An assessment of the small-scale fisheries in the Kogelberg District of the Western Cape, South Africa

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Contents

Abstract

Small-scale fisheries play a critical role in communities by contributing to food security, poverty alleviation and source of income. The study focused on the Kleinmond small-scale fishery and estimated the current economic value of the fishery as well as exploring the potential for increasing this and also whether it is being used in a way that ensures sustainable harvesting of the marine resources. It was important to evaluate the ecological, economic and social dimensions of the fishing community in order to address the problems currently facing the community.

The study draws on previous research done in the Kleinmond area. Data were collected to update and complement previous research and addresses current research. In order to investigate the fisheries catch contribution in the area, data were obtained from the Department of Agriculture, Forestry and Fisheries. Three different questionnaires were developed and conducted in face-to-face formal and informal interviews with the various stakeholders (n=42) in the value-chain. Interviews were also conducted telephonically with other stakeholders and a focus group was formed to supplement previous available data. Simple economic models were developed for the fisheries working from the Kleinmond harbour, which were used to estimate the gross and net economic value of catches for individual right-holders, as well as the Kleinmond area as a whole.

The economic models used in this study showed that the West Coast rock lobster *Jasus lalandii*, fishery was the primary source of income for small-scale fishers. This was due to the rock lobsters being sold to the export market as a high-valued commodity, whereas the linefish were sold to the local market as a lower-valued commodity. However, linefish were found to be more of a commodity to the community as a portion would be retained for personal consumption. The linefishers were concerned in that over the past couple of years, snoek *Thrysites atun* have been absent the Kleinmond area, resulting in and the fishing effort shifting to a resident species Cape bream *Pachymetopon blochii*. Whereas West Coast rock lobster were considered to be harvested sustainably under the current total allowable catch strategy, there was concern for the future of the fishery because of the occurrence of illegal fishing, both locally and nationally.

Small-scale fisheries in the Kleinmond community are largely dependent on fishing resources, even though the industry is only marginally profitable. Future management

measures should concentrate on optimising the value-chain to provide both sustainability for the resources and improve the livelihoods of the community.

Key words: Kleinmond, marine, management, small-scale fishery, socio-economics.

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Ethics

This study followed the Rhodes University ethical procedure, which was approved. The findings of this research have been given to WWF-SA, who now has a person working permanently with the Kleinmond fishing community, basing their work on the information gained by this study. The information has also been published for the community to read in a regularly distributed newsletter by the non-governmental organisation Coastal-Links.

List of Acronyms

DAFF	Department of Agriculture, Forestry and Fisheries
BPM	Biomass production model
CL	Carapace length
CPUE	Catch per unit effort
DBL	Daily bay limits
FRAP	Fishing rights allocation process
IRP	Interim relief permit
IUU	Illegal, unreported and unregulated
KMP	Kogelberg Marine Park
KZN	Kwa-Zulu Natal
LMP	Linefish management protocols
MCS	Monitoring, control and surveillance
MLRA	Marine Living Resources Act
MPA	Marine Protected Area
NGO	Non-governmental Organisations
NSCR	Nearshore commercial rights
OMP	Operational management procedure
PMC	Processing and marketing companies
SSF	Small-scale fishery
SSFP	Small-scale fisheries policy
TAC	Total allowable catch
TAE	Total allowed effort
TL	Total length
TLF	Traditional linefishery
WWF	World Wide Fund

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Chapter 1: Introduction

1.1. The role and nature of small-scale fisheries globally

Worldwide, small-scale fisheries plays a critical role in many coastal communities as they provide a major source of income, food security and poverty alleviation (McGoodwin 1990, Sowman 2006, Barnes-Mauthe et al. 2013, WWF 2013). The sustainability of small-scale fisheries is important both from the aspect of economics and socio-cultural values, which has been recognised internationally and nationally (Béné and Heck 2005, Sowman 2006, Andrew et al. 2007, WWF 2013, FAO 2015).

Small-scale fisheries are generally considered as having low capital, low technology and high labour intensity within developing countries (FAO 2005). The small-scale fisheries are also commonly characterised by the remoteness of landing sites, the dispersal of post-harvest and marketing activities, and the costs and income generated by the fisheries (Barnes-Mauthe et al. 2013, FAO 2015). The World Bank (2010) reported that 90% of people working in capture fisheries (not including cultured fisheries) and related activities fall under the definition of small-scale fisheries. Furthermore, small-scale fisheries frequently make an important contribution to the economies in impoverished countries (Andrew et al. 2007, Sowman 2011). The benefits of such fisheries to poverty alleviation are not only dependent on the landed value of the catches, but also include the provision of jobs, and the economic returns from processing and trading activities after landing the catch, as well as adding to the food security within the fisheries communities (McGoodwin 2001, Béné and Heck 2005, FAO 2005, Andrew et al. 2007). FAO (2005) estimated that 26 million people are involved in marine and inland small-scale fisheries, and around 78 million are directly dependent on such fisheries worldwide.

Despite the importance of small-scale fisheries they are generally overlooked in policies at a national level, even though they add value by contributing to the local, regional and national economies (Andrew et al. 2007, Isaacs 2006, Sowman 2006). In 2012, 200 countries were reported to have exported fish and fish products to the value of US$129.2 billion and in some developing countries such products amounted to more than half of the traded commodities

(FAO 2014). However, the economic stability of this fishery industry is linked to the sustainability of the resources. Currently, coastal fishery communities worldwide are facing serious concerns in terms of sustainability because of pressures from overfishing, habitat destruction, climate change and anthropogenic effects on marine resources (BRander 2012, Barnes-Mauthe et al. 2013).

1.2. Food security, international trade and value addition

Worldwide, people are facing food shortage increases in all food commodities on account of increases in food price and the global economic crisis (WWF 2011). The fisheries sector provides communities with access to an affordable, high-quality source of protein, while also providing employment and a livelihood to millions of people (FAO 2004, 2010, Kearney 2010). Small-scale fisheries therefore provide an important supplement to the wellbeing of the poor, especially increasing the importance of fisheries in local communities during periods of economic decline (FAO 2005, 2014).

Consumer demand for fish is high worldwide. In 2012, the global marine fisheries production amounted to 79.7 million tonnes (t) (FAO 2014). To meet this demand, marine fish or products of marine fisheries are transferred from the fishery to the consumer; this is facilitated through a supply and demand route, which generally goes through a value-chain from fisher to consumer.

The value chain determines the amount of value addition that takes place in the movement of the fish product from harvest through the production processes, which will differ depending upon factors such as whether consumer demand is from local or importing countries (Porter 1980, Kaplinsky and Morris 2000). The process of the value chain in small-scale fisheries is typically defined by men doing the fishing while the women mainly deal with the processing, marketing and distribution of the harvest (FAO 2003, 2015, Schomer 2009). The fishing and post-harvest activities in this industry generally support the local economies, and in particular, the small-scale fisheries which tend to be an anchor for the local communities (FAO 2015). The value chain process for the high-value species harvested by the fisheries sector, includes a chain of governance whereby the product is inspected along the value chain before distribution to purchasers (Humphery and Schmitz 2000). This governance sets key parameters that need to be met before the product is sold (Humphery and Schmitz 2000). It is

important that the governance ensures that the decision-making is done in a manner that will enhance livelihoods through pro-poor policies and programmes (FAO 2005, Sowman et al. 2014) and in doing so, also improves the livelihoods of people within the small-scale fisheries sector.

1.3. Small-scale fisheries in South Africa

The South African coastline supports numerous communities that rely on the natural marine resources for survival through harvest and employment from small-scale fisheries. However, historically, small-scale fisheries have frequently been neglected by fisheries managers, in favour of commercial fisheries (McGoodwin 1990, Sowman et al. 2014, Sowman and Cardoso 2010). It has been estimated that approximately 100 000 South Africans are directly involved in small-scale fisheries, under the definition of 'small scale' (EEU 2010). The economic wellbeing of coastal towns is fundamentally important to the local and national gross domestic product. It is supported through the use of marine resources, which are instrumental in the economic upliftment and job creation of coastal communities (Atkinson and Clark 2005). The South African coast is both economically and socially important to the fishing communities with approximately 30% of the country's population living near the coast (DEA 2011). Despite the significance of this sector, prior to the country's democratic government, small-scale fisheries were considered "unlawful" while operating under recreational regulations; and the subsistence fishers were either ignored or addressed by law enforcement through fines or imprisonment (Hauck 2008).

South Africa had the first truly democratic government after the 1994 elections, which resulted in changes in much of the old apartheid legislation to remedy past injustices. The impoverished coastal fishing communities had great expectations that government would improve access to marine resources (Branch and Clark 2006, Sowman 2011, Sowman et al. 2014). The expectations of the new democratic system included the alleviation of poverty, creation of jobs, and redistribution of the rights within impoverished communities (Sowman 2011, Sowman et al. 2014). Related changes that were anticipated were participation by the coastal fishing societies in governance, the need to maintain stability and economic efficiency, as well as new management measures (Branch and Clark 2006, Sowman 2011). While considerable progress was made in achieving these goals under the 1998 Marine

Living Resources Act (MLRA), further progress was made in 2012 when the government passed a new policy for small-scale fisheries (DAFF 2012a). The MLRA recognises subsistence fishers as being legal; however, it does not address the socio-economic and cultural needs of these fishers and communities (Sowman et al. 2014). The MLRA is an individual-rights-based policy, and does not promote pro-poor development, or have a positive trickle-down effect to the underprivileged communities (Sowman et al. 2014).

A considerable amount of research was conducted on the implementation of the appropriate management systems for subsistence fisheries (Harris et al. 2002). The research that was conducted identified that there was a need for a small-scale commercial sector (Harris et al. 2002), and in 2007 interim relief permits were given to subsistence fishers while a new small-scale fisheries policy (SSFP) was being developed. However, the new SSFP addresses the short-comings of the MLRA, by accommodating the traditional fishers and ensuring that they receive equitable access to the resources (DAFF 2012a, Sowman 2011). The SSFP also gives greater recognition and shifts the perception from a resource-based outlook to a more people-based outlook, as well as recognising the fishers' rights to use the marine resources to assist in alleviating poverty (Sowman et al. 2014).

Small-scale fisheries are complex socio-ecological systems (Berkes et al. 2001, Busurto et al. 2013, Leslie et al. 2015), consisting of an interacting web of ecological, biophysical, economic, social, and cultural components (Charles 2001). Sowman et al. (2011) concluded that in South Africa, small-scale fishers experience significant social, political and economic discrimination. The key unit 'community' in the governance policies is intended to create a shift towards a more community-based, small-scale fisheries management system (Sowman 2011), which would be achieved through the implementation of the SSFP, which addresses the social dynamics within the fishing communities around the South African coast (Sowman et al. 2011). Based on these issues, an appreciation of the social dimensions as an aspect of understanding of the Kleinmond small-scale fishing community is highly noteworthy.

1.4. An overview of the small-scale fisheries in the Kleinmond area

Kleinmond is a coastal town situated South-East of Cape Town, in the Overberg district of the Western Cape Province (Figure 1.4.1). The area is diverse and highly productive. It is characterised by the warm temperate waters of the South Coast that interface with a cold

upwelling current (Turpie et al. 2009). The Kogelberg Biosphere, within the Overberg district, comprises 103 000 ha of land and includes 24 500 ha of marine habitat along the southern Cape region. The Kogelberg coastline stretches for 79km from Streenbras River to the Bot/Kleinmond River, and includes the villages of Rooi Els, Pringle Bay, Betty's Bay and Kleinmond (Turpie et al. 2009). The Bot/Kleinmond River lagoon and estuary is to the east of the Kleinmond village, and has been classified under the Ramsar Convention as a wetland of international importance (Turpie et al. 2009). The estuary is highly productive and provides a nursery ground for many important species including the white steenbras *Lithognathus lithognathus*.

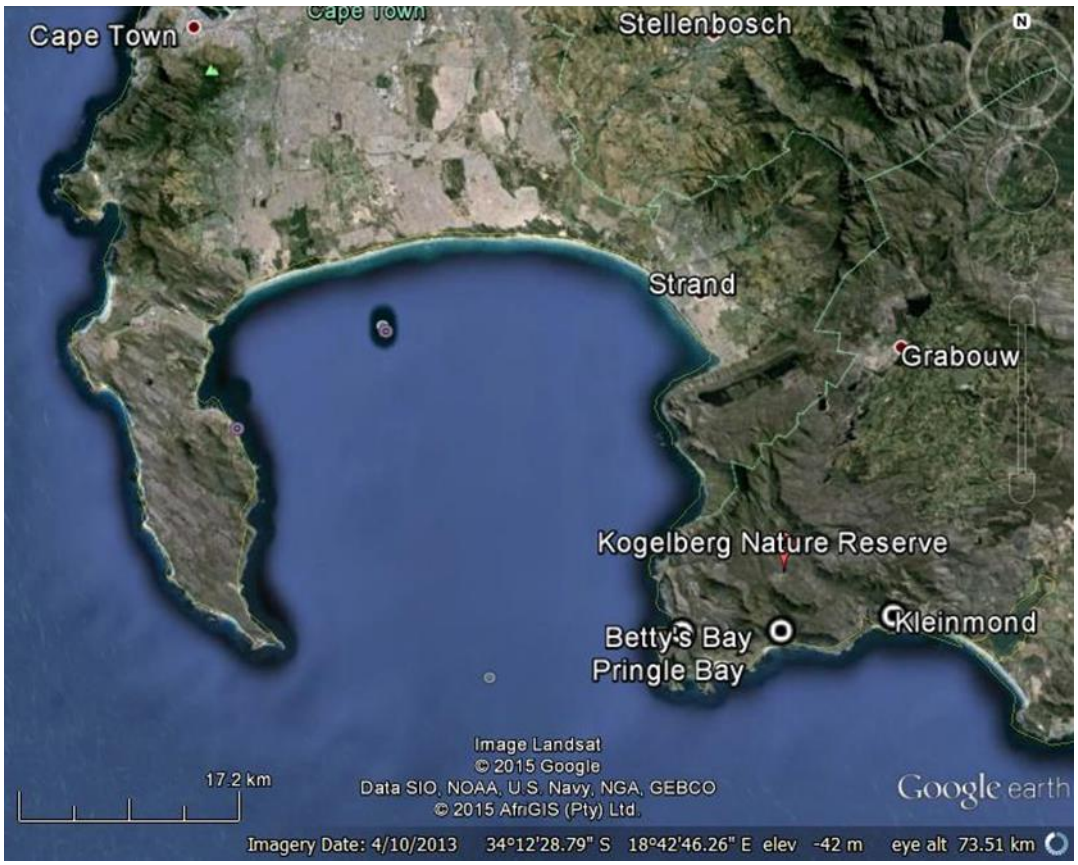

Figure 1.4.1: Map showing the locality of the study site relative to Cape Town and False Bay in the Western Cape, South Africa (Google Earth 2015)

Fishing in the 20th Century in Kleinmond dates back to 1915 when a small community was established at Jogensklip, now situated within the present Kleinmond harbour area (Hauck and Hector 2003). There are three main local communities fishing within the Kleinmond area: Kleinmond, with the largest population of 6 634, Betty's Bay with a population of 1 380 and Pringle Bay with 801 (Census 2011). Kleinmond was originally mainly a 'coloured' community but a large number of people were moved in 1954, under the Group Areas Act, to

an area that became the community of Proteadorp, where many of the modern Kleinmond fishers now live (Raemaekers et al. 2014). A Marine Protected Area (MPA) is situated on the coast of Betty's Bay. It is closed to all boat-based fishing activities to allow for a refuge for the marine resources, but there is limited enforcement of the regulations within this area (Turpie et al. 2009). There are two public launch sites in the Kogelberg area; Maasbaai and Kleinmond. There are also private launching sites at Rooi Els, Pringle Bay, Stony Point, Gordons Bay and Hawston (Turpie et al. 2009).

The Pringle Bay and Betty's Bay marine protected areas (MPAs) are situated on the Overberg coastline, which is a highly productive marine resource area. Two of the estuaries within the Kogelberg area are permanently open, with three of the estuaries open only during periods of high rainfall (Turpie et al. 2009). There is an abundance of high-value species, linked to the high productivity within a small, contained area (Turpie et al. 2009). Originally, this area was known for its linefishery and abalone *Haliotis midae* fishery, but during the last decade, West Coast rock lobsters *Jasus lalandii* have moved into the area (Cockcroft et al. 2008). There was a clear eastward shift in the distribution of West Coast rock lobsters, with numbers increasing especially around the Cape Hangklip area (Cockcroft et al. 2008). With the shift in the distribution of rock lobsters, coupled with the illegal fishing of abalone in the area, it was found that the abalone stocks declined to unsustainable levels and the abalone fishery was closed in 2007 (Neethling 2008). These MPAs plays a large role in the overall strategy to re-build the overexploited linefish and abalone stocks, as well as contributing to the understanding of how the coastal zone can continue to play a crucial role in the sustainability of the ecological, social and economics of the area.

The communities within the Overberg area mainly operate as a small-scale inshore fishery rather than as a subsistence one (Sowman 2011). The small-scale fisheries in the Kleinmond area can be divided into three groups depending on the types of permit that they hold. The permits are:

i) Nearshore commercial right holder for West Coast rock lobster (referred to in this thesis as NSCR),
ii) Traditional linefishery (TLF) and
iii) Interim relief permits (IRP).

Permit holders are defined by the countries laws which dictates restrictions on the fishing activity, fish species, allocated quantities, and when and where the fishermen are allowed to fish. Commercial fisher or fishing entities, known as right holders, are granted a fishing right during particular periods, for a specific fishery, and abide by the related fisheries regulations (DAFF 2015a). A small-scale fisher is a person who fishes to meet food and livelihood needs within their permit conditions (DAFF 2012a). However, there is also the recreational fisher, who is permitted to fish for leisure or sport and not for a source of income (DAFF 2014c).

As shown in Table 1.4.1, the IRP holders may catch West Coast rock lobsters, linefish (nomadic and resident) and white mussel *Donax serra* in the Kleinmond area. However, if an individual has a NSCR permit only, the fisher may only harvest West Coast rock lobster, and an individual with a TLF permit may only harvest linefish that are not on the prohibited list (DAFF 2012b, 2013, 2015a, Raemaekers et al. 2014, Wentink 2014). Several of the resources listed in Table 1.4.1 are currently overexploited, and the majority are widely distributed and shared among other communities and fisheries. The fisheries management for these resources is therefore controlled and co-ordinated by DAFF on a national basis.

