The average age of members in fisher households was respectively 31.7 and 29 on the west and south BCLME coasts, females being slightly younger than males (Table 10).

The educational level of people in the household aged 20 or older is very low throughout the BCLME coast: only 17 % on the West Coast and 23% on the south coast have education above primary school level, and none have tertiary education. Most of the others (70% and 66.5% respectively) either have no schooling or only have some primary education (Table 11).

Table 11: Level of education of those aged 20 or older in 'subsistence' fisher households and for 'subsistence' fishers

		No schooling	Some primary	Complete primary	Some secondary	Matric	Higher	Total
People >20 years of age	west BCLME	2.6%	67.5%	12.9%	14.9%	2.1%	-	100%
	south BCLME	5.5%	60.8%	10.9%	21.2%	1.6%	-	100%
Subsistence fishers >20 yrs	west BCLME	2.4%	74.7%	12%	10.8%	-		100%
	south BCLME	12.1%	68.1%	7.75%	11%	1.1%	-	100%
Commercial fishers >20 yrs	west BCLME	-	100%	-	-	-	-	100%
	south BCLME	3.8%	63.5%	10.6%	21.2%	1%	-	100%

Source: SFTG Draft Report 2, 2000 – Tables 18 and 20).

[12] Residency status – percentage of people remaining in the same household for at least 15 of the previous 30 days (SFTG, Draft Report 2, 200, p. 28).

According to the SFTG data only a small percentage (15% and 11%, for the west and south coasts respectively) of the economically active resident household members had regular employment; 16% and 23% (for the west and south coasts respectively) were unemployed (using the expanded definition of unemployment- SFTG, p. 41). Besides a small percentage of scholars (12% and 4.5% in the west and south coasts), most of the remainder (57% and 61% respectively) of the economically-active residents were involved in 'other activities', that translate into being 'underemployed' (Box A, Table 12).

Table 12: Man economic activity for resident household members, food security and ways by which 'subsistence' households in the BCLME coast may derive an income

: MAIN ACTIVITY FOR BCLME RESIDENT USEHOLD MEMBERS AGED 14-64* (from SFTG e 23, p. 41):

		West coast	South coast
sewife/child rearing	=	17%	18%
holar	=	12%	4.5%
	=	4%	3.4%
r employment	**=**	**15%**	**11%**
Casual employ	=	12%	8.5%
	=	2%	5.4%
nal work	=	13%	17.8%
arvesting	=	2%	6%
nal share harvesting	=	7%	3%
Unemployed **	**=**	**16%**	**23%**
	=	100%	100%

Box B: Type of occupation for those with access to some kind of wage employment (from SFTG, Draft Rep. 2, 2000, Table 55, p. 73)

	West coast	South C.
- Labourers	72%	14%
- Fishing	2%	46%
- Mining & quarrying	2%	
- Others (service, clerical/sales, production/ semi-skilled, drivers/messengers)	17%	31%
- Professional/semi-professional, technical, managerial, administration	6.5%	4%
Artisans	-	4.5%
Total	99.5%	99.5%

Box D: Non-employment income:
In general, most of this income comes from state old age pensions and disability grants. In the west and south coasts 40.5% and 44.7%, respectively, come from old age pensions (SFTG Draft Rep. 2, 2000, p. 79)

Box C: Type of occupation in self-employment/micro-enterprises (from SFTG, Draft Rep. 2, 2000, Table 58, p. 75):

	West	South C
- Fishing/ mussel harvesting	97%	84%
- Others (Sewing, selling clothes/goods on the street, shopkeeper, shoe repairs, taxi operator, hairdresser, child care, artisan)	3%	11%
- Gardener		6%
Total	100%	101%

Box E		**Food insecurity** (SFTG Table 36, p. 60)		**% Households with access to some kind of wage employ.** (SFTG Table 54, p. 72)		**Non-farm self-employment or micro-enterprises** (SFTG,Table 56, p. 74)		**Non-employment income** (SFTG, Table 59, p. 77 & Table 83, p.92)	
All households		No	Yes	No	Yes	No	Yes	No	Yes
	West	57%	43%	57%	43%	26%	74%	53%	47%
	South	51%	49%	44%	56%	56%	44%	80%	20%
Ultra –poor & vulnerable	West			50%	50%			100%	0%
	South							100%	0%

Source: SFTG Draft Report 2, 2000; * (the SFTG report reports those aged 14-64, although it is common practice to use the 15-65 age bracket- e.g. National Census and Labour Force Surveys by Statistics South Africa)
** using the expanded definition of unemployment.

The SFTG examined a variety of activities from which households surveyed might derive an income: wages from different kinds of employment, non-farm self-employment and non-employment income (i.e. claims from the state).

On the West Coast only 43% of households had 'at least one member engaged in some form of wage employment', while on the south coast the equivalent figure is 56% (Table 12 – Box E). Since these figures are much higher than the percentage of regularly employed household members in both regions, most of this wage employment must derive from non-regular, non-reliable employment. This phenomenon is particularly prevalent on the south coast, as only 11% have regular employment.

On the west BCLME coast most of those in households with access to some kind of wage employment worked as labourers (72%),; 17% worked in 'other' sectors and only 2% worked in the fishing industry (Table 12 – Box B). On the south coast 46% of (mostly irregular) wage employment derives from fishing, 31% from 'other' activities and 14% from work as labourers (Table 12 – Box B).

As an alternative 'entitlement generating activity' 74% of the 'subsistence' fisher households on the west BCLME coast and 44% on the south coast engaged in some kind of (non-farm) 'self-employment or micro-enterprise'; most of these (97% and 84% on the west and south coasts, respectively) entailed fishing or mussel harvesting (Table 12 – Box C).

Another source of income considered by the SFTG is in the form of claims from the state. The SFTG states that on average, 47% and 20% of the fisher households on the west BCLME and south coasts, respectively, receive this form of 'non-employment income' (Table 12 – Box E). These come mostly in the form of old age pensions and disability grants, old age pensions accounting for 41% and 45% of these grants in the west and south coasts, respectively (Table 12 – Box D).

There is a high level of food insecurity amongst the 'subsistence' fisher households (Table 12.3- Box E), with 43% and 49% on the west BCLME and south coasts being 'food insecure' (i.e. more than 60% of total household expenditure is spent on food – SFTG Draft Report 2, 2000,-p. 59-60; Branch et al., p. 447). The SFTG conducted a local shop price survey but it does not state where those prices were obtained. Thus the information quoted (SFTG, 2000, Report 2, Table 37b, p. 61), cannot be used here for the BCLME coast, but the SFTG concludes that their survey showed that the high cost of protein confirmed "the potential importance of protein derived from subsistence fishing" (ibid, p. 61).

Most of the SFTG data focuses on the household but certain information was provided in the report for individual fishers: of particular interest is the finding that all 'subsistence' fishers are male. This applies to both the households that classified themselves as subsistence and commercial. These two groups have similar ages (averages of 45 and 46, respectively), and their educational levels are marginally lower than that those found for others in the household who are older than 20 (Table 11).

As already mentioned (section 8.3, Table 9) Clark et al. (2002) also provide data on employment along the BCLME coast pertaining to the fishers themselves. Overall, what these data show is that both fishers and fisher households have very limited opportunities to access alternative sources of income and wage employment. Those opportunities that are available are irregular and/or seasonal, associated with poor pay, little job security and no opportunity for upward mobility.

9.2 ASSESSING POVERTY ACCORDING TO THE SFTG

The SFTG states that there are different definitions of and approaches to assess poverty, ranging from those that rely on quantitative and absolute indicators that can be measured (e.g. those used by the World Bank), to relative indicators that are set according to the standards of a given society (e.g. quotes Townsend, 1979), to those that emphasise the multi-dimensional nature of poverty (e.g. UNDP – SFTG Draft Report 2, 2000, p. 47). In this respect the SFTG notes that there are 5 dimensions of poverty:

- poverty proper –i.e., a lack of adequate income or assets to generate income;
- physical weakness due to under-nutrition, sickness or disability;
- physical or social isolation due to peripheral location, lack of access to goods and services, ignorance or illiteracy;
- vulnerability to crisis and the risk of becoming even poorer, and
- powerlessness within existing social, economic, political and cultural structures.

In its research the SFTG adopted the definition of poverty as "the inability of individuals to satisfy a socially acceptable minimum standard of living" (ibid, p. 47), and assessed fisher household poverty by choosing a poverty line based method.

Noting that the choice of poverty lines is "contentious" and "inherently crude and essentially arbitrary" (p. 49), it rejected the Minimum Living Level (MLL) and Household Subsistence Level (HSL) as income poverty measures because they imply "acceptance of differential

incomes that favour whites" and are "too generous and well above the internationally set rule of thumb of $1.00 per person per day" [13] (SFTG, 2000, p. 50). Instead the SFTG thus favoured and adopted the 'equivalent scales' method and ranked households according to the local "mean adult equivalent income per month"[14]. Following World Bank guidelines it divided them into five quintiles, classifying the poorest 40% of households as 'poor' and the poorest 20% as 'ultra-poor'.

The SFTG points out that expenditure, rather than income, is a preferred monetary indicator of household welfare. However, due to time and resource constraints the SFTG could not get an accurate expenditure measure, and also gathered data on incomes, which the SFTG found to be a more reliable indicator (SFTG Draft Report 2, 2000, p.47-48). To overcome its criticisms of quoting per capita income/expenditure by dividing income/ expenditure from a household by the number of people in the household (as this assumes that all individuals have the same needs - ibid, p. 48), the SFTG used the 'total income per equivalent' as an indicator, whereby children count as a fraction of an adult (ibid, p. 48-49).

On the basis of local 'mean adult equivalent incomes per month' the SFTG concluded that on average 18% of the households along the west BCLME coast are 'poor' and 6% are 'ultra-poor' (Table 13). According to these data the greatest disparity between the localities surveyed by the SFTG on the West Coast is found in Ebenhaezer, where there is a greater percentage of 'poor' households, but where there are no 'ultra-poor' households. St Helena has the greatest percentage of 'ultra-poor' households.

For the south coast, the equivalent average figures are 28% of 'poor' and 16% of 'ultra-poor' households, respectively. Within the south coast there are larger disparities between localities, but the largest are found in those that are not located within the BCLME boundaries (Knysna and Port Elizabeth & Arniston). If the latter were to be disregarded the percentages of both 'poor' and 'ultra-poor' 'subsistence' fisher households on the south BCLME coast would be greater than along the West Coast.

Although no figures are given for the different regions in the country, nationally 'poor' fisher households have on average 6.6 resident members and the 'ultra-poor' 7.3 (SFTG 2000, Table 29, p. 54).

[13] please refer to footnote 6, section 6.2.3.3 for comments on poverty measure based on USA$1 per day.
[14] Assumes that children under 15 have half the consumption requirements of an adult and allows for 'economies of scale, i.e. larger households are able to spend less per person ; it used the equation:
adult equivalent = total household income / [no. of adults + (0.5) no. of children]

Table 13: The incidence of poverty amongst 'subsistence' fisher households

Area and survey localities/sites	Mean adult equivalent income per month	'Poor': 40th Percentile	'Ultra-poor': 20th Percentile	Valid N
West Coast (Av)	**425.04**	**18.06**	**5.56**	**71**
Port Nolloth	380.27	15.38	7.69	25
Ebenhaezer	284.91	28.57	0.00	21
St Helena Bay	587.51	12.00	8.00	25
South Coast (Av)	**735.44**	**28.13**	**16.25**	**159**
Cape Town	567.21	24.00	12.00	25
Kleinmond	259.00	36.36	13.64	22
Buffelsjag	655.73	33.33	9.52	21
Arniston	**1927.55**	**30.77**	**30.77**	**26**
Gouritzmond	**401.79**	**16.00**	**4.00**	**25**
Knysna	**803.60**	**0.00**	**0.00**	**16**
Port Elizabeth	**427.75**	**48.00**	**36.00**	**24**

Source: SFTG Draft report 2, 2000, Table 27, p. 51. Please note that localities on the South coast that fall outside the boundaries of the BCLME coast (i.e., east of Cape Agulhas) are shaded.

The difference between the average education levels amongst the 'subsistence' fisher households in the west and south BCLME coasts classified by the SFTG as 'ultra-poor, poor and non-poor', is negligible, all being equally low (Std 4 and Std 5 – ibid, Table 38, p. 62).

In terms of access to services (e.g. housing, water, electricity) the SFTG only provides general data for 'subsistence' fishers at national level (i.e., it incorporates localities along the coastal areas of the Eastern Cape and Kwazulu Natal). Besides, it only provides data for 'non-poor' and 'poor' households but not for the 'ultra-poor' and thus it is not presented here as it would not contribute to deepening an understanding of circumstances of 'subsistence' fishers along the BCLME coast.

Similarly, the SFTG report only gives a national figure for poverty levels amongst the male-headed and female-headed 'subsistence' fisher households surveyed and does not give regional figures from which information for the BCLME region can be gathered. However it is important to note that contrary to national and international trends the SFTG reports that in comparison to male-headed households, most female-headed households are non-poor and few are poor and ultra-poor (Table 14).

Table 14: Poverty rates amongst male headed and female headed 'subsistence' fishers households surveyed nationally

	Non-poor	**Poor**	**Ultra-poor**	**N**
Female headed	80%	17%	11%	71
Male headed	57%	43%	21%	416
Total	60%	39%	20%	487

(Source: SFTG Draft Report 2, 2000, Table 30, p. 54)

9.3 CRITERIA RECOMMENDED BY THE SFTG TO IDENTIFY SUBSISTENCE FISHERS

To distinguish 'for certain' subsistence fishers from others the SFTG introduces the notion of vulnerability *"whereby poverty is not only about being poor, but it is also about the risk of becoming poor or poorer in the face of change*" (SFTG, Draft Report 2, 2000, p. 84). It advises that subsistence fishers should refer to the 'vulnerable group of fishers' in whose household "*there is no commercial fisher but where someone has been identified as a 'subsistence' fisher, and where the household is classified as being ultra-poor*" (ibid, p. 84)**.** The SFTG states that this "takes the most restrictive position" and "this is not to say that there may be those who fall out of the ultra-poor group but are still subsistence fishers. The intention is to produce characteristics that are known to be those of subsistence fishers rather than compare subsistence with commercial fishers", which was beyond its terms of reference (ibid, p. 84).

Besides being ultra-poor other indicators used by the SFTG for assessing vulnerability, together with their results for the west and south BCLME coasts, are listed in Table 15: vulnerable fisher households on the West Coast rely on private and unprotected sources of drinking water, which makes them vulnerable to water-borne diseases. This source of vulnerability is lower amongst subsistence fishers on the south coast. These vulnerable fisher households spend a high proportion (71-89%) of their income on food. Livelihood options (e.g. access to wage labour, access to either non-fishing micro-enterprises, non-employment sources of income or agriculturally based livelihoods) vary on the west and south coasts but are limited in general. No child labour in fishing activities occurs on the West Coast whereas children are involved in 12% of the vulnerable households on the south coast. All the fishers in these households have low levels of education (Grade 5 or Std 3).

Table 15: 'Indicators' associated with the 'ultra-poor' and vulnerable subsistence fisher households amongst 'subsistence' fisher households identified by the SFTG on the west and south coasts of South Africa.

'Indicators'		**West Coast**	**South coast**
Vulnerable subsistence households	No %	94	93
	Yes %	6	7
Water supply	Private	75	45
	Public protected %	0	55
	Unprotected %	25	0
% of total expenditure spent on food		71	89
Access to wage labour	No %	50	100
	Yes %	50	0
Access to agriculturally based livelihoods	Garden plot %	0	37.5
	Arable field plot %	0	0
	Ownership of agricultural equipment %	25	37.5
Access to non-employment income	No %	100	100
	Yes %	0	0
Participation in non-fishing micro-enterprises	No %	100	50
	Yes %	0	50
Participation of children (<15 years) in fishing activities	No %	100	88
	Yes %	0	12
Education level of adult fisher		Grade 5 (Std 3)	Grade 5 (Std 3)
Type of main dwelling unit: No figures are given for each region. Generally, countrywide: traditional, low cost materials houses (mud, thatch, corrugated iron – 58%), conventional houses (11%), temporary structures and permanent shacks (17%); other (14%)			

(Source: SFTG Draft report 2, 2000, Tables 75-87)

Thus according to these criteria the SFTG concludes that only 6% and 7% of 'subsistence' fisher households in the BCLME west and south coasts (respectively) are both vulnerable and ultra-poor and should be considered subsistence fishers (Table 16).

Table 16: 'Vulnerable subsistence fisher households'

	Vulnerable subsistence fisher households		Total
	No (% of HH)	Yes (% of HH)	
West Coast	94.44	5.56	100.0
South coast	93.13	6.88	100.0

Source: SFTG, Draft Report 2, 2000, Table 75, p. 85

10. CLASSIFICATION OF RESOURCES FOR ALLOCATION FOR SUBSISTENCE AND SMALL-SCALE COMMERCIAL USAGE

One of the tasks of the SFTG was to identify resources suitable for subsistence use, bearing in mind information gathered on resources harvested by these fishers during the survey. Key recommendations on the use of resources along the west and southern Cape coasts are presented in Table 17 and are discussed below (Cockcroft et al., 2002).

- **Remove West Coast rock lobster and abalone from subsistence fisheries** due to their high commercial value. They should rather be reserved for small-scale fishers (besides retaining their recreational and commercial harvest), even though 'subsistence' permits had been allocated for these resources in the past. Abalone is considered to have low suitability for subsistence fisheries because stocks are highly vulnerable to over-exploitation and are of high value.

- **Develop the following small-scale commercial fisheries** (although also retaining their subsistence and recreational usage):

Rocky shore intertidal invertebrate species: a) **limpets** (*Cymbula granatina* and *Scutellastra argenvillei*) in the rocky intertidal zone between Kleinsee and the Olifants River. b) The alien **Mediterranean mussel** (*Mytlilus galloprovincialis*) wherever it occurs in significant numbers. Like most mussels it is considered a resource highly suited to subsistence fishing. Its harvesting may actually constitute an essential ecosystem management measure that prevents these alien mussels from colonising space on the shore left vacant by the removal of the limpet *S. argenvillei*. Zonation of mussel harvesters may be required to avoid conflict between the different user groups (Cockcroft et al. 2002).

Table 17: Recommended use of resources along the West and South coasts of South Africa, where R = recreational, S = subsistence, SSC = small-scale commercial and C = large-scale commercial use respectively. Dashes denote that species do not occur in the region.

Parameters	West coast Recommended	South coast Recommended
Rocky shore intertidal		
Limpets[a]	R, S, SSC*	-
Cynbula granatina		
Scutellastra argenvillei		
Other limpet species	-	R, S
Polychaete bait worms	R, S	R, S
Gunnarea capensis		
Marphysa sanguinea		
Pseudonereis variegate		
Mussels		
Choromytilus meridionalis	R, S	R, S
Mytilus galloprovincialis	R, S, SSC*	R, S
Perna perna	-	R, S*
Oysters		
Saccostrea cucullata	-	R, S
Striostrea margaritacea	-	R, S, SSC*
Winkles[b]	R, S	R, S, SSC
Oxystele sinensis		
Turbo cidaris		
Rock lobsters		
Jasus lalandii	C, R, SSC	C, R, SSC
Panulirus homarus	-	R
Abalone		
Haliotis midae	C, R, SSC	R, SSC
Octopus		
Octopus vulgaris	-	R, S, SSC
Redbait		
Pyura stolonifera	R, S	R, S, SSC

Parameters	West coast Recommended	South coast Recommended
Other intertidal rocky-shore invertebrates[c]		
	R, S	R, S
Kelps and seaweed		
Gelidium spp.		
Gracilaria verrucosa	-	SSC
Ecklonia maxima	SSC	-
Laminaria pallida	SSC	-
	SSC[g]	-
Estuarine invertebrates		
Mud/sandprawns[d]		
Callianassa kraussi	R, S, SSC*	R, S, SSC*
Upogebia africana		
Other benthic bait		
Arenicola loveni	-	R, S
Solen capensis		
Penaeid prawns		
	-	R, S
Estuarine crabs		
Scylla serrata		
Other species		R, S
		S
Sandy-beach invertebrates		
Subtidal invertebrates[e]		
Bullia laevissima		
Ovalipes trimaculatus	SSC	-
Bivalves		
Donax serra	R, S, SSC	R, S, SSC*
Other crabs/mole crabs		
	-	-
Fish	SSC	-
Estuarine gillnet and seine-net	-	-
Estuarine trap-fishery	R, S	R, S
Shore-based rod and handline fishery[f]		
Non-motorised marine boats; rod &	S	-
handline	SSC	-
Marine gillnet and seine-net fisheries		

* Separate zones for small-scale commercial, recreational and subsistence activities

[a] Small-scale commercial fishery for intertidal populations of these species on the west coast.
[b] Small-scale commercial fishery for subtidal populations of these species on the south coast.
[c] Small-scale commercial bait-fishery directed at intertidal populations of these species in selected estuaries and/or harbours.
[d] Small-scale commercial fishery using hoopnets directed at these species on the west coast.
[e] Recreational permit restrictions apply: may not sell fish on recreational list.
[f] Exclusions -- *Ornithochiton salihafui*.
[g] Beach-cast collection only

Estuarine invertebrates: there may be **limited potential** in developing small-scale bait fisheries for mud and sand prawns in the Olifants and Berg River estuaries. These resources were considered to have low suitability as subsistence resources. In addition, the income generating potential of these resources is very low.

- **Potential further expansion** of kelp (*Ecklonia maxima* only) and white mussel (*Donnax serra*) fisheries that are already operating on a small-scale commercial basis (although still retaining their access to subsistence and/or recreational harvesters). Both resources were allocated moderate suitability for subsistence fisheries. The white mussel fishery should remain a bait fishery because of the dangers associated with the consumption of shellfish exposed to toxic algal blooms (Cockcroft et al., 2002).

Some of these resources have some potential to generate income as small-scale commercial fisheries (e.g. fish, sand mussel, *Gracilaria* and kelp sea weed, sea urchins). A demand is either present or can be created. However, there are two major problems that are generic for poor coastal fishers. Firstly, for most of these fishers the market is too far from the fishing location and the fishers have no means of getting the product to market, nor do they have means of keeping the product fresh until the market can be reached. Secondly, the amounts that can be harvested and the limitations the physical environment places on harvesting make the supply side too erratic to be attractive to the market**.**

11. INITIAL ALLOCATION OF SUBSISTENCE AND SMALL-SCALE COMMERCIAL FISHING RIGHTS

In the 1999-2000 lobster season in the Western Cape some provisions were made for subsistence fisheries. A pilot programme to alleviate poverty among fishing communities was introduced in which subsistence fishers were allowed to sell a recreational allowance of four west coast rock lobster per day. The programme led to wholesale abuse and greatly increased poaching, making it almost impossible to prosecute offenders. In the 2000–2001 season, approximately 1700 subsistence permits were issued for subsistence harvesting of west coast rock lobster and 208 for abalone. By 2002 these permits had been converted to limited commercial permits.

11.1 PROCESS FOR GRANTING OF LEGAL RIGHTS, PERMITS AND QUOTAS FOR SUBSISTENCE AND SMALL-SCALE/LIMITED COMMERCIAL FISHERIES

The current process of obtaining rights and quotas for the different fisheries sectors is preceded by the application for the grant of rights to engage in such activities. At present (as from 2001) medium-term rights last 4 years (with the exception of abalone which are valid for 2 years). The assessment of applications is done by the Rights Verification Unit (RVU), an independent consultancy appointed through an open tender process to ”remove the potential for corruption during any stage of the allocation and appeal process” (DEAT, 2004, p. 3). Unsuccessful applicants have the right to appeal directly to the Minister of DEAT.

The application for rights is subjected to a non-refundable fee regardless of whether or not the application is successful. Application fees are only refundable in exceptional cases at the discretion of the Minister.

Subsistence fisheries

Under Section 25 of the MRLA the DEAT issued a government notice (No. 701 - 27 July 2001) determining the “fees payable in respect of applications for and the issuing or granting of rights, permits and licenses”.

- The fees to undertake subsistence fishing are as follows:
    - Application for a right: R5
    - Application for a permit to exercise a right is R5
    - Issuing of a permit is R25 (Recreational fishing permits cost between R25 and R60, depending on the species)

Both subsistence and recreational permits are re-issued annually. However, since the administrative procedures to issue subsistence permits have not yet been put in place, most subsistence fishers have been granted ‘exemptions’.

Small-scale commercial or limited commercial fisheries

Since the recommendations by the SFTG for a small-scale commercial sector were only made in the year 2000, two years after the MLRA (1998) was promulgated, the latter does not legislate for this sector. In a special Government Gazette published on 27 July 2001, the DEAT announced the allocation of medium and long-term commercial fishing rights in South Africa and made provisions for persons applying for a limited commercial right. Thus the same

application form is used to apply for granting of rights for both large scale and limited/small-scale commercial fisheries.

However there are special provisions in the application form for 'persons'[15] applying for the grant of a limited commercial fishery right. As well as being a South African citizen, the granting of rights is subjected to the following terms:

- "To harvest no more than 60 000 oysters per annum using no more than four harvesters
- To collect white mussels for bait purposes
- To conduct fishing by means of small nets (beach seine for mixed shoal fish, gill, drift, drag, cast and shove)
- To catch 850kg of abalone or less
- To catch 1,5 ton or less of West Coast rock lobster
- Commercial (traditional) line fishing rights with five or less crew members." [Marine and Coastal Management, Application for the Grant of a Right in terms of the Section 18 of the Marine Living Resources Act, 1998 (Act No. 18 of 1998) – DEAT].

Applications for abalone, rock lobster and linefish must also be accompanied by fishing plans. A separate application must be submitted for each of the fisheries above, together with a non-refundable deposit of R500. The R500 fee applies regardless of the size of the quota finally allocated within the fishery concerned. The application form requires details of the applicant's past involvement in the fishing industry, the investment in the fishing operation, (number of boats, size and type of boats, gear etc), and the black economic empowerment component of the fishing venture. However, although the new Limited Commercial category of fishers is not clearly defined in law, the criteria for identifying who qualifies for a right as well as the procedures for applying for such rights tend to target those fishers at the upper end of what was envisaged by the SFTG's small-scale commercial category. Section 13.1 provides further information on resources harvested by this sector, as well as efforts to increase opportunities for historically disadvantaged individuals (HDI) to gain access to limited commercial resources.

On paper, the government has followed many of the FPDC's suggestions and the provisions of the MLRA. The Minister determines the quotas for each section of the industry (which is a

[15] According to the MLRA 1998 a :''South African person'' means— *(a)* a South African citizen in terms of the South African Citizenship Act, 1995 (Act No. 88 of 1995); *(b)* a company registered in terms of the Companies Act, 1973 (Act No. 61 of 1973), of which the majority of shareholders, as prescribed by the Minister, are South African persons; *(c)* a close corporation in terms of the Close Corporations Act, 1984 (Act No. 69 of 1984), of which the majority of members are South African persons; or *(d)* a trust in which—
(i) the majority of trustees having the controlling power at any given time are South African citizens; or
(ii) a majority of the beneficial interests are held by South African citizens;

portion of the TAC) upon the advice of the Consultative Advisory Forum (CAF). The CAF is comprised of 18 members, broadly representative of the industry (one from each of the four coastal provinces, scientists, sociologists, industry participants, and a lawyer). Seven fisheries are managed by means of a TAC. Those of relevance to the small-scale/limited commercial sector include the west coast rock lobster and abalone fisheries. Other resources such as the net and line fisheries as well as mussels and oysters are managed by means of effort controls (The various management mechanisms are discussed more fully in Section 13). Although the responsibility for allocating quotas is the responsibility of the Minister of Environmental Affairs and Tourism, he/she may delegate authority to allocate fishing rights to one or two senior officials in the Department.

The call for applications for fishing rights for both large-scale and limited commercial fisheries is announced in the Government Gazette. Application forms and guidelines to complete these forms are available from the coastal offices of DEAT. The guidelines describe the criteria used by the Rights Verification Unit to allocate fishing rights. Criteria for limited commercial sector include transformation, historic involvement in fishing, HDI status, access to fishing gear etc.