Table 1.4.1. Permits types and the species that each holder may harvest in the Kleinmond area

Permit type	West Coast rock lobster	Nomadic linefish	Resident linefish	White mussel
Interim relief permit	Yes	Snoek *Thrysites atun*	Cape bream[1] *Pachymetopon blochii*	Yes
Traditional linefishery	No	Cape salmon *Atractoscion aequidens* Snoek *Thrysites atun*	Cape bream[1] Carpenter *Argyrozona argyrozona* Red roman *Chrysoblephus laticeps*	No
Nearshore commercial rights	Yes	No	No	No

[1] Cape bream is referred to as Hottentot in the Appendix.

There are two separate value chains in Kleinmond, those of the West Coast rock lobster and the linefishery. Due to permit conditions, the rock lobster permits must specify where the harvested rock lobster are being sold, before actually obtaining the rock lobster permit. Therefore, as in this case, a chain of governance can set key parameters that must be met before the value chain may begin (Humphery and Schmitz 2000). In some cases there is a reduction of the bargaining power of the rock lobster fishers. On the other hand, there is no need for the linefishery permit-holders to specify where the harvested linefish are sold, thus allowing the fisher to have bargaining power and more flexibility as to the prices received for the linefish (Blomquist et al. 2013). It is therefore important for the NSCR holders to get the best price for their rock lobster quota before the season starts. Some processing and marketing companies (PMC) give the permit holders a set price for the season whereas others give a price according to the fluctuating market value (Wentink 2014). Some of the PMCs give advances or loans to the fishers once the permit is obtained, so that the holder has the initial season start-up capital required (Wentink 2014). In other cases, fishers will get paid by the PMCs on the amount (kgs) that gets passed over the scale and measured by compliance monitors in the harbour. This process is presented in Figure 1.4.2.

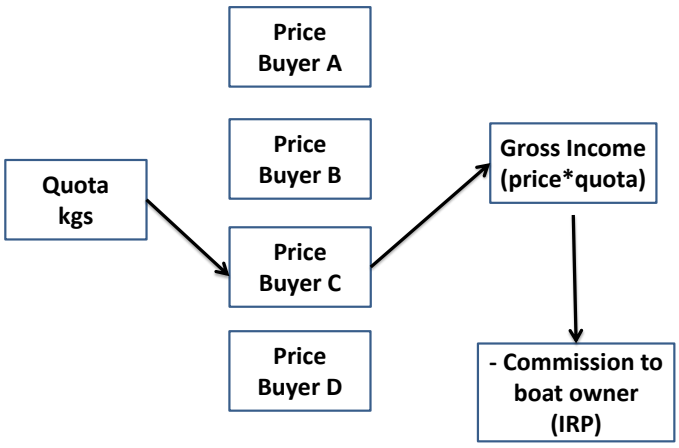

Figure 1.4.2: Representation of the steps involved in the determination of the gross value of annual catch of West Coast rock lobster for an individual permit-holder. In this case, the permit holder has opted to sell his/her quota to Buyer C.

The linefishery may have bargaining power and more flexibility than the rock lobster fishery, but the sale and prices of linefish differ according to species, market, season and demand (Isaacs 2013, Wentink 2014). The linefishery also depends on the amount (kgs) of fish

caught. The IRP holders mainly sell to the local community or retain fish for personal consumption. The TLF sell to wholesalers, hawkers, and the local community as they are able to catch a larger variety and greater quantity of fish species than the IRP holders. The process determining the linefishery income for the coastal community is presented in Figure 1.4.3

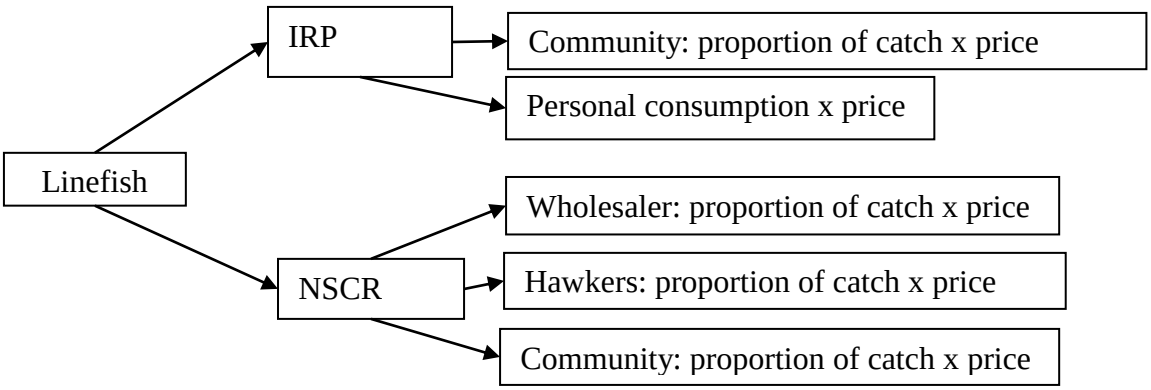

Figure 1.4.3: Representation of the key variables for the linefishery to estimate gross income. The fraction sold to each purchaser and the prices received differ for different species and vary according to season and supply.

Many projects that are underway by both government and non-government organisations (NGOs) within the Kleinmond fishing community, for which the Kleinmond fishing community has benefited from a focus on small-scale fisheries. These projects are being conducted through various levels of the supply chain within the local microeconomic system e.g.:

- Raemaeker et al. 2014 – Kogelberg Fisheries Improvement Project.
- Schomer 2009 – Towards Integrating Human Dimensions in the Kogelberg Marine Region: Understanding small-scale fisher dynamics and their implications.
- Turpie et al. 2009 – Ecology, value and management of the Kogelberg coast.
- Wentink 2014 – An analysis of enabling and constraining governance structures to the improve-ment of small-Scale Fishers livelihoods through value chains.
- WWF 2013 - WWF-SA Small Scale Fisheries Improvement Project Business Case.

However, these projects do not address the overall economic value of the fisheries or address the economic opportunities for the community to improve the socio-economic sustainability and performance of the small-scale fisheries. We need to look closer at a multidimensional approach to research to explore the broader picture.

The human dimension is an integral part of the small-scale fishery sector (Schomer 2009). Coastal communities such as Kleinmond are highly vulnerable to the choices made by the fisheries management, due to the limited education and livelihood choices, as well as a high dependence on the marine resources (Schomer 2009). In order to achieve the goal for sustainability, social diversity needs to be unpacked in a broader understanding of the fisheries ecosystem (Pollack et al. 2008). An ecosystems approach to management for fisheries will give a better understanding of the requirements that need to be met within the human dimension and will also provide social ecological understanding when dealing with a "human-in-nature" outlook (Berkes et al. 2001). The management model of small-scale fisheries lends itself to be analysed through a systems-based approach (Schomer 2009), whereas an ecosystems approach allows for a multidimensional understanding of the ability of fisheries or, for example, coastal towns to regulate themselves and adapt to changes in various situations (Schomer 2009).

The South African fishing industry can be viewed as a microeconomic system that is linked to the domestic and national economy (Mather et al. 2003). This system is a complex structure that comprises of four sections, namely the dynamic biological system, the economic system, the legal system, and the social system (Mather et al. 2003). It is important to understand that the microeconomic system has an impact on the economic wellbeing of individuals within a society (Mather et al. 2003).

1.5. Problem statement

There is an urgent need to improve living conditions in most, if not all, of the small-scale fishing communities in South Africa. In order to achieve this, it is necessary to implement mechanisms that can improve on the current knowledge of the socio-economics within the different fishery systems, and of the management processes being applied. The aim of this study was to investigate the economic benefits gained by the Kleinmond fishing community from small-scale fisheries, as well as determining whether there were opportunities for economic improvement. The fishing community of Kleinmond consists of the individuals who have direct contact with the catching and processing within the harbour, whereas the Kleinmond coastal community is the larger community which also includes of individuals earning their livelihoods through other industries. The long-term economic benefits for the

Kleinmond community also depend upon effective management and sustainable use of the marine resources on which the fisheries are highly dependent. With this in mind, this study investigated aspects of the biological, social, and economic aspects of the small-scale fisheries in the Kleinmond area. The results and conclusions should be useful for the DAFF, the Kleinmond fishing community and other local stakeholders as they will help support growth, understanding and development. The findings also provide a valuable case study that can provide useful insights and lessons for other South African fishing communities.

1.6 Research aims and questions

Main research question:

Is the Kleinmond small-scale fishery being implemented in a way that provides optimal economic benefits for the fishing community, and is it contributing to ensuring utilisation of the marine resources?

Within the broad objective of estimating the total economic value of the fishery, the study also considered:

- Number of people engaged in small-scale fishing operations in Kleinmond, directly or indirectly.
- Total annual landings by small-scale fishers operating out of the Kleinmond Harbour, by biomass and species.
- Breakdown of biomass and prices of the species sold commercially and biomass per species retained by the fishers for subsistence needs.
- Local seafood consumption patterns for different Kleinmond stakeholders (fishers, shops, restaurants, retailers and residents).

Chapter 2: The management of the West Coast rock lobster resource in the Kleinmond area

The West Coast rock lobster is a high-value species worth approximately R260 million per annum in market value, and in combination with the Hake fishery sector, contributes 80% of the value of the South African industry (SSA 2010). With the closure of the abalone fishery, the rock lobster has become the most valuable species for the Kleinmond community. There are NSCR-holders, IRP-holders and recreational permits potentially available to the community for the fishing of rock lobster but these permits are limited in number.

2.1. Governance

A comprehensive overview of the historical background to the South African rock lobster fisheries can be found in Cockcroft and Payne (1999). In that manuscript they point out that despite a minimum carapace length (CL) of 89 mm for the West coast rock lobster that had been introduced in 1933, and a tail-mass production quota in 1946, catches declined in the 1960's, most probably caused by overfishing. They further state that the decline was most severe in the northern areas where virtually uncontrolled fishing took place at a reduced minimum carapace length of 76mm, introduced after 1950. In 1970 the minimum size was again reviewed and a minimum size of 89mm applied throughout the fishery. In the early 1980s, management by means of total allowable catches (TAC) was introduced, and under this management system, catch limits were divided into areas and zones (Figure 2.1.1) (DAFF 2012b). By the mid 1980's the resource appeared stable, with an annual landed mass of 3500 to 4000 tons (Cockcroft and Payne 1999). That period of stability of the lobster fishery ended after 1989, and the subsequent decline was thought to be a direct result of a drop in the somatic growth rates of the stock, which resulted in low recruitment rates to the fishery (Cockcroft and Payne 1999).

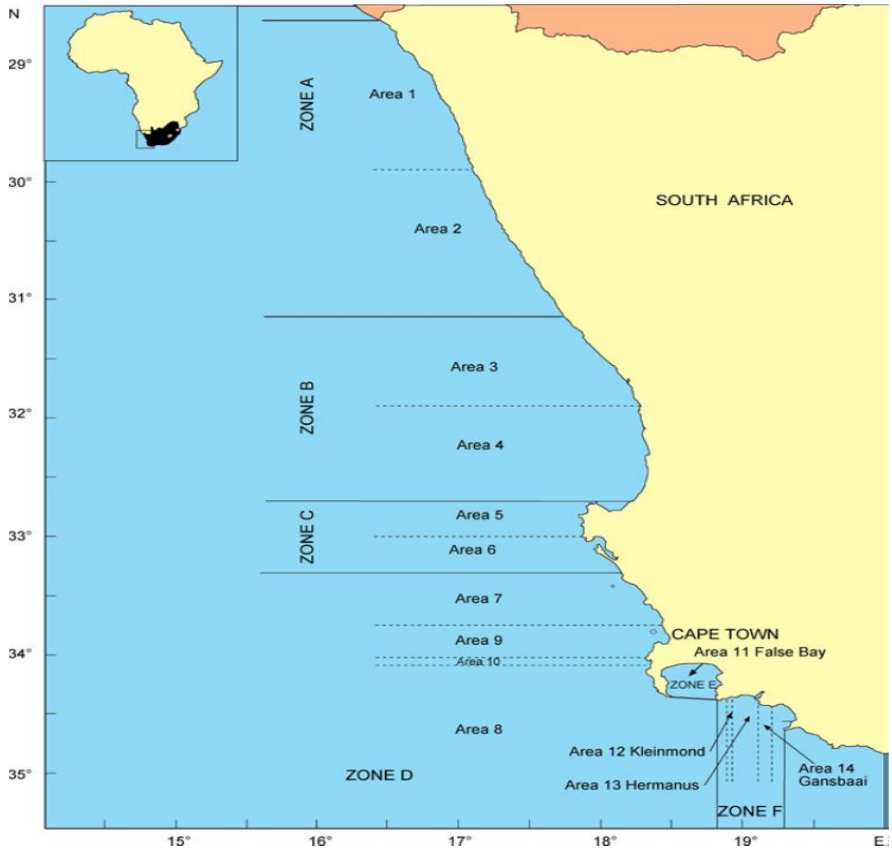

Figure 2.1.1. Fishing zones and areas for West Coast rock lobster (after DAFF 2014b)

Continued slow growth and the resultant poor catches continued into the 1990's and a number of new management interventions were introduced (Cockcroft and Payne 1999) but the rock lobster fishery still did not show signs of recovery. In 1997 an operational management procedure (OMP) for the rock lobster sector was implemented. The aim of the OMP was to facilitate a means by which the stocks could rebuild to 20% of its pristine level by 2006 (DAFF 2012b). However, the stocks were 18% of that level in 2006, mainly attributed to low recruitment as well as an increase in NSCR-holders in the fishery (DAFF 2012b). As a result, the TAC for the commercial fishery was reduced by 10% for three seasons from 2006/2007 to 2008/2009 (Figure 2.1.2.) in another attempt to rebuild the stocks by 20% above the 2006 stock levels by 2021 (DAFF 2012b).

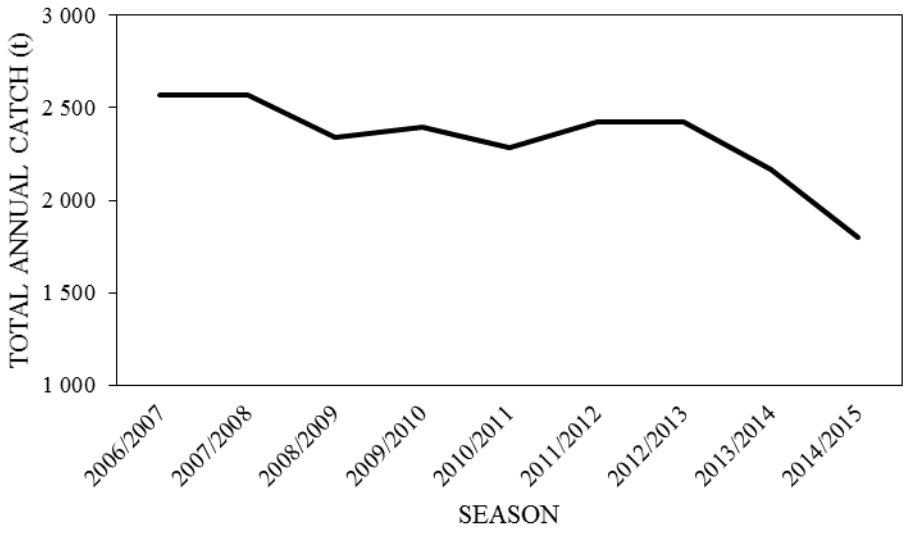

Figure 2.1.2. Trend in the total annual TAC of the West Coast rock lobster, 2006/2007 to 2014/2015

The South African management measures implemented for the 2014/2015 season were aimed at rebuilding and maintaining the rock lobster biomass (Bergh 2014). The current management regime controls stock levels by a combination of zones, TAC, size limit, specific times for fishing during the fishing season between November and July, and specific fishing gear allowed within specified zones. Currently regulations state that permit-holders may only catch male rock lobsters with a minimum size limit of 75mm CL, whereas the global TAC has been reduced by 16.79% for the 2014/2015 season and was set at 1 801 t (DAFF 2014a).

The Kleinmond area is situated within Zone F, which extends from Cape Hangklip in the west to Danger Point in the east. This zone encompasses areas 12 (Kleinmond), 13 (Hermanus) and 14 (Gansbaai) (Table 2.1.1). The area regulations do not allow for the right-holders to move between the fishing areas outside of their permit, and hoopnets are the only gear allowed for NSCR and IRP holders within these areas. Hoopnets are used within inshore areas up to depths of approximately 30 m for permit-holders who operate from dinghies and skiboats (Atkinson and Clark 2005). There are also other national regulations that apply to the inshore harvesting of the rock lobsters within these areas.

Table 2.1.1. Fishing zones, areas and coastal towns around the coast of South Africa that are allocated portions of the TAC for the West Coast rock lobster.

Zone	Area	Coastal Town
A	1	Port Nolloth
	2	Hondeklip
B		
	3	Doring Bay, Lambert's Bay
	4	Elands Bay
C	5	Paternoster
	6	Saldanha
D		
	7	Dassen Island, Robben Island
	8	Olifantsbos
	9	Cape Penisula
	10	Hout Bay
E	11	False Bay
F	12	Kleinmond
	13	Hermanus
	14	Gansbaai

2.2. The rock lobster fishery in the Kleinmond area

As previously discussed in Section 1.4, more than a decade ago there was a distributional shift of the West Coast rock lobster in a south-easterly direction, which resulted in a population shift of rock lobsters moving into Zone F. An experimental rock lobster fishery project was initiated in 1999/2000 season in Kleinmond, whereby area 12 was allocated an allowable catch of 40 t, to be divided among the permit-holders (Cockcroft et al. 2008). This experimental fishery programme was also conducted in two other fishing communities: Hermanus and Gansbaai (Table 2.1.1). For the 2001/2002 season, Kleinmond (Area 12) was allocated 90 t of rock lobsters to the medium-term rights-holders (Cockcroft et al. 2008). After the experimental phase finished in 2003, there were no further catches made for the year, and only in 2004 were the nearshore commercial rights issued (Turpie et al. 2009). The Kleinmond registered NSCR fishers were reported to have caught 90% of the allocated

harvest from the Kogelberg (Area 12) and approximately 10% from the False Bay (Area 11) (Raemaekers et al. 2014). The TAC allocated to the community in Area 12 was 72 t between 2003 and 2008 from the previously allocated 90 t (Raemaekers et al. 2014). IRP-holders were issued permits for the 2007/2008 season to harvest rock lobsters.

The annual catch for the 2014/2015 season in the Kleinmond area by the NSCR holders from Pringle Bay, Betty's Bay, Kleinmond and Hawston was 40 030 kg, divided into individual quotas of 482 kg and 322 kg, and the annual catch of the IRP holders from Pringle Bay, Betty's Bay, and Kleinmond was 6 955.2kg (110.4kg per holder). The individual TAC for Area 12 is currently at its lowest since the fishery started, on account of the depletion of the rock lobster stocks. The IRP quotas also showed an annual decline from 167 kg in 2012/2013 to 139 kg in 2013/2014 (Moses 2013), and a further drop in quota to 110.4 kg in 2014/2015.

2.3. Illegal, unreported and unregulated fishing

In 2010 and 2011, poaching in Zone F, between Rooiels and Kleinmond, was reported as having increased by 25% from the figures reported two years previously (DAFF 2015a). Bergh (2014) reported that Zone D, together with Zone F (Hangklip to Gansbaai), were identified as a cause for concern. Furthermore, the 2014/2015 TAC records reflect a negative reassessment in productivity for the area (Bergh 2014). The reasoning for this negative reassessment may be on account of the reported increase in the blatant illegal behaviour of illegal fishers, which has become a major concern to the fishing communities in the area with regard to the sustainability of the fishery (Bergh 2014).

Chapter 3: Management of the linefishery resources harvested by the small-scale fisheries of the Kleinmond area

The linefishery, as defined in South Africa, targets linefish using a hook and line, but excludes those fish species captured using longlines (Mann and Kerwath 2013). There are approximately 250 linefish species that have been caught by hook and line in southern African waters (Van der Elst and Atkin 1991). These fish are targeted by commercial, small-scale and recreational fisheries (Mann and Kerwath 2013) and they contribute significantly to the social and economic wellbeing of many people (Sauer et al. 1997).

Historically, the Kogelberg coast is reported as having high catches of reef species such as red roman, red steenbras *Petrus rupestris* and seventy-four *Polysteganus undulosus* (Turpie et al. 2009). Unfortunately, the stocks of red steenbras and seventy-four have collapsed and are therefore no longer targeted by the fishery (Mann and Kerwath 2013). The most valuable nomadic linefish species that passes along this coast are primarily snoek *Thrysites atun* and Cape salmon *Atractoscion aequidens*.

3.1. Governance

Attwood and Farqhuar (1999) studied commercial boat-based linefish historical data from the turn of the 19th century data from the region between Cape Hangklip and Walker Bay. The analysis indicated that the CPUE had dropped by approximately 80% over that period. The authors also highlighted that the anglers had reported that several species that were once caught in the fishery had disappeared. From the catches, Attwood and Farqhuar (1999) attributed the overexploitation of the fish stocks to a lack of legislative control in the commercial fisheries sector as well as the inadequate enforcement thereof. In the mid-1990s, a fisheries sustainability research survey showed that there was a need to revise the recreational and commercial linefishery daily bag limits (DBL). The DBL regulations were originally introduced in 1984 as a measure to reduce linefish mortality (Attwood and Bennett 1995). In 2000, the South African linefishing industry was declared to be in a ‘state of emergency’ (Mann and Kerwath 2013). Species-specific status reports were compiled according to the Linefish management protocols (LMP) with the aim to improve the sustainability of the South African linefishery (Griffiths et al. 1999). These management

protocols were implemented to improve legislative control within the linefisheries sector, following the marked declining trends in catch frequency and size of the fishes (Hara et al. 2008). A similar decline in the spawner biomass, resulting in a biomass of <10% of pristine levels, showed a severe reduction in some of the linefish stocks (Griffiths 2000). Atkinson and Clark (2005) classified 18 linefish species as collapsed one as overexploited, six as optimally exploited, and two as underexploited. The traditional commercial linefishery management policies control fishing by implementing a 'total allowable effort' (TAE)-based system. After the declaration of the 'state of emergency', there was a 70% reduction in the commercial linefishery TAE. The South African coastline is managed by three regional zones, with an overall TAE of 455 boats and 3 450 crew (DAFF 2013). Traditional commercial linefishery permit-holders were permitted to catch up to 200 different species; however they were not allowed to catch any species on the prohibited list. The boats used in this sector range in length from 4.5 m to 15 m (DAFF 2013).

The linefishery sector in the Kleinmond area consists of TLF rights-holders, IRP-holders as well as fishers with recreational permits. Recreational fisheries were not considered in this study. This area will generally have an influx of TLF boats from outside the Kleinmond community when the nomadic Cape salmon and the erratic snoek are available at sea (Turpie et al. 2009). The TLF rights-holders who work permanently out of Kleinmond Harbour benefit from the Cape salmon and snoek in the area. The IRP-holders are not legally permitted to catch Cape salmon but they can legally catch snoek (Raemaekers et al. 2014). The IRP-holders also have access to a combination of three linefish species that are stipulated on the permits, with the following restricted conditions on quota per day since 2007: interim relief measures for snoek (42 per day), yellowtail *Seriola lalandi* (42 per day) and Cape bream *Pachymetopon blochii* (42 per day) (DAFF 2012a). The main boats used by the Kleinmond linefishers are dinghies and skiboats in both the TLF and IRP sectors (Raemaekers et al. 2014).

3.2. Catches, seasonal distribution and trends

Snoek fishery

Snoek is a favoured species for fishers who use several methods of fishing, including catching snoek as a bycatch of demersal trawlers. This nomadic species is found in water

along the West Coast of southern Africa, from Angola to Algoa Bay, and along the East Coast of South Africa (Mann and Kerwath 2013). In winter, snoek occur offshore (150-450m) where they generally spawn, and during the rest of the year they move randomly in the inshore region (Mann and Kerwath 2013).

Given that snoek play an integral role in several types of fishery systems, the regulations and limits depend mainly on the individual fishery (Mann and Kerwath 2013). The main commercial linefishery for snoek is along the West Coast, where they comprise up to 40% of the landed catch. Only 20% of the bycatch is allowed to be snoek in the demersal trawl and purse-seine fisheries (Mann and Kerwath 2013). The tuna pole fishery also catches snoek as bycatch during the tuna season, but when tuna is unavailable for this fishery, fishers are allowed to catch snoek (Mann and Kerwath 2013). The handline fishery for IRP-holders and recreational permit-holders are allowed to catch snoek. However, recreational permits do have a DBL whereas IRP-holders are allowed to catch up to half of the daily catch allowance, with a minimum TL of 60 cm (Mann and Kerwath 2013).

Snoek are generally found off the Kleinmond slipway at depths of 50 m -100 m (Turpie et al. 2009). Kogelberg commercial fishing landings showed that snoek catches were variable over the years (see Section 5.5). In 2001, snoek landings reached a low of under 20 t, but then peaked at a record high in 2004 of over 70 t, before declining to a low of <1 ton between 2006 and 2008. Despite this low, snoek catches started to increase again to just below 60 t in 2009 and 2010 (Raemaekers et al. 2014). The current status of snoek is considered to be optimally exploited (DAFF 2014b).

Cape bream fishery

Cape bream (also locally known as 'hottentot') are found in the rocky reefs or in kelp beds of depths up to 55 m. This linefish species occurs along the west coast of southern Africa, from the Angola coast and along the South African coast as far east as Port Alfred (Mann and Kerwath 2013). Cape bream are most abundant between Port Nolloth and Cape Agulhas (Mann and Kerwath 2013). In the Western Cape, Cape bream is a very important species for the IRP-fishers and for the recreational fishery (Mann and Kerwath 2013).

The stock assessment of Cape bream is carried out using a biomass production model (BPM). During the 20th century, the Cape bream catch rate generally decreased by 22-38% but now the species appears to be optimally exploited and in recent years there have been indications of increased landings and CPUE of the species (Mann and Kerwath 2013). Generally, Cape

bream comprise a small portion (1-2%) of the landings by the demersal trawling and purse-seine commercial fisheries (Mann and Kerwath 2013). Cape bream are caught from boats along the shore, by both the IRP-holders and recreational fishery. As with snoek, the IRP-holders are only allowed to catch Cape bream up to half of the daily catch allowance. There is also a minimum TL of 22cm for IRP-holders and recreational fishing (Mann and Kerwath 2013). Cape bream generally benefit from MPAs around the coast of South Africa, by aiding recruitment of the stock for the resident inshore adults.

In the Kleinmond area, low catches of Cape bream (<1 t) were recorded in 2001, with extreme fluctuations over the decade (2000-2010). The best catches (almost 7 t) were taken in 2008, but dropped to 3 t in 2010 (Raemaekers et al. 2014).

Cape salmon fishery

Cape salmon (also locally known as geelbek) inhabits sandy and rocky substrata, at depths of up to 150 m. The species is found along the South African coastline from Cape Point to the southern regions of Mozambique (Mann and Kerwath 2013). The distributional range of Cape salmon is dictated mainly by their seasonal spawning migration from the Western Cape to the warmer waters off the coast of Kwa-Zulu Natal (KZN) (Mann and Kerwath 2013). Cape salmon are caught in two main fisheries, namely: a boat-based commercial linefishery and boat-based recreational linefishery. The landings of Cape salmon by the commercial linefishery are between 4 and 8% of their total landed weight (Mann and Kerwath 2013). The species is also caught as bycatch in the inshore trawl fishery (Mann and Kerwath 2013).

Data recorded between 1985 and 1995 showed that the CPUE of Cape salmon caught by the boat-based commercial linefishery had decreased to only 1.5-4.3% of its historical values (Griffiths 2000). There was an increase in the Cape salmon CPUE in 2000 after the state of emergency was declared for the South African linefishery, but the CPUE dropped dramatically to pre-emergency levels in the Western Cape in 2005 (Mann and Kerwath 2013). The CPUE remained elevated from 2000 to 2005 in the Eastern Cape and KZN, but this pattern may not have persisted to the present (Donovan 2010). Connell (2012) showed that since 2008, the egg production of the Cape salmon has declined, and a stock assessment conducted in 2012, using a standardised CPUE time-series, indicated that the Cape salmon stock had collapsed (Mann and Kerwath 2013). Legislative regulations such as MPAs are not suitable for migratory fish like Cape salmon, but other regulations that have been put in place include DBL for recreational fisheries and a minimum size limit of 60 cm TL. Mann and

Kerwath (2013) advised that the regulations for spawning adults needed to be enforced in order for the stock to improve through recruitment.

Raemaekers et al. (2014) showed that in the Kleinmond area, the Cape salmon catches peaked in 2003 with catches of 15 t, followed by a steep decline to <2 t in 2009. It was also found that in 2010 Cape salmon catches increased slightly. The inshore region between Cape Hangklip and Betty's Bay is known as a Cape salmon 'hotspot' by the local commercial fishers (Raemaekers et al. 2014).

Carpenter fishery

Carpenter *Argyrozona argyrozona* (locally known as silverfish) is a reef-dwelling resident species. Adults are found between 50 m and 200 m, whereas juveniles inhabit the inshore region, on shallow reefs between 10 m and 40 m (Brouwer and Griffiths 2005). Carpenter are endemic to South Africa and are distributed along the coastline from Cape Point to the Kei Mouth in the Eastern Cape (Heemstra and Heemstra 2004). Using a BPM (biomass production model), Winker et al. (2012) suggested that there had been recovery in the stock levels of carpenter as a result of effort reduction of the commercial fishery since 2003. Carpenter has benefited from the implementation of MPAs in the Western and Eastern Capes, where the fish have access to a considerable amount of reef habitat, which has been shown to have a positive impact on the species (Brouwer and Griffiths 2005). There are no limits for commercial catches of carpenter but the IRP-fishers and recreational fishers are regulated by a daily bag limit of four fish per person per day, with a minimum size of 35 cm total length or greater (Mann and Kerwath 2013).

3.3. Current stock status of the major linefish species

The linefishery sector has had an ever-increasing influence on the status of linefish, as a result of the combined involvement of the commercial, small-scale, and recreational linefisheries, as well as improvements in fishing technology. Exploitation has resulted in a significant change in the linefishery catch composition (van der Elst and de Frietas 1988, Attwood and Farqhuar 1999). Recent stock assessment techniques have shown a positive response in the stock levels of some South African commercial linefish species. This positive response is due to the implementation of the Linefish Management Protocol and other

interventions (Winker et al. 2012). Table 3.3.1 shows the status of the stocks contributing to the Kleinmond small-scale fishery.

Table 3.3.1. Status of stocks that contribute to catches of small-scale fishers in the Kleinmond area (after DAFF (2014b)

Species	Stock status	Fishing pressure
Snoek	Optimal	Optimal
Cape bream	Abundant	Light
Cape salmon	Not provided	Not provided
Yellowtail	Optimal	Optimal
Dusky kob	Heavily depleted	Optimal/heavy
Carpenter	Optimal	Optimal
White mussel	Unknown	Unknown

3.4. Illegal, unreported and unregulated fishing

Illegal linefishing occurs when linefish are caught in a manner that is not compliant with regulations for a particular species (Turpie et al. 2009). In the Kogelberg area, there has been extensive gill-netting in the Bot River area over the past decade. This type of fishing has a detrimental effect on the stocks of estuarine-dependent species (Turpie et al. 2009). Other types of illegal fishing in the area include fishing without a permit and fishing for species during prohibited seasons.

3.5. White mussel fishery

White mussels are harvested in the intertidal zone along sandy beaches from northern Namibian to the East Coast of South Africa. They are found in high abundance along the Western Cape and benefit from the high plankton abundance in that region (DAFF 2012a). White mussels are commercially harvested and used as bait. There are limited regulations regarding the harvesting of white mussels, but the IRP and recreational fishery sectors have DBL with a minimum legal length of 35 mm (DAFF 2014a). The IRP-holders in Kleinmond are allowed to harvest 70 individuals per day, which they mainly harvest along the Hermanus coast, some 50 km away. The stock status and the fishing pressure for the white mussel fishery are unknown (DAFF 2014a).

Chapter 4: Methods

This section highlights the different methods that were used to gain understanding on the socio-economic and fishing effort aspects of the small-scale fisheries in the Overberg district. The methods used in this research will be discussed as follows: (1) study area; (2) case study survey and the key interviews and group meetings; (3) catch records of the fisheries; and (4) the estimation of the total economic value. All of these methods were used to collect and analyse the qualitative and quantitative data on the socio-economics and ecology of the small-scale fishery in the Kleinmond area.

4.1. Study area

This study was conducted with the aim to assess the small-scale fisheries operating within the Kleinmond area. The marine resources are being used by various permit- holders living in the research area. However, this study was restricted to fishing communities of the towns of Kleinmond, Betty's Bay and Pringle Bay, which occur within this district.

4.2. Research methods

The research for this study was conducted in the manner of a case study, which was based on both qualitative and quantitative data. Yin (1989) created a guideline for case study methods, which consists of four stages:

1. Design the case study
2. Conduct the case study
3. Analyse the case study data
4. Develop the conclusion, recommendations and implications.

These stages were applied in the current case study. They cope with technically distinct situations, with multiple data variables, rely on multiple sources of data, and benefit from prior development of theoretical suggestions. In applying the case study method, this research made use of secondary and primary data gathered from various sources during the research process. The primary data were drawn from observations made on the daily activities of the

fishers, as well as one-on-one conversations and interviews conducted within the community. This personalised and friendly method of research can be described by the way in which a researcher participated, observed and interacted with the people in everyday life as a community, while making interpretations on the norms and behaviours (Walsh 2006). The underlying framework for this research was an ecosystem approach to fisheries (EAF). EAF is defined by FAO (2003) as striving to find a balance between the different objectives of society by taking into account the knowledge and uncertainties of the biotic, abiotic and human components of ecosystems and their interactions, whilst also applying an integrated approach to the fisheries within ecologically meaningful boundaries.

4.2.1. Consultation with stakeholders

A standardised survey was designed to collect the relevant ecological and economic data from fishers living in Kleinmond, Betty's Bay and Pringle Bay. The survey was conducted using standardised formal one-on-one interviews in order to ensure, as far as possible, that any variances occurring from the responses were attributed to the differences between interviewees rather than the actual interviewing process itself. It was recommended by Yin (1989) that in order to expand on the depth of data gathering and enhance the quality of the data in interviews, open-ended structured questionnaires should be constructed to allow for key data to become available through the questionnaire. This study's questionnaires were developed specifically for the purpose of interviewing a range of participants who are operating in the fisheries sector and value chain, namely, restaurants, retailers, West Coast rock lobster rights-holders, and linefishery rights-holders (n=42) (Appendix 1.). The fishery questionnaires were developed to be suitable for interviewing both the IRP-holders, TLF right holders, as well as NSCR-holders.

The questionnaires used for the interviews with the rights-holders and stakeholders comprised of the following:

i) Restaurants and retailers
    - Importance of fish to the business
    - Quantities bought from the local fishers (if any)
    - Obstacles or hindrances in purchasing from the local fishers
    - Prices purchasers were willing to pay to local fishers.

ii) West coast rock lobster fishery

- Quota per permit-holders
- Rock lobster sustainability, size, and movement
- Monitoring, control, and surveillance (MCS) for the fishery
- Who they sell to, the price obtained, and the general expenses incurred
- Loans taken out.

iii) Linefishery

- Species caught
- Annual catch of each species
- Species sustainability, size, and movement
- MCS for the fishery
- Who the fishers sell to, the prices obtained, and the general expenses incurred.

iv) White mussel fishery

- Amount of white mussel harvested
- Number of trips made to harvest
- Who the fishers sell to, the price obtained, and the general expenses incurred.

In addition to the research survey, informal interviews were also conducted with other stakeholders. These included interviews with the Fishery Control Officers for the Kleinmond area; a focus group with non-governmental organisations (NGOs) (Masifundise and Coastal links South Africa and WWF); researchers from the University of Cape Town Department of Environmental and Geographical Sciences; the Department of Agriculture, Forestry and Fisheries (DAFF); and phone calls to the SA Linefishery Association chairman and South African Inshore Fish Industry Association (rock lobster fisheries). *Ad hoc* informal discussion interviews were also conducted with fishers and Fishery Control Officers and in addition, observations were made concerning illegal fishing actives in the area.

4.2.2. Catch records from DAFF

Catch records of West Coast rock lobsters were extracted from DAFF's database for Area 12 - Kleinmond. These records reflect annual and seasonal catches between 2003/2004 and 2014/2015, in the form of TAC and actual catch. Statistics recorded under the section 'gear used' refers to the catch, effort, and CPUE. Additional data records the monthly landed catches for Area 12 over a decade 2005/2006 to 2014/2015.

Catch records of linefish were also extracted from the DAFF database for the area between Cape Hangklip and Hawston. These records show that 31 different linefish species were caught between 2000 and 2014. The data include the year and month of the catches, the gear used, number of crew per boat, longitudinal and latitudinal position, the species and weight of the linefish caught. For this research, the catch composition by species was calculated, and the annual and monthly catches for the main species in the area were also used to establish catch patterns and frequencies of the catch.

4.2.3. Estimating the total economic value of the catches

Previous and current research records and results were used to develop the economic models for the West Coast rock lobster fishery and the linefishery. The rock lobster and linefish fisheries economic models include data obtained from both IRP-holders and the commercial rights-holders. These economic models were developed specifically for this project in order to provide an estimation of the gross and net incomes of individual rights-holders, and the local economic value of the local fisheries as a whole. Although the basic costs were recorded during the interviews, it was not possible within the constraints of the current study, to analyse the fishing costs in detail. Therefore the economic models were developed with the aim to give an estimate of the current economic value of both fisheries through the understanding of the value-add chain workings depicted in Figures 1.4.2 and 1.4.3.