The applications are then submitted to the Rights Verification Unit (RVU) with the application fee. The Rights Verification Unit is appointed for the duration of the allocation by a public tender process. Key functions include reviewing and verifying each application. The verification process may require special investigations into certain applicants and discussions with fishers within coastal communities.

An independent Advisory Committee is then set up to assess the application in accordance with instructions issued by MCM. The Advisory Committee is also appointed through a tender process and work in teams to assess the applications. The Advisory Committee presents its recommendations to the Minister's delegate who makes a decision after careful consideration of the score sheets and comments received. The decision is officially documented in a Record of Decision. Applicants are then duly informed of the outcome by mail. Successful applicants must then apply for fishing permits and vessel licenses. Unsuccessful applicants may appeal to the Minister.

11.2 PROBLEMS WITH THE CURRENT SYSTEM

Although efforts have been made to put in place an independent and credible rights allocation system there are various problems which in particular impact on poor disadvantaged fishers.

Of particular concern is the mechanism for notifying people of an opportunity to apply for a right. For most poor fishers and members of fishing communities, the Government Gazette is an inaccessible document. Furthermore, the application forms are highly technical and require a reasonable level of education and sophistication. The fact that each resource needs to be applied for in a separate application form and requires the payment of a separate fee is also extremely onerous to poor fishers.

A key problem with the system is the fee payable which is not refundable. Most disadvantaged fishers cannot afford to submit an application, let alone pay a consultant to assist with drafting a business plan. The system also lacks an effective means of verifying information listed on applications. As a result, companies and individuals have been using token black names on the application form. Names of people who are not even part of a company's registrar are listed simply to get quotas granted.

Some empowerment groups and small-scale enterprises, headed by successful black businessmen and anti-apartheid activists who were eager to enter the fishing industry made promises to create jobs, construct infrastructure, promote development in disadvantaged communities, and amend historical imbalances in the industry. As a result, some of these new Small and Medium Enterprise (SME) entrants have been awarded quite large quotas. However, sometimes these SMEs do not personally sell their quotas, and may not even have a boat, crew, or the expertise to catch their allocations. The SME merely sells its fishing rights to the traditional industrial operators that have dominated the sector for the past 50 years.

Enforcement bodies within the government department are currently facing many problems. The principal problem is a gross shortage of manpower. There are 138 inspectors for the entire coast of South Africa. These inspectors' duties include patrolling, policing, harbour management, quota control, and administrative issues. Given these responsibilities, and the more than 3000 km of coastline, the government simply does not have the personnel to properly address the compliance situation. Inspector training is insufficient, and many lack the necessary policing skills and environmental knowledge needed to be effective.

With respect to allocating rights to subsistence fishers, the process has been slow, and permission to access resources has largely been issued in terms of Section 81 of the MLRA as an 'exemption'. Given that MCM does not consider there to be *bona fide* subsistence fishers in the west and south coast regions of South Africa, most effort from the department side has gone into managing the resources allocated to the limited commercial sector. The Subsistence Fisheries Management Unit is in the process of formulating a Subsistence Fisheries Policy and working out procedures for allocating rights to subsistence users. The

delays in granting fishing rights to subsistence fishers have also been a matter of extreme concern, especially for those dependent on these resources for basic food requirements. It should also be noted that at the time of writing this report, MCM were in the process of formulating new fisheries policies, and it is anticipated that several of the above concerns will be addressed in the new policies.

12. SOCIO-ECONOMIC ANALYSES AND DISCUSSION

12.1 INTRODUCTION

This section presents both an analysis of the research carried out by other researchers in the field (e.g. van Sittert, 2002a and b; Isaacs, 2004) and analyses that are an outcome of this research project. The discussion focuses on both the legislative process that led to and includes the MLRA and the research undertaken by the SFTG (post MLRA) to define and recommend the resources required for subsistence and small-scale commercial fishers. It is argued that the outcome of these processes has led to the marginalisation of poor historically disadvantaged fishers living in the BCLME region of South Africa.

12.2 MARGINALISATION OF 'INFORMAL" FISHERS AND THEIR INTERESTS DURING THE POLICY AND LEGISLATION FORMULATION PROCESS

In his analysis of fisheries policies in South Africa van Sittert (2002a) notes that post 1994, the fisheries legacy of the new government was one of "white monopolies, dispossession, politicisation, lack of legitimacy and resource collapse"**.** Prior to 1994 the fishing industry had become politicised and linked to National Party patronage, with marine resources being used to promote and protect Afrikaner interests, subsidise white agriculture and cement apartheid political alliances (van Sittert, 2002a, p. 46). 'Scientific management' during this period had failed to manage resources in a sustainable way (manifested in declining catches, increasingly poor fishing communities, increasing prices, etc.) and the overall lack of a legitimate management system had given rise to 'black markets' and 'poaching' (van Sittert, 2002, a,b).

Van Sittert (2002a) also notes that despite national control over marine resources that provided the new democratic government of South Africa with "a rare arena of state action within which simultaneously to facilitate the emergence of black capital and redistribute resources down the social scale" (van Sittert, 2002a, p. 46-47), the recent quota allocation and management process have favoured the established fisheries industries, historically-

disadvantaged black middle classes and employee share option plan (ESOP) partners (van Sittert, 2002a,b). Other HDIs with historical involvement in fisheries, in particular poor fishers and unorganised labour in the 'informal' and subsistence sectors continued to be marginalised.

12.3 DISEMPOWERMENT OF THE FISHERIES POLICY DEVELOPMENT COMMITTEE (FPDC) AND 'INFORMAL' FISHERS DURING THE DRAFTING OF THE MLRA

Van Sittert's (2002a and b) findings indicate that when the FPDC appointed the ARTC to prepare recommendations pertaining to access rights to marine resources, the issue was viewed as a technical and scientific problem as apposed to being addressed as a socio-economic issue (van Sittert, 2002a, quoting Martin and Nielsen, 1997). With the sidelining of the Fisher Forums, the FPDC became dominated by the industrial and corporate sector, in alliance with organised labour (van Sittert, 2002a, p. 47, quoting Martin and Nielsen, 1997; van Sittert, 2002b, p. 303).

Besides recommendations for the admission of 'new entrants', the dominance of this sector was reflected in some of the market driven recommendations of the FPDC/ARTC, some of which were eventually vetoed by the Parliamentary Committee on Environmental Affairs and Tourism (PCEAT) (van Sittert, 2002a and b). In this regard the PCEAT insisted that rights be leased (not sold) for a maximum of 15 years, the Minister be given the power to reallocate access rights and the fishing industry should be restructured to address historical imbalances and achieve equity (van Sittert, 2002a). However in some fishing industries the attempts by the Minister to redistribute global TAC were opposed and challenged in court by, and ultimately reversed in favour of the established industry.

For the previous 'informal' fishers, the MLRA (1998) eventually provided two options, namely, to become either a "limited" commercial or a subsistence fisher. Although subsistence fishers now had legal status, their activities were curtailed in relation to those of past 'informal' illegal fishers. In the past informal fishers had managed to make a marginal living, while the newly legalised subsistence fishers were now excluded from engaging on a *"substantial scale in the sale of fish on a commercial basis*". However, the MLRA definition of subsistence lacked clarity with regard to the identification and management of subsistence fishers (e.g. Harris et al., 2002). To address this, the SFTG recommended the recognition of another category of commercial fishers, namely small-scale or limited-commercial fishers, as a means to create space for the 'new entry' of some of the previously disadvantaged 'informal' fishers.

12.4 LACK OF ACKNOWLEDGEMENT OF THE HETEROGENEITY OF "NEW ENTRANTS" AMONGST HDIs

12.4.1 Financial exclusion of poor historical "informal" fishers

Neither the recommendations by the different task groups and technical committees (e.g. the ARTC, the SFTG) nor the policies and legislation promulgated to address the management of marine resources and the admission of 'new entrants' into the fishing industry (e.g. White Paper for A Marine Fisheries Policy for South Africa, 1997; MLRA, 1998) adequately dealt with the lack of homogeneity amongst 'new entrants', beyond the statement that they were meant to be 'historically disadvantaged individuals' (HDIs).

While the ARTC gave consideration to the potential conflicts between past legal commercial and recreational operators on one hand and 'new entrants' on the other, it did not deal with the potential conflicts between historically rooted 'informal' fishers and other potential 'new entrants' that did not have any historical involvement in fishing. Although both of these groups are part of the 'historically disadvantaged groups/individuals', some have very little else in common besides the fact that they have an interest in fishing. For those individuals and groups who had historical involvement in fishing, the only change was that they were now considered to be legal.

Isaacs (2004), whose Ph.D. thesis reviews the 'social process and politics of the MRLA 1998', also identifies a number of problems associated with the lack of a clear definition of HDIs (or PDIs, Previously Disadvantaged Individuals) and the broad range of interpretations associated with the term in the marine fisheries context; from black empowerment companies located far from the coast, to representatives of coastal settlements who claim traditional use and historical entitlement, to those who "worked the sea" (p. 167). Isaacs states that "in the end the definition of the rightful HDIs/PDIs depends to a large extent on how marine resources are perceived. Are they primarily national property, to be used for the creation of the largest possible economic surplus (resource fees, employment, export revenues) or do they in some way belong to the coastal communities as a general means of income, more in line with a welfare cheque" (ibid, p. 168). Isaacs (2004) states that "objectively speaking it is unjust to place organisational entrepreneurs, the emerging black elite group and the emerging middle class in the same category as the marginalised poor, who lack basic resources, education and financial capital" (ibid, p. 168).

The administrative and financial obstacles and difficulties encountered by many of the poor 'informal' fishers during the process of having to apply for limited commercial rights, as described by Isaacs (2004), illustrate some of the points raised above. Poor and illiterate fishers became dependent on 'experts' and local leaders with the required skills (e.g. lawyers and other people who could assist them in completing application forms, in forming and registering businesses, draft business plans - Isaacs, 2004, p. 270). The process also involved constant lobbying to MCM in Cape Town, which due to its location relative to the majority of fishing settlements, made poor fishers dependent on intermediaries (ibid).

These bureaucratic problems were compounded by the high costs associated with applying for a right, even in cases where resources were pooled to make an application. There was considerable financial risk involved in applying, as there was no guarantee that an application would be successful and the application fees were non-refundable.

The failure of the different recommendations and policies to deal with the heterogeneous composition of 'new entrants' and the lack of administrative procedures to cater for these different fishers, meant that the needs, interests and limited capacities of poor 'informal' fishers were not taken into account. Poor 'informal' fishers could not change from 'subsistence' to 'limited commercial fishers' overnight simply by being lucky enough to get access to 'reasonable' tonnage or quotas of particular (higher commercial value) species.

With the commercial status being subjected to the new 'user pays' system, the ability to afford the high application and user fees, not historical dispossession, became the key to deciding access to marine resources (van Sittert, 2002a, p. 55). The overall implications of this policy were that many poor fishers who had a history of involvement in fishing were excluded from gaining formal access to the limited-commercial resources due to a lack of financial resources and business skills. Some of the perceptions of people who were successful in gaining limited commercial fishing rights are illustrated in Box 1.

Box 1: Some perceptions of successful applicants for limited commercial fishing rights *(Source: interviews by DEAT)*

The DEAT interviewed 5 groups of fishers (representing +/- 50 predominantly west coast rock lobster (WCRL) limited commercial right holders and 200 fishers) along the west BCLME coast to assess their experiences regarding applications for limited commercial fishing rights (DEAT, 2002). In general each group had signed annual agreements with a buyer who purchases their catch for an annually negotiated fixed price. Prices obtained vary between R110 – R170 per kg, prices being higher nearer urban centres than in more remote coastal settlements.

From the published excerpts of these interviews (ibid, p. 12-17) it is apparent that the interviewees experienced mixed degrees of success and had mixed reactions to the process of rights allocation and to the quotas they received. Most right-holders had formed associations with either other right-holders or with fishers and were able to make some investments in equipment (e.g. boats, vehicles, etc).

It seems that those associations with a smaller ratio of right-holders to fishers, which received greater allocations (e.g. 1500 kg of WCRL) and had skilled management, managed to benefit the most from the allocations' outcomes. One such example is the Mariners' Fishermen's Association in Ocean View with 9 right-holders (8 of which received 1500 kg of WCRL and 1 received an 800 kg allocation) and 36 fishers. The DEAT states that in general, a 1 500 kg allocation to be shared amongst a right-holder and three fishers provided an annual income of +/- R20 000 each (p. 15).

Those associations in which allocations were smaller (800 kg WCRL) and in which the proceeds had to be shared amongst the right-holders and a greater number of fishers had poorer outcomes, which fishers claim to be not financially viable. For example in Lambert's Bay a 800 kg allocation was shared between the right-holder and nine fishers, providing individual incomes of R2000 for the season (ibid, p.15). In Elands Bay the six right-holders, allocated 800 kg WCRL each, shared it with five other fishers. In Paternoster 11 limited commercial fishing rights (seven rights to catch between 200 and 420 kg of WCRL and three rights to catch a total of 1 290 kg of abalone) were shared between 69 members of the local Small Fishers Association, each receiving a payout of R4 000 for the season (ibid, p. 15-17).

All the groups interviewed by DEAT had to borrow money to pay for application fees and to buy equipment (boats, fishing gear, safety equipment) which made the first year of operation costly. They all hoped that their lives would improve in the following season, although the installation of

expensive monitoring equipment would still be a challenge. Many of those that succeeded in obtaining rights acknowledged improvements linked to the advantages of being legal operators and thus not being at the 'mercy of the weather' and having to catch a daily bag, the ability to get better prices from seafood buyers and to do some financial planning. On the other hand they also claimed (as noted in Lambert's Bay) that support for skills development was not provided, application forms were too complicated, and that mistakes were made: "the verification process has not succeeded in … identifying *bona fide* fishers and allocating rights to deserving applicants" (p. 15). Quoting one of the DEAT interviewees in Eland's Bay: "There are no work opportunities for those who didn't get (a right). It's painful for those who didn't get" (ibid, p. 16).

12.4.2 The entry of "historically new" fishing entrepreneurs

Isaacs in her PhD (2004, Chapter 7), describes two ways in which successful 'new entrants' entered the fishing industry: Firstly, as black empowerment partners and co-owners or employee shareholding schemes in large commercial companies; and secondly, by entering into joint ventures with smaller established companies, as new entrants were starting off in seriously-disadvantaged positions (e.g. they lacked boats, processing facilities, marketing competence, physical and financial capital) despite re-allocation and re-distribution of quotas.

The new entrants comprised both people with and without historical involvement in fishing. Amongst the communities living in coastal fishing settlements, two main strategies were used to apply for limited commercial rights. The first approach involved using informed members of communities (e.g. teachers, entrepreneurs, local councillors, union leaders) to act as private entrepreneurs and form private commercial companies. The second involved community-based organisations applying as CCs (Close Corporations) or Trusts (Isaacs, 2004, p. 253).

Many of the applicants failed to meet the necessary requirements, although not all the unsuccessful applicants were poor or lacked formal qualifications. Isaacs (2004) states that it is difficult to assess how many of the successful applicants were genuine fishers with a history of active involvement in fishing, as they applied as individuals, CCs with up to 10 participants, co-operatives with hundreds of members and shareholding companies with many shareholders (p. 267). Although this process created opportunities for HDIs in the fishing industry, it promoted Black Economic Empowerment goals regardless of any historical involvement in fishing or residency near the coast (as recommended by the SFTG). In this sense *bona fide* fishers lost out in the process of commercialisation of 'subsistence'/informal fisheries.

Isaacs (2004) also points out that while the appointment of a Rights Verification Unit and an Independent Resolve Group by MCM may have succeeded in avoiding corruption and nepotism in the adjudication of the application process, it is unlikely that the professionals involved had sufficient knowledge of fishing communities to be able to distinguish between *bona fide* fishers and 'fortune seekers' (p 162). By the end of the process there was a high level of dissatisfaction amongst poor fishers towards local organisations and leaders who seemed to have become the main beneficiaries of the new quota system. Many had used poor fishers' names and identity numbers to acquire quotas. These poor fishers were sidelined once companies were established (Isaacs, 2004, p. 250- 255).

12.4.3 Lack of differentiation of the heterogeneity of 'new entrants' amongst HDIs

The lack of acknowledgment of the heterogeneity amongst 'new entrants' is also reflected in the DEAT data (on marine resource quotas and rights allocated in the commercial sector) reviewed as part of this research. The DEAT information (Section 11) indicates that significant transformation in terms of HDI fishing rights and quotas has occurred in the WCRL and abalone fisheries on the BCLME coast. However, the data does not reveal which HDIs have benefited from the process, particularly in the limited commercial sector. But, given that the largest proportion of TAC remains in the formal commercial sector, the HDIs benefiting from this redistribution have not been limited commercial fishers, but 'new entrants' to the formal commercial sector.

The data also does not show who the beneficiaries in the limited commercial sector are (i.e., their historical involvement and whether they are coastal residents). Although Isaacs (2004) states that it is difficult to identify who the successful and unsuccessful applicants were, it would be important to know:

- How many applicants for limited commercial rights were received and how many were unsuccessful?
- What criteria were used to evaluate the successful and unsuccessful applicants?
- How many of the successful applicants had a historical involvement in fishing?
- Of the successful applicants how many live near the coast and engage in fishing themselves (i.e., have hands on involvement in harvesting or processing as recommended by SFTG).
- How many rights were allocated for other species (e.g. of fish) besides WCRL and abalone? What was the size of the allocations and for how long are they valid?

Answers to some of these questions would help to clarify the criteria used in the current allocation for medium-term limited commercial rights and which of the recommendations of the SFTG were followed.

12.5 INCOMPATIBILITY OF PRINCIPLES AND OBJECTIVES IN DIFFERENT POLICIES AND LEGISLATION

12.5.1 Equity, sustainability and stability

The ARTC pointed out that while it would be possible to balance the government's objectives of achieving equity, sustainability and stability in a fisheries development policy, these three objectives were often incompatible and there would need to be trade offs between them. An analysis of the process and current outcomes suggests that the trade-offs adopted to ensure the sustainability of the resources have favoured maintaining stability in the fishing industry, while neglecting the equity objective especially amongst poor disadvantaged fishers.

The term 'equity' appears frequently in both recent legislation (e.g. MLRA, 1998, NEMA, 1998) and policy recommendations (e.g. ARTC, 1996 and SFTG reports), and refers to the need to address past inequalities in the fishing industry in South Africa. However it is argued here that both policy and legislation has failed to address the issue of equity adequately.

The term 'equity' is never clearly defined in the legislation and policies covering the fishing industry and management of marine resources, and is loosely used as meaning "fair to all people" (e.g. ARTC, 1996, p. 3). The Concise Oxford Dictionary, 2001, states that equity refers to a "branch of law that developed alongside common law in order to remedy some of its defects in fairness and justice". The Dictionary of Economics states that "equity is a concept of distributive justice in welfare economics. Equity as fairness has several possible meanings not always consistent", which can be in conflict. However both the Dictionary of Economics and the Dictionary of Social Sciences point out that there are two elements in the concept of equity namely: horizontal and vertical equity. Horizontal equity deals with considerations of fairness as far as treating individuals in similar circumstances similarly. Vertical equity deals with considerations of fairness of treating individuals in different circumstances differently in accord with the relevant circumstances (e.g. taxation should be progressive according to the levels of wealth/income).

Equity as a concept is therefore concerned with outcomes. For example the notion of equitable development as used by the UNDP (Taylor, 2000) refers to a strategy that is based

on principles of equity, which accept that poorer areas or people should be allocated more resources. In this regard, the policies and legislation relevant to the allocation and management of marine resources have not been clear and consistent.

12.5.2 A resource-centred versus people-centred policy

Given that the objective of equity has not been adequately addressed in fisheries policies and legislation, the assertion in the White Paper on Sustainable Coastal Development (2000) that the new policy would be people-centred, in contrast to the past resource-centred approach, remains unfulfilled. Some of the provisions of the White Paper (WP) on Sustainable Coastal Development are in fact at odds with the MLRA. The WP seeks to eliminate coastal poverty and allocate and use coastal resources by evaluating the needs of disadvantaged communities. However, the WP has little power over the allocation and management of marine resources which are governed by the MLRA and implemented by MCM. Access rights are based on the commercial values of resources rather than on the circumstances and needs of their historical users, particularly those of poor fishers.

12.6 DEFINITION OF TERMS SUBSISTENCE AND ARTISANAL FISHERS

The sidelining of poor historically disadvantaged fishers' needs and interests can also possibly be attributed to the choice of terminology and definitions of fishers adopted by the SFTG, together with the final recommendations on the usage of resources. While this was never the intention of the SFTG, the restrictive definition of subsistence and resources available for subsistence use, meant that very few fishers were ultimately classified as subsistence in the BCLME region of South Africa. While creation of a category of small-scale commercial fishers was an attempt to enhance access for poor, coastal fishers, the failure to put in place administrative procedures to give effect to these recommendations meant that hundreds of *bona fide* fishers living in coastal settlements on the west and southern Cape coast were effectively excluded from gaining access to marine resources.

Hauck (2002) reviewed the literature associated with the international usage of the terms artisanal and subsistence fishers for the SFTG. Her research found that there is no consistency in definitions and terminology relating to artisanal and subsistence fishers (Hauck, 2000). The SFTG were of the opinion that consistency was not a necessary goal as "definitions are context specific and the circumstances of 'subsistence harvesting' differ widely from country to country" (Harris et al., 2002, p. 413). However, in summarising Hauck's review, the SFTG made the following observations, namely:

- "*Subsistence fishers are invariably poor, their activities tend to be rooted in history and culture and often undertaken by a sector of the population that has been politically marginalised*."
- Management systems for subsistence and artisanal sectors have focused on a few common principles, including:

  "*Use of traditional knowledge, co-management (shared decision-making between government and resource users) and establishment of clear prioritization of the allocation of resources to subsistence in preference to commercial and recreational sectors in times of shortage*" (emphasis by this researcher).

However, the SFTG's own recommendations on the usage of the resources did not follow this principle.

12.7 PRIORITISATION OF THE COMMERCIAL AND RECREATIONAL SECTORS

While few resources were considered to be highly suitable for subsistence fishing by the ARTC (Types 3 and 4, shown in Table 5) even less were considered suitable by the SFTG (see Table 17 section 10). Of the resources considered highly suitable for subsistence use, none were recommended for subsistence only. Where it was considered that additional harvesting of any resource was viable, although subsistence usage was still recommended, small-scale commercial usage was also introduced. For example, even species that have relatively-low commercial value, such as limpets, Mediterranean mussels and mud/sandprawns, and that previously were only harvested by 'subsistence' and recreational fishers are also recommended for small-scale commercial purposes. This would lead to an increase in the levels of competition for deriving any potential income from them. The complete *de facto* removal of rock lobster as a subsistence resource, while allocating quotas to the commercial and recreational sectors, was based purely on commercial value of this resource. Thus priority 'in times of shortage' was clearly not given to subsistence fishers.

12.7.1 Artisanal versus subsistence fishers in South Africa: from basic needs to "food security'

In one of the research projects undertaken by the SFTG in which 'subsistence' fishers participated, artisanal and subsistence fishers were characterised as follows:

Table 18: Characterisation of subsistence and artisanal fishers by the SFTG

Characteristics	Subsistence Fishers	Artisanal Fishers
(1) Poverty level:	(1) Poor	(1) Poor
(2) Harvesting:	*(2)* Personally harvest resources	*(2)* Personally harvest or *fish* resources
(3) Main resources use:	*(3) Source of food to meet their basic nutritional needs rather than to earn money*	(3) *For sale and secondarily for consumption; generate only sufficient returns to meet basic needs*
(4) Harvesting area:	(4) Operate on shore or estuaries	(4) Operate on shore or estuaries
(5) Technology:	(5) Use low technology gear	(5) Use low technology gear
(6) Origin of fishery:	(6) Part of long-standing community-based or cultural practice	(6) Part of long-standing cultural tradition
(7) Value of resource:	(7) Collect resources that have low cash value	(7) Collect resources that have low cash value

Source: Branch et al., 2002, p 479, 1st column

Table 18 illustrates the large degree of overlap between the perceptions of 'subsistence fishers' regarding the definition of subsistence and artisanal fishers. The main difference between them (illustrated in italics in Table 18) was in the use of resources. The use of resources by subsistence fishers was only for meeting basic nutritional needs, whereas artisanal fishers were characterised by the usage of resources for sale to generate sufficient returns to meet basic needs. The usage of "marine resources to be used or sold to meet basic needs of food security" eventually emerged as one of the SFTG criteria to classify subsistence fishers, whereas the satisfaction of basic needs was shifted towards the limited commercial sector.

The concept of 'food security'[16] is less encompassing than that of 'basic needs'[17], and it is unlikely that 'subsistence' fishers participating in the SFTG research process were aware of

[16] **Food security –** Food security means "access by all times to adequate safe and nutritious food for a healthy and productive life" (South African Agriculture and Land Affairs Portfolio Committee, minutes of a meeting on Food Security, 27 Feb 2001). The UN Food and Agriculture Organisation (FAO) recognises that food security also entails a cultural aspect as 'eating is not only a question of being fed but much more so a moment when the culture of a community is expressed.

[17] **Basic needs approach** - The World Employment Conference in 1976, endorsed the ILO proposal that all countries should give priority to meeting the **basic needs** of their populations by the year 2000, which include: minimum nutritional requirements, healthcare, education, shelter, clothing, transport, employment opportunities and participation in making decisions that affect their livelihoods. It is argued that by providing more resources to the most disadvantaged produces a healthier, better educated and productive workforce. Those who propose a basic needs approach believe that such an approach provides a more effective foundation for sustained economic growth and raising the levels of wealth and well being of the poor, rather than reliance on economic growth and 'trickle-down" effects, for which there is no evidence. (UNDP Human Development Report) (Taylor, 2000)

the distinction. Despite differences in opinion amongst SFTG members, the term 'artisanal fishers' was removed from South Africa's legal terminology and the terms subsistence and limited commercial were used.

12.7.2 The lack of provision for food security

According to the SFTG (Report 2, 2000), 43% of 'subsistence' fisher households along the west BCLME coast and 49% along the south coast experience food insecurity (Table 12). These findings were based on the definition of a food-insecure household as one in which more than 60% of expenditure was spent on food.

The SFTG recommended that only those households that were both ultra-poor and vulnerable should be classified as subsistence fisher households. Using this measure, only 6% and 7% of households on the west and south BCLME coasts, respectively, were recognised as subsistence fisher households (Table 19). These households were in fact spending 71-89% of their income on food. By adopting such strict criteria, the food security of the (43-49%) households originally found by the SFTG as being food insecure at the beginning of the study, was effectively undermined.

Table 19: Summary of some variables pertaining to 'subsistence' and 'for certain' subsistence fishers

	Self-definition		Calculated by the SFTG			No non-employment income	
	Commercial fishers	'Subsistence' fishers	Food insecurity of 'subsistence' households	Ultra-poor households	Ultra-poor & vulnerable or 'for certain'** subsistence households	'Subsistence' households	Ultra-poor & vulnerable or 'for certain'** subsistence households
West Coast	2.3%	97%	43%	6%	6% (spent 71% of household income on food)	53%	100%
South coast	54%	46%	49%	16%	7% (spent 89% of household income on food)	80%	100%

(Source: the source of these figures are discussed in Section 8 and only summarised here)

** 'For certain' subsistence households were defined by the SFTG socio-economic report (2000) as those households in which there was no commercial fisher but someone had been identified as a subsistence fisher and where the household was classified as ultra-poor, and one vulnerable to becoming poorer in the face of change (Russell *et al*, 2000) .

Besides this wide discrepancy, the type of resources recommended by the SFTG to be allocated to subsistence fishers for household 'food security' are of poor quality and cannot provide for food security, which entails a variety of dietary components (e.g. fruit, vegetables, carbohydrates, protein, etc.) in sufficient amounts. The acquisition of these food resources requires purchasing power, especially in areas where people have no access to agricultural land. Bearing in mind the statement by the SFTG on their recommendations on the suitability of resources it is important to note that:

- Except for mullet/harders and fish associated with the recreational shore-based rod and handline fishery, few of the other fish species identified by Branch et al. (2002) as being harvested by 'subsistence' fishers appear in the SFTG recommendations as 'suitable' for subsistence.

- A few of the other species recommended for subsistence (within the BCLME region) by the SFTG are potentially edible (e.g. limpets and mussels), but do not provide for 'food security', nor for adequate nutrition in everyday life. Besides, they are not part of people's customary diet and eating traditions.