West Coast rock lobster economic model

The West Coast rock lobster is classified as a highly valuable species for the South African export market. In contrast, the value of the fishery sector for a coastal community such as

Kleinmond can be measured by how a specific fishery contributes to the income of the IRP and NSCR rights-holders, a factor that has not previously been estimated. The rock lobster economic model was developed with a view to filling this gap in our knowledge and to estimate the small-scale fisheries value for the coastal community. We can thus ascertain whether potential catch value is being lost in the value-chain, and thereby identify the potential for improvement of benefits to the community.

This model makes use of the prices paid by the PMC to permit-holders at the time of the interviews for the 2014/2015 season. These prices determine the lower and upper limits of the gross income for an individual rights-holders, as well as the local fishery as a whole. In order to ensure that the reliability of the data, two columns were included in the model spreadsheet to show a reliability index, depicted by a 'key' - green (reliable), orange (moderately reliable), and red (only an informed guess). The reliability indices are included in the spreadsheets shown in Appendices 2 and 3. This approach in terms of the researched data allowed for follow ups, identifying where improvements were needed, or where more current data could be gathered, as well as allowing for additional questions to be directed to particular stakeholders. Table 4.2.3.1 addresses this approach by highlighting some of the key parameters that were needed for the rock lobster base-case model.

Table 4.2.3.1. Key parameters used in the West Coast rock lobster fishery and linefishery fieldwork to obtain relevant and reliable data for the base-case models. Information was collected for the 2014/2015 fishing season for rock lobster and for 2014 for linefish.

Lobster fishery	Linefishery
Number of IRP-holders	Number of IRP -holders
Number of NSCR-holders	Number of TLF-holders
Quota harvested	Species harvested and total weight of each
To whom are the rock lobsters are sold to	To whom are the linefish sold to
Pricing for live rock lobster	Pricing from the different buyers per species
Pricing for dead rock lobster	
Running costs incurred	Running costs incurred
Capital costs	Capital costs

The fieldwork allowed for the clarification of a number of important factors, as well as providing the data used for the economic base-case model. Important data that are included in

the study are listed as follows: permit-holders only sell to PMCs; pricing that the right-holders are receiving from the PMCs for live rock lobster (Rands per kilogram); and the incurred costs of the 17 NSCR-holders and six IRP-holders who own boats (these costs include bait, petrol, crew, equipment, levies, permits and maintenance), as well as the depreciation costs of the boat, vehicle and trailer. It should be noted that the incurred costs for the IRP-holder do not include the levies incurred on landed catch or permit cost. NSCR-holders and IRP-holders who do not own a boat are charged R45-60/kg (per kilogram caught) on the amount of rock lobster they catch on each trip, and this amount is taken by the boat owner as commission. From these inputs, the outputs are calculated and provide the gross income per rights-holder, (IRP and NSCR), the combined gross income of all fishers, the net income, the net income per individual right holder, and the net combined income for the linefishery.

Linefishery economic model

The economic linefishery model was developed with the aim of providing estimates for the income contribution from the linefishery sector to the right-holders and the Kleinmond community, as well as to highlight possible opportunities for managing sustainable improvements within the value-add chain.

The linefishery economic model makes use of current prices obtained per species from the buyer, and the portion of fish sold to each buyer. These prices are used to determine the gross income for an individual rights-holder, as well as the local fishery as a whole. A similar reliability key and framework as used in the rock lobster economic model was used for the linefishery economic model (Appendix 2). Table 4.2.3.1 shows the highlighted key parameters that are addressed for the linefishery base-case model.

The fieldwork allowed for the clarification of several important features within the linefishery, as well as providing additional data incorporated into the economic base-case model. Important data included in this research addresses the quantities caught for several species caught by both the IRP and the TLF-holders. The data show where the linefish are being sold and for what price. Challenges arose, however, because of the multiple species that are caught and sold to the buyers at differing prices (e.g. Rands per bunch or Rands per kilogram). The average weight of linefish per bunch and the prices received per bunch for each species were estimated from the interviews. The model incorporated the fact that the two TLF-holders own boats operating in the area and, as a result, costs incurred included bait,

petrol, crew, equipment, levies, permit and maintenance) and the depreciation costs (boat, vehicle and trailer). The incurred costs for the IRP-holders who owned boats was also calculated. The IRP-holders do not have to pay levies on landed catch or permit costs. The depreciation of assets for IRP boat owners was not included in the linefishery model as those costs had already been taken into account in determining net income in the rock lobster fishery base-case model. IRP-holders who do not own a boat are charged 50% of the value of the landed catch as commission. From these inputs, the outputs are calculated and provide the gross income per rights holder (IRP and NSCR), the combined gross incomes, the net income per individual right-holder, and the net combined income for the linefishery as a whole.

Chapter 5: Results

In this section the key findings from the survey, group meetings and key informant interviews are outlined. Relevant data were gathered and analysed in terms of the basic demographics, the economics within both the West Coast rock lobster and the linefishery, and the sustainability of the surrounding marine resources in Kleinmond.

5.1. General

A total of 18 interviews were conducted for the rock lobster fishery. Out of the 18 interviews, nine were with IRP-holders (also able to catch linefish) and nine with NSCR-holders. The age of the IRP-holders ranged between 30 and 59 years, and between 30 and 74 for the NSCR-holders (Figure 5.1.1). Data obtained from DAFF indicated that there are only two TLF-holders in the Kleinmond area; one in Kleinmond itself and the other in Betty's Bay. Both of these individuals were interviewed giving a total of 20 interviews overall.

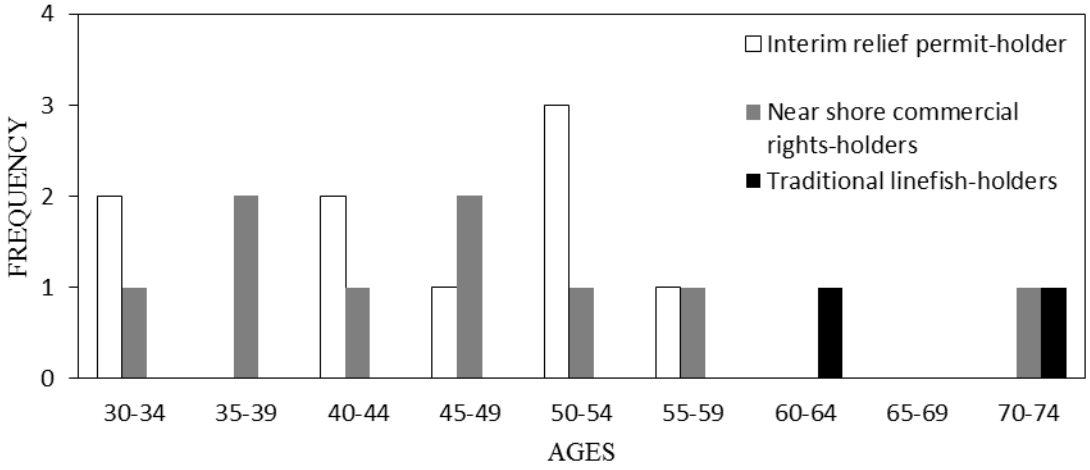

Figure 5.1.1. Age distribution of right-holders interviewed from the Kleinmond fishery

The majority (55%) of the interviewees had spent more than 20 years working as fishers. The income generated by these permit-holders has to support both themselves and their families; their dependants can comprise of up to 10 people within their immediate household. Interviewees lived in the areas of Kleinmond (15), Pringle Bay (2), Betty's Bay (2), and Hawston (1).

5.2. Economic value of the West Coast rock lobster fishery

a) Total annual landings by the small-scale fishers as determined from interviews

Data obtained from DAFF indicates that there are 95 NSCR-holders in Pringle Bay, Betty's Bay, Kleinmond and Hawston. Unfortunately, it was not possible to access specific statistics for Pringle Bay, Betty's Bay and Kleinmond only. As a result, the following data pertain to this wider area. The NSCR-holders received quotas for the 2014/2015 rock lobster season of either 482 kg (70%) or 322 kg (30%), with a total of 40 185 kg allocated (Figure 5.2.1.).

There are 61 IRP-holders for Pringle Bay, Betty's Bay, and Kleinmond, with a total quota for the 2014/2015 season of 6 734.4 kg. The IRP-holders each received a uniform quota of 110.4 kg. The total mass of quotas given to each community is dependent on the number of IRP-holders fishing in the area, Kleinmond harvest 73% of the total catch of rock lobster from the area whereas Pringle Bay (14%) and Betty's Bay (13%) harvest smaller portions (Figure 5.2.2.). The number of IRP-holders residing in the different areas is as follows: Kleinmond (44), Pringle Bay (8) and Betty's Bay (9). Pringle Bay and Betty's Bay each have nominated one main community member as the IRP-holder, and this person is responsible for signing and holding the permit for all the community members. On the other hand, Kleinmond nominated two community members to be responsible for the permit application and signing off of the catches. The nominated IRP-holders were all interviewed. The rock lobster fishers that were contacted indicated that they fill their quota or allowance each year. As a result, the extracted amount for the season 2014/2015 between Pringle Bay and Hawston totalled approximately 47 t, with the NSCR-holders harvesting 85% of the rock lobster in the area (Figure 5.2.3.).

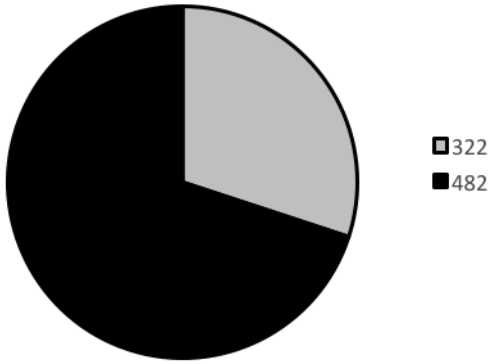

Figure 5.2.1. Comparison of the total amounts allocated to nearshore commercial rights-holders quotas (kg) in the Kleinmond area according to individual quota mass (322 or 482 kgs).

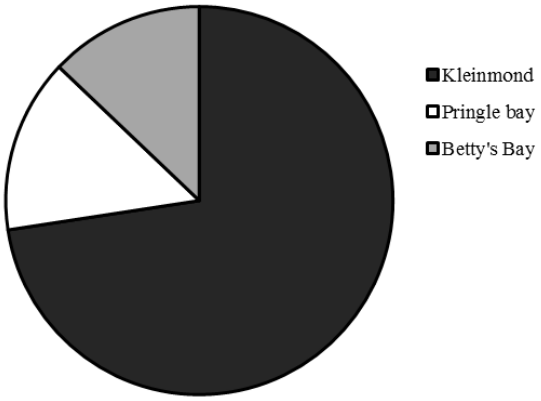

Figure 5.2.2. Comparison of the amounts (kg) allocated to interim relief permit-holders from each community in the Kleinmond area.

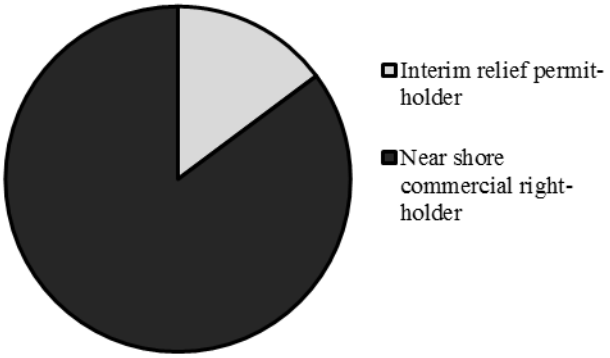

Figure 5.2.3. Comparison of allocations of West Coast rock lobster quotas (kg) between the Kleinmond interim relief permit-holders and the nearshore commercial right-holders.

During the interviews the permit holders were asked about the sustainability of the West Coast rock lobster caught in the area (Table 5.2.1, Figure 5.2.4). The majority (78%) of the responses considered that the rock lobster in the area were at least sustainable if not abundant when caught, within that 67% of the permit holders said that the rock lobster had changed size and 83% of these permit holders said that the size had decreased over the decade.

Table 5.2.1 Responses received from the nine interviews for IRP-holders and nine for NSCR-holders on individual opinions on questions related to the sustainability of the West Coast rock lobster resource (Appendix 1a Kleinmond West Coast Rock Lobster Fishery Permit Holders, Sustainability, Questions 1 - 5):

Permit holders'	IRP	Commercial
Perceived status of the stock		
Abundant	4	5
Sustainable	2	3
Heavily exploited	3	1
Depleted	-	-
Observations on movement of lobster		
Yes	2	4
No	7	5
Direction of movement		
Towards Cape Town	-	1
Towards Hermanus	2	3
Has the size of lobster caught changed over last 9 years?		
Yes	7	5
No	2	4
Nature of change in size		
Smaller	5	5
Bigger	2	-
Change in catch rate?		
Yes	6	4
No	3	5

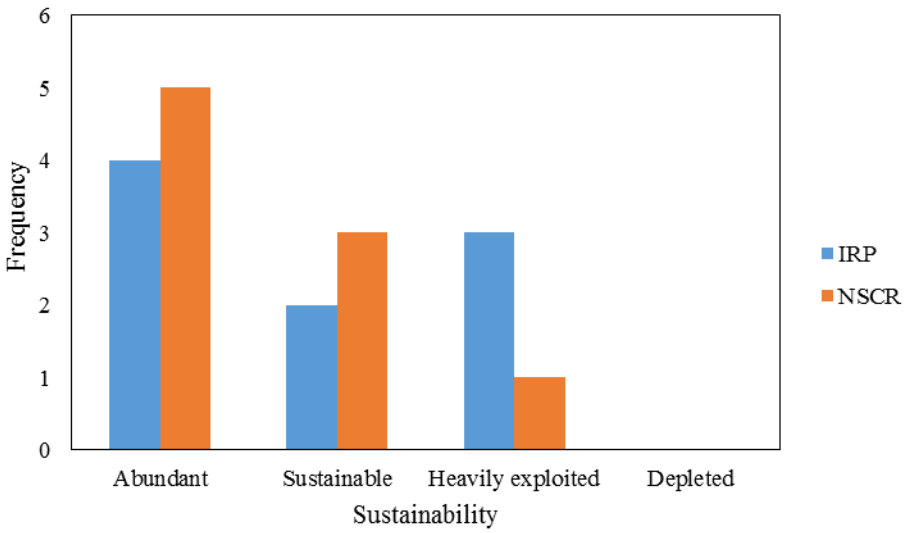

Figure 5.2.4. Responses received from the nine interviews on individual opinions on questions related to the sustainability of the West Coast rock lobster resource (Appendix 1a Kleinmond West Coast Rock Lobster Fishery Permit Holders, Sustainability, Questions 1 - 5)

b) Uses and values of landings from data obtained from interviews

In the questionnaires all the nine respondents that were IRP-holders and the nine NSCR-holders rated the rock West Coast rock lobster as being very important for their livelihoods. All rock lobster are sold commercially and each permit holder signs an agreement to sell their individual quota to a specific PMC. Five different PMCs were identified during the interviews: 2 Oceans, I & J – Walker Bay, Inkosi Keta, Lusitania, and Valley River Trading. The arrangements made for payment to the fishers differs between the PMCs; some give the permit-holders a set price for the season, whereas others vary the price according to the market value at the time. The prices paid to NSCR holders for live rock lobsters during the 2014/15 season varied between R180 and R270/kg, depending on when the catch was sold, as well as which PMC was involved. Government has set a minimum payment of R200/kg to IRP-holders for rock lobsters but R250/kg was paid to IRP-holders for live rock lobsters at the start of the season in November/December 2014. By February/March 2015 this price had decreased to R225/kg.

On average, only 2% of the rock lobsters landed are dead. Dead lobsters fetch a lower price (R100/kg) than the live ones.

c) Expenses

The costs incurred by boat owners fishing for rock lobster are summarised in Table 5.2.1, which shows the average cost to operate and maintain a boat of 4.1-5.5 m hull length (the average length of boat used by the interviewed boat-owners), and a larger sized boat of 7.8 m hull length (used by one boat owner). Unsurprisingly, running costs were higher for the larger boat length. The boat owner charges a permit-holder to make use of his or her boat at the same rate for fishing (R50.00/kg for an IRP-holder and R45.00/kg for a NSCR-holder), irrespective of boat length. However, fishers catch more rock lobster per trip (approximately 120 kg) on the larger boats.

Table 5.2.2. Estimated mean costs for boat owners fishing for West Coast rock lobster. Figures based on interviews with six owners of boats in the range 4.1 – 5.5 m and one owner of a boat of 7.8m length.

Expense	Mean costs (Rands) (Boat: 4.1-5.5 m)	Range (Rands)	Mean costs (Rands) (Boat: 7.8m)
Boat cost (including outboard motors and trailer)	205 416.00	30 000.00 – 650 000.00	450 000.00
Vehicle cost (assumed)	200 000.00	-	200 000.00
Equipment cost (GPS, fish finder, radio, safety gear, flares, etc.)	11 580.00	7 900.00 – 16 400.00	13 400.00
Annual maintenance cost (including trailer and vehicle)	7 250.00	2 200.00 – 10 000.00	19 200.00
Fishing equipment cost/year	6 486.00	1 500.00 – 10 000.00	15 600.00
Fuel cost (towing and fishing)/trip-	923.00	400.00 – 1 500.00	1 800.00
Levy/month	200.00	-	200.00
Bait cost/trip	658.00	200.00 – 1 313.00	1 000.00
Payment to crew members Rands/kg	9.60	8.00 – 12.00	15
Payment to skipper Rands/kg	9.00	8.00 – 10.00	10
Average number of trips per year (assuming mean catch of 74 kg/ trip and IRP and NSCR boat owners' fish only for holders in their own category).	IRP – 15 NSCR - 32	-	IRP – 9 NSCR – 20

d) Illegal, unreported and unregulated fishing

This study did not attempt to quantify the extent of illegal, unreported and unregulated fishing but the impacts of illegal fishing on the rock lobster fishery were a concern to a 61% of interviewees. Illegal sale and distribution of rock lobsters on a small scale was clearly evident while the research was being conducted. This type of illegal fishing involves the poaching of small quantities of rock lobsters by fishers from within the community around the harbour area when catches are being landed. The DAFF compliance officers in the area confirmed that large-scale illegal fishing also takes place and involves dedicated boats, operating from the harbour at Hawston in particular, and can involve hundreds of kilograms per trip. Compliance officers also confirmed that large-scale illegal fishing for rock lobster frequently occurs in combination with abalone poaching.

DAFF is currently working on an OMP for the West Coast rock lobster sector, and if successfully implemented, it could lead to an increase of approximately 30% in the biomass of legal-sized male lobsters within the period 2014 -2021. If this is implemented, the national TAC could be expected to rise by approximately 750 t (Johnson and Butterworth, UCT pers comm.). This could mean that the small-scale fishers in the Kleinmond area could benefit considerably by being allocated higher quotas. However, that forecast recovery is based on an assumption that the assumed levels of illegal fishing are accurate, and that there is no further increase in poaching after 2012. If the estimates of illegal fishing used in the forecasts are too low, or there is a significant increase in illegal fishing after 2012, then the recovery of the rock lobsters may not happen. The issue of illegal fishing of rock lobsters should therefore be given priority by all stakeholders in order to control and reduce the damage that is currently being created.

5.3. Economic value of the Linefishery

a) Total annual landings by the small-scale fishers as determined by interviews

The two TLF-holders that operate in the Kleinmond and Betty's Bay areas are bound by the permit conditions of Zone A. The fishery for linefish is not an output-controlled fishery and is instead managed by a suite of input regulations that include restricted areas, minimum sizes, bag limits and restricted species (DAFF 2014b). The 61 IRP-holders referred to in Section 5.2.a. are allowed to catch linefish and white mussel, but the data obtained from the community leader indicated that less than half of the IRP fishers made use of the linefish and white mussel allowance in 2014.

The interviews revealed substantial differences in the way in which fishers used the individual allowances to catch linefish and white mussel (Table 5.3.1). However, there was general agreement that fishing for linefish was economically challenging and therefore many holders made limited use of this opportunity. The most commonly caught species was reported to be Cape bream and all but one of the interviewees reported catches of Cape bream during 2014. One of the two TLF-holders reported that he had caught 89 kg of Cape bream, whereas the other stated that he had caught 3 300 kg. The estimates of the catches obtained by the IRP-holders in 2014 ranged from 30 to 200 kg per holder. Results indicate that snoek is caught in high quantities when available, but this fish was reported to have been scarce in the Kleinmond area recent years.

Table 5.3.1. Maximum and minimum catches by species reported for the Kleinmond area during the interviews of both TLF- and IRP- holders. The numbers of non-zero catches reported by the nine IRP-holders interviewed are also shown.

Species	TLF	IRP
Cape bream	89 – 3 300 kg	8 reported catches 0 – 200 kg
Snoek	0	1 reported catch 35 kg
Cape salmon (Geelbek)	0-380 kg	1 reported catch 24 kg
Dusky kob	0-20 kg	1 reported catch 5 kg
Yellow tail	0	0
Carpenter (Silverfish)	0-1 kg	2 reported catches 0-200 kg
Mackerel (*Scomber japonicus*)	130-260 kg	1 reported catch 300 kg
White mussel	-	5 reported catches 0-18 200 individuals

b) Uses and values of landings data obtained by interviews

In the questionnaires all the nine respondents that were IRP-holders and the two TL permit holders rated the linefishery as being every important for their livelihoods. Data on the prices of linefish were obtained directly from a buyer from a company (located in Gordon's Bay, which is some distance (47.5km) from Kleinmond) that buys from the two TLF-holders in the Kleinmond area, a TLF-holder from Hawston, and the nine IRP-holders that were interviewed. While data on catches from the Hawston-based fisher have not been included in this study, it was considered that the data on prices would be relevant to the Kleinmond area and as such it has been included (Table 5.3.2.).

Table 5.3.2. Comparison of the linefishery buyers and prices for linefish and white mussels

	TLF	IRP
Fish buyers	- Community - Hawkers	- Personal consumption - Community - Hawkers (only when snoek are caught) - Bait shops
Prices paid to fishers		
Cape bream	R18/kg	R15-25/kg or R35-50/bunch (average bunch weight is approx. 4 kg)
Snoek	R10-25/fish (average fish weight is approx. 1 kg)	Not being caught
Cape salmon	R35 -50/kg	R55/kg
Dusky kob	R40 -50/kg	R20/fish (average fish weight is approximately 2 kg)
Yellowtail	R25-30/kg	Not being caught in the area.
Carpenter	R14/kg	R25/kg or R30-50/bunch (average bunch weight approx. 2.5 kg)
Mackerel	R4.50/fish (average weight of fish is approx.750 g)	R10/kg
White mussel	n/a	R1/mussel

During the interviews the permit holders where asked about the sustainability of the linefish caught in the area (Table 5.3.3, Figure 5.3.4). The majority (81%) of the responses reported that the two main species, snoek and Cape bream, in the area were at least sustainable if not abundant while 63% of interviewees did not know the status of the Cape salmon or carpenter stocks.

Table 5.3.3. Responses received from the nine interviews for IRP-holders and two for TLF-holders on individual opinions on the status of selected linefish species and whether they have observed any change in the size of fish in their catches (Appendix 1b Kleinmond Linefishery Permit Holders, Sustainability, Questions 8 and 10).

	Species					
	Cape Bream	Snoek	Cape salmon	Carpenter	Mackerel	White mussel
Perceived status of stock						
Abundant	7	9	2	3	5	8
Sustainable	2			1	1	1
Exploited	2	1	2			
Depleted						
Don't know		1	7	7	5	
Observed change in size of fish caught change						
No	5	11	3	4	4	9
Yes	6		1			
Don't know			7	7	7	

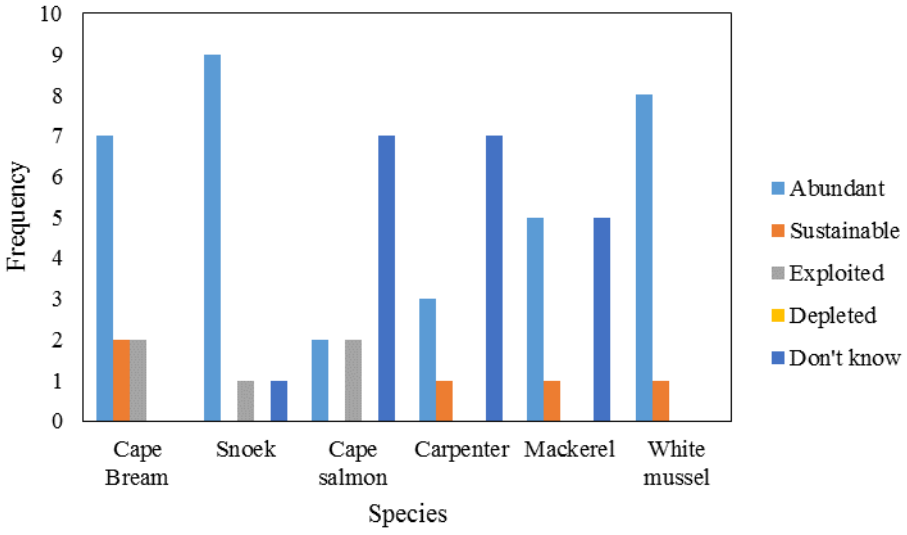

Figure 5.3.1. Responses received from the 11 interviews on individual opinions on the status of selected linefish species and whether they have observed any change in the size of fish in their catches (Appendix 1b Kleinmond Linefishery Permit Holders, Sustainability, Questions 8 and 10).

c) Costs of fishing

The operating and maintenance costs incurred by a boat owner using an average boat (4.1-5.5m hull length) are summarised in Table 5.3.3. The IRP-holders do not pay permit costs or levies on their catches. However, the TLF-holders have to pay a levy on the weight of fish caught. Due to the low catch for the 2014/2015 season, the TLF permit-holders only had to pay a 0-2 t levy, which was R161.00. The costs of use of a boat for permit-holders who don't own a boat are covered by paying a commission to the boat owner, which is typically 50% of the permit-holders' linefish catch. If the boat owner is the skipper and using another permit-holder as crew, there are no additional crew costs and the permit-holder would pay a commission to the owner for the use of the boat.

Table 5.3.3. (a) The estimated mean costs for boat owners fishing for linefish and (b) the mean costs for collecting white mussel

Expense	Mean costs (Rands) (Boat: 4.1-5.5m)	Range (Rands)
a) <u>Linefish</u>		
Boat cost (including outboard motors and trailer)	205 416.00	110 000.00 - 375 000.00
Vehicle cost (assumed)	200 000.00	-
Equipment cost (GPS, fish finder, radio, safety gear, flares, etc.)	11 580.00	7 500.00 – 15 660.00
Levy (TLF only). Sliding scale depending on season's catch. Rate shown here for catch between 0 and 2 t (R)	161.00	161.00 – 5 640.00
Annual maintenance cost (including trailer and vehicle) (R)	7 250.00	6 000.00 – 8 500.00
Fishing equipment cost per year (R)	255.00	190.00 – 300.00
Fuel cost (towing and fishing) per trip (R)	350.00	300.00 – 400.00
Bait cost per trip (R)	250.00	200.00 – 300.00
Average number of trips per year	IRP – 17 TLF - 60	4 - 144

Commission paid to boat-owner by IRP-holders without their own boats	50% of the value of their catch	-
b) White mussel		
Fuel cost per trip per passenger (160 kms/trip assuming four IRP-holders sharing costs) (R)	56.00	-
Number of trips per year	12	0 - 52
Total cost per year per permit-holder (R)	672.00	-

5.4. Local consumption and options for increasing demand and value

a) Contributions to food security

Fishers interviewed regarding rock lobster catches reported that the entirety of the individual quota was commercially traded and not used for personal consumption. This is in contrast to the fishers targeting linefish where they typically use part of the catch for personal consumption, shared with their families, and sell the rest within the community. Some IRP-holders were of the opinion that linefish was "very important" for the fishers' livelihoods, whereas others stated that the linefish component was of limited value as the costs of a trip were often far greater than the value of the catch obtained. Of the nine IRP-holders interviewed, two reported that they retained 50% of the linefish catch for personal consumption, while the responses of the remainder ranged from 2% to 10%. On average, 15% of the snoek and Cape bream and 10% of white mussels are retained for local consumption. Total catch is low, with an estimate of 0.6 kg of snoek, 9 kg of Cape bream and approx. 500 white mussels per fisher during the year with individual catches per fisher varying considerably

b) Opportunities for selling to local restaurants and retailers

Of the 12 local outlets selling fish and fish products in the Kleinmond area, four (one retailer and three restaurants) stated that they are currently buying fish from the local fishers. All indicated that they bought most of the fish from outside the Kleinmond area (Table 5.4.1). Two retailers, five restaurants and both fish and chip shops stated that they would be willing to pay the current market prices when buying from local fishers. This would provide the local

fishers with a significant mark-up from the prices they are receiving when selling directly to the middlemen fish dealers for resale.

Table 5.4.1. Summary of key data obtained on the potential for selling local fish products to restaurants and retailers in the wider Kleinmond area. A total of 12 enterprises were interviewed

	Retailers	Restaurants	Fish and chip shops
Number interviewed	3	7	2
Currently buying from local fishers	1	3	0
Additional enterprises that would like to buy from the local fishers	1	4	2
Most of fish bought from outside the Kleinmond area	3	7	2
Willing to pay the current market price if requirements are met	2	5	2

There is considerable interest among local outlets to buy directly from the local fishers, but the interviewees reported that this would be dependent on two main requirements. The first involves simplifying the documentation currently required by the buyers as proof of purchase, because the current regulations specify that to purchase fish from the fishing permit-holder requires copies of documentation such as the fishers' permit, skippers' license, the boat license, and a receipt of sale and others. The second condition for local enterprises to buy more fish directly from the fishers is a guarantee of a consistent and reliable supply of fish, which would be difficult for small-scale fishers to fulfil.

5.5. DAFF records of landings and effort

a) West Coast rock lobster

Catches in the Kleinmond area (Area 12) have been largely consistent for most years, except during the 2006/2007 and 2012/2013 seasons, when there was a spike in the catches. This is likely due to the increase in fishing activity in the area that occurred during these seasons. The DAFF records reflect that the total landings from Area 12 peaked at 91 t in the 2006/2007 season and have since declined steadily to 57 t in the 2014/2015 season (Figure 5.5.1). The CPUE in Area 12 has also declined over this period, decreasing by more than 72%.

The total recorded catch for the 2014/2015 season of 57 t was larger than the combined quota of 47 t for all NSCR-holders in Pringle Bay, Bettys Bay, Kleinmond and Hawston, as well as IRP-holders in the these area (except Hawston) centres (see Section 5.2.a.). The discrepancy can be partially explained by the fact that fishers registered in Hermanus also operate in this area, a community not reflected in this study, therefore a significant catch in this area may be taken by fishers living outside the study area.

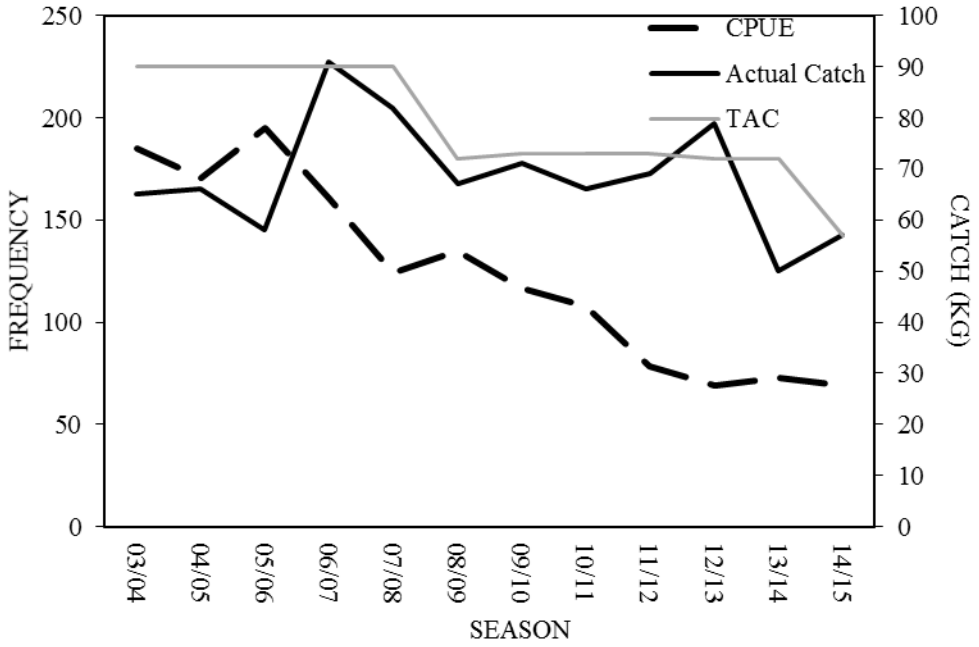

Figure 5.5.1. TAC, CPUE and total landing of West Coast rock lobster from Areas 12 (Kleinmond) (extracted from the DAFF database).

b) Linefish

The DAFF linefish landings database for the area from Cape Hangklip to Hawston has records of 31 different species caught between 2000 and 2014. In all, 11 of these species accounted for over 99.5% of the total catch during this period, with snoek comprising almost 70%; and snoek, Cape salmon and Cape bream accounting for over 90% of the total catch (Table 5.5.1.).

Table 5.5.1. Average annual catch by weight recorded for the 11 species that make the largest contribution- to the total catch in the area from Cape Hangklip to Hawston, as well as the percentage contribution to the average total linefish catch (DAFF linefish data base, 2000-June 2014)

Species	Code	Average annual catch (kg)	Cumulative percentage of total (%)
Snoek	SNOK	41 118.8	69.3
Cape salmon	GLBK	9 853.4	85.9
Cape bream	HTTNT	3 827.1	92.3
Cow shark	CWSH	1 511.2	94.9
Hake	Hake	1 399.2	97.2
Soupfin shark	SFSH	327.9	97.8
Sharks	SHRK	270.7	98.2
Carpenter	CRPN	225.3	98.6
Red roman	Romn	213.5	99.0
Chokka squid	CHOK	153.4	99.2
Kob	KOB	143.6	99.5
Panga	Pang	94.1	99.6
Total of all species		59 362.8	100

The most recently recorded catch data obtained from DAFF for the period January 2000 to June 2014 for the five top species is shown in Table 5.5.2. These data are likely to provide a more accurate estimate of the current catches from the study area than the average from 2000 to 2014. Snoek was the most important of the five species during this period, accounting for over 75 000 kg (86%) of the average annual total catch of 87 337 kg, followed by Cape bream at nearly 6 400 kg (7%) and Cape salmon at 4 254 kg (5%). No hake catches were reported during this period, but there is a relatively high mean of hake catches recorded for the period 2000-2014, due mainly to the nearly 20 000 kg in 2005 (see Figure 5.5.2.)

Table 5.5.2. Annual catch (kg) for the period 2010 – 2013 for the five species making the largest contribution to catches between 2000 and 2014.

	Cape salmon	Cow shark	Hake	Cape bream	Snoek	Total
2010	8 387	1 597	0	1 919	35 277	47 180
2011	4 309	458	0	6 728	58 712	70 207
2012	3 489	1 375	0	8 356	190 278	203 498
2013	832	80	0	8 485	19 067	28 464
Mean 2010-2013	4 254	878	0	6 372	75 834	87 337

An important factor affecting the economic viability of the small-scale fisheries sector is that interannual variability of catches for each species is high (Figure 5.5.2.). As a result, the income can be equally variable and regular supplies to buyers cannot be guaranteed. It is noted that snoek is the most abundant on average, but catches have varied from a minimum of 312 kg (2006) to over 190 000 kg (2012), whereas Cape bream catches have ranged from 590 kg (2007) to a peak of 8 485 kg (2013). The fact that Cape bream is a local reef species and is more consistently available throughout the year than snoek is particularly important to IRP-holders.

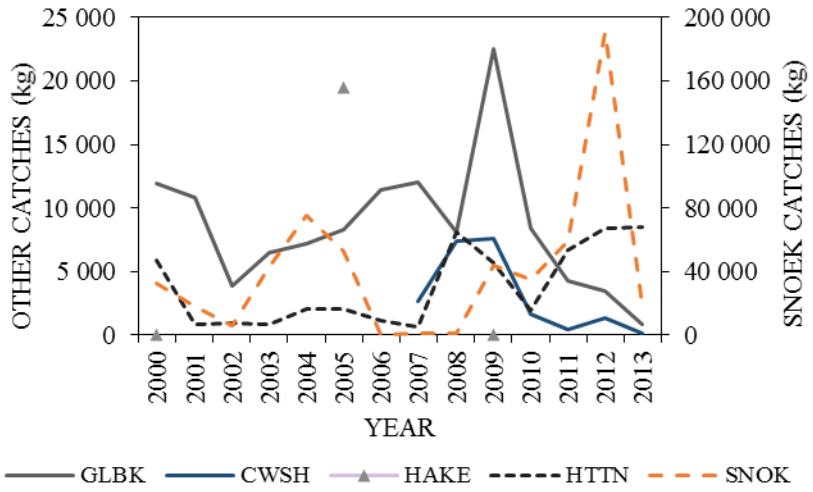

Figure 5.5.2. Total annual catches of five of the most abundant species recorded by DAFF for the period 2000-2013 in the area from Cape Hangklip to Hawston. GLBK = Cape salmon, CWSH = cow shark, HAKE = hake, HTTN = Cape bream, SNOK = snoek

The recorded number of active fishers is also highly variable (Figure 5.5.3). Fishers operating in the Kleinmond area varied from a maximum of 1 843 fishing trips in 2005 to a minimum of 97 in 2006. Figure 5.5.3 clearly shows that the variability in the number of fishing trips closely matches the size of snoek catches. This demonstrates how important snoek is to small-scale fishers in the area. The number of fishing trips recorded from the Betty's Bay area is much lower, falling steadily from 465 in 2000 to 0 in 2007, with an isolated increase to 32 in 2012, the only year since 2006 in which any fishers have been recorded from that community. Catches reported from the Pringle Bay area are even lower. The low numbers of fishers from these two areas can be attributed to a combination of smaller registered numbers of rights and IRP-holders and a preference for using harbour facilities in Kleinmond.