The species recommended for subsistence usage (whether edible or not) by the SFTG have a very limited commercial or monetary value because there is a limited market for them (mainly for bait), especially in their immediate surroundings where subsistence fishers are supposed to sell their surplus harvest (i.e., at less than 20 km from point of capture). In its definition and recommendations regarding the subsistence fishing sector the SFTG does not provide a definition of what is meant by food security. The application of the definition used in its research process is likely to prove a difficult, if not an impossible bureaucratic exercise, and is likely to suffer from the negative aspects associated with other existing means tests (e.g. Taylor, 2002).

A broad (and less quantitative) definition of food security such as the one used by the South African Agriculture and Land Affairs Portfolio Committee, would provide a framework that would allow fishing as a means of livelihood for both consumption and to earn enough income to access "safe and nutritious food for a healthy and productive life". The cultural component associated with food security highlighted by the FAO would also imply access to some of the resources that are now excluded due to their high commercial value, such as rock lobster. As noted earlier, subsistence fishers are now only allowed to harvest and consume marine resources if they pay 'user fees' like their recreational and commercial counterparts. Historical

evidence shows that crayfish has been consumed by 'informal' fishers for thousands of years and that until recently it was the 'food of the poor' (see Section 5).

The argument in Harris et al. (2002, p. 479) that some of those fishers originally described as artisanal fishers who had "the potential, opportunity and aspirations to become commercial", should no longer be classified as subsistence fishers is debatable. It is highly likely that given the opportunity, all subsistence fishers would aspire to get out of a lifestyle that (at best) only allows them to access poor quality marine protein.

Branch et al. (2002, p. 475) state that to find a definition for subsistence fishers the SFTG research process had to consider the fact that "the White Paper leading up to the (MLR) Act made it clear that subsistence should be seen as a means of survival, not a way of making a living", in which case the final recommendations by the SFTG were to a certain extent guided by government directives.

However its own lack of definition of what entails food security resulted in recommendations that fail to achieve this goal, and contrary to its own research findings, did not prioritise "subsistence in preference to commercial and recreational sectors in times of shortage".

12.8 FOOD SECURITY AND THE UN MILLENNIUM DEVELOPMENT GOALS – ERADICATING EXTREME HUNGER

"More than three quarters of hungry people are in rural areas of developing countries. About half live in farm households on marginal lands, where environmental degradation threatens agricultural production, nearly a third live in rural landless non-farm households, such as those dependent on herding, fishing or forestry. Yet poor fishers are seeing their catches reduced by commercial fishing and foresters are losing their rights as logging companies move in under government concessions" (UNDP, Human Development Report 2003, p.88).

When considering the issue of subsistence and artisanal fishers it is also worthwhile reflecting on the UN Millennium Goal 1 (Box 2), particularly the declared intent of eradicating extreme hunger.

Box 2: UN Millennium Development Goal 1: Eradicate extreme poverty and hunger
Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day.
Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger

In 2002, the UNDP Human Development Report (p. 47-49) indicated that there was no information available for South Africa on the target of halving the proportion of people suffering from hunger. Data on the percentage of undernourished people is also "not available" in the UNDP Human Development Report of 2003. However the UNDP South African Human Development Report states that 33% of all households experienced hunger in 1999 (p. 81).

Recently there has been widespread public controversy in South Africa regarding the best approach to deal with people who are HIV positive or suffer from AIDS, with government emphasising the importance of a proper and healthy diet. Information on the prevalence of HIV/AIDS in the fishing settlements along the BCLME coast has not been gathered in this report, although Isaacs (2004) reports that the main health problems in Elands Bay (on the west BCLME coast) are TB and a rapid increase in HIV/AIDS. Given this, the strict position adopted by the SFTG in defining subsistence fishers and in its recommendations on the usage of living marine resources needs, is unlikely to contribute to food security and a healthy diet along the coastal areas.

12.9 POVERTY AMONGST 'SUBSISTENCE' FISHERS AND THEIR LOCAL AND PROVINCIAL CONTEXTS

"Poverty has various manifestations, including lack of income and productive resources sufficient to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments; and social discrimination and exclusion. It is also characterised by lack of participation in decision making and in civil, social and cultural life …" (1995 UN World Summit on Social Development, quoted in Taylor, 2000)

12.9.1 Assessing poverty amongst "subsistence" fishers

The UN definition above implies that poverty has many dimensions and that economic factors (e.g. unemployment, wage levels, access to services, prices) are just one of them. It also implies that poverty cannot be assessed by quantitative and statistical means alone.

The SFTG Draft Report 2 acknowledges that there are different definitions and approaches to measure poverty and that there are relative and absolute indicators. These are reflected in a range of statistical measures based on absolute poverty measures, below and above which people are considered to be poor or non-poor (e.g. “number of people living below the poverty line”, population living below USA$1 or $2 a day, etc.). In its research the SFTG opted to use an absolute poverty measure (mean adult equivalent income per month) to assess poverty amongst ‘subsistence’ fishers households (and to recommend criteria to finally define’ ‘for certain’ subsistence fisher households), based on the World Bank’s guidelines. The criteria used marginalised many of the fishers who saw themselves as subsistence, during the SFTG research process.

12.9.2 Marginalisation of fishers’ perceptions

At the beginning of the SFTG survey 97.7% of households along the west BCLME coast and 46% along the south coast, were self-classified as ‘subsistence’. At the end of its research the SFTG viewed only 6 % and 7% of the households, respectively, as ‘for certain’ subsistence households. So great a discrepancy needs to be explored due to the implications that this has in terms of legal access to resources and the impact on livelihoods. Furthermore, this difference between self-classification and task group classification may hinder one of the BCLME project’s intended outcomes, improved management and communication between government and fisherfolk. If communities feel that their knowledge, perceptions, needs and interests are not taken into account, as the difference in classification may indicate, they will be less likely to participate in state-led programmes.

12.9.3 Gender dimension in fishing related activities

Based on its adopted research criteria the SFTG found, contrary to both national and international trends, that both poor and ultra-poor male-headed households experience poverty levels that are at least double those experienced by female-headed households. This implies that most female headed households would not be considered subsistence fisher households, which could impact upon the development of potential policies, programmes and decisions supposed to prioritise women, who are one of the most vulnerable groupings in South Africa. It would therefore be useful to confirm the SFTG results and explore further the role of women in fishing-related activities and in fisherfolk households along the BCLME coast.

12.9.4 Criteria for assessing 'vulnerability' of ultra-poor or subsistence fishers

It is well known, as stated in the SFTG Report 2, that non-employment income, or state pensions (e.g. state old age pensions, disability grants, etc), play a key role in the survival of poor households in South Africa. It is also common practice to include these in estimates of household incomes. The SFTG found that 53% and 80% of 'subsistence' fisher households on the west and south BCLME coasts, respectively, had no such income, and that none of the ultra-poor and vulnerable households received state pensions in both regions. These findings confirm that the ultra-poor identified in this study are potentially poorer in terms of total household cash income than other poor households in South Africa. But the inclusion of these sources of income as one of the indicators to confirm the status of ultra-poor and vulnerable households (i.e. 'for certain' subsistence fishers) has the effect of penalising those who get a state pension. It penalises those who have been officially considered unable or unfit to work, and rather than this providing them with a measure of social assistance and alleviate the burden on wage earners in the household, their pensions are now presupposed to support other members of the household, including the economically active age group. Thus the inclusion of non-employment income (state pensions, disability grants) in estimating fisher household incomes may have resulted in several poor fishers being excluded from being classified as ultra-poor in the SFTG survey.

12.9.5 The lack of local employment opportunities

Section 6 of this report attempted to show that in general, unemployment levels in the coastal settlements in which poor 'informal' fishers live and work are high. It also showed that at least between 1996 and 2001 (using official Census data), opportunities for employment have decreased in the formal sectors of the local economy in small coastal towns, with very few new jobs being created.

Most of the jobs in the formal employment sectors in these settlements are also associated with low skills and low pay. According to the Census 2001 data, large percentages (30-79%, with one value at 25%) of the economically active population in these areas have in fact no employment income and the majority (31-62%) earn between R1 and R1600 per month.

12.10 EXPLORING OTHER LIVELIHOOD ALTERNATIVES

Besides the lack of employment opportunities in the formal employment sector other factors have emerged that show that there are severe limitations in exploring other livelihood options in the coastal settlements along the BCLME coast. These are discussed below.

12.10.1 Lack of access to land

In general most of the poor people living in the fishing settlements along the BCLME coastal region have very limited access to land.. Although much land on the Northern and Western Cape coast has limited agricultural potential, there is potential for growing rooibos tea, proteas, grapes and certain other agricultural crops. However most of the land is privately owned by mining companies (e.g. Alexcor in Namaqualand), private farm owners and/or used for private holiday homes. In this regard, the Green Paper Towards Sustainable Coastal Development identifies accessing land as one of the obstacles to socio-economic development in these areas

12.10.2 The potential and limits of tourism

Although tourism is mentioned as one of the sectors with potential to promote local and national development (e.g. SA UNDP Human Development Report, 2003) it is important to consider both its potential benefits, especially in the short term (e.g. increased revenue linked to increased consumption and need of services by tourists) and limitations. Although there is some evidence that tourism does create jobs, can build skills and boost local economies and in this way can contribute to poverty alleviation under certain conditions, the potentially damaging outcomes associated with tourism are increasingly being highlighted. Whilst there are a few community-based tourism initiatives operating within the BCLME coastal region, the actual benefits flowing from these projects have not been evaluated. However, the actual number of people employed from these tourism ventures is relatively low. Tourism tends to generate seasonal and low incomes and it is subjected to unpredictable world fluctuations in the tourist market, exchange rates and outside world events and perceptions. Also unless measures are put in place to ensure that a significant part of the financial gains are reinvested in local communities (e.g. health, education, skills development, needed infrastructure) there is little chance that the next generation will overcome their current status of poverty and marginalisation. Furthermore, the kind of infrastructural development required by tourism is usually more relevant to the needs of affluent tourists than to those of the locals. There are aspects of tourism development which may aid poor local communities, such as the upgrading

of the West Coast Road. In general though, tourism fails to impact positively upon local communities as it often results in the loss of access to coastal areas and the consumption of scarce resources, such as water (Green Paper on Sustainable Coastal Development for South Africa, 1998).

12.11 DISCUSSION

Poor informal fishers in South Africa had hopes of legalising their acitvities after 1994, but these hopes have not been realised for many because they remain marginalised. Even though some of the quotas previously held by the commercial sector have been redistributed and this has allowed the entry of some HDIs into the limited commercial sector, poor fishers with an historical involvement in fishing have often not been the primary beneficiaries.

This report has argued that one of the options offered by the new policies, namely that of being confined to the newly defined and severely restricted subsistence status, does not result in a viable or sustainable subsistence livelihood because it often does not provide for household food security. The second option for accessing marine resources, namely that of becoming a small scale or limited commercial fisher, is dependent on an ability to afford steep application and user fees, and not on historical involvement. Many historical poor 'informal' fishers have also been excluded from gaining formal access to the newly defined limited-commercial resources due to a lack of business skills, financial support, and the capacity to satisfy bureaucratic and administrative requirements.

The SFTG recommendations on criteria for qualification as subsistence fishers appear to be overly prescriptive with respect to user rights. The rights allocation process ignores livelihood strategies that may involve the extended family, and a wide range of activities that include the activity of opportunistic fishing. It would appear therefore that there is a need for greater flexibility in the approach to granting rights, including group or community rights.

One of the more intractable problems has been that the SFTG's recommendations regarding criteria to define and identify 'subsistence fishers' based on 'basic needs of food insecurity' excluded large numbers of food insecure fisher households (refer Section 9). The type of resources allocated for legal harvest by these 'ultra-poor and vulnerable' subsistence fishers on the north, west and southern Cape coast include species that, in many instances, are usually not regarded as edible (e.g. worms and winkles) and are not customarily consumed. The criteria do not provide for food security as defined by the South African Agriculture and Land Affairs Portfolio Committee nor the FAO. The right to have access to sufficient food is

considered a basic human right both nationally and internationally and is enshrined in the Constitution of South Africa.

Poor 'informal' fishers usually engage in a variety of livelihood strategies that are seasonal in character. However, current land ownership patterns along the South African BCLME coast preclude agriculturally related activities as a viable livelihood alternative for many. The Sustainable Coastal Livelihoods Study (2002) has indicated that the slow pace of land restitution, redistribution and tenure reform is a limiting factor to reducing levels of poverty and promoting sustainable livelihoods for the poor.

An overview of the socio-economic context in which poor fishers live along the BCLME coast shows that there is a prevalence of poverty, with negative provincial (and national) trends in the Gini coefficient, in the human development index (associated with declining life expectancies linked to HIV/AIDS) and in the proportion of people living below the national poverty line. It also shows that most people have low or no incomes, either because they earn low wages, experience high unemployment rates or because most of the economically active population do in fact not work. In addition, recent trends in employment show that at least since 1996 most of the local industries in the fishing settlements along the BCLME coast have shed jobs. These trends are already part of the Western Cape economy and labour market. It is therefore unlikely that the formal sector along the BCLME coast will be a major source of job creation. A wide range of sustainable livelihood activities therefore play an important role for the majority of poor fishers in this region.

In the past opportunities for earning a living along the Namaqualand Coast were limited. However, proposals are now being developed to overcome the economic decline associated with downscaling of mining and with the decline of fishing activities that have prevailed until recently. According to Britz *et al* (2000), both fisheries and mariculture have the potential to provide sustainable economic growth for the benefit of local communities, and to decrease the prevailing levels of poverty. However, a critical requirement is the need for a "state led fishing and mariculture sector plan" (p. 6), as well as for scientific research and technology transfer, capital investment, capacity building through access to funding and appropriate education and training of local communities with long-term strategies for back up advice and services (Britz et al., 2000; Oellermann and Mathews, 2002, quoted in NCCMP). The success of these potential opportunities in Namaqualand to create alternative livelihoods or opportunities for poor fishers will depend on government policies, decisions and planning (Britz *et al,* 2000) . It will also be important to investigate the potential negative social and environmental impacts of mariculture before proceeding with such projects.

If and when alternatives for sustainable coastal livelihoods are implemented for poor fishers, care should be taken to locate the alternatives within their environments so that traveling requirements are limited to affordable levels. Proposals for alternative livelihoods must also either ensure that the existing types and levels of skills are relevant to the proposals, and that skills training and development programmes accompany the development of those alternatives. Proposals should also bear in mind the large youthful population of the area and should therefore carefully consider the implications of the possible alternative livelihoods on the next generation of job seekers.

This review also found that the focus of government policies is on the sustainable use of resources without identifying where responsibility should lie to ensure that sustainability, and who should be prioritised for resource access in times of need. The policies do not adequately address the objective of equity and remain centred on the commercial value of resources, favouring the stability of the commercial sector rather than the needs of poor fishers. This is largely a result of the government's decision to develop a stable national economy and the problem is difficult to resolve, since there is clearly a strong case to be made for a more equitable distribution of rights and benefits, and the protection of traditional user rights. Even though some of the commercial sector quotas have been redistributed to enable the entry of HDIs into the limited commercial sector, poor fishers with historical involvement in fishing have often not been the primary beneficiaries. The current restrictions on the right of traditional fishers to harvest marine resources in some cases denies them the ability to ensure their own food security.

Until fisheries policies take note that social stability is premised on access to social resources compatible with the levels of consumption available to the wider society, poor fishers are likely to continue, by whatever means, to assert their basic rights to a livelihood. They are thus unlikely to become active partners in attempts to ensure sustainable management of marine resources if these resources are only allocated to further the interest of dominant groups and the commercial sector.

13 RESOURCES HARVESTED BY SUBSISTENCE, INFORMAL AND SMALL-SCALE COMMERCIAL FISHERS

This section presents data extracted from various publications that describe fisheries and fishing activities similar to those considered informal or artisanal in the BCLME countries other

than South Africa. Both fin fish and invertebrate resources are harvested by informal fishers in the BCLME region of South Africa. The approach adopted by the South African authorities towards the management of subsistence or informal fishers has been to classify coastal resources in terms of their suitability for subsistence, small scale commercial, recreational or commercial use and to issue licenses appropriate to the type of resource used rather than the type of fisher. Generally, high value resources were considered as suitable for commercial fisheries and low value resources were considered suitable for subsistence use. However, this approach has some drawbacks because it locks subsistence fishers into the poverty cycle from which they aspire to escape. Further, commercial license fees are generally set well above anything that a subsistence fisher can afford. In addition, there are many fishers in the region who would clearly fall within any reasonable subsistence or informal fisher classification simply by virtue of their livelihoods and livelihood strategies and it makes no sense to classify them as commercial fishers by virtue of the type of resource(s) they target.

In this report, resources used by informal fishers have been examined in the wider context of their overall use (informal, artisanal, recreational and commercial), since resource management has as its goal the overall sustainable use of the stock(s) and it is not possible to examine in isolation only one sector targeting a particular stock. In addition, if management practices in a country such as South Africa are to inform management in a country like Angola, it is necessary to look at the same type of fisheries rather than their classification as fisheries sector. The sectors themselves and their relative importance in the national economy are very much defined by the geo-political history of the country and the level of industrialisation and economic diversification.

13.1 INVERTEBRATES

Invertebrate resources targeted by subsistence fishers along the southern and west Cape coasts of South Africa were classified during the SFTG survey with regard to their suitability for different fishery sectors (refer Table 17). Alternative resources that could possibly form the basis of future fisheries were also evaluated. However, on the West Coast there have been no applications for subsistence fishing rights for any of the species recommended for subsistence fisheries. According to the Subsistence Fishing Management Unit (MCM) there are no subsistence fishers along the Northern, Western and Southern Cape Coasts. This interpretation is largely due to the fact that subsistence has been defined in terms of the resource rather than the fisher. In addition, those resources identified as suitable for subsistence on the West and Southern Cape coast, are not suitable for consumption, nor have they been historically harvested for subsistence purposes.

13.1.1 Abalone

The abalone fishery is based on subtidal stocks of the gastropod mollusc *Haliotis midae*. The fishery began in Gansbaai in 1949 and initially licenses were freely available to almost anyone. Until 1968 catches were unlimited and the 112 licensed divers delivered their catches to one of 14 processing plants. Originally concentrated in the area around Hawston, Hermanus and Gansbaai, the fishery now extends along approximately 535 km of coastline between Cape Columbine in the north and Cape Agulhas in the south. The first limits on catch were introduced in 1968 (386 tons meat mass). Declining catches in the late 1970s and early 1980s prompted a further reduction in harvest quota. In the mid 1980s the TAC was set at 640 tons whole mass and this appeared to be sustainable until uncontrolled poaching and the effects of ecological changes caused serial reductions in the TAC from 1994 (Sauer et al., 2003). Today, the abalone fishing area between Cape Agulhas and Cape Columbine is divided into seven commercial fishing zones and each zone is allocated a TAC determined by annual fishery independent stock assessments conducted by the management authority (MCM). Some of the areas have very limited fishing seasons and limited effort levels, and the West Coast areas immediately south of Cape Columbine have only small TACs The majority of the catch has always come from the south western Cape, between Cape Agulhas and Cape Hangklip. In 2000 – 2001 the zone that incorporates Hawston and most of Hemanus, previously one of the richest fishing grounds, was closed to fishing because of low stock biomass and a lack of recruitment. This has been primarily the result of very large-scale poaching, which has affected stock density and breeding success.

The abalone fishery along the south western and western Cape coast is managed by a quota system or Total Allowable Catch (TAC) which has declined steadily from 640 tons in the years between 1986 and 1989 to 371 tons in the 2000 –2001 season. Historically (until 1995/6) the entire TAC was allocated to the commercial fisheries sector, which comprised 24 big concession holders. In 1993-1994 season, a 10 ton community trust quota was allocated for the first time which is still active today. During 1995 – 1996 season 10% of the quota was allocated to 10 new entrants into the fishery who were each granted quotas of between two and 10 tons (Sauer et al., 2003). The allocation of TAC during the 1998-1999 season was expanded to cater for the majority of participants in the abalone fishery. The TAC which had previously applied only to the commercial sector now included the recreational and subsistence sectors which were allocated 158.5 tons each. Non-commercial fishers (subsistence/informal) were invited to apply for a subsistence permit, which allowed them to sell a daily bag limit of four abalone to end users only (i.e. not to the industry). A tag system

was introduced to prevent multiple sales of daily bags. This category of fisher was also referred to as a small scale commercial fisher (SSC). In the 1998-1999 season 236 permits to fish the 158.5 tons were issued. However, in the following year 45 applicants out of 154 were granted permits to fish 45 tons of abalone on a small scale commercial basis during the eight month fishing season. A further eight applicants who had been unsuccessful in the initial rights allocation were granted rights on appeal. It should be noted that >50% of the successful SSC applicants are or were employed in the commercial fishery, or are boat owners holding abalone fishing permits or are shareholders of commercial rights holding companies (Sauer et al., 2003). Substantial restructuring of the subsistence fishery has taken place with regard to the commercial quota, and over 850 applications were received for the 208 subsistence permits issued in 2001-2002 season, for which a quota of 62.5 tons was set aside. It is very difficult to distinguish between what are now termed small scale commercial fishers, and the smaller rights holders in the commercial fishery, except that small scale commercial (previously subsistence fishers) are allowed to sell only to end users and not to the industry .

Between December 2001 and June 2002 MCM allocated about 230 limited commercial fishing rights for abalone. The quotas for these rights holders included 202 rights to harvest 430 kg of abalone and 26 rights to harvest 200 kg of abalone for a total of 92.1 tons or 29% of the global South African quota. The full scale commercial sector was allocated 225 tons during this period. For abalone 95% of limited commercial rights were allocated to individuals and 5% to closed corporations, and 84% of right holders are HDI-owned companies The DEAT estimates that each of the limited scale commercial 430 kg quotas created seasonal employment work for at least 2 other individuals (i.e. a further 456 individuals) and that in total 1 750 people were employed in the abalone fisheries in 2002 (compared to 550-600 in 1992).

Most abalone are collected by surface supplied divers operating from outboard engine powered fibreglass ski boats 4-6 m long. The personnel employed for harvesting are limited to five per boat regardless of the vessel size. Abalone divers can dive for a maximum of 20-25 days a month in the Western Cape (but frequently much less towards the end of the season) because of prevailing weather conditions. Subsistence divers spend 1 – 1.5 hours a day in the water, keeping only the four largest abalone. Some subsistence divers operate from the shore, diving in the shallow water kelp beds. Abalone are shucked, cleaned and individually packed with their tags and the catch is sold to local fish dealers or runners for the black market at about R220/kg (shucked weight). These dealers have permits to transport abalone so the sale takes place directly from fisher to dealer, because the subsistence permit only allows the transport of abalone in a whole state. Management of the subsistence abalone sector is by way of limited entry through permitting, daily bag limits, a closed season, a

minimum legal size and a tag system to ensure only one bag is collected each day. Perhaps more importantly, the success of the fishery will depend on better control of the rampant poaching by both licensed and unlicensed fishers (see below).

Since four abalone constitute about 1.3 kg of shucked weight, the permit holder receives about R290 per day (Sauer et al., 2003). It should also be noted that the practice of keeping the four largest abalone captured is not an efficient regulatory control because abalone are frequently injured when they are prised from the rock surface, despite the regulation governing the width and shape of the collecting tool. Consequently there is significant mortality of abalone that are removed and then returned to the water.

Management

Primary management of the abalone resource is by way of an annually determined quota for each of eight commercial zones between Cape Columbine and Cape Agulhas. This area encompasses the major part of the commercial stock in the south western Cape. The size of the quota for each zone is decided after annual fishery independent stock assessments conducted by Marine and Coastal Management of the Department of Environmental Affairs. Stock assessments mainly take the form of diver counts of abalone size frequencies and density along fixed transect lines in the various zones followed by mathematical modelling of the stock. The level of recruitment of juvenile abalone is also evaluated during the survey. The fishery is regulated further by a minimum legal size limit (11.4 cm shell width or 13.8 cm shell length), a control on the width and shape of the collecting tool (25 –35 mm wide with rounded, non-sharp edges) and a closed season from 1 August to 31 October. Management of the subsistence abalone sector is by way of limited entry through permitting, daily bag limits, a closed season, a minimum legal size and a tag system to ensure only one bag is collected each day. However, currently no useable fisheries data is collected for the small scale commercial sector. This is potentially a serious omission and the sustainability of the sector will depend on this omission being rectified. Perhaps more importantly, the success of the fishery will depend on better control of the rampant poaching by both licensed and unlicensed fishers (see below).

It should be noted that there has always been an illegal fishery for abalone resources, but the extent of this fishery increased dramatically in the mid 1990s. This illegal fishery is carried out by both licensed and unlicensed divers as well as shore based fishers, and is a result of the high levels of poverty among coastal communities coupled with the very high prices that abalone fetch, increased expectations of access to fishing resources among previously disadvantaged communities, and the declining commercial quota (which is itself a direct result

of the increase in poaching activities) leading to licensed fishers supplementing their legal quotas with illegal catches. It should also be noted that the tag system implemented to prevent subsistence fishers from collecting multiple daily bags is proving to be a useful tool that allows poachers to transport their catches without fear of prosecution. Tags are accumulated from the subsistence sector or else just printed illegally, and then used to 'legalise' abalone transport. Poaching may account for as much as 1600 tons of abalone a year, creating a total loss on value of R51.2 million per year (Pulfrich, 2001). More importantly, much of the poached abalone is smaller than the minimum legal size, which impacts on stock viability because of the effect on reproductive potential.

The current concept of subsistence fishing is perhaps not appropriate for the abalone sector due to the lucrative nature of the species. Abalone is not a species that is consumed by the subsistence or informal fisher, since selling a single daily bag can provide food for a month. The guidelines and regulations specified by the MLRA of 1998 are simply not effective in managing the resource within the subsistence sector. Allowing the sale of a daily bag has only succeeded in giving fishers the incentive to poach. However, if poaching could be eliminated, in theory the resource has high potential to contribute to a reduction in the poverty of coastal communities, because of its high value and the fact that fishing activities can take place with a minimum of specialised gear. As from 2004 the management authorities intend to introduce a co-management TURF (Territorial User Right Fishery) system for abalone to help to curb illegal fishing and to aid recovery of the badly over-exploited resource. The implementation of a TURF system may help to reduce poaching and bring resource use into some sort of alignment with stock availability. However, it is too early to say whether this new approach has yielded positive results. MCM will be recommending that in the future the limited commercial sector be recognised as a distinct sector, not as part of the commercial sector, so that it can be managed separately (A. Cockroft – MCM; *pers comm*.)

13.1.2 Lobsters

The west coast lobster fishery is based on the spiny lobster *Jasus lalandii* which ranges in distribution from approximately 23^{O} S in Namibia to 28^{0} E. Commercial exploitation started in the late 19^{th} century and expanded rapidly in the early 20^{th} century. Most of the resource is concentrated in water less than 80 m in depth. Limited fishing takes place in shallow waters (<10 m depth) along the coastline of the Northern Cape. Fishing is conducted using baited hoop nets and traps, traps being about 2.5 times more efficient than hoop nets (Sauer et al., 2003). More than 80% of the commercial quota is caught using traps. Traps are too large and too heavy to be operated by small boats and dinghies and are therefore rarely used in shallow

water. Deck boats catch lobsters in traps in the deeper waters and fishermen using hoop nets and small dinghies equipped either with oars or an outboard motor, operate in the shallow water. The use of hoop nets is particularly common in the Northern Cape where low oxygen incidents are frequent and the lobster resource appears to be confined to the well aerated inshore zone. In the last decade, the range of commercially exploitable stocks of *J. lalandii* appears to have expanded eastwards beyond False Bay and this has may have be having quite serious ecosystem effects and may have played a significant role in the recruitment failure of abalone in some of the abalone zones (Sauer et al., 2003).