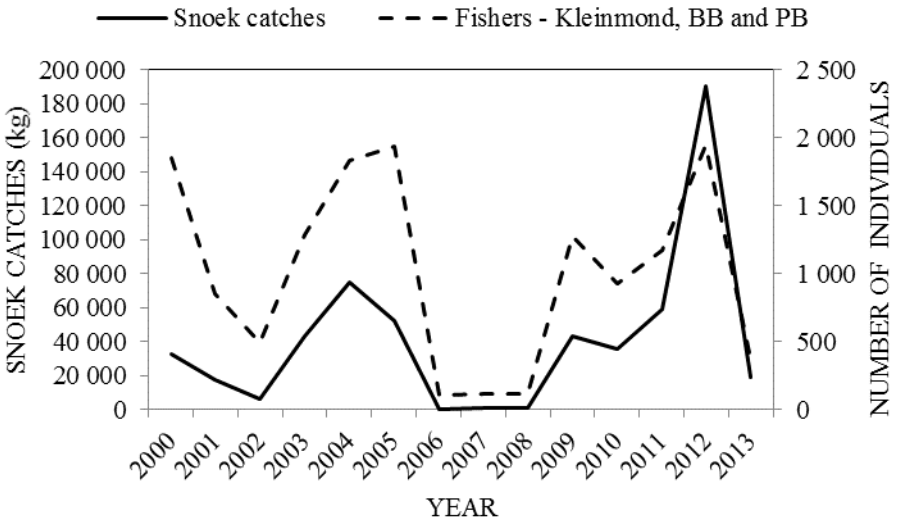

Figure 5.5.3. Number of fishers fishing from Kleinmond, Betty's Bay (BB) and Pringle Bay (PB) in relation to snoek catches for the period 2000 - 2014.

5.6. The overall economic value of the small-scale fishery

a) West Coast rock lobster

The estimates of catch, price and costs related to NSCR- and IRP-holders fishing for West Coast rock lobster were obtained from the interviews described in Section 5.2. These estimates were combined in a simple economic model using Microsoft Excel (see Appendix 3). The data were considered reliable and the gross incomes estimated from these inputs can be viewed as giving a reasonably accurate estimate of the real total value received for the 2014/2015 season by the 61 IRP-holders from Kleinmond, Betty's Bay and Pringle Bay, as well as the 95 NSCR-holders registered from those areas and Hawston.

However, the estimated operating and maintenance costs incurred, particularly those pertaining to boat owners, are thought to be considerably less reliable, and are presented here as indicative figures only. A number of assumptions had to be made in deriving these estimates. Two of the more important assumptions were:

- The six IRP boat owners fish for the total allocated IRP rock lobster allowances and the 17 NSCR-holders fish for the total allocated NSCR quotas issued for the 2014/2015 season.

- The value of boats and trailers reported by interviewees depreciates at a rate of 10% per year, which is deducted as an annual cost.

The summarised estimates of the average income of all permit holders over the 2014/2015 season are presented in Table 5.6.1. The combined gross income (using the average prices received) over this season for 156 permit holders (IRP and NSCR) was estimated to be approximately R12 200 000 per annum. In the same period, the estimated gross income received for the West Coast rock lobster per fisher was R24 564 for an IRP-holder and R93 652 for a NSCR-holder. After deducting costs, the net income for an individual who does not own a boat was estimated to be approximately R19 000 for an IRP-holder and R72 000 for a NSCR-holder for the 2014/2015 fishing season.

Table 5.6.1. Summarised estimates of gross income, costs and net income of IRP and NSCR-holders for the 2014/2015 West Coast rock lobster season, differentiating between those who own boats and those who don't. All incomes and costs are in Rands.

	IRP	NSCR
Number of holders	61	95
Quota per holder (mean quota for NSCR) - kg	110.4	423.0
Mean fraction to PMC	1.00	1.00
Fraction of rock lobster landed dead (%)	2	2
Number of boat owners	6	17
Non-boat owners		
i) Income		
Gross income per individual holder	24 564	93 652
Gross income for all permit holders	1 351 020	7 304 872
ii) Costs		
Levies and permits per holder	0	2 552
Boat owner commission paid per holder	5 520	19 035
iii) Net income		
Net income per individual	19 044	72 066
Net income of all holders without boats	1 047 420	5 621 125

Boat owners		
i) Income		
Boat commissions received per individual boat owner	50 600	87 337
Gross income from own quota	24 564	93 652
Total gross income per boat owner	75 164	180 989
Gross income for all boat owners	450 984	3 076 817
ii) Costs		
Bait and fuel costs	23 992	50 527
Annual costs (equipment, levies, payment to crew and skippers)	30 138	53 642
Annual depreciation costs on vehicle, boat and trailer (at 10% per year)	41 700	41 700
Total cost for season	95 829	145 869
iii) Net income (including boat owners' quota)		
Net income per individual boat owner (owner skipper, no depreciation)	31 511	98 882
Net income per individual boat owner (owner skipper, with depreciation)	-10 189	57 183
Net income per individual boat owner (hired skipper, with depreciation)	-20 665	35 120
Net income for all boat owners (owner skipper, with depreciation)	-61 135	972 106
Total		
Net income of all boat owners (owner skipper, with depreciation) and non-boat-owners	986 285	6 593 230

It is apparent from Table 5.6.1, that there is little gain in income for fishers who own a boat. An IRP boat owner who skippered the boat would annually earn an estimated R31 511 and a NSCR boat owner R98 882 from rock lobster fishing (these figures are based on the 2014/2015 quotas and allowances). These figures take into account that, because the owner of

the boat is the skipper they would not have to pay an additional cost to hire one, but do not take into account the capital depreciation of the vehicle, boat and trailer. If the capital depreciation is taken into account (as it should be), and assuming new values for the capital items listed in Section 5.2.c, then boat owners are considerably worse off than permit-holders who do not own a boat. The estimated net income will be a loss of approximately R10 189 for an IRP-holder and a positive income of approximately R57 183 for a NSCR-holder. Furthermore, if the boat owner does not skipper the boat, then returns fall even more (Table 5.6.1.). It should be noted that these estimates do not take into account the income received by the IRP boat owner from fishing for linefish. A factor examined below.

For the rock lobster fishers of Kleinmond, Bettys Bay and Pringle Bay, including NSCR-holders in Hawston, the total gross economic value for the 2014/2015 season of the lobsters landed by the local rights and permit-holders is estimated at nearly R1.35 million for IRP-holders and R7.30 million for NSCR-holders, totalling R8.66 million. The net economic value for the same period for the lobsters landed by the local rights and permit-holders (assuming the boat owners are the skippers of the boats and taking capital depreciation into account) is estimated at R986 285 for IRP-holders, and R6 593 230 for NSCR-holders, respectively, a total net value of approximately R7.6 million (Table 5.6.1.).

To investigate some of the uncertainty in the economic model, calculations were also done using the reported minimum and maximum price/kg of the potential gross income for the rock lobster IRP and NSCR permit-holders for the 2014/2015 season (Figures 5.6.1 and 5.6.2.). These estimates illustrate that the gross income for the local economy can vary considerably depending on the actual prices paid. The combined gross income for 156 rights holders (IRP and NSCR) using the minimum price (IRP R200/kg, NSCR R180/kg) is estimated to be R7.05 million, whereas using the maximum price (IRP R250/kg, NSCR R270/kg) the estimate is R10.26 million, which is a difference of 31% per annum (Figure 5.6.2). After deducting the running costs, the combined net income for IRP and NSCR holders shows a minimum of R 5.66 million and a maximum of R 8.87 million, which is a difference in net income of 36% (Figure 5.6.1).

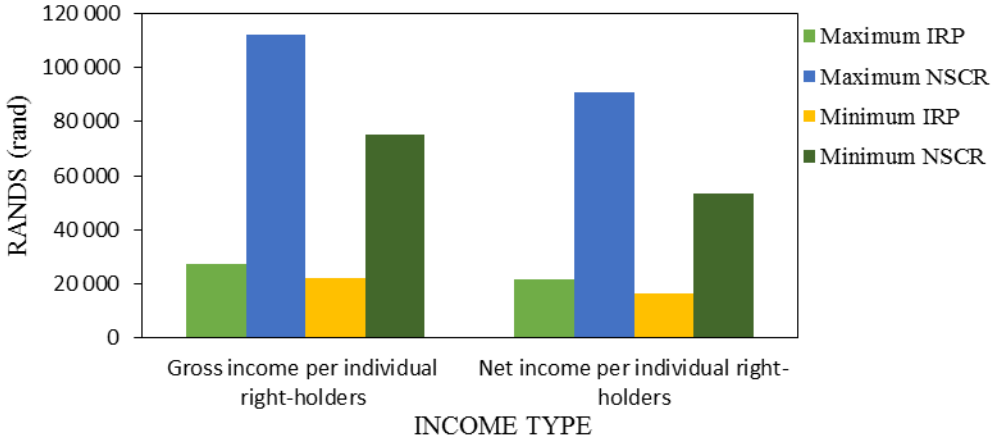

Figure 5.6.1. Estimates of the gross and net income for individual right-holders, using the minimum and maximum prices per kg obtained by IRP- and NSCR-holders for the rock lobster season 2014/2015.

Figure 5.6.2. Estimated gross and net income for all right-holders, using the minimum and maximum obtained by IRP and NSCR holders for the rock lobster season 2014/2015.

Figure 5.6.1 also shows a gross income difference between the minimum and maximum earned, with 33% for an individual IRP-holder and 70% difference for a NSCR-holder. The net income for an individual permit-holder (who does not own a boat) was estimated by calculating the difference between the minimum and maximum range of costs, totalling an approximate net income difference of 33% for an IRP-holder and a 70% difference for a NSCR-holder.

One of the fishers interviewed had a boat of 7.8 metres in length, substantially larger than the other boat owners that were interviewed. The expenses that would incur for a boat owner using a boat of this size were investigated. The calculations took into account that that the larger boat with more equipment would allow for more WC rock lobster to be harvested per trip, decreasing the number of trips made by the permit holder using the larger boat to an estimated 9 and 20 for IRP and NSCR holders respectively compared to 15 and 32 trips by the smaller boat owners in those two categories.

Nevertheless, using the values reported by the large boat owner, the running costs for a NSCR-holder owning a larger boat would be R54 927 per year which is over R4 000 more than the running costs per year of the small boats, and R26 081 for an IRP-holder with a larger boat, which is over R2 000 per year more than an IRP-holder owning a small boat. The value of the large boat was reported as being approximately R650 000, more than R400 000 more expensive than the average cost of a smaller boat, which means that depreciation costs will also be proportionately much higher. Unless the larger boat owner charges a higher boat commission per trip to non-boat owners, the larger boat owner will earn a considerably lower net income than the small boat owners, resulting in no advantage to owning a larger boat.

b) Linefish

The estimated figures of catches, prices and costs related to the TLF and IRP permit-holders fishing for linefish, and also white mussel in the case of IRP-holders, were obtained from the interviews described in Sections 5.3. These estimates were combined in a simple economic model using Microsoft Excel, similar to the economic model used for West Coast rock lobsters. In contrast to the rock lobsters data, in which it reflected that individuals almost always catch the full individual allocated quotas, the linefish data showed a wide range in the size of the catch of different species among the interviewees, as well as a high proportion of zero catches (see Section 5.3.a). There are no written records available for the IRP linefish catch by each individual each year and the interviewees frequently relied on memory. Therefore there is lower confidence in these results than those for rock lobster. In view of this uncertainty a hypothetical income and expenditure model for linefish and white mussel was undertaken. This was based on mean prices obtained for the catches of IRP and TLF permit-holders. The TLF catches and the boat-owner expenses of both IRP and TLF fishers were

based on specific examples for which detailed data had been obtained from the interviewees. Nevertheless, while the examples are likely to be accurate for those individuals, they cannot be assumed to be an accurate representation of the Kleinmond fishery sector as a whole. In view of this high uncertainty, the linefish and white mussel gross and net incomes per individual are presented only as examples and were not used to estimate a total value for all registered fishers.

Key assumptions made when calculating the figures presented in Table 5.3.2 and 5.3.3 were:

- The TLF boat owner is accompanied on each trip by one rights-holder who can catch the same species and quantities as the boat owner, but has to pay the boat owner a 50% commission on the value of the total daily catch (data obtained from interviewee);
- Over the period of a year, the IRP boat owner is accompanied by seven IRP-holders who can catch the same species and quantities as the boat owner, but pay the owner a 50% commission on the value of the total daily catch (data obtained from interviewee);
- The IRP-holders retain some of their catch for the fishers own consumption, which is assumed to be 15% of the snoek and Cape bream, and 10% of the harvest of white mussels.
- The IRP boat owner uses the same boat, vehicle and trailer for linefishing as for rock lobster fishing. Therefore, the depreciation of capital equipment was not taken into account when determining the net income of linefish catches for IRP boat owners because these variables were already considered when formulating the rock lobster base-case model in Section 5.5.a. However, rock lobster and linefish fishing trips are always separate, therefore separate running costs were estimated for linefish fishing.

The estimates of the gross income, costs and net income relating to IRP and TLF-holders targeting both linefish and white mussel in the 2014 season are presented in Table 5.6.2. The mean gross income calculated for an IRP fisher who does not own a boat is estimated to be just over R7 022 per year. After paying a commission to the boat owner and covering the costs for petrol to collect white mussel, the net income for these fishers is estimated to be R5 028 per year. The economic position of an IRP fisher who is also a boat owner is even less. Using a hypothetical example whereby the IRP owner's boat is used by seven IRP-holders

(non-boat owners) and does not include the harvesting of white mussel or the fraction of the catch that is kept for personal consumption, the gross income of the boat owner is approximately R11 806 per year. When taking the incurred costs into consideration, the net income is estimated at approximately R675 for the year. This scenario was validated by a reliable source living in the area who stated that without good catches of snoek, and declining catches of Cape bream, it is often not worthwhile going out to sea.

There are only two TLF fishers living in the area and both own boats, therefore no results could be presented for non-boat owners. One of the TLF-holders reported fishing very infrequently, whereas the second, whilst recording considerably higher catches than the first, also reported limited fishing during 2014 because of personal reasons. The data obtained from the second TLF-holder was used as the primary source for the basis of the calculations presented in Table 5.6.2. These figures show that the gross income for a moderately active TLF fisher in the Kleinmond area is nearly R77 370 per year. After deducting the running costs but without taking depreciation into account the net income amounts to R52 511 per year. If depreciation of the value of the boat, trailer and vehicle is also taken into account (assuming new or nearly new equipment), then the net income, including commission received, for the TLF-holder was estimated to be approximately R10 800 per year.

If a fisher was able to catch 2 000 kg of snoek, in addition to the catches of other species used in these estimates, then the net income would be higher, even though additional trips would be required to catch that amount of snoek. If the fisher had required 20 trips to catch the 2 000 kg of snoek then, using the 2014 fish prices and costs, his or her net income would have increased by about R24 000. This hypothetical example demonstrates the importance of years in which snoek availability is high.

Table 5.6.2. Estimates of the gross income, costs and net income relating to IRP- and TLF-holders fishing for linefish and white mussel (IRP only) in the 2015 season. The different figures for IRP-holders who are boat owners and non-boat owners are shown (depreciation costs are not included for IRP boat owners as they are covered in the rock lobster model). The two TLF-holders living in the Kleinmond area both own boats, so costs and income for TLF refer to boat owners only.

	IRP	TLF
Number of holders	61	2
Number of holders who registered catches	25	2
Number of boat owners	6	2
Non-boat owners		
i) Income		
Gross income from sale of catch per individual holder (including white mussel and including value of catch that used for personal consumption)	7 022	n/a
ii) Costs		
Boat owner commission paid per holder (50% of value of linefish catch)	763	n/a
Contribution to petrol for white mussel collection	675	
iii) Net income		n/a
Net income per individual	5 028	n/a
Boat owners		
i) Income		
Boat commissions received: assuming i) 7 additional IRP holders use IRP boat and ii) commission on TLF-equivalent catch for season for TLF boat	5 340	19 343
Gross income from own catches (including white mussel but excluding catch used for personal consumption)	6 466[!]	77 370
Total gross income per boat owner	11 806	96 713
ii) Costs		
Bait and fuel costs	10 875	36 000

Annual costs (permit, maintenance, fishing equipment, levy,)	255*	8 202
Annual depreciation costs on vehicle, boat and trailer (at 10% per year)	0*	41 700
Total cost for season:		
i) without depreciation	11 130	44 202
ii) with depreciation	n/a	85 901
iii) Net income		
Net income per individual boat owner (owner skipper, no depreciation)	676	52 511
Net income per individual boat owner (owner skipper, with depreciation)	n/a	10 811

Key:

! Takes into account 15% of snoek and Cape bream catches and 10% of the white mussels harvested are retained for personal consumption

* Boat/vehicle maintenance and depreciation of capital equipment are not included in the figures calculated for IRP boat owners as these costs have already taken into consideration in the rock lobster budget (Table 5.6.1.).

c) Total income of an IRP-holder

An IRP-holder is given the permission by the authorities to fish for West Coast rock lobster, selected linefish species and white mussel. Figure 5.6.3 shows that rock lobsters are the primary contributor (81%) of the net income to the IRP holders. Combining the estimates of the net incomes for this basket of resources, the figures show that an IRP-fisher who is not a boat owner will earn a total net income of R24 072 per year, whereas the IRP boat owner will earn an income of R32 187 per year. The above mentioned figures don't take the depreciation of the value of the IRP-holder's boat, trailer and vehicle into consideration. If the depreciation of the assets is taken into account, then the IRP-holder who is the skipper and boat-owner will have a net loss (from boat commission and permit for harvesting of rock lobster and linefish) of R9 513 per year. These figures are based on 2014 catch recorded estimates when the catches of snoek are recorded as being exceptionally low.

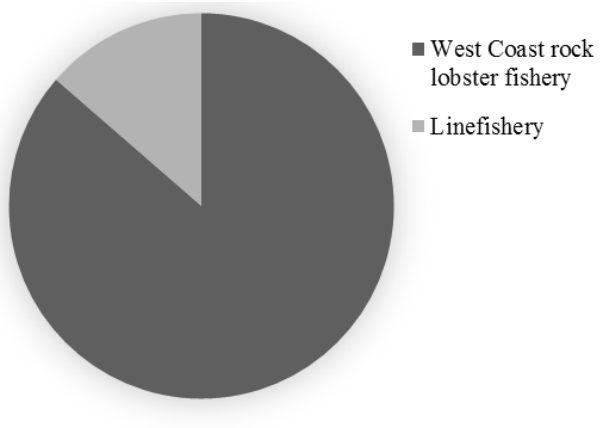

Figure 5.6.3. The proportions of the West Coast rock lobster fishery (86%) and linefishery (14%) making up the net income for an IRP-holder.

d) Estimating uncertainty in the economic values

The inputs for the economic models developed in this study for the WC rock lobster fishery and the linefishery showed considerable uncertainty, particularly for the latter. The oral reports and records obtained showed considerable differences in the catches and prices for the different species being harvested. As a supplement to this study, but separate from it and therefore not reported on in detail here, an attempt was also made to estimate the uncertainties in the earnings calculated from the economic models described in Chapter 4. This was done through the development of a simple Monte Carlo modelling approach, as described in a report to WWF-SA (Cochrane et al. 2015), drawing catches and prices randomly from the ranges of each as reported in this study.

The application of this approach generated estimates of the combined annual gross income for all IRP fishers in the area for both the linefish and white mussel harvesting with a mean of R1.27 million and five and 95 percentiles of R755 000 and R1.84 million, respectively, and the rock lobster was valued for Area 12 at a mean of R16 million with five and 95 percentiles of R24 million and R32 million, respectively. The mean gross income of an individual IRP-holder, taking into account rock lobster, linefish and white mussel catches was estimated to be approximately R41 000 per annum, with five and 95 percentiles of R28 000 and 56 300 (Cochrane et al. 2015).

It needs to be taken into account in interpreting these results that the Monte Carlo approach drew from uniform distributions[2], whereas the base-case model used mean catches and values from the interviewees. In practice the distribution of catches of linefish would most certainly be skewed towards zero rather than being uniformly distributed over the range, which would lead to lower mean or median estimates than estimated with a uniform distribution (Cochrane et al. 2015). Therefore the Monte Carlo results provide an indication of the extent of the uncertainty in the results of the economic calculations, but the economic models themselves should give better estimates of the means.

[2] The Monte Carlo approach was used to estimate the expected mean catches and prices, and thereby the expected mean total sales price per fisher for all species combined, as well as the uncertainty around that mean. With the small sample size and high variability, it was not possible to fit the distributions to the values obtained for each variable and therefore values for each sample in the Monte Carlo procedure were drawn from uniform distributions between the minimum and maximum value of each variable (annual catch and price for each species).

Chapter 6: Discussion

This study has focused on an assessment of the small-scale fishery sector in the town of Kleinmond and the neighbouring communities of Betty's Bay and Pringle Bay. The data emphasise the contribution that the small-scale fisheries makes to the livelihoods of the people living within these communities. It also identifies potential opportunities within the value-chain for improving the economic benefits obtained, and includes some proposed solutions for the sustainability of the Kogelberg fisheries and marine resources.

6.1. Marine resources

The importance of the sustainability of the Kogelberg marine resources for this fishing community cannot be stressed enough, especially since the livelihoods of many of the people depend on the small-scale fishing industry. Several of the principle stocks harvested by the fisheries are depleted and it is therefore important that there is some form of structured facilitation between governments, NGOs and the communities, with the aim of encouraging all the stakeholders to work together through a system of co-management to ensure that the West Coast rock lobster and the linefish species are sustainably harvested. The results of this study reinforce the need for improvement in the management of the resources and highlight the current pressures experienced within this fishing sector.

West Coast rock lobster

The economic importance of rock lobsters has been well documented (e.g. Mather et al. 2003, Hara et al. 2008, Tuko 2010, Wentink 2014), but as mentioned in Section 2.1, the available data show that the current stock status of the rock lobster is bordering on depleted/ heavily depleted (DAFF 2014b). Whereas the stock is still considered to be optimally fished (DAFF 2014b), forward projections made by DAFF in 2014 showed that there would be a deterioration in the West Coast rock lobster stock status in Area 8+, from which most of the global TAC is extracted, if the TAC remained unchanged. This resulted in a reduction in the TAC for the 2014/2015 season (Bergh 2014). The legal harvesting of rock lobsters isn't a threat to their sustainability but rather it is the illegal harvesting that is placing the resource

under pressure and the high levels of illegal fishing in Area 8+, including zone F, are a major concern (Bergh, 2014, Johnston and Butterworth 2015).

The majority (78%) of the fishers interviewed for this study indicated that the availability of West Coast rock lobster is currently sufficient for the permit-holders to harvest the entirety of the individual quota for the season (legal size only). However, the fishers had to return a large number of under-sized rock lobsters back into the ocean. Even the larger rock lobsters in this area were reported to be usually no larger than the legal size or below legal size. The interviewed permit-holders also mentioned that the smaller rock lobsters are generally found just outside of the local MPA, whereas the larger lobsters are found farther offshore. As described in Section 5.2.d, the illegal fishing of rock lobsters revolves mostly around the non-reported catches in both the commercial and recreational fisheries sectors (Herbig 2001). Bergh (2014) referred to widespread reports of increases in the amount of poaching taking place in Area 8+ and "the use of increasingly brazen methods of illegal fishing." Small-scale poaching in this sector occurs even though all the interviewed permit-holders confirmed that they are monitored by the MCS officials when the fishers land the harvested catches in the harbour. This shows that the policing system has weaknesses, which were also observed during this study. Some rock lobsters are offloaded without passing over the scale and are therefore not being deducted from the permit-holders' quotas (Herbig 2001, TJ pers. obs.). It is not only these small-scale IUU fishing activities that are of concern but also the larger - scale IUU fishing activities that harvest fish out of the same area. Catches from the larger-scale IUU fishing were reported during the informal interviews, as being landed in a separate private harbour in Hawston. The large quantities that are acquired in this manner, which was reported during the formal and informal interviews, are a great concern for the sustainability of the rock lobster stocks in the area.

The full scale of illegal fishing for rock lobster is very difficult to determine, both nationally and within areas 12 and 13. It was reported in the DAFF assessment of West Coast rock lobster and setting of annual TACs (Johnston and Butterworth, 2015) that historic poaching from 1990 to 2008 averaged between 250 t (considered less likely scenario) and 500 t (considered the most likely) per year. This is significant as 80% of the poaching is believed to occur in 'Super Area 8' (includes Area 8 and Zone F), in which Kleinmond, Betty's Bay, and Pringle Bay are located (Johnston and Butterworth 2015). The national TAC during much of this period was between 2 000 and 3 000 t, therefore illegal fishing could have been as much as 17 to 25% of the legal catch. The DAFF West Coast Rock Lobster Working Group

developed scenarios for likely trends in poaching in the period 2008-2012. The most likely scenario is believed to have been an increase of 75 t in illegal fishing in Super Area 8. The scenario with the lowest increase was of 25 t for that period.

Linefishery

The linefishery sector harvests several species that include both nomadic and resident linefish species. The current management of the linefish species focuses on maintaining stocks at productive levels (DAFF 2013). A case study by Isaacs's (2013) was done on the small-scale fishing community of Ocean View, in the Western Cape, where the linefishery is the primary fishery, with snoek being the dominant species caught and sold within a strong local market. The author raised concern about the future potential of snoek catches, which could be impacted by the increased snoek bycatch allowance for the established trawling companies. This concern by the fishers was again raised in Raemaekers et al. (2014) that the trawlers were fishing inshore for snoek in the Kleinmond area. Another concern was raised on the availability and catches of linefish within this sector because of the high intra- and interannual variability, particularly with nomadic species such as the snoek. Thus, the fishers' income becomes similarly variable as a result of the inconsistent supply of particular fish. For the past two years, this small-scale linefishery community has had concerns about the low occurrence and catches of snoek in the area. On the positive side, mackerel were caught for the first time in 40 years in the Kleinmond inshore area at the beginning of 2015. When interviewed, the fishers reported that the catches of resident species (in particular the reef species Cape bream) were sustainable and caught in reasonable quantities throughout the year. The other key species for the Kleinmond area also need to be managed accordingly. Challenges arise in the management of the Cape salmon because of their nomadic behaviour, which renders them vulnerable to a number of different fisheries However, the resident reef-dwelling species, Cape bream and the carpenter, face other challenges such as being vulnerable to overfishing by the fisheries in the area.

6.2. Fishing rights allocations and fishing operations

During the interviews, the NSCR permit-holders raised concerns regarding the ending of the West Coast rock lobster long-term rights issued a decade ago and scheduled to expire after

the 2014/2015 season. These rights were issued during the transition period from an experimental rock lobster fishery stage in the Kleinmond area to the issuing of long-term rights for Zone F in the 2003/2004 (Cockcroft et al. 2008, DAFF 2012b). According to the draft fishing rights allocation process (FRAP) on the allocation and management of the West Coast rock lobster (nearshore commercial rights), the maximum initial allocation for the NSCR sector in 2015 will be the same TAC allocation as for the 2014/2015 season for each zone (DAFF 2015a). Similar to the previous policy, the draft for the new rock lobster policy states that the sectoral primary objectives are: to maintain the transformation profile of the industry; and to ensure that the previously disadvantaged fishers associated with the West Coast rock lobster are allocated fair access. This transformation policy forms part of the comparative balancing criteria that are used to assess applicants against each other, with gender used as an important deciding factor (DAFF 2015a). The draft does not cover the number of NSCR fishers who will be issued permits or the approximate quota allocations per individual. The policy, however, states that the permit-holders should anticipate an annual decrease in the TAC if required, and that the permit may be granted for a maximum period of 15 years (DAFF 2015a). This rights allocation policy is currently being finalised and will be followed by a call for new long-term rights applications. The re-issuing of West Coast rock lobster permits to stakeholders is economically vital to coastal communities.

Another objective of the policy is to achieve optimum utilisation and ecological sustainability of the stock of the rock lobster, which is especially important for the Kleinmond area. It is a concern that the allocation of rock lobster for IRP-holders was not discussed in the draft FRAP. DAFF (2015b) released a report in November 2015, stating that the TAC for the NSCR-holders for the 2015/2016 West Coast lobster season will remain the same, and that the IRP sector as a whole would receive a slight increase from 230.1 to 235.3t for the same season.

Regarding rock lobster and linefish, the IRP sector are waiting for the implementation of the Policy for the Small Scale Fisheries Sector (SSFP) (Sowman et al. 2014) so they can determine what species the small-scale fishers may harvest and any other implications that this far-reaching policy may have on the fishers' livelihoods. It clear from the study by Schomer (2009) that the Kleinmond community is vulnerable due to limited livelihood choices. A consequence of this vulnerability is the high dependency on marine resources, which means that the Kleinmond fishing community would be impacted further if there are any additional restrictions on the access to marine resources.

Other concerns relating to the small-scale fishery sector operating out of the Kleinmond Harbour that were raised by fishers and skippers during the interviews include: 1) the number of days at sea have been less than in previous years on account of rougher seas, and 2) because of the rough seas, there is potential risks in launching and landing of boats in the harbour. An assessment on the harbour safety should be done with the aim to increase the potential days at sea and to increase the safety of launching and landing boats.

6.3. Contribution of the small-scale fishery to Kleinmond and the neighbouring communities

This study focused on the value-chain of the small-scale fishery and the contribution of this sector to the livelihoods of the Kleinmond and neighbouring communities. Previous research has shown that the small-scale fishery sector within the Kleinmond community extends beyond the fishers to activities within the fishing industry, incorporating a large number of other community members as well (Schomer 2009, Wentink 2013). The current study has confirmed that a substantial number of community members that are not permit rights-holders are involved in making a livelihood from the fishing industry. These individuals partake in activities that include: preparing the bait; being crew members; skippering the boats; transporting catches; and assisting in the sale of catches.

6.4. Kleinmond fisheries economics

i) Current values and earnings

A primary objective of this study was to demonstrate the contribution, importance and dependency of the community on fishing and the harvested marine resources. The economic models constructed showed that the rock lobster sector is the primary fishery operating out of the harbour in terms of economic value. However, this is not the case with all small-scale fisheries in South Africa and in some cases, snoek and yellowtail are more valuable to the community than rock lobster (Isaac 2013).

It was estimated that West Coast rock lobsters are sold for between R180-270/kg, which allowed the permit-holders to make a reasonable income and livelihood from the resource.

On the other hand, the linefishery sector does not fetch these high prices, even for the most valuable species. Maximum prices of R50/kg were obtained for catches of Cape salmon and kob, approximately one quarter of the prices for rock lobster. This study also reinforced the view of a number of traditional linefishers that were interviewed that the present conditions in the linefishery rendered it to be not economically viable, particularly in recent years when the local availability of snoek was low (Table 5.3.1., Figure 5.5.2. and 5.5.3.). This creates a second problem in that, in addition to low prices, the linefish catches can also be low and insufficient to make a profit.

The results reported in Chapter 5 showed the gross income from the rock lobster fishery for a NSCR-holder was estimated at R93 652 per year. After taking into account the costs, an NSCR-holder who doesn't own a boat would have a net income estimated at R72 000 per year, while the net income for a NSCR-holder who owns a boat and fishes for other quota holders was at R57 000 per year, taking into account depreciation of boat, trailer and a vehicle for towing.

For the linefishery, both a TLF permit holders in the area are boat owners. They were estimated to be able to obtain a gross income of approximately R77 000 per year but their net income, taking depreciation into account was estimated at R 10 800 per year.

For an IRP holder without a boat, the net income for catching rock lobster, linefish, and white mussels was estimated at R24 000 per year. An IRP holder who owns a boat, taking into account his/her running costs, will earn a net income estimated at R32 000 per year after deduction of running costs but if depreciation of the vehicle, trailer and boat is also taken into account the net income was estimated to be a loss of approximately R9 500 per year.

The dynamics of the payments between the fisheries and the boat owners are also different. The relatively low value of landed linefish species means that there is a considerable risk that permit-holders and boat owners can return from a trip with not enough fish to even cover the running expenses of the trip. It is therefore important that linefishers look at opportunities to improve the prices they currently obtain for the harvest catches to ensure that the linefishery can operate at a reasonable profit.

ii) Potential for increasing the value to the fishers

As a small coast town, Kleinmond is highly dependent on the tourism industry as well as the fishing industry. This study supports previous observations by Raemaekers et al. (2014) and Wentlink (2014) that the fishing community benefits from selling locally sourced fishery products directly to local businesses and that there is an opportunity to do the processing and marketing within the community. Currently however, the rock lobsters are processed and sold largely for export by PMCs and the higher- value linefish stocks are sold to wholesalers or langanas for processing. Local business owners that were interviewed reported that the restaurant industry is interested in supporting the local fishery and buying fish directly from the linefishery at current market related prices. This act of empowerment could eliminate the need for the middleman in the value-chain and thereby provide the local fishers with a significant increase in income in relation to the prices they currently receive by selling directly to the middlemen. However, the restaurant owners are concerned about whether the fishers would be able to ensure a constant supply of fish. This concern could be addressed in different ways. If the fishers invest in industrial freezers, for example, to store the harvested fish in times when catches exceed demand, they would be better able to supply high-quality fish to the restaurants, even during the leaner catch times. If the fishers worked cooperatively in selling the harvested fish, they could ensure greater consistency in supply through providing some buffer against variability in individual catches. The restaurants are also willing to pay the same prices for the rock lobster that the fishers are currently receiving from processing and marketing companies, which would mean that they, as buyers, wouldn't have to compete with the US dollar/kg export market. There is a need to simplify and streamline the current regulation in such a manner that it will facilitate the purchase of fish by various markets within the area.

Another potential aspect of the value-chain that the communities could use, with the establishment of a co-operative, would be to allow the community or communities to do the processing and selling of all the harvested marine resources, thereby adding value that would also help to facilitate wealth generation. The extra money currently made by the processing companies could then be earned by the community or communities themselves. Intervention by government in stipulating a minimum price at which the linefish may be commercially sold, similar to that which has been done for IRP-holders in the rock lobster industry, could also provide economic benefits to the community.

Government involvement in countries such as Namibia (Namibia's Fish Consumption Promotion Trust) and the United Kingdom (Marine Conservation Society), in promoting buying and consumption of local fish has been found to be highly beneficial. In these countries, government and non-government organisations have stepped in to raise awareness and promote the consumption of sustainable local fish products (NFCPT 2015, MCS 2011). This proactive marketing drive creates a demand within the market and in doing so allows for increased fish value and an economic gain to the industry (NFCPT 2015).

6.5. Personal and community use

The study showed that none of the permit holders take rock lobsters for personal consumption; all the rock lobster quota is sold through marketing and processing agencies. The rock lobster has a cultural value to the community, however due to being so expensive the community members are unable to afford rock lobster. On the contrary, consuming linefish has a cultural value in the community so the fishers will frequently either catch the linefish for personal use or buy from other permit-holders who caught linefish on a particular day. The traditional linefishers confirmed that there is always a community market where its members wish to buy linefish. This fact was also raised by a retailer, who mentioned that the community prefers to buy fresh linefish straight from the boats landing in the harbour rather than from the retail shops.

This is of particular interest as the supply and demand for personal consumption and the commercial market may differ depending on the fish supply. If large numbers of snoek were available and able to be caught in areas accessible from Kleinmond Harbour, the linefishery could become considerably more valuable as a source of income to the community and the situation there could be comparable to that in Ocean View, as described by Isaacs (2013). However, it would be inadvisable to develop or encourage reliance on only one species and the 'basket of resources' planned for the South African small-scale fishery policy must take into account the likely availability of valuable marine species to particular communities. This is especially important as the local fishers typically do not have the personal economic resources needed to travel large distances outside their area to harvest additional marine resources not locally available.

In a study by Cross (2014), the small-scale fisheries showed a pattern whereby at least one individual within the family would carry on the tradition of working in the fishing industry, not just for social or financial reasons but also from a cultural perspective. However, the results from this study showed that some of the fishers are discouraging the younger generations from working in the industry. This cultural shift stems from the insecurity that many fishers feel regarding the sustainability of the fishing livelihood, as well as the low income that is generated. It may be significant that none of the individuals interviewed in this study were under the age of 30 years old.