Lobster catches peaked at about 10 500 – 11000 tons in the 1950s and early 1960s and subsequently declined steadily until they stabilised at around 3000 tons p.a in the 1980s. In the late 1980s there was a substantial reduction in the growth rate of lobsters (perhaps linked to El Niño oceanographic events) and this caused a serious decline in resource productivity and recruitment and a concomitant reduction in the TAC to 1500 - 2000 tons since in 1995 (Sauer et al., 2003). Catch per unit effort data suggests that by about 1970 the depletion of surplus stock had reached an end. Thus the current fishery relies on the sustainable yield of the resource. The drastic decline in growth rates in the 1990s threatened the whole lobster industry, and in 1991 – 1992 the minimum legal size limit was reduced from 89 mm CL (Carapace Length) to 75 mm CL and a TAC of about 3800 tons set. The purpose of this measure was to reduce the proportion of the annually recruited stock of legal size animals that was harvested and to reduce discard mortality. Subsequently, the MLS was increased again to 80 mm CL and then reduced again to 75 mm CL. The resource is currently fully exploited and current management strategy is aimed at achieving a 20% increase in resource biomass >75 mm CL by 2006. An operational management plan was developed and implemented in 1997 – 1998 and, based on input parameters collected during annual surveys (growth rates, catch per unit effort), the plan provides as output a TAC recommendation. Apart from the commercial fishery there is an active recreational fishery that operates in shallow water either with hoop nets or by means of breath hold diving. Currently the south west and west Cape coast is divided into four zones and each zone is further subdivided into a two Areas. A fifth zone in the most eastern sector is part of an experiment designed to examine the resource and management implications of a small scale commercial fishery in the area. In the north (Zone A) the majority ($\geq$90%)of lobsters are caught by hoop net but further south in Zone B this declines to 50% and to <1% in the areas immediately west and south of Cape Town itself.

Management

Management of the lobster resource is made up of:

1. The determination of a global TAC based on scientific information collected by means of fishery independent biomass surveys, growth measurements resulting from an intensive annual tagging programme and sophisticated length-based mathematical models.
2. The division of this TAC between various fishing sectors
3. A minimum legal size (historically 89 mm Carapace Length but now reduced to 75 mm CL)
4. The provision of various lobster sanctuaries
5. Various gear limitations that apply to different sectors
6. Various seasonal limitations that apply to different sectors
7. A closed season from July to October
8. Limited landing sites and the presence of an inspector at each landing site
9. Effort control – a limit on the number of vessels and the number of traps per vessel.
10. A prohibition on the capture of berried females.

Part of the Total Allowable Catch (TAC) of the resource is set aside for SSC fisheries legally categorised as 'limited commercial' fishers, part is allocated to the recreational sector and the bulk is allocated to the commercial fishery sector (Table 20). A small part of the TAC is reserved for appeals. Once global TACs have been set, then zonal TACs are determined.

Table 20: The Global west coast rock lobster TAC for the 2000–2001 season and its breakdown into fishing sectors (Sauer et al. 2003)

Fishing Sector	TAC Allocated (Tons)	% of Global TAC
Commercial	1614	80
Recreational	174	8.6
Subsistence	230	11.4
Global TAC	**2018**	**100**

There has been major transformation in the lobster industry and approximately 58% of the commercial quota is owned by Previously Disadvantaged Individuals (PDIs). Three categories of quota are recognised by the industry – small quota holders who hold less than 10 tons each, medium quota holders who hold between 10 and 40 tons each and large quota holders who hold quotas of more than 40 tons. Currently some 226 commercial quota holders harvest the commercial quota. In contrast, in the late 1980s, 39 quota holders harvested the entire quota which was about twice that harvested today. In 2000–2001, the 199 small quota holders were allocated 40% of the commercial quota (Sauer et al., 2003).

Minimum viable quotas for various gear types were calculated as part of an Economic and Sectoral Study of the fishing industry in South Africa (Sauer et al., 2003). These are given in Table 21.

Table 21: Minimum viable lobster quotas required for the operation of various vessels

Vessel Category	Minimum Viable Quota (tons)	Attached to:
Outboard Dinghy	1.0	A linefish license
Chukkie	1.5	A linefish license
Ski-boat	1.5	
Small trap boat	3.5	
Medium trap boat	5	
Large trap boat	8	

Subsistence fishing was introduced in the 1999 - 2000 fishing season and 1 700 subsistence permits were issued in the Western Cape during the 2000 – 2001 season. The catch was estimated at 230 tons which was the amount set aside for this sector. Subsistence fishers operated from the shore or from dinghies. Permit holders were allowed to catch four lobsters per day and these were meant to be sold to end-users only. However, it is generally acknowledged that the issue of these permits was problematic and led to wholesale poaching, because fishers caught much more than legally permitted, hid part of it and then transported it for sale. This subsistence sector now forms the basis of the SSC sector or 'limited commercial'.

Limited commercial lobster fishing rights

Generally a Small Scale Commercial (SSC) fishing operation will be allocated a quota of about 800 kg. If members of the fishing operation have other sources of income, no permit will be issued. If there is any of the TAC left over after all appeals have been heard, then the remainder is distributed among the fishers. Between December 2001 and June 2002 MCM allocated about 500 limited commercial fishing rights to harvest between 200 and 1500 kg of lobsters each (Average about 700 kg). Their intention was to target fishers from disadvantaged communities in the BCLME region in South Africa. However, there were shortcomings in the allocation and verification procedures and there are concerns that the poor and marginalised fishers did not benefit as planned (see Section 12). The total tonnage allocated was 364 tons or 18.6% of the total TAC (Dept. Environmental Affairs and Tourism, 2002; 2004). The limited commercial rights for WCRL were allocated to either historically disadvantaged individuals or HDI-owned micro-enterprises. Apparently about 70% of the global west coast rock lobster TAC is HDI controlled. The DEAT estimates that between 1 000

– 1 500 HDIs were employed to catch this limited commercial TAC. The approach is to reserve the harvesting of west coast rock lobster near the coast (using rowing boats and hoop nets) largely for limited commercial fishers, while the larger scale commercial industry is to concentrate on deep water harvesting that requires the use of traps. In the large scale commercial sector 234 rights were allocated with an average of 6.8 tons of lobsters per right holder, for a total of 1591 tons during 2001 - 2002.

General Lobster Resource Use Problems

From the perspective of the poor and historically disadvantaged fishers there are a number of problems relating to the current resource allocation practice. **1**. Quotas are so small that the entire quota is often caught in a week or two and then the fishers are essentially grounded for the rest of the year, which makes poaching a very attractive option. **2**. Many of the fishers have limited financial management skills, so the money that accrues rapidly while they are catching their quotas is soon spent and is not managed to cover those periods after the quota is caught. **3**. Often a consortium applies for the permit because it is necessary to pool resources to demonstrate a capability to enter the fishery. When the consortium is made up of four or five fishers, the sale of 800 kg of lobsters does little to improve the economic position of individual fishers because it is divided among so many people. In some cases these consortia comprised 30-40 fishers, and several problems arose with the distribution of the benefits amongst such a large group. **4**. Catching of lobsters by hoop nets is forbidden after 30 June. However, the biggest export demand occurs in July and August, which are the main tourism/holiday seasons in Europe and America. Thus the SSC fishers are excluded from benefiting from this demand. **5**. There are so many fishers that it is difficult to institute monitoring and the collection of catch statistics.

13.1.3 Oysters

There is a small scale commercial/artisanal fishery for oysters (*Striostrea margaritaceae*) but it operates mainly along the coast east of Cape Agulhas and only a small component of the fishery occurs in the area included in the current definition of the BCLME. Quotas are estimated but currently there are no stock assessments for the species and the quota is based on guess work, seasoned with a precautionary approach that takes into account a best estimate of trends in catch per unit effort. Data collection and monitoring is limited to fishers filling in a daily tally sheet for oysters, and there is much mis-reporting. Individual rights have been granted for a four year period to harvest oysters between 2001 and 2005. Gear restrictions allow the use of a mask and snorkel for use in the wave zone, but fishers are not supposed to dive. However, the infratidal areas have apparently become denuded of oysters

and deeper waters are now targeted. There are 145 rights holders in the oyster fishery, but this is only of limited relevance to the BCLME region since the concessions start at Witsands near the Breede River and extend up the South and East coasts of South Africa.

13.1.4 White mussels

White mussels (*Donax serra*) are harvested by informal fishers at seven sites along the West Coast, but the fishery is now classified as a limited commercial fishery. The concession areas are: Lamberts Bay, Elands Bay, Britannia Bay, Paternoster, Dwarskersbos, Ysterfontein and Koeberg and there are fixed boundaries for each concession area. The seven rights holders work with a crew of 3 –10 people. The last stock assessment for white mussels was done in the early 1990s. Based partly on this information and partly on 'gut feel' each right holder is allowed a monthly quota of 2000 white mussels, which is considered fairly conservative. A minimum legal size of 35 mm shell width applies and there is no closed season. Mussel collection only takes place at spring low tides and generally the entire quota for the month is collected in a single day. Data collection and monitoring are limited to fishers filling a monthly tally sheet for white mussels. There appears to be wholesale under-reporting of catches and all tally sheets are returned with a figure of 2000 mussels. Because the fishery is essentially low value, little effort is devoted to compliance. Mussels are sold for bait, each concessionaire doing his/her own marketing. Some mussels are sold in local bait shops, some to factories for processing other fishing products, and some are sold in bait shops on the south coast. Thus sale is not limited to the area of capture. The parameters of relevant research are still being defined. Biomass estimates obtained from density surveys are problematic because white mussels move up and down the coast.

13.1.5 Giant Winkles (Alikreukels)

No artisanal or small scale commercial fishery for the giant winkle (*Turbo sarmaticus*) is planned. The resource has been exploited to a point of economic extinction and there is only a recreational fishery for the species.

13.2 FISH

It is not possible to separate the use and management of line fish resources by informal or artisanal fishers from that of the commercial and recreational fishing sectors. The traditional commercial line fishery originally developed in the Cape and this region is still responsible for 95% of the South African line fish catch. The fishery consists of about 2500 vessels ranging in

length from 3-15 m and which operate on the continental shelf at depths between 5 m and 130 m. Gear is either rod and reel or hand lines. Before the introduction of trailable ski boats in the 1970s, most of the fishing was done from deck-boats or chukkies. Large freezer vessels were not introduced until the mid 1980s (Sauer et al., 2003). Characteristics of the main vessels used in the commercial line fishery are given in Table 22.

Table 22: Characteristics of commercial vessels used in the Cape line fishery (Data from Sauer et al., 2003).

Vessel Type	Length	No. Crew	Propulsion	Operating range	Replacement cost (R)	Daily running cost (R)
Dinghy	3-5 m	2	Single outboard/Oars	10 km	1600-4000	110
Skiboat	5-8 m	6	Twin outboards	35 km	130-300 000	350-500
Deck-boat (Chukkie)	6-13 m	10	Single screw diesel	20-80 km	280-350 000	350-500
Freezer boat	15-20 m	20	Diesel engine	2000 km	1.5-3 million	1750

Skiboats could theoretically be used by artisanal or small scale commercial fishers, but it is unlikely that the capital investment of >R130 000 is within the capabilities of such fishers, so shore-based rod and line angling and fishing from dinghies with or without an outboard engine are likely to be the techniques most commonly used (see below). These boats would have similar capabilities to Canoas and Chatas in the Angolan artisanal fishery. A deck boat or chukkie is comparable to the Catronga used in Angola.

Recreational, commercial and subsistence or informal fishers are subject to the finfish catch limitations contained in the regulations of the MLRA. These regulations classify fish species into various groups (specially protected, critical, restricted, exploitable, bait etc) and different bag limits apply to the different groups. There are also closed seasons for elf (Po*matomus saltatrix*) and galjoen (*Dichistias capensis*) and minimum size limits (lengths or weights) apply to various species. (See linefish management below).

Fish species caught by subsistence or informal fishers in seven communities along the west and south west coast between Port Nolloth and Arniston were ascertained by way of household questionnaires, focus group meetings and interviews with key informants (see Branch et al., 2002). These included harders and mullet (in all settlements), and hottentot (in all except Ebenhaeser and Arniston; See Table 11.5 in Branch et al. 2002). Snoek, yellowtail,

roman and kob were other species caught by at least four communities. This is not an exhaustive list. Mackerel (*Scomber japonicus*), Blacktail (*Diplodus sargus capensis*), St Josephs shark (*Callorhincus capensis*), Baardman (*Umbrina canariensis*) and Blue hottentot (*Pachymetopon aenum*) are also likely to be important subsistence/informal fisher species but are not included in Table 23. It is doubtful that queen mackerel *(Scomboremorus plurilineatus)* is an important subsistence species in the BCLME since it is essentially a warm water western Indian Ocean species and the Breede River must be an extreme western limit of its range.

Table 23: Fish species reported as being harvested by subsistence/informal fishers in 7 communities on the south west and west coast of South Africa. (Data from Branch et al*,* 2002). Stock status: C = Collapsed; UR = Under review; OE = Optimally exploited; Under exploited = UE. Superscript N, R or CM refers to whether the species is resident, nomadic or a coastal migrant.

Common name *(species)*	Stock status	Port Nolloth	Ebenhaeser	St Helena Bay	Cape Town	Kleinmond	Buffels-jags	Arniston
Harders & mullet (*Liza & Mugil spp)*	UE?	X	X	X	X	X	X	X
Hottentot^{R} (*Pachymetopon blochii)*	UR	X		X	X	X	X	
Snoek^{N} (*Thyrsites atun)*	UR	X		X	X	X		
Yellowtail^{N} (*Seriola lalandii*)	OE			X	X	X		
Roman^{R} (*Chrysoblephus laticeps)*	C				X	X	X	X
Stumpnose^{R} (*Rhabdosargus spp)*	UR				X	X		
Steenbras^{CM} *(lithognathus lithognathus*)	C				X	X		
Kob ^{CM}(*Argyrosomus spp)*	C				X	X	X	X
Geelbek^{CM}*(Atractoscion aequidens)*	C						X	X
Red steenbras^{R}*(Petrus rupestris)*	C						X	X
Galjoen^{R} *(Dichistius capensis)*	OE?						X	X
Queen mackerel^{CM} *(Scomboremorus plurilineatus)*	OE?							X

The species in Table 23 include both bottom fish and pelagic gamefish as well as species recently classified as baitfish in the regulations of the MLRA. A number of these species are caught by the commercial line fishery as well as by recreational fishers. Of these species, only the mullets and harders were considered highly suitable for subsistence fishery use (SFTG Report, 2002). For recreational and subsistence fishers there are various size restrictions and bag limits attached to many of these species (output controls), as well as a closed season for

galjoen, shad and red steenbras, while the commercial linefishery is managed mainly by effort limitation rather than species specific regulations (input controls), although bag limits for commercial fishers also apply to some critical species. This complicates management to some extent, and there is continued dissent regarding the different catch limitations that apply to the commercial sector and the recreational/subsistence sector. It should be noted that fisheries of several of the fish species listed in Table 21 are considered collapsed while several others are under review. Resident fish are highly susceptible to over-fishing, particularly with the advent of GPS systems that allow the exact re-location of reef habitat from one fishing trip to another.

Subsistence or informal fishers on the southern and west Cape coasts operate with a number of different gear types. As part of the SFTG deliberations, these gear types were classified with respect to their suitability for different fishery sectors (Table 24). It must be noted that existing seine and gillnet fisheries target mullets and harders, but management authorities are in favour of phasing out gillnet fisheries entirely because of their unselective nature and this is probably why they are classified as of low suitability for subsistence use (Table 24).

Table 24: Gear types used by subsistence or informal fishers on the West Coast (BCLME region), principal fish targeted and recommended sector suitability. S = subsistence, R = recreational, SSC = small scale commercial. (Source: Crockcroft et al., 2002; SFTG Report, 2000)

A: Gear type	B: Main Species targeted (common name)	C: Suitability for subsistence			D: Use of resources	
		High	Moderate	Low	Current	Recommended
Estuarine gillnet & seine-net	*Harders and mullet*			X	SSC	SSC
Shore based rod & handline fishery	*Hottentot Stumpnose Steenbras Kob Galjoen Blacktail Blue hottentot*	X			R, S	R, S
		X			S	S
Non-motorised marine boats; rod & handline	*See Table 9.2 excluding harders and mullet*			X	SSC	SSC
Marine gillnet & seine-net fisheries	*Harders and mullet*					

13.2.1 Shore based line fishery.

The shore based line fishing in South Africa is essentially a recreational fishery. Less than 5% of shore based linefish anglers would be classified as subsistence fishers (Brouwer et al., 1997). All the communities interviewed by Clark et al. (2002) indicated that fishing was an important subsistence activity but there was no differentiation by gear type and net fishing activities probably predominate. However, in the Northern Cape, where the use of boats is least, there are probably individuals who operate in a manner similar to the shore-based subsistence linefishers in Namibia.

Effort

In the Western Cape between Port Nolloth and Cape Point there are 0.12 to 0.4 anglers.km^{-1} while on the south western Cape between Cape Point and the Breede River there are 1.29-2.29 anglers.km^{-1}. Comparative figures are 0.39 and 4.65-7.23 anglers.km^{-1} respectively for the Eastern Cape and KwaZulu-Natal. However, particularly in the western and south western coast, there is a lot of temporal variability because of seasonal appearances of some fish species and variations in weather conditions. The Western Cape has 205 242 angler days.year^{-1} while the South western Cape has 658 862 angler days.year^{-1} (Brouwer et al., 1997; Attwood & Farquhar, 1999). However, most of these angler days are likely to be a result of recreational fishing activities.

Catch

In both the western and south western coasts the primary target species of shore based anglers is galjoen followed by white stumpnose in the Western Cape and silver kob in the Southern Cape. Galjoen make up about 70% of catch but white stumpnose, white steenbras, silver kob, blacktail, white mussel cracker, elf and baardman are other catch species. Substantial proportions of the catch of those species governed by regulatory size limits are under size and <50% of anglers are know the regulations pertaining to linefish species. Of concern is the fact that fish targeted by shore anglers are slow growing and long lived species. (Brouwer et al., 1997; Attwood & Farquhar 1999). Some of the main species caught are similar to those targeted by Namibian linefishers (galjoen, silver kob, blacktail), but white steenbras rather than west coast steenbras are caught in South Africa.

Catch rate

Catch rate is about 0.94 fish.angler day^{-1} (0.56 kg.angler day^{-1}) along the West Coast and 1.40 fish.angler day^{-1} (1.55 kg.angler day^{-1}) on the southwest coast but catch rates are particularly low (0.32 fish.angler day^{-1}) in the Hermanus area. Eastern Cape fishers catch 2.06 fish.angler day^{-1} (1.15 kg.angler day^{-1}) and KwaZulu-Natal anglers = 1.18 fish.angler day^{-1} (0.45kg.angler day^{-1}; Brouwer et al., 1997; Attwood & Farquhar, 1999).

Management

Along the entire South African coast line fish stocks are generally considered to be in a state of collapse. CPUE (Catch per Unit Effort) of shore anglers is low and many of the species caught earlier in the century have vanished from catches. Current line fish CPUE has dropped by about 80% compared with early records. Most shore based line fishers acknowledge that catches have declined, and most attribute the decline to pollution, trawling, gill netting and beach seining activities (Brouwer et al., 1997; Attwood & Farquhar, 1999). Curiously few

anglers acknowledge that excess fishing effort in their own sector might be a contributory factor. Shore-based linefishing is governed by the MLRA regulations pertaining to linefish, with bag limits and size limits for most fish species and a prohibition on the sale of fish on the recreational list (see below and Appendix 4). There are also closed seasons for elf and galjoen (see below). Management measures are similar to those in place for line fishers in Namibia. The single biggest difference is that approximately 66% of the Namibian coast is closed to shore-based fishers because of diamond mining concessions. Thus the shallow inshore area is a de facto marine reserve, which constitutes a major advantage for the juveniles of many fish species and has concomitant positive benefits for the entire line fishing sector. It is of interest to compare catch rates of the Namibian recreational shore fishery (about 2.9 kg fish.angler day^{-1}) with the figures for South Africa, where the highest catch rates recorded (Eastern Cape) are substantially less than half the catch rates of Namibian fishers. Comparable South African West Coast fishers catch less than 20% by weight of the fish caught by their Namibian counterparts.

13.2.2 General Linefish

Linefish comprise all the finfish species captured by means of hook(s) and line either by handlines or by rod and reel, from both the shore and from boats of various descriptions. Although the line fishery clearly has different sectors based on the gear used and the extent to which the resource can be accessed, the fish resource targeted is common to all sectors and management is essentially resource based rather than fishery sector based. The merits of traditional resource based management have been the subject of much recent discussion, particularly with the current focus on c-management initiatives.

It is of critical importance to examine the history of line fish management in South Africa. Line fishing is currently largely a commercial sector but the resource is common to subsistence and small scale commercial fishers. Line fish (although they are caught mainly with nets and not lines) are by far the most important component of the central and northern subsistence fisheries sector in Angola, and there is much to be learned from the South African experience, where the line fish resource is generally considered to be in a state of crisis. Much of the following information is from Griffiths et al. (1999), Sauer et al. (2003) and B. Mann (ORI - *pers comm*.)

Past Management

The first attempts at managing South African line fish resources were the introduction of minimum size limits for selected species in 1940. However, these regulations were determined

on a fairly arbitrary basis because there was little biological information on which to base regulation. However, it was clear that large scale changes in species composition of commercial linefish catches (particularly for reef-dwelling sparids) had taken place and catches were only sustained by sequential target switching from large endemic reef fish to smaller sparids. In the 1960s, biological studies on a few important species (e.g. seventy-four, hottentot, carpenter) were initiated because it was evident that some components of the line fish resource were over-exploited. However, with the exception of a closed season for elf (shad) in KwaZulu-Natal, and snoek in the Cape, there were no other restrictions, until a comprehensive management framework was introduced for the line fishery in early 1985. These management measures have formed the basis for management of South African line fish resources to date.

Line fish species were divided into management categories based on perceived exploitation status, with associated category-specific bag limits for the various line fishery sectors. Standard minimum size limits, based on sizes at 50% maturity, were introduced for many species, and closed seasons were established for certain species that were considered to be over-exploited. Finally, a prohibition was placed on the sale of any fish by recreational fishers, and on the sale of those species designated as recreational species by any sector (See Appendix 4; Note: These regulations are in the process of being amended). However, owing to a lack of both biological and fisheries data, the level of protection afforded to each species depended largely on subjective perceptions of its vulnerability to exploitation, rather than on quantitative evaluations based on biological information. Furthermore, the absence of clear management guidelines and the existence of strong lobby groups, resulted in considerable compromise between managers and fishers, with regard to the implementation of management action for certain species. These management measures generated widespread and ongoing controversy, because of the perceived disparity between controls placed on commercial and recreational line fishers (Sauer et al., 2003).

Commercial permits were issued for the South African line fishery for the first time in 1985. These permits were in the form of full-time commercial *(A permit*s) or part-time commercial *(B permit*s). Virtually all applicants were successful, and the fishery remained essentially an open-access fishery. Although the intention was to freeze effort at the 1984 level, most of the damage to the reef-fish populations had already occurred. Even now, the line fishery in the Cape maintains a fleet of about 2785 vessels (although it must be noted that 569 of these vessels operate east of Cape Agulhas and thus outside the BCLME region). Clearly this constitutes a very high fishing effort and the question is: how such a depleted resource can maintain such a large fleet. The answer is that the management system allows line fishers to

hold more than one kind of permit. Thus line fishers can target other resources such as lobsters, squid or tuna, and are not dependent on line fish catches only for economic viability. In addition, B licenses (part time commercials) were issued to fishers who had additional sources of income. As a result, fishing effort is effectively subsidised by external sources, which greatly reduces economic regulation of commercial effort and allows the fleet to remain large in spite of declining catches (Griffiths et al., 1999; Sauer et al. 2003).

Present Management

Stock assessments conducted since the mid-1990s have revealed that, with the exception of snoek and yellowtail, most commercially exploited traditional line fish species appear to have been depleted to dangerously low levels. Assessment methods included Spawner biomass per recruit models, Age structured production models, Virtual population assessments and Catch per unit effort indicators. Particularly vulnerable species appear to be benthic predators. Loss of these trophic levels can result in changes in species diversity, community structure and trophic pathways in subtidal ecosystems. More importantly they can result in a loss of genetic diversity because fast growing fish are selected and caught first, which makes any rehabilitation of the resource much more difficult. The risk of stock collapse and the commercial extinction of many of the resident reef fish species is extremely high and has already occurred with seventy-four. Stock declines are clearly the result of excess commercial effort, inadequate regulation and poor enforcement (Griffiths et al., 1999; Sauer et al., 2003).

A new Linefish Management Protocol (LMP) was developed for the line fishery in 1999 (Griffiths et al., 1999), in which regulations are based on clearly defined objectives and quantifiable reference points. The LMP was developed both in response to the considerable failure of the previous management framework to generate realistic regulations, and also to fulfill the requirements of the new Marine Living Resources Act. This protocol – accepted by both the Consultative Advisory Forum and the South African Marine Linefish Management Association – requires management plans for all linefish species, with stock status evaluated using biologically-based stock assessments and historical trends in catch and effort. The LMP will specify: **1**. The kind of data required to assess individual stocks **2**. The quantitative approach to be used **3**. Appropriate biological reference points **4**. Long term goals for the stock **5**. The management action that will be undertaken to achieve this goal. Essentially the LMP is designed to execute management plans for each important species through a pre-determined cycle of monitoring, assessment, and revision of management regulations. In conjunction with the development of management plans, research effort and funding to provide species specific biological information that will inform management plans have been increased.

The basic aim of fisheries management is the optimal sustainable use of the resource. Essentially this requires the balancing of fishing effort or catch and the preservation of an adequate spawning stock. Today, mathematical representations of individual stocks are considered indispensable for assessing stock status and for making projections of future stock status under different fishing regimes, thereby achieving optimal sustainable use. The most commonly-used age structured models require catch at age, annual catch and indices of abundance to reconstruct the dynamics of the stock and provide an assessment of current status and future management options. However, many of the individual stocks do not have data regarding catch at age, and have only limited information about annual catches and some index of abundance such as CPUE or fisheries independent biomass surveys.

Future Management

In December 2000, The Minister of Environmental Affairs and Tourism declared the line fish resource to be in a state of crisis, in terms of Section 16 of the Marine Living Resources Act. Management plans were drafted to reduce commercial fishing effort by up to 70% when line fish rights are allocated. The number of line fish vessels between Port Nolloth and Cape Point would be reduced from 1421 to 120 and from 373 to 173 for the area from Cape Point to Cape Agulhas. The control of fishing effort (input control) rather than on a catch basis (i.e. TAC) is the only feasible way to manage the commercial fishery because of the large number of users, launch sites, species targeted, and the wide operational range of the vessels used. There have been a number of suggestions for ways of reducing the fishing effort. Because of the vulnerability of shark fisheries to over-exploitation it has been suggested that shark species be excluded from general line fish permits made the subject of a separate permit. Snoek accounts for 45% of linefish landings and is believed to be in a fairly healthy state. Therefore it may be an option to allocate snoek permits to fishers who also target other species like hake, tuna, squid or lobsters while reserving genuine linefish permits for a much smaller sector of the fishing community (Sauer et al., 2003). The general focus of this management plan is of relevance to the artisanal fisheries sector in Angola.

In the new regulations accepted by the South African MLRA and the Consultative Advisory Forum, commercial line fishers also have reduced bag limits on some of the species they capture (Kob, dageraad and various species of steenbras) as well as minimum sizes for most species (output controls). Further, no fishers (commercial recreational or subsistence) may sell species that are on the recreational list of the MLRA, the bag limit for shad has been reduced and a one month extension in the length of the closed season for this species has been introduced. The general philosophy proposed for the future allocation of traditional linefish rights, is to reserve them for those who are dependent on traditional linefish stocks for

more than 75% of their income. Fishers holding other rights (including hake handline and tuna handline/pole) will be excluded from commercial access to traditional line fishes, with the exception of snoek. The goal is to maximise the number of commercial participants while simultaneously minimising the impact on traditional line fishes.

Recreational and subsistence fishers are managed by output controls which require the possession of a license to engage in fishing activities, and bag limits on all species except bait fish species. A new (2004 Amendment to MLRA) overall bag limit of 10 fish per person per day has been imposed and the bag limits on individual species have been reduced for many of the resident, reef dwelling sparid fishes. There are also minimum size limits for many species and a maximum size for four of the five daily allowed Kob. For subsistence/informal fishers there are extended bag limits for a few species that are considered not threatened (e.g. karanteen *Sarpa salpa* and pinkies *Pomadasys olivaceum*). Recreational fishers may not sell any fish caught with a recreational fishing permit. The sale of fish by subsistence fishers is a difficult issue and is still being debated by management authorities.

One of the major contributory factors to the current unhealthy state of the South African line fish resources has been that funding and effort channeled into fish research and management has been inadequate. The basic life histories of important species have only recently been understood and this information is critical for management. In South African fisheries management, the commercial landed value has been used as the main criterion for prioritising resources for research, and socio-economic factors, which are an integral component of line fish management, have largely been ignored. This factor should be carefully noted by Angolan fisheries management authorities.

Given the problems of slow growth rate, sex change and barotrauma associated with the catching of bottom fish, strong inter-sector competition, difficulty in achieving substantial reductions in effort and the ineffectiveness of current bag limits, it is likely that the maintenance of a number of adequately large, well situated marine reserves offers one of the few practicable chances of conserving the endemic fish stocks (Griffiths et al. 1999; Brouwer 2002; Cowley et al. 2002; Sauer et al., 2003). Further, there is unlikely to be any increase in the availability of wild linefish along the South African coast in general, and the domestic culture of linefish species by way of mariculture initiatives is almost certainly the only way that fish harvests can be increased in the future.

13.2.3 Institutional framework for management of the linefish resource

The MLRA states that marine living resources are the heritage of all South African, and the state is responsible for the management of these resources. Ultimately, all management recommendations are therefore submitted by the Chief Directorate: Marine and Coastal Management to the Minsiter of Environmental Affairs and Tourism for approval and promulgation. In 1984 the Minister set up a National Marine Linefish Committee (NMLC) to provide advice on linefish management. On dissolution of the NMLC in 1985, the participants agreed to establish the independent South African Marine Linefish Management Association (SAMLMA) to provide a continued representative negotiating forum for review of linefish management measures. SAMLMA was formally established in 1990 and includes representatives from scientific institutions, conservation agencies, recreational angling clubs and commercial fishing associations. Because of the multi-species, multi-user nature of the linefish sector and also its large area of operation, there are three major role players in the management of the resource.

The Linefish Working Group (LWG) consists of eight scientists from MCM and other institutions involved with linefish research. The LWG undertakes to formulate and scientifically evaluate linefish management recommendations. Where necessary fisheries managers are also invited to participate. Recommendations generated by the LWG are submitted to SAMLMA for further evaluation and input and thus user groups have the opportunity to determine the most acceptable combination of regulations designed to attain a target reference point (see OMPs). Recommendations generated by SAMLMA are then channeled via the Chief Director MCM to the LWG prior to submission to the Minister. Draft management recommendations generally pass through the Consultative Advisory Forum (CAF) which is comprised of 18 fishery representatives and scientists external to MCM. CAF was established to provide advice to the Minister and can play a part in evaluating the social implications of proposed regulations. Inevitably, recommendations that are implemented are a compromise between conflicting views of the represented sectors. As a result there continues to be widespread dissatisfaction among many fishers from all linefishing sectors concerning the existing linefish management measures. The CAF may also autonomously address issues around the management of marine living resources but in such a case scientific input is generally requested from MCM. It is also possible for user groups to independently submit recommendations to Chief Director or Minister, but these are generally evaluated by the LWG and, if necessary, SAMLMA. The current linefish management system therefore in theory has some flexibility and involves input from a wide variety of sources and embraces elements of consultative and co-operative management paradigms (Information from Griffiths et al., 1999).

13.2.4 Data collection in South African linefisheries

Information in this section is mainly taken from Penney et al*.,* 1997. The National Marine Linefish System is a catch and effort database developed between 1983 and 1985 to capture and analyse data from commercial and recreational line fisheries in South Africa. It is basically a co-operative fisheries monitoring system and has initiated much interaction between linefish users, managers and scientists. Data collection varies between different fisheries sectors. The submission of monthly catch returns is a legal requirement of all commercial fishing vessels and all net fishers. These data are captured and stored on the National Marine Linefish System (NMLS) managed and funded by the management authorities MCM.

Linefish vessels are required to report daily crew, hours fished, fishing area, and total catch weight per species. However, weights on these returns are estimated by fishermen and there have been allegations of falsification of data. A pilot observer programme has been implemented, designed to capture data from boat based linefisheries and has shown potential for capturing the necessary information. However, one of the problems is that the linefish boats are generally small, wet and uncomfortable, and these factors decrease the number of observers willing to spend extended time at sea.

Harbour returns from all fisheries harbours are submitted by harbour masters. These data include estimates of effort (number of boats) and catch per species. These data provide a source of validation of vessel catch returns, but the quality of the data varies from harbour to harbour.

Linefish dealers also provide information on fish purchases and these data provide independent estimates of total catches, and are particularly effective where fish purchases are controlled by a single large company.

Recreational catch returns: South African fisheries management have also developed a comprehensive system of voluntary catch card returns that are submitted by various recreational fisheries sectors – Recreational skiboats, Light tackle estuarine boat anglers, Shore anglers, Spearfishers, Competition anglers. These catch returns rely on the co-operation of the fishing public and a great deal of public relations effort has been expended to maintain the data flow and improve the quality of the data submitted. Data typically include area fished, number of fishers, time spent fishing, catch weight per species and total catch weight. In KwaZulu-Natal these recreational data are augmented by information obtained from

shore patrols and skiboat inspections undertaken by the Ezemvelo KZN Wildlife inspectorate, but resources for this kind of exercise is lacking in the Cape Province generally.

Data from each sector of the linefishery (e.g. estuarine fishing, skiboats, deck boats, shore angling etc) are assimilated by way of sector specific data collection methods and entered into separate databases. The NMLS can also capture length frequency data together with information on catch method, catch area, and sample weight and the data can be used to provide size frequency summaries. Another NMLS facility can capture standard biological sample data such as lengths, weights, sex, maturity and gonad stage. The data base has the capacity to provide feedback summaries for the various fishery sectors.

13.2.5 Gillnet and Beach Seine Fisheries on the West and South West coast of South Africa

Much of the information regarding gill net and seine net fisheries on the West Coast of South Africa has been extracted from Hutchings & Lamberth (2002a, b); Hutchings et al. (2002).

Beach-seine fishing was introduced to South Africa in the 1600s and the technique has remained essentially unchanged since then, except for changes in the construction materials of the boats and nets that are used and the innovation of using a four wheel drive vehicle to move the gear up and down the coast on sandy beaches, thus increasing the range of the fishers. The net is rowed out into the surf zone to encircle a shoal of fish. The net is attached to head ropes and a crew of between 6 and 30 (depending on net size) then hauls the net ashore. As the net is drawn shorewards, fish within the net are gradually forced into the bag in the middle of the net. Nets deployed from boats may be up to 275 m long, but smaller nets 50 – 100 m long may be deployed by walking them out into the surf to encircle a shoal of fish. Between 60% and 90% of crew employed in beach seining operations have other jobs.

Gillnetting is a passive fishing process in which a net is suspended in the water and fish that swim in to it are trapped generally by the gill covers. Gill nets may target surface swimming fish species such as mullet or ‘harders’ (mainly *Liza richardsonii*) in which case they are buoyed at the surface. In the Western Cape, surface gillnets may not be anchored, may not be left unattended and are called drift nets. Gill nets targeting bottom fish are negatively buoyant, are anchored at both ends are often deployed over reefs. Such nets are widely used to capture St Josephs shark (*Callorhinchus capensis*). Bottom set gillnets are also widely used illegally to capture linefish species such as galjoen (*Dichistius capensis*). Some commercial gill netters in the Western Cape employ echo sounders to locate shoals of fish and use

spotlights at night or outboard engine to scare fish into the net. Gill net fishers commonly employ a crew of 1 – 2 during a fishing operation but may employ about 4 casual helpers to remove fish from the net. These helpers get paid R5 per crate of fish but get to keep small bycatch species for food.

Most gillnets used in the Western Cape are made of monofilament nylon. Braided multifilament nets are more durable and take up less space on a boat than monofilament nets but are apparently more visible in the water and therefore are less efficient at catching fish. (It is of interest that the Angolan fishers preferred multifilament nets to monofilament mesh, perhaps because replacements were more difficult to access in Angola and therefore the higher durability was more important than higher catch efficiencies). Gillnet fishing is largely confined to the summer months in the St Helena Bay and Berg River areas, when weather conditions are favourable, catch rates are higher, and other fishing sectors less active. However, in the area around Saldanha Bay and Langebaan Lagoon, net fishers are active throughout the year. Beach seine netters operate opportunistically throughout the year during periods of high fish abundance, favourable weather conditions or during times that it is not possible to undertake other fishing activities. Beach seining in False Bay is seasonal, operating mainly in summer. Strong westerly winds and rough seas prevalent in winter prevent beach seining activities.

Permit holders

Approximately 321 marine gillnet permit-holders are licensed to operate in the sea on the West Coast north of Melkbos Point (Figure 4). An additional 45 permits are issued for the Olifants River estuary. Until recently 120 permits were allocated for the Berg River estuary, but this fishery has now been closed because of overexploitation and a decline in catch rates. About 73% of all marine gillnet permit-holders operate in St Helena Bay and may legally use a maximum of four 75m floating 'harder' (44-64 mm stretch mesh) or sinking 'St Joseph' (178 mm stretch mesh) nets, although each net must be licensed. Fishers north of St Helena Bay may obtain permits for up to four 'harder' nets, but most (78%) use only one. The 10 Saldanha Bay permit holders may use two 75m 'harder' nets. Permit holders for Langebaan Lagoon, the Berg River and Ysterfontein are only allowed to operate one 75-m 'harder' net, and Olifants River estuary permit-holders are restricted to one 'harder' net 45 m long. In areas where the number or length of nets is restricted, many permit-holders exceed these limits. The South African National Parks management authority controls the fishery in Langebaan Lagoon, which is a national park. In the area south of Melkbos Point to Cape Agulhas there are only three experimental gill net permit holders. There are approximately 100 beach-seine permit-holders more or less equally distributed along the west and south west coasts between the

Olifants River and Cape Agulhas. Beach-seine nets are restricted to 137m length to the east of Walker Bay at Hermanus and to 275 m to the west of it.

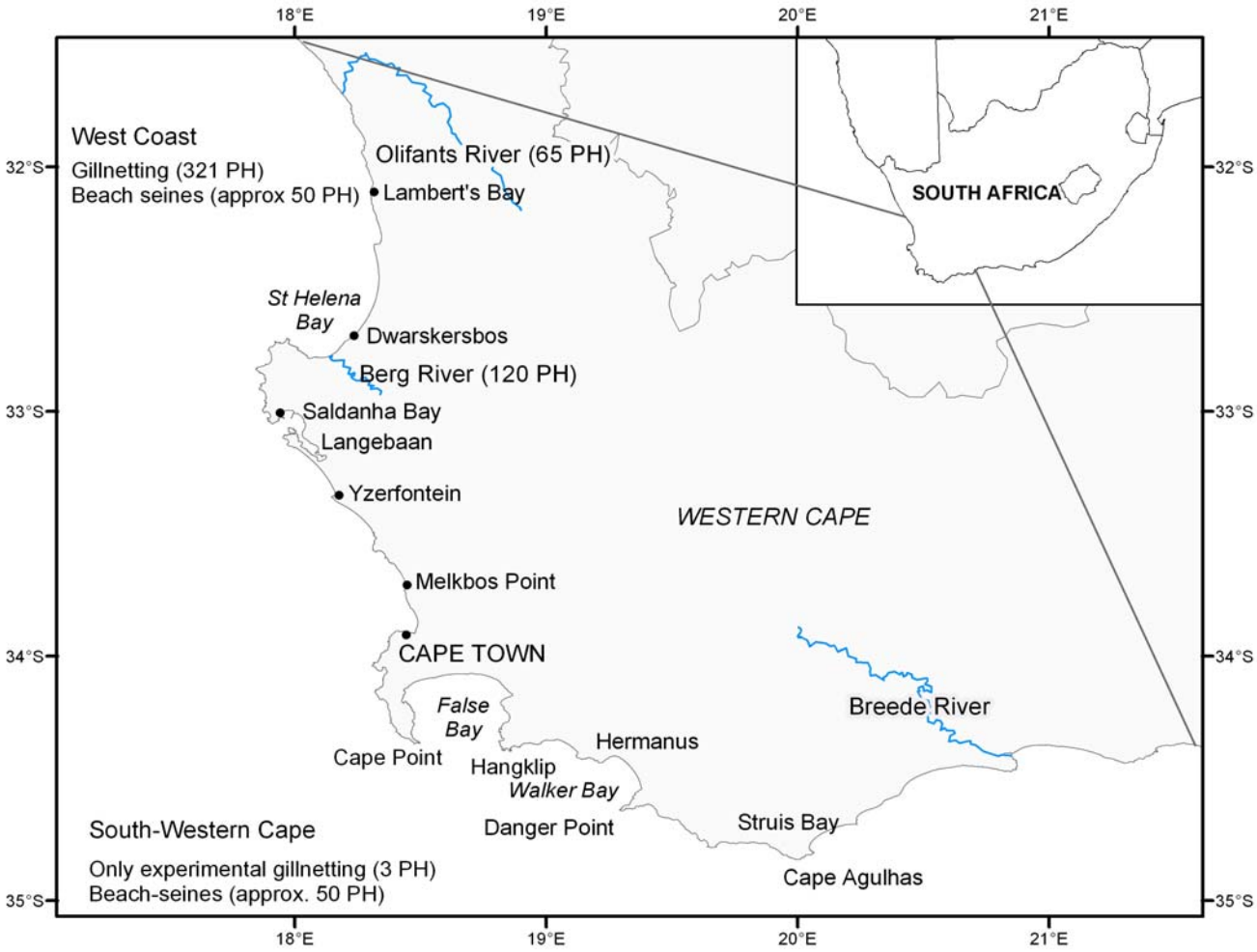


Figure 4: Map of the Western Cape showing current location of net fisheries. After Hutchings & Lamberth (2002)

Catch and effort

Marine gill nets The marine gillnet fishery on the West Coast has a total annual effort of approximately 25 000 man days of fishing and catches around 2 510 tons of harders or mullet a year and 647 tons of St Joseph shark. Basic details of the fishery are given in Table 26 but actual figures for the different parameters vary according to the data collection methods (telephone survey, interview, access point survey or factory records). The majority of permit holders operate opportunistically in a small scale commercial or recreational fashion. Permit holders in the northern section between Doring Baai and Elands Baai are the least active and those fishing in protected waters of Saldanha Bay and Langebaan Lagoon are the most active in terms of the number of trips carried out per year, but the fishery in the St Helena Bay area

has the greatest number of active fisher days. This latter fishery is where the majority of the catch of mullet and St Josephs sharks is made (Table 25).

Table 25: Marine gillnet catch and effort data *(Source: Data from Hutchings & Lambert, 2002)*

Parameter	Northern sector to Yzerfontein	South of Elands B. to Saldanha B.	Saldanha B. + Langebaan	Total
No. Permit holders	58	235	28	321
No. trips per year	33-60	52-72	142-195	
Man days fishing.year^{-1}	±2 500	±15 000	±5 000	±25 000
kg mullet.trip^{-1}	10-34	44-159	78-136	
kg St Josephs shark.trip^{-1}		252		
Total mullet. Tons.y^{-1}	19	1949	542	2510
Total St Josephs tons.y^{-1}		647		647

Estuarine gillnets

Up until recently in the estuarine net fisheries in the Olifants and Berg Rivers, 45 and 120 permits respectively have been issued and about 30 illegal fishers operate in the Olifants River (Sowman et al., 1997; Hutchings & Lamberth, 2002). However, in 2002, the Berg River net fishery was closed due to overexploitation and concerns regarding bycatch. Although the Olifants River net fishers are classified as limited commercial fishers, MCM recognises that they are poor and largely subsistence in nature, and has consequently issued exemptions to enable these fishers to continue fishing. These fishers are permitted to sell their catch. About 100 tons of mullet and 6-8 tons of juvenile elf are caught annually by Olifants River fishers. Catch data for the Berg River are not clear but catches of the order of 100 tons of mullet and 15 tons of elf bycatch appear to be probable.

Illegal gillnets

Illegal netters target galjoen (23 850 fish.y^{-1}) along the West Coast, because it is much more lucrative than fishing for mullet or St Joseph shark. There may be as many as 180 illegal nets in use between St Helena Bay and Elands Bay. Other valuable line fish species such as kob (3 375 fish.y^{-1}), lesser sand shark (1 350 fish.y^{-1}), hottentot and elf are also captured along the open coast as well as considerable quantities of mullet (22 550 fish.y^{-1}) and St Joseph shark (3 150 fish.y^{-1}). An illegal net fishery for hound shark has recently developed in Langebaan Lagoon and may catch as much as 20 tons per month. Only a small proportion of illegal

netting activity is apprehended because of a lack of capacity in the MCM inspectorate. Illegal netting effort may be as much as 5 000 net days.y^{-1}. Illegal netters use special 'galjoen' nets with a stretch mesh size of 100 - 145 mm or barbel nets with a mesh size of 90 – 100 mm. (Hutchings & Lamberth 2002).

Beach seine nets

There are 93 beach seine permit holders distributed approximately evenly along the coast between Doring Baai and Melkbos Point. They make about 3 300 hauls annually, catching 746 kg.$haul^{-1}$ with a total annual catch of 1 900 tons of harders (Hutchings & Lamberth, 2002).

Fish captured by gill nets

A total of 20 different fish families and 29 species are caught by gill net fishing operations in the western and south western coasts (Table 24). Harders or mullet (*L. richardsonii*) are the major catch species making up 95% of estuarine catches and 96% of marine gill netters using 44 – 51 mm mesh nets. Bycatch species comprise less than 6% by number of the total catch for both estuarine and marine netters and the bycatch appears to be similar in all regions when netters target harders. Number of species caught and CPUE was greatest for marine gill netters using the smallest mesh size (44-51 mm stretch mesh). CPUE was much lower for estuarine fishing operations. Only 7 fish species (all bony fish) were recorded from estuarine gillnetting operations. However, fishers in estuaries use only one net of 35-75 m length compared with the two to four nets of 75 m length used by legal marine operators, so the catch per net is similar for estuaries and the marine environment. It should be noted that illegal catches of teleosts were considerably larger than those made in legal larger mesh nets. More common bycatch species in marine small mesh fisheries were *G. feliceps T.t. capensis, P. saltatrix, A. inodorus, C. capensis,* and *C. capensis.* Galjoen, which is an important (and high value) recreational species only occurred in 4% of catches of legal fishers but was much more common in illegal catches. With the exception of *P. saltatrix*, bycatch species are not important recreational or commercial linefish species.

Table 26: Species composition of fish caught by gillnet fisheries in the Western Cape. Percentage occurrence is the proportion of landings in which a particular species was recorded. *(Source: Data from Hutchings & Lamberth, 2002 b)*

Species	**% of Total Catch (No.s)**	**CPUE (No of fish per day^{-1}) and (% Occurrence)**			
		W. Coast Estuary	W. Coast marine	W. Coast marine	Illegal netters
		44-51 mm net	44-51 mm net	178 mm net	44-145 mm net
Osteichthyes					
Aridae					
Galeichthys feliceps (Barbel)	0.039	0.5 (12)	0.36 (12)		0.63 (25)
Galeichthys ater (Barbel)	<0.001			0.33 (33)	
Carangidae					
Trachurus t. capensis (Horse mackerel)	3.111		33.59 (33)		0.13 (12)
Clupeidae					
Sardinops sagax (Sardine)	<0.001	0.13 (12)			
Coracinidae					
Dichistius capensis (Galjoen)	0.131		0.32 (4)		13.25 (75)
Cyprinidae					
Cyprinus carpio (Bastard mullet)	<0.001				
Gempylidae					
Thyrsites atun (Snoek)	<0.001		0.01 (1)		
Merluccidae					
Merluccius capensis (Hake)	0.011		0.10 (3)	0.67 (66)	
Mugilidae					
Liza richardsonii (Mullet/Harder)	94.87	285 (100)	1096 (96)		12.5 (12)
Mugil cephalus (Mullet)	0.003	0.38 (25)			
Pomatomidae					
Pomatomus saltatrix (Elf/Shad)	0.963	0.13 (12)	8.14 (47)		
Sciaenidae					
Argyrosomus inodorus (Silver kob)	0.025		0.20 (93)	0.33 (33)	1.89 (12)
Sparidae					
Lithognathus aureti (W.C. steenbras)	<0.001				
Lithognathus lithognathus (Silver steenbras)	0.002		0.02 (2)		
Pachymetopon blochii	0.005		0.05 (1)		

(Hottentot)					
Dichistius capensis (Galjoen)	0.022		0.24 (8)		
Sarpa salpa (Karanteen)	<0.001		0.01 (1)		
Spondyliosoma emarginatum (Steentjie)	0.024		0.26 (4)		
Soleidae					
Austroglossus microlepis (Sole)	0.004		0.04 (3)		
Triglidae					
Chelidonichthys capensis (Gurnard)	0.083		0.73 (13)	5 (33)	0.13 (12)
Chondrichthyes					
Callorhinchidae					
Callorhinchus capensis St Joseph shark)	0.674		1.46 (16)	252 (100)	1.75 (12)
Hexanchidae					
Notorynchus cepedianus (Cow shark)	0.002			0.67 (33)	
Rajidae					
Raja alba (Ray)	0.004			1.33 (66)	
Raja straeleni (Ray)	<0.001			0.33 (33)	
Rhinobatidae					
Rhinobatos annulatus (Sand shark)	0.006				0.75 (12)
Scyliorhinidae					
Haploblepharus edwardsii (Dogfish)	<0.001		0.01 (1)		
Haploblepharus pictus (Dogfish)	0.002				0.25 (12)
Squalidae					
Squalus megalops (Dogfish)	0.002		0.02 (1)		
Triakidae					
Mustelus mustelus (Hound shark)	0.012		0.09 (3)	1.33 (33)	
Total No.of fish.day^{-1}		**313**	**1 142**	**262**	**31**
Number of species		**7**	**19**	**9**	**9**

The severity of the impact of netting operations on fish stocks is a function of both the quantity of the catch and the size of fish caught in relation to the size at maturity. The total numbers of fish caught as bycatch by marine gillnetters operating with 44-64 mm gillnet along the BCLME

coast in South Africa is shown in Table 27. In the various types of net fisheries, species vary in their proportions of immature to mature fish. Horse mackerel and mullet captured were largely mature; galjoen, gurnard and St Joseph shark were approximately equally distributed between mature and immature fish (but immature galjoen form a large component of illegal net fish catches) and most of the stumpnose, elf, hound shark and barbel captured were immature. In the legal net fisheries, catch rates of shore angling species are very low relative to catch rates of target species but are similar to individual angler catch rates. However, the linefish species catch rates of illegal netfishers (combined catch rate of 15.14 fish.day^{-1}) are very much higher than shore based anglers (1.16 fish.day^{-1}). The net fishery catch rates (8.14 – 27.4 fish.day-1) for elf, which is a popular angling fish on the east coast are very high compared to rod and line anglers for all species combined (1.18 – 2.06 fish.angler^{-1}.day^{-1}).

Table 27: Annual marine 44-64 mm gillnet bycatch estimated for the western and south western Cape coast. *(Source: Data from Hutchings & Lamberth, 2002)*

Species	**Common name**	**Estimated number caught (CPUE: number.trip^{-1})**			
		Northern sector + Yzerfontein	**South of Elands to Saldanha**	**Saldanha + Langebaan**	**Total number of fish**
Trachurus t. capensis	Horse mackerel	2 850 (1.5)	5 16920 (42)	3 300 (0.83)	523 070
Pomatomus saltatrix	Elf		1 24597 (10)	3 333 (0.83)	127 930
Chelidonichthys capensis	Gurnard		9 744 (0.79)	3 333 (0.83)	13 077
Galeichthys feliceps	Barbel		5 271 (0.43)	1 125 (0.63)	6 306
Dichistius capensis	Galjoen		4 952 (0.40)		4 952
Rhabdosrgus globiceps	White stumpnose		3 035 (0.25)	1 333 (0.83)	4 378
Spondyliosoma emarginatum	Steentjie			8 333 (2.08)	8 333
Mustelus mustelus	Houndshark		1 230 (0.5)	2 333 (0.58)	3 563
Pachymetopon blochii	Hottentot	1 188 (0.63)			1 188

Beach seine

There are fewer data available for the beach seine net fishery on the West Coast. Mullet (*Liza richardsonii)* comprise the principal catch, and bycatch species probably comprise <5% by numbers of fish landed. Interviews with fishers have indicated that the species listed in Table 25 are bycatch species but quantitative information regarding the proportion of bycatch relative to target species is very limited. It would appear that bycatch is very small when shoals of harders or mullet are deliberately targeted, but may be quite large when blind throws or net hauls in the dark or in dirty water are made. Beach seining does not appear to have a detrimental effect on the benthic environment (Lamberth et al., 1995).

Table 28: Bycatch species obtained from interviews with beach seine net operators.
(Source: Data from Hutchings & Lamberth, 2002 b

Species	Common name	Species	Common name
Lithognathus lithognathus	White steenbras	*Rhinobatos annulatus*	Lesser sandshark
Argyrosomus inodorus	Silver kob	*Callorhinchus capensis*	St Joseph shark
Pomatomus saltatrix	Elf	*Trachurus t. capensis*	Horse mackerel
Dichistius capensis	Galjoen	*Sardinops sagax*	Sardine
Mustelus mustelus	Hound shark		
Umbrina spp.	Baardman		
Unspecified others			

Sometimes very large catches of white steenbras, elf, silver kob and sardine are made and these may be genuine mistakes on the part of the fishers or deliberate targeting of more valuable fish. Lamberth (1994) recorded 66 fish species from 34 families in permitted beach seine net operations in False Bay. Seine netters in the False Bay region have an exemption to catch linefish species but generally they target only harders, white steenbras and yellowtail (*Seriola lalandii*).

Monitoring

Net fishers are required to fill in a catch return for each trip. Declining total catches since 1974 –1984 indicate either increasing under-reporting of catches or a fishery in a state of collapse. Monitoring has indicated that the submitted catch returns are grossly inaccurate, with up to 90% of catch and effort, particularly of bycatch species, not reported (Hutchings & Lamberth 2002a, b). The compulsory catch return system has therefore failed. Net fishers do not submit accurate returns because they fear that the information will be used to limit their activities.

Permit holders operating in estuaries and Langebaan Lagoon submit catch returns to different licencing authorities.

Management

There has always been an considerable conflict between line fishers and gill netters. Line fishers feel that the unselective nature of the net fishing gear negatively impacts on stocks of commercially or recreationally important species such as geelbek (*Attractoscion aequidens*) and galjoen. Permitting was introduced in the 1970s but almost anyone who wanted a permit was given one so the fishery remained almost open access. By the early 1980s net fishing management measures included a small reduction in overall netting effort, a restriction on gill netting south of Melkbos Point, a permit system that required the submission of daily catch returns, a number of gear restrictions (length and number of nets), and, excepting False Bay, the permitting of netters to catch only mullet and St Josephs shark. However, these regulations have done little to defuse the conflict and line fish species continue to be caught as a bycatch of net fisheries and by illegal netters.

Net fishing can have severe impacts on the productivity and reproductive potential of linefish stock. The capture of linefish juveniles in nets results in reduced potential yields and recruitment over-fishing (i.e. too few fish surviving to adulthood and reproduction). Beach seine fishing mortality on juveniles is apparently insignificant when compared with natural mortality of the size classes captured, but fisheries using 44 – 64 mm mesh gillnets probably contribute significantly to adult mortality rates of the species captured, particularly if large catches of high value, over-exploited bycatch species such as white steenbras and silver kob are ‘inadvertently’ made quite frequently. (Bycatch of linefish species represents >60% of the value of fish catches of False Bay beach seine netters). Current mesh size regulations are aimed at reducing the mortality of adult linefish and maximising the catch rates of target species. The regulations relating to linefish with respect to size limits, closed seasons, bag limits and sales bans on recreational fish species apply to netters. There is supposed to be a limit of 10 fish per day of species other than the target species (mullet and St Joseph shark), but enforcement of the regulations is almost non-existant. Restrictions on the time nets can be used (closed seasons) and the areas in which they can be used (closed areas) are effective management measures that can reduce inter-sectoral conflict. The gillnet fishery is subject to a closed area restriction in that it is limited to the West Coast north of Melkbos Point. This is probably the most effective management measure for reducing the impact of gill netting on linefish stocks. Historical evidence suggests that net catches of linefish were much greater in the past. The current low levels of bycatch are a reflection of the over-exploited status of many of the South African linefish species.

It should also be noted that analysis of harder (mullet) catch size frequency distributions indicates that the stocks may be regionally over-exploited in areas with high effort levels (St Helena Bay, Saldanha Bay, Berg River). Historical evidence also indicates an order of magnitude decline in catches of mullet in the Berg River during the early years of the 20th century. This indicates the very real potential net fishing has to impact on supposedly plentiful low-value fish stocks classified as baitfish. The general conclusion reached by management scientists is that along the West Coast, the net fishery for mullet is maximally exploited or over-exploited. This is a common scenario for open access fisheries. More than 70% of gill net fishers operating outside Saldanha Bay and Langebaan Lagoon felt that their catches had declined since they had entered the fishery. However, less than 50% of beach seine fishers felt that catches had declined. Most fishers felt that no more permits should be issued, except those in the north who, incongruously, felt that although catches were declining more permits could be issued (Hutchings & Lamberth, 2002a, b).

It should be noted that in net fishing operations much of the bycatch is damaged and dies in the net before it can be released, or will die shortly after release. In addition, the bycatch often consists of high-value species and there is therefore a strong incentive to keep rather than release them. A further problem is that catch returns submitted by net fishers are largely inaccurate, with up to 90% of effort and catch (particularly bycatch species) not reported (Hutchings & Lamberth, 2002). This is partly a result of apathy, but also partly because permit holders fear that a true reflection of fishing activities will endanger future permit issue. Inaccurate reporting is also partly the result of net fishers disillusionment with the management authority (MCM) due to uncertainty over future access rights.

This lack of reliable data and the low survival of fish released from nets complicate management. Because net fishers on the West Coast have historically targeted a number of species and can demonstrate an historic and cultural association with this particular form of fishing, any management action that seeks to limit their access to fish in favour of other sectors is likely to be met with resistance. Co-management initiatives, education of fishers and the better policing of illegal netfishing activities are likely to be the best options for management authorities to pursue. Management authorities believe that an effort reduction in the fishery of around 60% is required to maximise economic yield. However, this effort reduction is likely to prove to be difficult, since even though the commercial permit stipulates conditions under which the permit holder can operate, knowledge of catch restrictions was very low among net fishers. This is indicative of both a lack of communication between management authorities and fishers and a lack of enforcement of the regulations by the authorities. In some areas, as many as 70% of fishers had never had their catches inspected

by authorities. The low likelihood of being apprehended must contribute significantly to the willingness of net fishers to keep bycatch line fish species catches in excess of that allowed in the permit conditions. This has the potential to add significantly to fishing effort on linefish stocks.

By contrast, commercial linefishers have their catches inspected on average 12 times a year. Recreational shore anglers on the West Coast also have very low rates of inspection, and <2% have ever had their catches inspected. This provides some insight into the short comings of the compliance sector of fisheries management in South Africa. Compliance problems can be attributed mainly to manpower shortages, but it may be possible to address some shortcomings by re-evaluating the monitoring methodology and prioritising relevant data capture.

Catch rates of mullet for the West Coast net fishery are higher than those in other parts of the world. However, apart from the area north of Elands Bay, the West Coast net fishery is predominantly commercial or recreational, with few participants needing to fish to survive (Hutchings & Lamberth, 2002b). The fishery is therefore effort subsidised and fishers operate mainly at times of known fish abundance which provides a biased indication of CPUE. In the Olifants River estuary and north of Elands Bay, where fishing is at a subsistence level, catch rates approach those of other similar net fisheries in the world (10 – 20 $kg.d^{-1}$). The net fisheries of the West Coast provide part-time employment for about 2000 crew, but most of the net fishing permit holders claim that it is not possible to survive economically on the fishery as catches are so low. However, it should be noted that the free availability of net permits in the past, coupled with the effort subsidisation has led to considerable over-capitalisation in the fishery, with fishers investing far more in boats, engines, nets etc than they can possibly make from their fishing activities.

Less than 10% of permit holders in South Africa consider themselves net fishers by trade and 66% work or have worked in other fishery sectors. Many of them are employed in the pelagic fishery which has a closed season over the summer months which is when the net fishery activity is at its greatest, while others have jobs not related to fishing. The majority of gill net fishers claim that <5% of their income is derived from net fishing. Only in the Saldanha Bay and Langebaan Lagoon areas, and to a lesser extent in St Helena Bay, do net fishers manage to make enough from the sale of their catches to cover their costs. Only these fishers can be said to rely commercially on this form of fishing. However, beach seine operators make a small profit form their fishing activities. Very few of the previously disadvantaged permit holders appear to rely on the net fishery for income when there are no other fishing sectors

active. Most of the permit holders in the north-western Cape, which is the most economically deprived area, are actually active. One explanation may be that they are too poor to maintain and replace equipment or they choose not to risk existing equipment for low probable rewards. From this it is possible to conclude that the simple issue of permits is not likely to relieve poverty in the area.

Historical involvement

Many of the permit holders claim to have been involved in net fishing all their lives and thus claim traditional rights of involvement in the fishery. Although the economic returns on net fishing are generally low, many of the net fishers apparently remain in the fishery because it provides a source of food. These fishers are classified as commercial. However, given the evidence of this report, most should be reclassified as subsistence. It is a characteristic of the fishery that turnover of permit holders is low. This is a result partly of very low license fees (R25 per net per year until 1998 and R30 in 1999) so there was little to lose by reapplying for a license year after year, even if the license was not used or only used very occasionally. However, the current high price of fuel and imported net materials is taking an economic toll of net fishers and many are less and less active. The gill net fisheries at the Berg River and St Helena Bay are greatly over-subscribed which makes the fisheries economically very inefficient. A reduction in numbers of fishers would probably improve catches, although it may take a considerable time to rebuild stocks (Hutchings & Lamberth, 2002b).

Demographics of net fishers and capital requirements

The demographics of permit holders in the net fishery are somewhat anomalous in that 80% of the permit holders are white males whereas in the West Coast areas for which the permits are issued, only 21% of the population is from the white race group. This indicates the lack of economic and demographic transformation within the fisheries sector. In addition, a large number of permits are held by people over the age of 65. Most fishers live <5 km from where they launch their boats. Commercial net fishers are restricted to specific areas in terms of their permit conditions and the average distance travelled to launch sites is 4.8 km for gillnet fishers and 7.8 km for beach seine fishers, as opposed to the 44 km travelled by commercial skiboat fishers. Most net fishers do not transport their boats, but keep them moored in harbours or estuaries or stored on the beach. Most net fishers in the area between Elands Bay and Langebaan Lagoon own outboard motors which they us for fishing. North of Elands Bay the majority of gill net fishers do not own outboard motors. Those that do, use small motors (10 hp). Nets, boats, motors and the safety gear required by the Department of Transport accounted for most of the capital costs of net fishers. Gill net fishers in the St Helena Bay area individually invested on average R30 460 in fishing gear, calm water fishers in Saldanha Bay,

Langebaan Lagoon and the Berg River estuary invested about R18 400 in fishing gear (small motors are suitable for calmer waters), and in the northern areas, investment in fishing gear was only about R3 400 (mainly a result of the low availability of fish north of Elands Bay). Entry into the beach seine fishery required the purchase of a net (±R77 000) and the use of a 4x4 vehicle. Nets last only about six months for Saldanha Bay/Langebaan Lagoon gill net fishers who make 142 trips a year, and four years for fishers north of Elands Bay who make only 33 trips a year. Net fishers at St Helena Bay and in Saldanha Bay and Langebaan sell >90% of their catch, while Berg River fishers keep 21-30% for own consumption. The crew involved in a net fishing operation get paid a third of the total value of the catch. One third goes to the boat for wear and tear on the gear and one third goes to the permit holder (Hutchings & Lamberth, 2002b).

13.3 GENERAL MANAGEMENT PROBLEMS IN SOUTH AFRICA

Interest in the fishing industry in South Africa has increased considerably in recent years. About 500 applications for fishing rights were received annually before 1998, whereas today, more than 11 000 applicants now annually apply for fishing rights along the South African coast, placing great pressure on both the resources of the fisheries management department (MCM) and the resources of the marine environment. This figure excludes many poor and marginalised fishers who do not have the means and capacity to apply for fishing rights through the formal channels.

Processing of applications has to be repeated year after year, appeals have to be heard and legal challenges fought. This results in a situation of uncertainty that is not healthy for the fishing sector nor for those seeking to gain access to the fishery sector. The problems surrounding the capacity to handle this massive load have to be addressed if the fishing sector is going to play an active role in economic development and job creation, especially for disadvantaged coastal communities who are dependent on fishing for their livelihood. Clearly there are major benefits in keeping permitting simple, issuing long-term rights that do not require annual processing, and employing, training and keeping staff capable of dealing with the requirements of the sector. It is necessary to coordinate management arrangements or policies with the capacity to implement them so that the development of each runs in tandem with the other.

South African fisheries management authorities ultimately envisage a system that would enable fishers to purchase valuable long-term rights as opposed to annual quotas. These rights could be obtained through a competitive bidding process, designed to ensure

transparency and fairness. This would greatly improve the position of small-scale operators. Long term rights take on the form of assets that are transferable, inheritable, and divisible. This would strengthen the small-scale operators' bargaining power and their ability to negotiate with fish-processing companies. These rights would however, still be limited by traditional regulatory measures such as TACs, closed seasons, gear specifications, etc.

Although not yet legislated, there is also an intention to introduce a TURF system (Territorial User Right Fishery) to manage some subsistence/informal and small scale commercial fisheries. Permits will not be issued on a species-by-species basis, but rather for a range of species present in a particular geographic area. Applicants would have to specify what they would do with their catches, in order to prevent wastage and they would be largely responsible for the sustainable use of the resources in their areas.

14 CONCLUSIONS AND RECOMMENDATIONS

14.1 CONCLUSION

The advent of democracy in South Africa recognised the need to address historical exclusion of many fishers and their communities from legitimate access to the marine resource base. However, the rights allocation and management system that was implemented to allow historically marginalised fishers to access marine resources had various limitations that effectively excluded poor and marginalized fishers living along the Northern, Western and Southern Cape coast. A key problem relates to the criteria used to define subsistence and small-scale commercial fishers in the South African context. The term "artisanal" has been abandoned and is not recognised in law. Instead the terms "subsistence" and "limited commercial" have been used to categorise economically disadvantaged fishers, and these latter categories are defined in terms of the resources that they may exploit. It must be recognised that there is a fisher continuum from poor people who harvest marine resources mainly for their own consumption to industrial 'fishers' who harvest, process and sell marine resources only for profit. This resource-centred classification system does not recognise fishers in terms of their socio-economic characteristics, poverty levels or historical and socio-cultural fishing practices, but rather in terms of Marine and Coastal Management's (MCM) characterisation of resources. This classification creates problems because fishers from poor coastal communities seldom fall neatly into one or other category because they employ a range of livelihood strategies to survive. In addition, along the west coast particularly, the final

list of marine species that was ultimately identified as suitable for subsistence use is extremely limited and comprises several species that were not historically consumed by poor coastal communities and therefore do not contribute to food security. Other constraints to gaining access to marine resources relate to lack of access to capital and equipment, onerous administrative procedures in applying for rights, high application costs and very small quotas that were insufficient to meet livelihood needs and provide a basic income to those applying for limited commercial rights.

RECOMMENDATION

Government needs to revisit the criteria and classification system created for subsistence fisheries in South Africa. In view of the policy and legislative requirements to adopt a people-centred approach to environmental resource management, government needs to ensure that historical, socio-economic and cultural considerations are taken into account in defining subsistence fishers. This will ensure that poor fishers, who depend on marine resources as a contribution to food security and livelihoods receive the necessary access to these resources within sustainable limits. In addition, re-visiting the term “artisanal” would realign South Africa with both international terminology and other coastal SADC countries (e.g. Angola, Mozambique and Tanzania) who recognise an “artisanal” fishery sector. The procedures for applying for limited commercial rights to marine resources needs to be simplified and the costs reduced to make the process viable for the user group for which such procedures are intended. It is important that management authorities set up validation mechanisms that allow them to check the credentials of individuals and groups that apply for subsistence and limited commercial fishing rights so that access to the resource base is not abused.

14.2 CONCLUSION

Information on socio-economic and poverty profiles of fisher households involved in the SFTG study reveal that poverty levels amongst fisher households living on the west and south Cape coasts of South Africa are high. There is a high level of food insecurity amongst the “subsistence” fisher households with 43% and 49% on the west and south Cape coasts respectively, being “food insecure”. Over 20% of fishers in this region fall within the poor and ultra-poor categories – as defined in the SFTG report (SFTG, 2000). Employment figures are generally very low, there are poor soils with very limited agricultural potential, the pace of land restitution is very slow, and the tourism potential of the region is limited and may not be the panacea to poverty as advocated by many. There is also poor infrastuctural development throughout most of the region and access to basic services is poor for much of the area.

Within this socio-economic environment there are a significant number of fishing families that have a longstanding tradition of marine resource use, and cannot meet their basic food needs without regular access to this resource base. As a result of the existing socio-economic conditions they have very limited opportunities for deriving an income other than from those relating to exploitation of marine resources.

RECOMMENDATION

Government needs to clarify its policies and strategies with respect to addressing the food security needs of the poor. Furthermore, it must as a matter of urgency determine to what extent marine resources can contribute to addressing food security of poor and vulnerable coastal fishers. The marine resource base throughout most of the BCLME region in South Africa is fully exploited (see below) and there are limited opportunities to accommodate new marine resource user groups, particularly in the finfish sector. Some redistribution of user rights has taken place but most poor and vulnerable fishers living on the west and south Cape coast have not been able to gain access to those resources. Government thus needs to review how marine resources are allocated across the various sectors (recreation, commercial, limited commercial and subsistence). New fisheries policies are currently being developed and the findings in this report will hopefully inform this process.

However, clearly there are many other features of the socio-economic environment that impact negatively on the lives of the informal fishing sector other than access to the marine resources. Improvement in any one of the sectors outlined above (formal employment, agricultural potential, land restitution, tourism development, basic services, infrastructure) would greatly improve the livelihoods of the impoverished coastal communities without the need to increase use of marine resources. Clearly management of the marine resources is closely tied to an improvement in the general socio-economic status of the coastal communities. Government needs to adopt a multi-faceted approach to the management of coastal resources, recognising that the provision of opportunities in fields other than fisheries, and an improvement in living conditions in general, will often result in more sustainable outcomes that have the same result as strict regulation of the fisheries.

14.3 CONCLUSION

One of the greatest challenges to developing and managing a subsistence and small-scale commercial fisheries sector in South Africa is determining an appropriate system of allocating use rights and management rights. South Africa has adopted an individual rights based

approach to fisheries allocations in fishing communities and has legislated accordingly. This is problematic given historical patterns of use and socio-cultural practices that have prevailed in coastal communities, where collection of marine organisms is one of a range of livelihood strategies and is often undertaken collectively by family or community groups. The notion of other kinds of use rights such as community-based, or collective rights, have not been entertained.

RECOMMENDATION

MCM needs to explore an alternative system of allocating use rights, such as community based or collective rights particularly in areas far removed from the urban environment. For example, in coastal fishing communities, where there is geographic clarity of the community, and cohesiveness and a level of organisation amongst the fishers, a collective rights based approach may be more appropriate. Management could then take place at a much smaller scale which might be much more appropriate for the user groups concerned. Clearly this requires resources and capacity, but these issues can be resolved.

14.4 CONCLUSION

Institutional arrangements for the allocation and issuing of permits to subsistence fishers are cumbersome and administratively inefficient for both fishers and management staff. Although there are officially no subsistence fishers in the BCLME region of South Africa, the structures that have been set up to deal with permit issues have in the past failed to deliver permits on time or failed to deliver permits at all. In certain localities along the South African coast, genuine subsistence fishers have not received permits, while in other localities permits have been issued to people who do not qualify as subsistence fishers in terms of the government criteria.

RECOMMENDATION

Subsistence fisheries management authorities need to determine firstly whether permits are necessary to manage all subsistence fisheries. It may prove possible to manage a subsistence fishery by for example zonation and gear limitations alone. Such a proposal would require some in depth evaluation by management authorities and may be resource specific. If permits are ultimately deemed a necessary requirement, then management authorities should devote serious attention to streamlining the permit issue process. Permit

issue requires mainly funding and personnel. At the same time management authorities need to generate and maintain a database of fishers who qualify for subsistence permits. This will be a lengthy process and the database will require in the first instance validation, and thereafter continual updating to keep abreast of changes in the status of permit holders.

14.5 CONCLUSION

There has been a significant shift in thinking with respect to the management of subsistence and small-scale fisheries in South Africa. Furthermore, much effort has been made to engage fishers in the process of trying to address past difficulties and injustices with respect to access to marine resources especially by informal fishers and poor fisher communities. However, the current management systems relevant to subsistence and small scale commercial fisheries in the BCLME region of South Africa remain highly centralised and bureaucratic. MCM holds all the decision-making powers and is responsible for a wide range of management activities including allocating fishing rights and permits, enforcement, resource conservation and research. However, MCM does not have the resources nor capacity to manage or consult with the hundreds of subsistence and limited commercial fishers spread across over a thousand kilometre of coastline along the west and south west Cape coast. (It must be noted that MCM is burdened with similar management responsibilities for subsistence and small scale commercial fisheries active along almost 2000 km of coast east of Cape Agulhas). Consequently, the relationship between subsistence, small scale commercial and other informal fishers and MCM is strained, and the potential for developing joint management arrangements is limited. This highly centralised and legalistic system lacks flexibility and mitigates against developing localised management responses to particular situations.

RECOMMENDATION

MCM needs to identify relevant conservation/resource management agencies at the provincial and/or local level that can assist in managing aspects of subsistence and small-scale commercial fisheries. It is simply not possible to manage over 3000 km of coastline incorporating multiple and varied fisher communities from a central office in Cape Town. In addition, MCM needs to be willing to delegate certain decision-making powers and management functions to such relevant agencies and provide the appropriate resources to enable such agencies to fulfil these functions effectively. In some instances it may be appropriate to devolve certain decision-making powers and management responsibilities to local resource users groups (eg local fisheries management committee). Government needs to identify conditions under which such management regimes are workable.

14.6 CONCLUSION

In South Africa, most fisheries are fully exploited or over-exploited and there is no excess capacity to be taken up by a new fisheries sector, although opportunities exist for reallocation and redistribution. Within certain fishery sectors, redistribution of allocations has taken place and new HDI entrants have gained access to the fishery. However, the resolution of resource allocation complexities between industrial fisheries that provide significant employment opportunities but require large quotas to maintain economies of scale, and poor and mostly marginalized coastal fishers who require access to the same resources to maintain their livelihoods, is not easily achieved. Most South African fisheries require either no further increase in fishing effort or a reduction in fishing effort, and the central problem is in trying to define the sector in which the effort limitation or reduction should occur. Essentially the problem is one of balancing one set of interests against another.

RECOMMENDATION

In view of the fact that most marine resources are either fully exploited or overexploited, government needs to devote effort to research on stock rebuilding strategies. Rather than simply reducing effort government also needs to explore other effective mechanisms for rebuilding overexploited stocks such as the declaration of Marine Protected Areas and Closed Areas. Where areas are zoned for the use of subsistence and possibly small-scale commercial fishers, management authorities in conjunction with the local fisher representative organisation should consider setting aside up to 20% of the area zoned as sanctuary areas. Reseeding and rotational harvesting systems can also function as stock rebuilding strategies in certain situations. The identification by government of previously unexploited resources that have the potential to be targeted by the limited commercial and subsistence sectors would also help to resolve the problem, but this in not easily achieved. To be effective, such interventions frequently require the development of a market as part of the process of re-focusing effort. Perhaps most importantly, government needs to adopt a holistic multi-faceted approach to the management of coastal resources that sees fisheries as part of a suite of livelihood strategies. Thus MCM needs to work collaboratively with other government agencies, NGOs and fisher organizations to address livelihood needs of coastal fishing communities rather than focusing strictly on the biological implications of resource use.

14.7 CONCLUSION

We have noted above, that most South African marine resources are either fully or over-exploited. This is partly a result of historical fishing pressures, as well as an inability to reduce the fishing effort because of socio-political pressures over the last 5-10 years. Furthermore, the focus of research, management and monitoring effort has been on large scale industrial fishing stocks at the expense of stocks that were important for food security and coastal livelihoods. Thus the commercial landed value has been used as the main criterion for prioritising resources for research, and socio-economic factors have largely been ignored. The line fish stocks particularly have suffered as a result of this management approach, and the biological data and catch data required for the mathematical representations of individual stocks and their future stock status under different fishing regimes has still to be gathered in many cases. As a result management of individual stocks has been very much *ad hoc* and "gut feel" and stocks of many line fish species are now considered collapsed.

RECOMMENDATION

South African management authorities are now attempting to remedy the lack of species-specific knowledge by way of a new Line Fish Management Plan incorporating focused, species-specific research and data collection that generates realistic regulations. It should also be noted that the decision by the South African fisheries management authority to reduce line fishing effort by up to 70% over the next five years is likely to have significant socio-economic implications. Given the reliance of many of the poor South African fishing communities on line fish resources, it is imperative that government considers the implications of such effort reduction programs in conjunction with other development programs that seek to address livelihood needs of fishers in collaboration with other government departments.

14.8 CONCLUSION

Current regulations of the Marine Living Resources Act limit the catches of most species of line fish. The regulations require a permit to fish, and set minimum size limits, closed seasons for some species, closed areas and species-specific bag limits. Some species are listed as non-saleable for all sectors, and all sale of fish by the recreational sector is forbidden. Management authorities are extremely concerned about allowing subsistence or limited commercial fishers to sell their catch, and so far this has not been allowed. This strict regulation of line fish catches is problematic for all informal fishers and their associated

communities, because livelihood issues have to be considered along with resource management issues (see also #2 and #3 above).

RECOMMENDATION

Because of the over-fished status of most of the desirable South African line fish stocks, there should be no relaxation of the MLRA regulations for subsistence and limited commercial or other informal fishers. Despite the poverty of most subsistence fishers and their associated communities, fishing controls of over-exploited resources, should be based on resource status and not socio-economic features of the local environment. Management authorities must focus on increasing the awareness of line fishers of the relevant regulations and their understanding of the necessity for the regulations. This will be a long process and should be built into the management brief of the management authorities as an ongoing process. More importantly, government needs to adopt a holistic multi-faceted approach to the management of coastal resources that sees fisheries as part of a suite of livelihood strategies. Thus MCM needs to work collaboratively with other government agencies and NGOs and fisher organizations to address livelihood needs of coastal fishing communities so that resource use can be maintained within biologically sustainable limits.

14.9 CONCLUSION

One of the major contributory factors to the over-exploitation of line fish stocks has been a management system that has in the past allowed line fishers to hold more than one kind of resource use permit. Thus line fishers have been able to target a range of resources such as lobsters, squid or tuna, together with line fish. They are thus not dependent on line fish catches only, for economic viability. Previously, part time commercial licenses were also issued to fishers who had additional sources of income. As a result, line fishing effort has effectively been subsidised by other fisheries or external sources, which greatly reduces the natural economic regulation of commercial effort and allows the fishing fleet to remain large in spite of declining catches.

RECOMMENDATION

Within the context of subsistence fisheries working groups (see above) South African fisheries managers should underline the potential problems associated with open access fisheries and the cross-subsidisation of fishing effort. South African management authorities are considering

allocating snoek permits (not a threatened stock) to fishers who also target other species like hake, tuna, squid or lobsters while reserving genuine linefish permits for a much smaller sector of the fishing community. This has much to recommend it but some kind of socio-economic profiling should be done to determine the non-fishery impacts of such a licensing system.

14.10 CONCLUSION

In terms of research and stock assessment capabilities South Africa is well endowed compared with other African countries. South Africa can therefore play a lead role in the fields of sophisticated stock assessment and modelling. However, South Africa has much to learn with regard to the management of subsistence and small-scale fisheries that have as their focus the need to sustain basic livelihoods. Understanding of socio-economic characteristics of the fishers, as well as involving fishers in management activities and decisions is critically important. Undertaking livelihood assessments are as important as stock assessments. However, currently South African fisheries management authorities are not capacitated to deal with these latter issues. Nor is the management authority structured to interact and liaise with departments that might be able to provide such skills.

RECOMMENDATION

Fisheries management authorities in South Africa need to broaden the scope of their management vision so that livelihood issues become an integral part of the management paradigm. They should also consider what lessons they might learn from artisanal and informal fisheries management programs in other African countries with more flexible management regimes. Management staff involved in the subsistence and limited commercial sectors in South Africa should engage with their counterparts in Angola in discussions and working groups. It is recommended that working groups such as those established for rock lobster, abalone and line fish be formed with regular meeting schedules and a budget to liaise at least bi-annually with artisanal fisheries managers from outside South Africa.

14.11 CONCLUSION

Effective management of marine resources is not possible without effective enforcement and the development of a compliance ethic among fishers. Enforcement is a critical component of any management approach, and the method of enforcement should be negotiated between the resource users and the relevant management agency. MCM is structured to have Fishery

Control Officers based at regional offices throughout the country. These FCO's are responsible for ensuring compliance of the MLRA, but it is apparent that the distribution of FCO's follows the distribution of commercial fishing and does not accord with the requirements of subsistence and limited commercial fisheries management. Furthermore, until very recently MCM has not been well capacitated in terms of both staff and staff willingness to engage in participatory management approaches as a means to resolve non-compliance issues.

RECOMMENDATION

MCM needs to increase the number of compliance staff in areas where there are significant concentrations of informal fishers. However, MCM and their compliance staff need to go beyond enforcement and look at creative ways of increasing compliance. There is a need to examine other mechanisms to achieve compliance. This includes awareness raising and education, as well as management partnerships leading to stewardship through co-management arrangements (Hauck and Sowman, 2003). National, regional and local government bodies need to understand that in order to move towards a participatory resource management approach, a major restructuring of the power relations between the state and communities has to take place. Enforcement is the responsibility of the implementing agency i.e. MCM and should not necessarily be delegated to local community structures. However, community resource use monitors should be trained to aid compliance efforts, particularly by providing information related to their specific fisheries.

14.12 CONCLUSION

Adequate fisheries data collection, management and analysis is imperative for effective fisheries management. Although there is relatively good information on the extent of resource use by the industrial fisheries, there is very limited information on patterns of resource use from the subsistence and informal fishery sector. There is also very limited information resulting from direct monitoring on the extent and patterns of resource use by recreational fishers. The information that is available for these latter sectors is mostly inadequate for the purposes of making informed management decisions. Voluntary catch returns have been shown to provide insufficient data because of reluctance on the part of recreational anglers to report catches, illiteracy among fishery participants as well as non-reporting of commercially valuable by-catch species. In addition many of these fishers do not have an understanding of the rationale behind the collection of catch data and view it as a means of spying on their activities

RECOMMENDATION

Considerable effort must be devoted to the design of monitoring programmes for subsistence and limited commercial fisheries. Management authorities need to give serious consideration to the kind of data they wish to collect and the kind of data analyses they need to perform in order to monitor and manage such fisheries. Quantifying fishing effort will be a particularly difficult problem. There may be a requirement for area specific data collection profiles. The development of a database to capture data in a format relevant to subsistence and limited scale commercial fishing is necessary. The focus should be on the collection of representative data. Arrangements must be made for reliable data input, storage and data analysis. Monitoring personnel would need to be identified, employed and trained, data collection sheets designed once the type of data to be collected had been defined, and a suitable database would have to be designed in order to store and analyse the data. It is recommended that use be made of community monitors in each community to monitor resource use, contribute to internal communication networks, assist with compliance and act as capacity-building agents.

Implementation of community monitoring programmes should be instituted as soon as possible in all areas where subsistence and other informal fisheries exist, using supervised community monitors funded by MCM. Monitor training will need to be done on an area specific basis, because of different fishery dynamics and catch compositions along different parts of the coast. Fisher education programs must also be designed and implemented in order to increase fisher understanding of the ecological processes relevant to the harvesting of marine resources and their understanding of the necessity for controls, monitoring and the collection of real catch data. This should improve the quality of the data collected. SAN Parks have implemented a very effective resource use monitoring programme in the Table Mountain National Park Marine Protected Area using CoastCare workers trained to enter data directly into simple robust GPS capacitated palm top computers. Data are then directly downloaded for analysis at central computing stations. It is strongly recommended that the system be evaluated for implementation in major subsistence and limited commercial use areas in the Northern, Western, and Southern Cape coastal zone.

14.13 CONCLUSION

Although the focus of marine research in South Africa is heavily influenced by the Sea and Coast Programmes, and MCM (through its Marine Living Resource's Fund) has considerable say in what projects are funded, It is probably true that scientists at tertiary institutions rather

than the staff from management agencies develop research project proposals that are submitted for evaluation to the Sea and Coast Programme. Thus the research often has a focus or bias that reflects the interests of the individual scientist rather than the management agency.

RECOMMENDATION

There is an urgent need to enhance understanding between government and tertiary institutions regarding the information needs of management authorities. The management agencies need to frame their research questions themselves and then develop these in conjunction with individual researchers or research teams. Regular research prioritisation meetings need to be held between the management agency and tertiary institutions in order to develop proposals that address management concerns.

14.14 CONCLUSION

Because of the extremely limited scale of subsistence and limited commercial fishing as currently defined by management authorities in South Africa, there are no real trans-boundary issues in this sector. West coast rock lobster stocks and some commercially and recreationally important line fish stocks such as kob, galjoen, baardman and steenbras are shared by South Africa and Namibia. However, the new fisheries policies currently being formulated in South Africa, will provide an opportunity to review the definition of the subsistence and limited commercial fisheries sectors and the legal provisions governing them, and address some of the concerns raised in this report.

RECOMMENDATION

With respect to transboundary issues relevant to the three participating countries, management issues related to west coast rock lobster and shared line fish stocks should be discussed amongst fisheries scientists and managers from all countries. For benthic organisms such as lobsters, recruitment issues are probably of major importance, since the lobster stock from southern Angola to Cape Agulhas is composed of a single species and there is very limited information as to recruitment processes that might affect local populations. With respect to most of the stocks of shared fish species, the entire spectrum of reproductive dynamics and life histories should be researched in order to inform transboundary management. Finally, the new fisheries policies currently being drafted in South Africa should seek to align the legal framework relevant to poor historically

disadvantaged fishers and fishing communities with regional and international fisheries protocols such as the SADC Fisheries Protocol and the FAO Code of Conduct for Responsible Fishing.

REFERENCES

General References

BRANCH, G.M., HAUCK, M., SIQWANA-NDULO, N. and DYE, A.H. 2002. Defining fishers in the South African context: subsistence, artisanal and small-scale commercial sectors. *South African Journal of Marine Science* **24**: 475 – 487.

BRANCH, G.M., MAY, J., ROBERTS, B., RUSSELL, E. and CLARK, B.M. 2002. Case studies on the socio-economic characteristics and lifestyles of subsistence and informal fishers in South Africa. *South African Journal of Marine Science* **24**: 439 – 462.

CARDOSO, P. 2004. Overview and Analysis of Social and Economic Information Relevant to Artisanal Fisheries Management in the BCLME Region of South Africa. Unpublished EEU Report No. 5/05/263

CENTRE FOR MARINE STUDIES. 1999. Assessment of marine resource availability for subsistence fisheries along the coast of South Africa. Unpublished Report, University of Cape Town.

CLARK, B.M. 2000. Identification of subsistence fisher communities, areas and resources. Subsistence Fisheries Task Group Report No 1. Unpublished Report, Marine and Coastal Management, Department of Environmental Affairs and Tourism, Cape Town: 22 pp.

CLARK, B.M., HAUCK, M., HARRIS, J.M., SALO. K. and RUSSELL, F. 2002. Identification of subsistence fishers, fishing areas, resource use and activities along the South African coast. *South African Journal of Marine Science* **24**: 425 – 437.

COCKCROFT, A.C., SAUER, W.H.H., BRANCH, G.M., CLARK, B.M., DYE, A.H. and RUSSELL, E. 2002. Assessment of resource availability and suitability for subsistence fishers in South Africa, with a review of resource management procedures. *South African Journal of Marine Science* **24**: 489 – 501.

CRAWFORD, R.J.M., SHANNON, L.V. and D.E. POLLOCK 1987. The Benguela ecosystem. 4. The major fish and invertebrate resources. In *Oceanography and Marine Biology. An Annual Review*. **25**. Barnes, M. (Ed). Aberdeen University Press: 353-505.

DEAT 2002. Where have all the fish gone? Measuring Transformation in the South African Fishing Industry. Department of Environmental Affairs and Tourism.

DEAT 2004. Transformation in the South African Fishing Industry - The TAC controlled fisheries. pp. 24-27. Department of Environmental Affairs and Tourism.

GEROMONT, H.F., DE OLIVIERA, J.A.A., JOHNSTON, S.J. and C.L.CUNNING- HAM (in press) – Development and application of management procedures for fisheries in Southern Africa. ICES *Journal of Marine Science.*

HARRIS, J.M., BRANCH, G.M., CLARK, B.M COCKCROFT, A.C., COETZEE, C., DYE, A.H., HAUCK, M., JOHNSON, A., KATI-KATI, L., MASEKO, Z., SALO, K., SAIJER, W.H.H., SIQWANA-NDULO, N. and SOWMAN, M. 2002. Recommendations for the management of subsistence fisheries in South Africa. *South African Journal of Marine Science* **24**: 503 – 523.

HARRIS, J.M., SOWMAN, M., BRANCH, G.M., CLARK, B.M., COCKCROFT, A.C., COETZEE, C., DYE, A.H., HAUCK. M., JOHNSTON, A., KATI-KATI, L., MASEKO, Z., SALO, K., SAUER, W.H.H., SIQWANA-NDULO, N. and BEAUMONT, J. 2002. The process of developing a management system for subsistence fisheries in South Africa: recognizing and formalizing a marginalized fishing sector in South Africa. *South African Journal of Marine Science* **24**: 405 – 424.

HAUCK, M., SOWMAN, M., RUSSELL, E., CLARK, B.M., HARRIS, J.M.,VENTER, A., BEAUMONT, J. and MASEKO, Z. 2002. Perceptions of subsistence and informal fishers in South Africa regarding the management of living marine resources. *South African Journal of Marine Science* **24**: 463 – 474.

HAUCK, M AND SOWMAN, M. (EDS). 2003. Waves of Change: Coastal and Fisheries Co-management in South Africa. UCT Press, Cape Town.

RUSSELL E, MAY J, ROBERTS B. 2000. A socio-economic and resource-management profile of subsistence fishers in South Africa. Subsistence Fisheries Task Group Report No 2, Unpublished report, Marine and Coastal Management, Department of Environmental Affairs and Tourism, Cape Town.

SCHUTTE, D.W. 1993. ‘n Ontleding van die ontwikkelinggspotensiaal van geselekteerde visser-gemeenskappe aan die wes- en suidkus. Unpublished Report submitted to Department of Environmental Affairs and Tourism and the African National Congress: 108 pp + 5 appendices.

SFTG. 2000. Recommendations for subsistence fisheries management in South Africa. Subsistence Fisheries Task Group Final Report. Unpublished Report, Marine and

Coastal Management, Department of Environmental Affairs and Tourism, Cape Town: 88 pp.

SHANNON, L.V. and PILLAR, S.C. 1986. The Benguela ecosystem. Part III. Plankton. . *Oceanography and Marine Biology. An Annual Review*. Barnes, M. (Ed). Aberdeen University Press: Vol. 24: 65 – 170.

SHANNON, L.V. and O'TOOLE, M. 1999. Integrated overview of the oceanography and environmental variability of the Benguela current region. Synthesis and Assessment of information on the Benguela Current Large Marine Ecosystem (BCLME), Thematic Report No. 2. 29 pp.

TECHNICAL RELIEF MEASURES TASK TEAM. 1996. Relief measures for marine subsistence fisherfolk in South Africa. Unpublished Report submitted to the Fisheries Policy Development Committee: 19 pp.

WYSOKIŃSKI, A. 1986. The living marine resources of the Southeast Atlantic. FAO Fisheries Technical Paper 178 (Rev.1): 120 pp.

FISHERIES LITERATURE REVIEW

SOUTH AFRICAN REFERENCES

Estuarine net fish References

LAMBERTH, S.J. and TURPIE, J.K. 2003. The role of estuaries in South African fisheries: economic importance and management implications. *African Journal of Marine Science* **25**: 131 – 157.

MAKKA, S.J. 1992. The effect of recreational activities of tourists in and around the Langebaan Lagoon on the traditional fishing community. Submitted in partial fulfillment for a B.A. Honours degree, University of the Western Cape: 40 pp.

Estuarine line fish References

LAMBERTH, S.J. 2000. Current fishing activities in estuaries from the Orange River to Cape Point. Unpublished Report, Marine and Coastal Management, Department of Environment and Tourism, Cape Town: 23 pp.

LAMBERTH, S.J. 2000. Current fishing activities in estuaries from Cape Point to Mossel Bay. Unpublished Report, Marine and Coastal Management, Department of Environment and Tourism, Cape Town: 14 pp.

LAMBERTH, S.J. and TURPIE, J.K. 2003. The role of estuaries in South African fisheries: economic importance and management implications. *African Journal of Marine Science* **25**: 131 – 157.

Estuarine bait (digging/pumping) References

WYNBERG, R.P. and BRANCH, G.M. 1991. An assessment of bait-collecting for *Callianassa kraussi* Stebbing in Langebaan Lagoon, Western Cape, and associated avian predation. *South African Journal of Marine Science* **11**: 141 – 152.

Rocky intertidal invertebrates References

BOSMAN, A.L., EEKHOUT, S. and BRANCH, G.M. 1990. The exploitation potential of limpets on the coast of Namaqualand. Unpublished Final Report to the Chief Directorate Sea Fisheries, Cape Town: 76 pp.

EEKHOUT, S., RAUBENHEIMER, C.M., BRANCH, G.M., BOSMAN, A.L. and BERGH, M.O. 1992. A holistic approach to the exploitation of intertidal stocks: limpets as a case study. *South African Journal of Marine Science* **12**: 1017 – 1029.

GRIFFITHS, C.L. and BRANCH, G.M. 1997. The exploitation of coastal invertebrates and seaweeds in South Africa: historical trends, ecological impacts and implications for management. *Transactions of the Royal Society of South Africa*. **52**(1): 121 – 148.

PULFRICH, A. and BRANCH, T.A. 2002. Population dynamics and potential yield of three species of giant winkles in the Western Cape, South Africa. *South African Journal of Marine Science* **24**: 161 – 183.

RAUBENHEIMER, C.M. 1991. Length-based simulation model for assessing the exploitation potential of the limpet, *Patella granatina*. M.Sc. Thesis, University of Cape Town: 58 pp.

SCHOEMAN, D. 1996. An assessment of a recreational beach clam fishery: current fishing pressure and opinions regarding the initiation of a commercial harvest. *South African Journal of Wildlife Research* **26**: 160 – 170.

VAN ERKOM SCHURINK, C. and GRIFFITHS, C.L. 1990. Marine mussels of southern Africa – their distribution patterns, standing stocks, exploitation and culture. *Journal of Shellfish Research* **9**(1): 75 – 85.

Marine subtidal invertebrates (diving) References

CASTILLA, J.C., BRANCH, G.M. and BARKAI, A. 1994. Exploitation of two critical predators: the gastropod *Concholepas concholepas* and the rock lobster *Jasus laladandd*. In Sigfried, W.P. (Ed.). *Rocky Shores: Exploitation in Chile and South Africa*. Berlin, Springer. 101 – 130.

COCKCROFT, A.C. and PAYNE, A.I.L. 1999. A cautious fisheries management policy IN South Africa: the fisheries for rock lobster. *Marine Policy* **23**: 587 – 600.

GRIFFITHS, C.L. and BRANCH, G.M. 1997. The exploitation of coastal invertebrates and seaweeds in South Africa: historical trends, ecological impacts and implications for management. *Transactions of the Royal Society of South Africa*. **52**(1): 121 – 148.

HAUCK, M. 1998. Abalone and crayfish poaching: An analysis of the problem and recommendations for action. Unpublished Report, Institute of Criminology, University of Cape Town: 17 pp.

POLLOCK, D.E. 1989. Review of the fishery for and biology of the Cape rock lobster *Jasus lalandii* with notes on larval recruitment. *Canadian Journal of Fisheries and Aquatic Sciences* **43**: 2107 – 2117.

TARR, R.J.Q. 1992. The abalone fishery of South Africa. In: Abalone of the world. Shepherd, S.A., Tegner, M.J. and Guzman del Proo, S.A. (Eds). Fishing News Books, Oxford: 438 – 447.

TARR, R.J.Q., WILLIAMS, P.V.G. and MACKENZIE, A.J. 1996. Abalone, sea urchins and rock lobster: a possible ecological shift that may affect traditional fisheries. *South African Journal of Marine Science* **17**: 319 - 323.

Marine subtidal invertebrates (hoop nets/traps) References

SMITH, C.D. and GRIFFITHS, C.L. 2002. Aspects of the population biology of Octopus vulgaris in False bay, South Africa. *South African Journal of Marine Science* **24**: 185 - 192.

Marine line fish (motorized boats) References

BROUWER, S.L. 2002. Movement patterns of red steenbras Petrus rupestris tagged and released in the Tsitsikamma National Park South Africa. *South African Journal of Marine Science* 24: 375-378.

CRAWFORD, R.J.M., UNDERHILL, L.G. and J.D.VENTER 1990 – Handline catches and stock identity of snoek *Thyrsites atun* off South Africa and Namibia. *S.Afr.J.mar.Sci .***9**: 95-99.

GRIFFITHS, M.H., ATTWOOD, C. & THOMSON. R. 1999. New management protocol for the South African linefishery. Proceedings of the Third Southern African Marine Linefish Symposium, Arniston, 28 April 1 May 1999. Editor B.Q. Mann.

GRIFFITHS, M.H. (submitted) – Life history of *Thyrsites atun* (Pisces: Gempylidae): a pelagic predator of the Benguela Ecosystem. *Fish.Bull.U.S.*

HUTCHINGS, K. 2001. Catch and effort and socio-economic characteristics of the gill and beach-seine net fisheries in the Western Cape, South Africa. M.Sc. thesis, University of Cape Town. 148pp.

HUTCHINGS, K. and LAMBERTH, S.J. 1999. Management and socio-economic considerations for the drift and beach-seine net fisheries on the west and south western coasts of South Africa. Final Report for Marine and Coastal Management, Department of Environmental Affairs, Cape Town: 56 pp.

HUTCHINGS, K. and LAMBERTH, S.J. 2002. Bycatch in the gillnet and beach-seine fisheries in the Western Cape, South Africa, with implications for management. *South African Journal of Marine Science* **24**: 227 – 241.

HUTCHINGS, K. and LAMBERTH, S.J. 2002. Catch and effort estimates for the gillnet and beach-seine net fisheries in the Western Cape, South Africa. *South African Journal of Marine Science* **24**: 205 – 225.

HUTCHINGS, K., LAMBERTH, S.J. and TURPIE, J.K. 2002. Socio-economic characteristics of gillnet and beach-seine fishers in the Western Cape, South Africa. *South African Journal of Marine Science* **24**: 243 – 262.

MCGRATH, M.D., HORNER, C.C.M., BROUWER, S.L., LAMBERTH, S.J., MANN, B.Q., SAUER, W.H.H. and ERASMUS, C. 1997. An economic valuation of the South African linefishery. *South African Journal of Marine Science* **18**: 203 – 211.

PENNEY, A.J., GRIFFITHS, M.H. and C.G. ATTWOOD 1997. - Management and Monitoring of the South African Marine Linefishery. *SANCOR Occasional Report* **3**: 87 pp.

Marine line fish (non-motorised boats, shore based) References

ATTWOOD, C.G. & FARQUHAR, M. 1999. Collapse of linefish stocks between Cape Hangklip and Walker Bay, South Africa. S. Afr. J. Mar. Sci. **21**: 415-432.

BROUWER, S.L., MANN, B. Q., LAMBERTH, S.J., SAUER, W.H.H. and C. ERASMUS. 1997. A survey of the South African shore angling fishery. *S.Afr.J.mar.Sci.* **18**: 165 - 177.

COWLEY, P.D., BROUWER, S.L. & TILNEY, R.L. 2002. The role of the Tsitiskamma National Park in the management of four shore-angling fish along the South-Eastern Cape coast of South Africa. *S.Afr.J.mar.Sci* .**24**: 27-35.

LAMBERTH, S.J. 1996. The distribution of total catch and effort between all sectors of the linefishery in the southwestern Cape. (Regional programme to evaluate participation in, an management of, the linefishery in the SW Cape, SE Cape and KwaZulu-Natal). Final Report to the Sea Fisheries Research Institute, Department of Environmental Affairs and Tourism, Cape Town: 22 pp.

LAMBERTH, S.J. 2000. Current shore based line-fishing from the Orange River to Mossel Bay. Unpublished Report, Marine and Coastal Management, Department of Environment and Tourism, Cape Town: 7 pp.

MCGRATH, M.D., HORNER, C.C.M., BROUWER, S.L., LAMBERTH, S.J., MANN, B.Q., SAUER, W.H.H. and ERASMUS, C. 1997. An economic valuation of the South African linefishery. *South African Journal of Marine Science* **18**: 203 – 211.

PENNEY, A.J., GRIFFITHS, M.H. and C.G. ATTWOOD 1997. - Management and Monitoring of the South African Marine Linefishery. *SANCOR Occasional Report* **3**: 87 pp.

SAUER, W.H.H. and ERASMUS, C. 1996. Evaluation of the line and net fisheries along the west coast of South Africa. Final Report submitted to Sea Fisheries Research Institute, Department of Environmental Affairs and Tourism, Cape Town: 34 pp.

Marine fish (gill/beach-seine netting) References

DE VILLIERS, G. 1987. Harvesting harders *Liza richardsoni* in the Benguela up welling region. In: The Benguela and comparable ecosystems. Payne, A.I.L., Gulland, J.A. and Brink, K.H. (Eds). *South African Journal of Marine Science* **5**: 851 – 862.

HUTCHINGS, K. 2001. Catch and effort and socio-economic characteristics of the gill and beach-seine net fisheries in the Western Cape, South Africa. M.Sc. thesis, University of Cape Town. 148pp.

HUTCHINGS, K. and LAMBERTH, S.J. 1999. Management and socio-economic considerations for the drift and beach-seine net fisheries on the west and south western coasts of South Africa. Final Report for Marine and Coastal Management, Department of Environmental Affairs, Cape Town: 56 pp.

HUTCHINGS, K. and LAMBERTH, S.J. 2002. Bycatch in the gillnet and beach-seine fisheries in the Western Cape, South Africa, with implications for management. *South African Journal of Marine Science* **24**: 227 – 241.

HUTCHINGS, K. and LAMBERTH, S.J. 2002. Catch and effort estimates for the gillnet and beach-seine net fisheries in the Western Cape, South Africa. *South African Journal of Marine Science* **24**: 205 – 225.

HUTCHINGS, K., LAMBERTH, S.J. and TURPIE, J.K. 2002. Socio-economic characteristics of gillnet and beach-seine fishers in the Western Cape, South Africa. *South African Journal of Marine Science* **24**: 243 – 262.

LAMBERTH, S.J., BENNETT, B.A. and CLARK, B.M. 1994. Catch composition of the commercial beach-seine fishery in False Bay, South Africa. *South African Journal for Marine Science* **14**: 69 – 78.

LAMBERTH, S.J., BENNETT, B.A., CLARK, B.M. & JANSSENS, P.M. 1995. The impact of beach seine netting on the benthic flora and fauna of False Bay, South Africa. S. Afr. J. Mar. Sci. **15:** 115-122.

LAMBERTH, S.J., CLARK, B.M. and BENNETT, B.A. 1995. Seasonality of beach-seine catches in False Bay, South Africa, and implications for management. *South African Journal for Marine Science* **15**: 157 – 167.

LAMBERTH, S.J., SAUER, W.H.H., MANN, B.Q., BROUWER, S.L., CLARK, B.M. and ERASMUS, C. 1997. The status of the South African beach-seine and gill-net fisheries. *South African Journal of Marine Science* **18**: 195 – 202.

SAUER, W.H.H. and ERASMUS, C. 1996. Evaluation of the line and net fisheries along the west coast of South Africa. Final Report submitted to Sea Fisheries Research Institute, Department of Environmental Affairs and Tourism, Cape Town: 34 pp.

Sandy beach invertebrates References

FARQUHAR, M. 1995. Stock assessment and population dynamics of the white mussel, *Donax serra*. Unpublished Report, Marine and Coastal Management, Department of Environment and Tourism, Cape Town: 67 pp.

SCHOEMANN, D. 1996. An assessment of a recreational beach clam fishery: current fishing pressure and opinions regarding the initiation of a commercial harvest. *South African Journal of Wildlife Research* **26**: 160 – 170.

Socio-economic references

A DICTIONARY OF ECONOMICS. 2002. John Black. Oxford University Press, 2002. Oxford Reference Online. Oxford University Press. University of Cape Town. 28 April 2004 <http://www.oxfordreference.com/viws/ENTRY.html?subreview=Main&entry=t19.e1454.

ANC 1994. The Reconstruction and Development Programme (RDP). Umanyamo Publications, Johannesburg.

BRANCH, G. M., MAY, J., ROBERTS, B., RUSSEL, E. and CLARK, B.M. 2002. Case Studies on the Socio-Economic Characteristics and Lifestyles of Subsistence and Informal Fishers in South Africa. South African Journal of Marine Science **24**: 439-462.

BRITZ,P., SAUER, W. AND PHILIPS, L. 2002. Towards Equity, Sustainability and Stability: A Sector Planning Approach to Fishing and Mariculture Development in the Northern cape Province, South Africa, IFET 2000 proceedings.

CARDOSO, P. 2004. Overview and Analysis of Social and Economic Information Relevant to Artisanal Fisheries Management in the BCLME Region of South Africa. Unpublished EEU Report No. 5/05/263

CLARK, B.M., HAUCK, M., SALO, K., and RUSSELL, E. 2002. Identification of Subsistence Fishers, Fishing Areas, Resource and Activities along the South African Coast. South African Journal of Marine Science **24**: 425-437.

DICTIONARY OF THE SOCIAL SCIENCES, Craig Calhoun, ed. Oxford University Press, 2002.Oxford Reference Online. Oxford University Press. University of Cape Town. 28 April 2004.

<http://www.oxfordreference.com/viws/ENTRY.html?subreview=Main&entry=t104.e552

HAUCK, M. 2000. Subsistence Fisheries Task group (SFTG) Draft Report 6: Review of Literature on Artisanal and Subsistence Fishers. Institute of Criminology: Social justice Resource Project, Faculty of Law, University of Cape Town.

(www.uct.ac.za/depts/sjrp/publicat/subsist.htm).

HARRIS, J.M., SOWMAN, M., BRANCH, G.M., CLARK, B.M., COCKCROFT, A.C., COETZEE, C., DYE, A.H., HAUCK, M., KOHNSTON, A., KATI-KATI, L., MASEKO, Z., SALO, K., SAUER, W.H.H., SIQWANA-NDULO and BEAUMONT, J. 2002. The Process of Developing a management System for Subsistence Fisheries in South Africa: Recognizing and Formalizing a Marginalized Fishing Sector in South Africa. South African Journal of Marine Science **24**: 405-424.

ISAACS, M. 2004. Understanding the social processes and politics of implementing a new fisheries policy, the Marine Living Resource Act of 1998, in South Africa. Ph.D thesis, University of Western Cape, Cape Town.

LANDMAN, J.P., BHORAT, H., VAN DER BERG, S. and VAN ARRDT, C. 2003. Breaking the grip of Poverty and Inequality in South Africa 2004-2014, Electronic copy.

NALEDI, 1999. *Poverty and Economics in South Africa* – Input paper for the national hearings on poverty "Speak Out On Poverty", www.naledi.org.za/poverty.html

NORTHERN CAPE PROVINCE COASTAL MANAGEMENT PROGRAMME, 2003. State of Play Report, Unpublished Report, Eco-Africa for Northern Cape Provincial Department of Agriculture, Land Reform, Environment and Conservation, June 2003.

PARKINGTON, J. 1976. Follow the San: An analysis of seasonality in the pre-history of the South Western Cape, South Africa, Ph. D. thesis, Queen's College.

PENN, N.G. 1987. The Frontier in the Western Cape, 1700-1740. Papers in the Prehistory of the Western Cape, South Africa., Part II. J Parkington and M Hall (Eds). BAR International Series 332, Great Britain.

SACHS, W. 1999. Social Justice and Environmental Sustainability in the Post-Development Era. Chapter 4, p. 59-75. In: Ecology, Politics and Violent Conflict, M Suliman (editor. Zed Books, London.

STATISTICS SOUTH AFRICA: Census 1996 and Census 2001.

SUBSISTENCE FISHERIES TASK GROUP (SFTG), 2000. Draft Report 2 – A Socio-Economic and Resource Management Profile of Subsistence Fishers in South Africa, 23 January 2000.

THACKERAY, J.F. 1998. Molluscan fauna from Klasies River, South Africa. South African Archaeological Bulletin **43**:27-32.

TAYLOR, V. 2002. What kind of social security? New Agenda, South African Journal of Social and Economic Policy **5**, First Quarter.

THE CONCISE OXFORD DICTIONARY. Ed. Judy Pearsall. Oxford University Press, 2001. Oxford Reference Online. Oxford University Press. University of Cape Town. 28 April 2004.<http://www.oxfordreference.com/viws/ENTRY.html?subreview=Main&entry=t23.e18675

UNDP, 2002. Human Development Report: Deepening democracy in a fragmented world. Oxford University Press, New York.

UNDP, 2003. Human Development Report: Millennium Development Goals: A compact among nations to end human poverty. Oxford University Press, New York.

UNDP, 2000. South Africa: Transformation for Human Development, UNDP Programme, Pretoria.

UNDP, 2003. South Africa Human Development Report: The Challenge of Sustainable Development: Unlocking People's Creativity. Cape Town; Oxford University Press Southern Africa.

VAN SITTERT, L. 2001a. 'Velddrift': the making of a South African company town. *Urban History* **28 (**2): 193-217.

VAN SITTERT, L. 2001b. 'To live this poor life': remembering the Hottentots Huis squatter fishery, Cape Town, c. 1934-1965. *Social History* **26** (1): 1-21.

VAN SITTERT, L. 2002a. Leviathan Bound: Fisheries Reform in South Africa, 1994-2001. In: Lemon, A. and C.M. Rogerson (Eds). *Geography and Economy in South Africa and its Neighbours*., Ashgate.

VAN SITTERT, L. 2002b. 'Those who cannot remember the past are condemned to repeat it': comparing fisheries reforms in South Africa. *Marine Policy* **26:** 295-305.

VAN SITTERT, L. 2003. The tyranny of the past: why local histories matter in the South African fisheries. Ocean and Coastal Management **46:** 199-219.

Government Publications:

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 1998 - Coastal Policy Green Paper: Towards Sustainable Coastal Development in South Africa, September 1998.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 1997 – White Paper for A Marine Fisheries Policy for South Africa.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 2000 -: White Paper for Sustainable Coastal Development in South Africa, April 2000.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 2002: 'Where have all the fish gone': Measuring transformation in the South African fishing industry.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM 2004 - Transformation in the South African fishing industry. 1 – The TAC controlled fisheries.

MARINE LIVING RESOURCES ACT 1998

NATIONAL ENVIRONMENTAL MANAGEMENT ACT 1998

WEST COAST DISTRICT SPATIAL PLAN 2000 - Consultative Draft, November 2000, Vol. 1.

APPENDIX 1
CLARIFICATION OF DIFFERENCES IN BOUNDARIES USED IN DIFFERENT PUBLICATIONS

As stated in the Introduction to this report the BCLME region in South Africa stretches along the west coast of South Africa from the Orange River in the north (border with Namibia, in the Northern Cape Province - NC) to Cape Agulhas in the south (in the Western Cape Province - WC).

Information relevant to subsistence and small-scale commercial fishers and fisheries along the BCLME coastal region can be found in a number of publications, which have served as sources of reference for some sections of this report. These include publications based on the findings of the SFTG (eg: SFTG Draft Report 2 that reports on the national socio-economic survey, Clark et al, 2002, Branch et al, 2002 & Cockcroft et al , 2002) and the White and Green Papers on Sustainable Coastal Development.

These different publications divide the coast into different regions or zones with different names and in some instances with slightly different boundaries. In the publications arising from the national SFTG survey for instance different teams of researchers have published articles pertaining to their area of work and expertise, each dividing the national coast (including the coast equivalent to the BCLME coast) into different regions whose boundaries do not always coincide.

This fact complicates the analysis and places some constraints on integration and presentation of the data for the purpose of this report. Thus information based on their data must be considered qualitatively and in descriptive terms rather than quantitatively. However, as a whole, the data from each of these different sources still provide us with a general overview of 'subsistence' fishers along the BCLME coast.

For clarification an explanation of the boundaries used by each source is given below (and reproduced in Maps 1-3 below):

Clarke et al (2002) – As part of the SFTG research to identify people who "fish for food or to meet the basic needs of life" (i.e. it disregarded those harvesting resources solely for financial gain, as a business or a means of employment)[18] Clarke et al (2002) divided the coastline in

[18] This information emerged during a national survey by the SFTG that aimed at identifying subsistence fisher communities, areas in which they occur and which resources they use. The information was gathered during 37 interviews (19 in region A and 18 in region B) with researchers, authorities and community leaders; fishers themselves were not interviewed unless they fitted into one

South Africa into eight regions (See Map 1, A to H). Three of these regions (A, B and C) are broadly located within the BCLME artisanal fisheries project study area, and in each of these 'subsistence-fishing' communities have been identified. The boundaries of each of the regions and the name of the localities are shown in the table below:

Table A-1

Region	Boundaries*	"Subsistence-fishing" localities**	Comment
A	Namibia border to Olifants River	1- Port Nolloth, 2- Hondeklip Bay, 3- Ebenhaeser, 4- Papendorp, 5- Doringbaai	1,2- N. Cape Province; 3,4,5- W. Cape Province
B	Olifants River to and including Hout Bay	6- Groothoekbaai, 7- Lamberts' Bay, 8-Elands Bay; 9- Veldrif; 10- St Helena; 11- Paternoster; 12- Vredenburg: 13- Saldanha; 14- Churchhaven 15- Hopefield; 16- Yzerfontein; 17- Mamre; 18- Atlantis; 19- Cape Town; 20- Hout Bay	
C	Hout Bay to Breede River	21- Oceanview; 22- Kommetjie; 23- Masiphumelele; 24- Retreat/Steenberg; 25- Khayelitsha; 26- Macassar; 27- Gordon's Bay/Strand; 28- Kleinmond; 29- Hawston; 30- Hermanus; 31- Gansbaai; 32- Buffeljags; (33- Struisbaai; 34- Arniston)	21-32- situated within BCLME; 33-34- outside BCLME

Source: Clarke et al 2002 (*p. 427; ** 437):

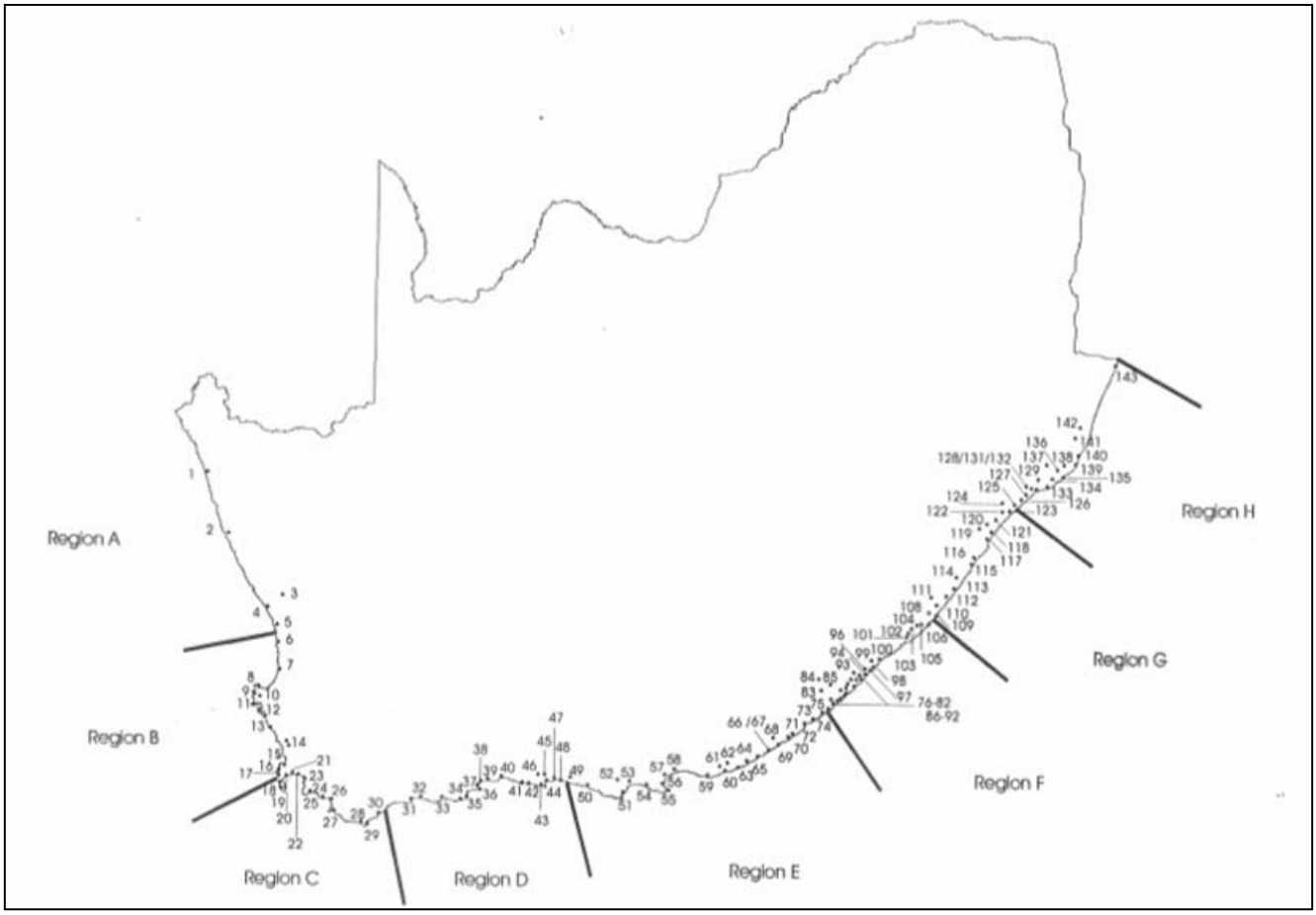
The boundary between their Regions A and B is at the Olifants River, the political boundary between the Northern Cape and Western Cape provinces. This is also the boundary between the Namaqualand Coast (in the Northern Cape province) and the West Coast/Cape Metro regions (in the Western Cape Province) used by the White Paper on Sustainable Coastal Management. But 3 (Ebenhaeser, Papendorf and Doringbaai) of the 5 localities Clarke et al (2002) included in their region A actually fall (in administrative terms) in the Western Cape province. This means that by including these 3 communities in their region A, data for this region does not apply to settlements in Namaqualand/the Northern Cape province only.

of these 3 categories (Clark et al, 2002, p- 427). During the study researchers did not have a definition of what constituted a subsistence fisher but were encouraged to formulate their own ideas guided by the principle that subsistence fishers are "people who fish for food or to meet the basic needs of life" and disregard those harvesting resources solely for financial gain, as a business or a means of employment" or recreational fishers (Clarke et al –p. 428). As pointed out in the introduction to this report their data include fishers who subsequently were considered by the SFTG to be small-scale commercial. Because in some instances answers to the questions asked were provided by one single individual during an interview, Clarke et al state that some of the information they obtained might have been biased and thus preferred to present the data acquired summarised according to regions rather than to individual localities. (p. 428).

Bearing this in mind Clark et al's data are still relevant and used in this project, their combined Regions A and B applying to the west BCLME coast.

Region C of Clark et al (2002), which extends to the Breede River, includes 2 settlements (out 14) that strictly speaking fall outside (east of) the BCLME boundary. However broadly speaking their boundaries almost coincide with those of the BCLME region as defined in this project, and thus their data for region C are used here as reflecting the south BCLME coast.

Cockcroft et al (2002) – These authors assess resource usage by 'subsistence' fishers and make recommendations regarding their future usage, on the basis of the 'west, south and east coasts'. They state that the location of these regions follows Clark et al, 2002 (Cockcroft et al, 2002, p. 493). However it is not clear what Cockcroft et al (2002) mean by 'south' and 'east' coasts. For instance, Cockroft et al (2002) do not present data for KwaZulu-Natal as other SFTG publications do, which may mean that KwaZulu-Natal is part of their 'east" coast, and that their 'south' coast also incorporates regions D and E of Clark et al (2002 –please refer to Map 1), which are outside the BCLME region as defined in this project. However as Cockroft et al's (2002) data is only used in this project to provide a list of resources used by 'subsistence' fishers and their own recommendations for the future usage of the same resources (Table 7.5), any discrepancies in boundaries do not affect the findings and analysis presented here.

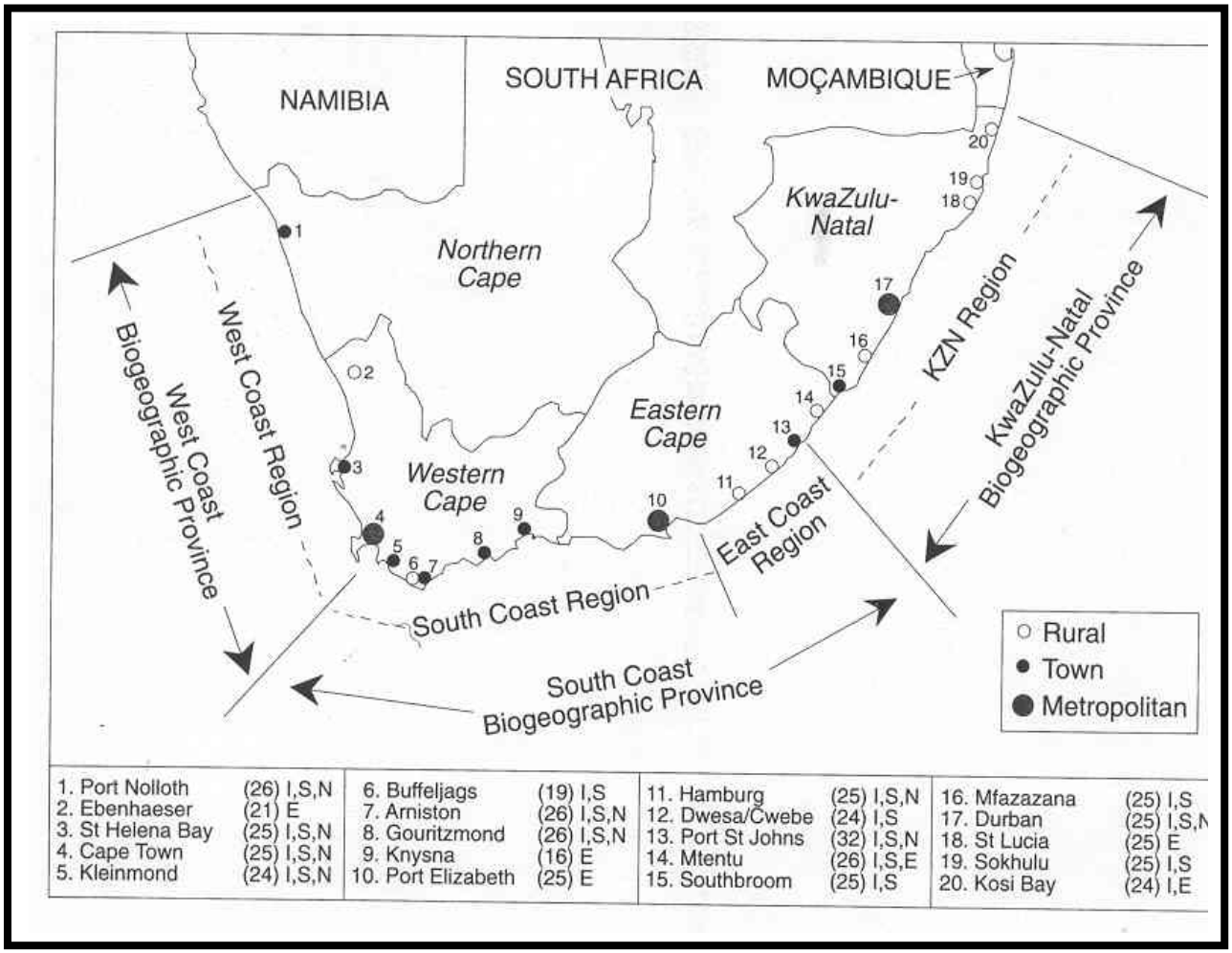


Map 1: From Clark *et al,* 2002.

Branch et al (2002) - The west coast of the BCLME region is part of Branch et al's (2002) "West Coast Region"; however their "South Coast Region" is more extensive than the south portion of the BCLME region, which extends as far east as Port Elizabeth (Map 2). Branch et al's (2002) data was used in this project to draw up the list of fish found to be used by "subsistence" fishers during the SFTG national survey. Since they break down their information as per fishing settlement, it was possible to only list fish in settlements that are part of the BCLME region, and exclude settlements outside the BCLME. Socio-economic data for 'subsistence' fishers provided by Branch et al (2002) were not used in this report, as a more comprehensive study is given by the SFTG Report 2 (2000 – please see below).

According to Branch et al (2002) the (three) bio-geographic zones identified in SA each has different species and types of resources, which are one of the factors that influence the behaviour of fishers. Other factors that influence the behaviour of fishers include: a) The geographic political location, which determines the type of management structures and enforcement levels; and b) The type of settlement in which fishers reside as this influences the

availability of alternative sources of income and livelihood, access to markets, infrastructure, etc (Branch et al, 2002).

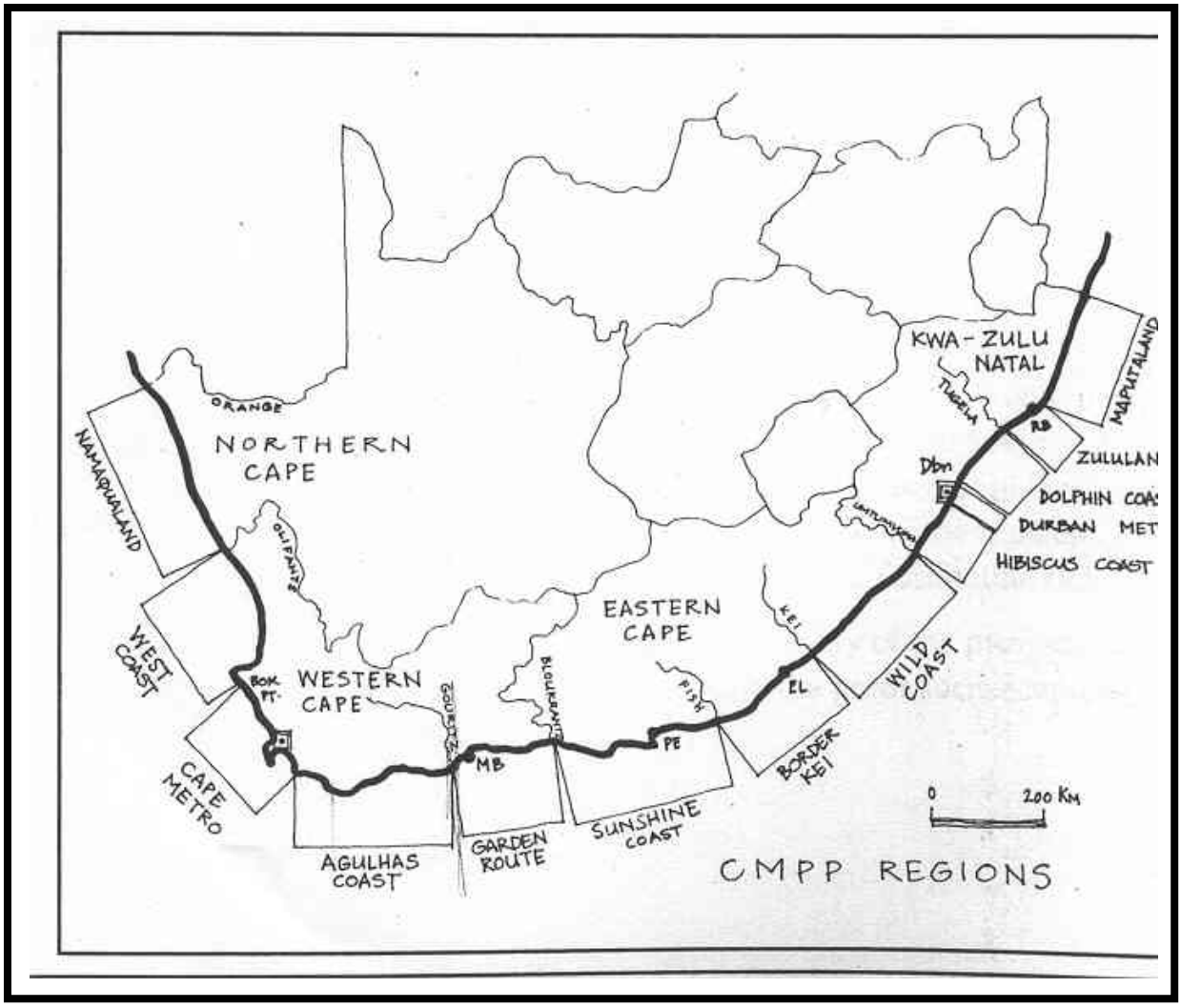


Map 2: From Branch *et al,* 2002.

SFTG Draft Report 2, 2000: This SFTG provides information according to 'biogeographic regions' (Map 2), and the corresponding data for their west and south regions were the main source of socio-economic data for "subsistence" fishers for the current report as it provides data in greater detail than Branch et al (2002). The SFTG's south region extends further east (to Port Elizabeth) than the BCLME boundary defined here (Cape Agulhas). However, despite this limitation, given that the SFTG's data is used in this report in a descriptive and qualitative nature, this does not invalidate the conclusions drawn here.

White Paper on Sustainable Coastal Development, 2000 and the Green Paper that preceded it (Coastal Policy Green Paper, 1998) were used as sources for the broad characterisation of the BCLME coastal region (section 4), which incorporates the politically defined regions designated as (Map 3):

- The Namaqualand Coast (in the Northern Cape Province, which extends from the Namibian border to the Olifants River, the border between the Northern Cape and Western Cape Provinces).
- The West Coast (in the Western Cape province, extending from the Olifants River to Atlantis, on the outskirts of the Cape Town Metropole).
- The Cape Metro (from Atlantis to Cape Hangklip, in the Western Cape Province).
- The Agulhas Coast (in the Western Cape Province, extending from Cape Hangklip to the mouth of the Gouritz River). This part of the coast extends further east than the BCLME boundary defined in this project, but this does not impact in any significant way on the overall information gathered for this report.



Map 3: From White Paper on Sustainable Coastal Development in South Africa, 2000.

APPENDIX 2
OCEANOGRAPHIC AND FISHERIES DATA AND INFORMATION SYSTEMS (Extracted From Shannon & O'Toole 1999).

(a) MCM has been using the Data General range of mini computer since 1979 for the processing of data relating to commercial catches, research samples and environmental parameters. The applications were developed in Cobol and the data stored in an Infos hierarchical database. These systems are currently being converted in order to make use of the advanced features offered by new hardware and software technology. These applications will be run on a local area network using Novel NetWare. The data are being converted to a relational database which will support the integration of common entities, such as grids, vessels and species codes, and provide better facilities for ad hoc management and research queries. The software is being developed using Borland Delphi, a fourth generation language which runs on PCs using Windows 95. The bulk of the systems relate to commercial catches from the following sectors: Demersal, Pelagic, Rock Lobster, (West Coast, South Coast and Natal), Abalone, Linefish and Netfish. Some data sets cover catches from 1978 to date. The environmental parameters (physical and chemical0 and stored in the Oceanographic Database. The issuing of vessel licenses and fishing permits is handled by the Boat Registration System.

(b) The University of Cape Town is well connected in the academic and research environments in Southern Africa. Not only does the University have a wide range of computers available, from Macs to PCs to Workstations, but it has expertise that is of world class quality. All of the University computers are connected to the Internet as well as on several local area networks on campus. The University is constantly seeking to upgrade and improve the quality of this interconnectivity so as to increase the flow of information. Through the Centre of Marine Studies and the various Departments at the University, expertise is readily available in the fields of data processing and statistics, resource assessment, management and conservation as well as environmental evaluations and oceanographic remote sensing. These skills can be applied to the problems of data and information management as well as in the interpretation, presentation and publication of the necessary data.

(c) South Africa possesses an extremely comprehensive collection of oceanographic data; discrete, profile and time series. Most of these are available from SADCO (see below) and/or MCM. South Africa also has extensive holdings of NOAA satellite sea surface temperature data.

South African Data Centre for Oceanography (SADCO)

SADCO was established as a national oceanographic data bank in the 1970s to service South Africa's marine science community. It has subsequently developed into a regional facility. SADCO archives, extracts and manipulates oceanographic data from the southern African marine environment and provides a spectrum of professional cost-efficient and user-friendly services. It also promotes the scientific and commercial application of oceanographic data.

SADCO receives data for the area 0°-70°S and 30°W-70°E from a variety of sources including various southern African marine agencies, and World Data Center, and other international data sources by exchange or purchase.

The SADCO data base contains observations since 1850 which include *inter alia* the following:

- Oceanographic station data for surface and serial depths, giving values of temperature, salinity, sound velocity, oxygen, nutrients etc.
- Digital bathythermograph and XBT data
- Surface data from voluntary observing ships (VOS) including waves, wind and weather, comprising some 3 million readings

SADCO also has access to various document information systems which enable literature searches for published oceanographic data

SADCO is guided by a Steering Committee and managed by CSIR on behalf of its sponsors which include the South African Department of Environmental Affairs and Tourism, the South African Navy, CSIR, Foundation for research Development and the Namibian Ministry of Fisheries and Marine resources. Service
charges are modest. SADCO could play an important role in BCLME.

Data Confidentiality/Restrictions

Most oceanographic data collected by regional scientists/research institutions is generally available to other *bona fide* scientists subject to certain conditions. These conditions include *inter alia* appropriate acknowledgement of data ownership, a time clause to give the owner a reasonable period to analyse the data and publish research results. Oceanographic collected in international waters around southern Africa by overseas oceanographic institutes is likewise generally readily available to scientists and technicians in southern African states. Again the principals and ethics of international science and/or intellectual property rights apply. For

example, SADCO receives and archives various forms of oceanographic data but can put a limited-period hold on data if requested by the collector of the data to do so. These data would then not be released to a third party during the embargo period unless authorised by the data owner, but the data could be used with other data in the data-base for averaging purposes. The present system works well.

Resource-based data are, however, in a different category and fisheries data may not be readily available outside of the organisation responsible for its collection. This practice is not peculiar to southern Africa and applies almost universally. There are two main reasons for this viz. (a) commercially sourced fisheries data contains information which may give the supplier (fisherman or fishing company) a competitive edge over rivals and (b) raw fisheries data may be regarded as strategic information by management agencies and national governments. Fisheries data are, however, generally readily available in processed form. Nevertheless the fact remains that most fisheries and oceanographic data are collected by, or at the behest of, organisations funded by national tax payers and there is a universal movement towards increased transparency and accountability of governments.

APPENDIX 3

List of subsistence fishing communities identified by Clark et al. (2002) as part of the SFTG study

REGION A	REGION B	REGION C
Port Nolloth	**Groothoekbaai**	**Oceanview**
Hondeklipbaai	**Lambert's Bay**	**Kommetjie**
Ebenhaeser	**Elandsbaai**	**Masiphumele**
Papendorf	**Veldrif**	**Retreat/Steenberg**
Doringbaai	**St Helena**	**Khayelitsha**
	Paternoster	**Macassar**
	Vredenburg	**Gordon's Bay/Strand**
	Saldanha	**Kieinmond**
	Churchhaven	**Hawston**
	Hopefield	**Hermanus**
	Yzerfontein	**Gansbaai**
	Mamre	**Buffeljags**
	Atlantis	**Struisbaai**
	Cape Town	**Arniston**
	Hout Bay	

APPENDIX 4

MARINE FISH: CLASSIFICATION OF FISH SPECIES AND MINIMUM LEGAL SIZES (MLRA 1998) RECREATIONAL AND SUBSISTENCE FISHER BAG LIMITS FOR EACH CATEGORY ARE GIVEN BELOW.

LINEFISH REGULATIONS*

General regulations
Closed seasons:
Elf/Shad: 1 September to 30 November, both dates inclusive.
Galjoen: 15 October of one year to the last day of February in the following year, both dates inclusive.
Chokka: 25 October to 22 November, both dates inclusive.
No fish may be sold or offered for sale.
No person may catch and retain more than 20 squid per day.
No sport angler or spearfisher may sell or offer any fish for sale.
Fish must be measured in a straight line along the side from the tip of the snout to the extreme end of the tail or caudal fin.

Specially protected list	Critical list	Restricted list	Exploitable list	Recreational list	Bait list	Size restriction	Mass restriction
Brindle bass Potato bass Natal wrasse Great white shark Saw fishes	Poenskop Red steenbras	Bludger Blue Hottentot Dageraad Dane Elf/Shad Englishman Hake Red Stumpnose Rock cods# Roman Scotsman Slinger	Blueskin Cape Gurnard Cape Snoek Cape Yellowtail Carpenter/Silverfish Dorado/Dolphinfish Elasmobranchs # (excluding Great white shark) Ragged tooth shark Spotted gulley shark	Baardmans Banded galjoen Billfishes # Blacktail Bronze bream Cape knifejaw Cape stumpnose Galjoen Garrick/Leervis John Brown Kingfish # (excluding	Anchovies # Chub mackerel # Fransmadam # Garfishes # Glassies Half beaks # Horse mackerel Mullets # Pinky Sardines #	**2.5cm**: Glassy **7.5cm**: Pinky **15cm**: Strepie **20cm**: Cape stumpnose, Dassie/Blactail **22cm**: Hottentot **25cm**: Natal stumpnose River bream, Carpenter/Silverfish, Slinger, White	**3.2 kg**: Bigeye tuna, Yellowfin tuna **6.4 kg**: Bluefin tuna **25 kg**: Swordfish

Seventy-four		West Coast steenbras Zebra	Leopard and Striped catshark Geelbek Hottentot Javelin grunter King mackerel Panga Queen mackerel Red tjor-tjor Sand soldier Santer Snapper salmon Tunas # White stumpnose	Bludger) Large-spot pompano Leopard catshark Natal knifejaw Ragged tooth shark River bream River snapper Southern pompano Springer Spotted grunter Spotted gully shark Stonebream Striped catshark Swordfish White musselcracker White steenbras	Sauries # Scads # Steentjie Strepie Cutlassfish Wolfherring	stumpnose **30cm**: Bronze bream, Dageraad, Elf/Shad, Roman, Santer/Soldier, Scotsman, Red stumpnose, Zebra **35cm**: Galjoen, Squaretail kob **40cm:** Bellman, Kob, Red steenbras, River snapper, Seventy-four, Spotted grunter, West Coast steenbras, Spotted rock cod, White-edged rock cod, Yellowbelly rock cod, **50cm:** Poenskop, **60cm**: Geelbek, Musselcracker, Snoek, White steenbras **70cm**: Garrick/Leervis	

The # indicates that the regulations apply to all species belonging to the group.

BAG LIMITS

SPECIALLY PROTECTED LIST	CRITICAL LIST	RESTRICTED LIST	EXPLOITABLE LIST	RECREATIONAL LIST	BAIT LIST
None	2 per person per day	5in total per person per day	10 in total per person per day	10 in total but only 5 of the same species	Unlimited

*Please note that at the time of writing this report the linefish regulations were being amended.