6.6. Gaps in knowledge

It must be acknowledged that there are still important gaps in knowledge in understanding and quantifying both the economic value and personal livelihood values of the small-scale fisheries in the Kleinmond area, as well as in identifying opportunities that should help to increase the benefits currently obtained. In particular, the data on the actual catches and uses of linefish by IRP-fishers were found to be patchy and the accuracy of some of the data obtained was uncertain. For more accurate data on the linefish species and quantities that are caught out of the Kleinmond Harbour, there would need to be more prolonged, consistent and reliable monitoring and recording of catches and fishing effort in this fishery. An alternative, or complementary source of these data could be a further, more comprehensive study with monitoring over a full year, where the research takes note of the daily catches by species, how often the linefishers go out to sea, the number of crew members, distances travelled and other data relevant to determining catches and fishing costs. This additional research could also capture the prices obtained, the expenses per fishing boat, how much fish the right-holders retained for personal consumption, and how much fish is commercially sold, in order to determine more accurately the economic value of the fishery and its contribution to personal and community consumption. The financial and personnel resources that would be needed for such detailed monitoring were not available for this study.

It was not in the scope of this study to go into detail on the illegal, unreported and unregulated fishing activities taking place along the Kogelberg coastline. However, as discussed above, the extent to which West Coast rock lobsters are illegally fished is of great concern and there is an urgent need to gain more in-depth understanding on the extent and

nature of illegal fishing to establish whether or not the current management measures for this area are truly sustainable, and to facilitate improved enforcement of regulations.

6.7. Conclusion

The small-scale fishing industry is an important contributor to the personal livelihoods, food security and poverty alleviation of the Kleinmond community and the surrounding towns. The export market for the rock lobster fishery is where most of the financial income for the small-scale fishery is currently being generated. However, there is potential for economic growth from the linefishery and, with the current depleted target resource and threat of IUU fishing in the rock lobster fishery, the linefishery may be more sustainable for the community in the long-term. In addition, the linefishery sector does not focus on a particular species and is therefore less dependent on individual stocks but, on the other hand, it is subjected to interannual variability in catches, particularly in snoek.

For the future sustainability and economic growth of the small-scale fisheries of Kleinmond, Betty's Bay and Pringle Bay, there is a need for proactive intervention by government and non-governmental organisations to improve the livelihoods of the fishers and their families, and to ensure that there are adequate economic benefits to justify the personal and financial investment required, while still minimising the risks of overfishing.

The fisheries as a source of food and money are critical to the livelihoods of the Kogelberg fishers, but currently the fishers can barely make ends meet. However, there are sustainable options that can be implemented to improve the economic variability. There are opportunities to develop the value chain with the local restaurants, organising collectives like co-operatives, being able to address the IUU problem, gaining more support around the concept of value-adding, and developing better fishing operations for linefish and other potential species in the area. These components are critical when addressing the economic viability of the small-scale fishery. Government allocating commercial viable quotas will not necessarily address the livelihoods of the fishers and the local development needs. This research shows that the sustainability and use of the West Coast rock lobster and line-fisheries needs to be approached using the EAF when implementing the small-scale fisheries policy.

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Appendix 1: Questionnaires (3) developed for the interviews:

Remain anonymous? Yes / No

Kleinmond West Coast Rock Lobster Fishery Permit Holders

Date:

1) Type of permit: **IRP / NSCR**
2) Name of interviewee:
3) Age:
4) Number of family members needing to support:
5) How long have you been a fisher:
6) What is your WC rock lobster quota currently:
7) Which community are you from:

Gordon's Bay	**Pringle Bay**	**Betty's Bay**	**Kleinmond**	**Hawston**	**Hermanus**

8) How important is the WC rock lobster for your livelihood?

Importance	**More than 75% of your annual income**	**50 – 75% of annual income**	**25-50% of annual income**	**Less than 25% of annual income**
Comments				

Income:

1) Do you take any WC rock lobster home for personal use? **Yes / No**

2) What percentage of your catch goes to personal consumption?

3) Do you currently sell WC rock lobster to the agents, restaurants, retailers or community? **Yes / No**

i) Which agents, restaurant, retailers or community do you sell to?

_____

ii) What percentage of your catch goes to:

a) Agents
b) Restaurant
c) Retailer
d) Community

4) Selling of the WC rock lobster:

i) What prices do you receive from the following buyers?

Species	Lobster	Comments
Importance ➢ **Agents** ➢ **Restaurant** ➢ **Retailer** ➢ **Community**		

ii) Estimate the kilograms of WC rock lobster caught during the following months

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

iii) What prices have you been receiving for your WC rock lobster catch per month:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Price (live)												
Price (dead)												

5) If you are not selling your WC rock lobster to the local restaurants, retailers or community, would you like to? **Yes / No**

i. If yes, for what prices would you like to sell to them?

_____

ii. What are the obstacles selling lobster to restaurants, retailers or community?

_____

6) What is your average income from fishing (day/ weekly/ monthly/ annually)? **R**

Expenses:

1) Do you own your own boat? **Yes / No**
2) If yes, do you hire your boat to fish, or hire it out to someone else?

_____

3) If you hire it out, how many people do you hire your boat out to?
    a. What price do you charge? **R**
    b. What are your maintenance cost per year? **R**

    c. Maintenance factors, in the cost?

    _____

    d. What is the current condition of your boat?

    _____

4) What costs do you have as a fisher?

a) If you're a boat owner

Cost	Expense (R)	Comment
Boat (Value)		
Boat repair		
Bait		
Petrol		
Equipment value / fishing gear		
Insurance		
Tow / vehicle cost		
Crew (per member)		**Crew size:**
Permit		
Other expenses:		

b) If you don't own your own boat

Cost	Expense (R)	Comment
Boat		
Crew (per member)		**Crew size:**
Permit		
Food		
Other expense:		

5) How often do you have to pay for these expenses?

a. Boat owner

Expense	Period of time	Comment
Boat (replacement)		
Boat (average number of days, your boat goes out for the season)		
Boat repair (out of commission for)		
Bait (how often do you need to buy?)		
Petrol (per trip)		
Petrol (per season)		
Equipment value / fishing gear (time period lasts for)		
Insurance		
Tow / vehicle cost		
Crew (per member)		
Permit		
Other expenses:		

b. If you don't own your own boat

Cost	Expense (R)	Comment
Boat		
Crew (per member)		
Permit		
Food		
Other expense:		

6) What percentage of your income goes towards covering your expenses?

_____

7) Are there any other expenses that you would like to mention?

_____

8) Do you have or need to take out loans?

1. If yes, how much do you take your loans for?

   _____

2. Who do you take your loans from?

   _____

3. How much interest do they charge you?

General:

1) How important do you think is the WC rock lobster fishery for the local community?

Very important	Important	Partially	Not important

a. Explain why you say this?

_____

2) Do DAFF check your permit, quota allowance, boat etc. through MCS? **Yes / No**

a. If yes, how often do they get checked?

Often	Sometimes	Not at all

3) Do you have any concerns about the WC rock lobster fishery? Yes / No
4) Do you have any further ideas or insights for improving the Kleinmond WC rock lobster fishery?

_____

Sustainability:

1. What are the WC rock lobster stocks looking like:

Abundant	Sustainable	Exploited	Depleted	Don't know

a. Why do you say that?

_____

2. When catching WC rock lobster, are they staying in the same area, or are they moving? **Yes / No**

a. If yes, in what direction have they moved?

_____

3. Has the WC rock lobster catch size changed over the last 9 years (permit lengths)? **Yes / No**

a. If yes, could you estimate the size change?

_____

4. Are you able to catch your entire quota over the season? **Yes / No**

a. If yes, how long has it taken you to catch your current quota?

_____

b. If no, why do you think you're not able to catch your entire quota?

_____

5. Over the time period you've been fishing for WC rock lobster, has the catch rate changed (amount of lobster caught, of legal size changed)? **Yes / No**

a. If yes, what is the difference in catch?

_____

b. Could you please, guesstimate the total kg WC rock lobster you sell annually?

_____

…….End of Questionnaire…….

Remain anonymous? Yes / No

Kleinmond Linefishery Permit Holders

Date:

1) Type of permit: **IRP / Traditional commercial permit**
2) Name of interviewee:
3) Age:
4) Number of family members needing to support:
5) How long have you been a fisher:
6) Which community are you from:

Gordon's Bay	**Pringle Bay**	**Betty's Bay**	**Kleinmond**	**Hawston**	**Hermanus**

Income:

1) Do you take any fish home for personal use? **Yes / No**
2) What percentage of your catch goes home?

   _____

3) How important is fish for your livelihood?

Importance	**More than 75% of your annual income**	**50 – 75% of annual income**	**25-50% of annual income**	**Less than 25% of annual income**
Comments				

4) Do you currently sell fish to the local restaurants, retailers or community? **Yes / No**

i) If yes, which restaurant or retailers do you sell to?

   _____

ii) What percentage of your catch goes to restaurants, retailers or community?

e) Restaurant
f) Retailer
g) Community

5) Which of the following species do you currently sell to the restaurants or retailers?

i) Priority species by using number 1 to 4 (1=most important and 4= least important):

Species	Hottentot fish	Snoek	Geelbek	Silverfish	White Mussels	Others (give names)
Importance ➢ **Restaurant** ➢ **Retailer** ➢ **Community**						

ii) Estimates of kilograms sold per week for each species in off peak-season

Species	Hottentot fish	Snoek	Geelbek	Silverfish	White Mussels	Others (give names)
Kgs ➢ **Restaurant** ➢ **Retailer** ➢ **Community**						

iii) Estimates of kilograms sold per week for each species in peak-season

Species	Hottentot fish	Snoek	Geelbek	Silverfish	White Mussels	Others (give names)
Kgs ➢ **Restaurant** ➢ **Retailer** ➢ **Community**						

iv) What prices do you currently get from the restaurant, retailer or community for each species:

Species	Hottentot fish	Snoek	Geelbek	Silverfish	White Mussels	Others (give names)
Price (R) ➢ **Restaurant** ➢ **Retailer** ➢ **Community**						

v) Please mention any other species not mentioned above that you would be keen to fish for?

_____

6) If you are not selling to local restaurants, retailers or community
   iii. Who are you selling your fish to?

   _____

   iv. Would you like to sell to local restaurants, retailers or community? **Yes/No**
   v. What are the obstacles to selling fish to restaurants, restaurants or community?

   _____

7) What is your average income from fishing (day/ weekly/ monthly/ annually)? **R**

Expenses

1) What percentage of your income goes towards covering your expenses?

   _____

2) Do you own your own boat? **Yes / No**
3) Do you use your boat to fish, or hire it out to someone else?

   _____

4) If you hire it out, how many people do you hire your boat out to?
   a. What price do you charge? **R**
   b. Maintenance cost per year? **R**
   c. Maintenance factors, in the cost?

      _____

   d. What is the current condition of your boat?

      _____

5) What costs do you have as a fisher?
   a. If you're a boat owner

Cost	Expense (R)	Comment
Boat (Value)		
Boat repair		
Bait		
Petrol (per trip)		
Petrol (per season)		
Equipment value / fishing gear		
Insurance		
Tow / vehicle cost		
Crew (per member)		**Crew size:**
Permit		
Other expenses:		

b. If you're not a boat owner

Cost	Expense (R)	Comment
Boat		
Crew (per member)		**Crew size:**
Permit		
Food		
Other expense:		

6) How often do you have to pay for these expenses?
   a. If you're a boat owner

Expenses	Period of time	Comment
Boat (replacement)		
Boat (average number of days, your boat goes out for the season)		
Boat repair (out of commission for)		
Bait (how often do you need to buy?)		
Petrol (per trip)		
Petrol (per season)		
Equipment value / fishing gear (time period lasts for)		
Insurance		
Other expenses :		

b. If you're not a boat owner

Cost	Period of time	Comment
Boat		
Crew (per member)		
Permit		
Other expense:		

7) Are there any other expenses that you would like to mention?

_____

8) Do you have or need to take out loans?

_____

   a. If yes, how much do you take your loans for?

_____

   b. Who do you take your loans from and how much is the interest?

_____

General:

1) How important do you think is fishing for the local community?

Very important	Important	Partially	Not important

i) Explain why you say this?

_____

2) When are your best fishing months for each species and how much (kgs) do you catch:
   i) Hottentot:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

ii) Snoek:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

iii) Geelbek:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

iv) Silverfish:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

v) Other species:

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Kgs												

3) **IRP - Are there any other species you would like to fish for:**

Please mention any other species not mentioned above that you would be keen to source from the project.

_____

4) Would you sell your fish in a harbour market, if there was one? **Yes / No**
5) Do DAFF check your permit, quota allowance, boat etc. through MCS? **Yes / No**
   a. If yes, how often do they get checked?

Often	Sometimes	Not at all

6) Do you have any further ideas or insights for that the Kleinmond linefishery?

_____

7) Whom do you prefer to sell your catch to? (preference: 0 - not at all, 1st, 2nd,3rd ,4th, 5th)

Use	Restaurants	Retailer	Community	Harbour/Tourist	Personal
Order					
Comments					

Sustainability:

1. What is your catch allowance for the season?

_____

2. Are you able to catch your entire allowance for the season? **Yes / No**

b) If yes, how long has it taken you to catch your current allowance?

_____

c) In no, why don't you think you're able to catch your entire allowance?

_____

3. What are the line fish stocks looking like:

3.1. Hottentot

Abundant	Sustainable	Exploited	Depleted	Don't know

3.2. Snoek

Abundant	Sustainable	Exploited	Depleted	Don't know

3.3. Geelbek

Abundant	Sustainable	Exploited	Depleted	Don't know

3.4. Silverfish

Abundant	Sustainable	Exploited	Depleted	Don't know

3.5. Other species

Abundant	Sustainable	Exploited	Depleted	Don't know

4. When catching linefish, are the fish staying in the same area, or are they moving? **Yes / No**

4.1. If yes, which species are moving areas?

_____

4.2. In your opinion, what direction are they moving from and to?

_____

5. Have you noticed whether the catch size of any of the linefish species has changed? **Yes / No**

5.1. If yes, which species catch size has changed?

5.2. Could you estimate the size change?

6. Over the time period you've been fishing for linefish, has the catch rate changed (amount of linefish caught, per boat trip)? **Yes / No**

6.1. If yes, what is the difference in catch?

6.2. When did you experience the difference in catch?

6.3. Why do you think there is a difference in your catch?

…….End of Questionnaire…….

KLEINMOND RESTAURANTS AND RETAILERS

Date:

1) Name of business:
2) Name of interviewee:
3) Position in business:

4) Description of business:

5) How important is fresh fish for your business?

Importance	Main product	Important	Useful, struggle without	Not essential, some income	Don't deal with fish
Comments					

6) Do you currently by fish from local fishermen of agents? **Yes / No**

7) If yes, which of the following species do you currently buy from local sources?

7.1 Priority species by using number 1 to 4 (1=most important and 4= least important) on the table below:

Species	**Hottentot fish**	**Snoek**	**Geelbek**	**Silverfish**	**West Coast Rock Lobster**	**White Mussels**	**Others (give names)**
Importance							

7.2 Daily estimates of kilograms for each species in <u>off-season</u>

Species	**Hottentot fish**	**Snoek**	**Geelbek**	**Silverfish**	**West Coast Rock Lobster**	**White Mussels**	**Others (give names)**
Kgs							

7.2.1 Daily estimates of kilograms for each species in peak-season

Species	Hottentot fish	Snoek	Geelbek	Silverfish	West Coast Rock Lobster	White Mussels	Others (give names)
Kgs							

7.2.2 What prices do you currently have with the local fisherman for each species:

Species	Hottentot fish	Snoek	West Coast Rock Lobster	White Mussels	Others (give names)
Price (R)					

7.2.3 Please mention any other species, not mentioned above that you would be keen to source from the local fishers:

_____

8) If you are not buying local fish

vi. Why aren't you buying local fish?

_____

vii. What requirements need to be met before the fishing community could sell fish to your restaurant?

_____

viii. Where are you buying your fish in from?

_____

9) How soon would you like to source fish from the Kleinmond small-scale fishing community?

Now	3 months	6 months	Need more time

10) Given the socio-economic importance of fishing to the local community, will you be prepared to pay more for the small scale fisheries from Kleinmond?

No	Market price	More than the market price	Need more time to consider the price

11) When in Kleinmond are your peak-seasons?

Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec

12) Would you need help with promoting the story of locally sourced seafood to your customers?

If so, in what way?

---

13) Do you have any further ideas or insights that you may have about locally source seafood within Kleinmond?

…….End of Questionnaire…….

Appendix 2: Linefishery base-case model – screen shots

IRP: Inputs				Traditional commercial: Inputs		
Number linefish	25	Asked the community permit holder how many peple they signed for fish in last		Number	2	Fieldwork
Number white mussels	25	only from BB and Klein (PB				
Commission to boat owner fraction of catch	0,5	Fieldwork		Commission to boat owner fraction of catch	0,5	Fieldwork
No of boat owners	6	6 boats are registered with IRP numbers		Boat owners	2	Traditional linefishing permits

Catches and markets		
a) Snoek		
Catch/holder/yr	4	Fieldwork
Proportions sold	0,85	Wentlink, Raemackers et al
Proportions for own consumption	0,15	
b) Cape bream		
Catch - kgs/holder/yr	48	Fieldwork
Proportions sold	0,85	Impression from interviews
Proportions for own consumption	0,15	
Cape salmon		

Catches and markets		
a) Snoek		
Catch/holder/yr	0,0	Fieldwork
Proportions to agents + retailers	0,9	Impression from interviews
Proportions to community	0,1	
Proportions for own consumption	0,0	
b) Cape salmon		
Catch - kgs/holder/yr	380,0	Fieldwork
Proportions to agents + retailers	0,9	Guess, impression from interviews
Proportions to community	0,1	
Proportions for own consumption	0,0	

Cape salmon			Proportions for own consumption	0,0	
Catch - kgs/holder/yr	1	Fieldwork			
Proportions sold	1	Impression from interviews	***c) Cape bream***		
Proportions for own consumption	0		Catch - kgs/holder/yr	3300,0	Fieldwork
			Proportions to agents + retailers	0,0	
Kob			Proportions to community	1,0	Impression from interviews
Catch kgs/holder/yr	1	Fieldwork	Proportions for own consumption	0,0	
Proportions sold	1	Impression from interviews			
Proportions for own consumption	0		***d) Kob***		
			Catch - kgs/holder/yr	20,0	Fieldwork
Carpenter			Proportions to agents + retailers	0,8	Impression from interviews
Catch - kgs/holder/yr	31	Fieldwork	Proportions to community	0,2	
Proportions sold	1	Impression from interviews	Proportions for own consumption	0,0	
Proportions for own consumption	0				

Proportions for own consumption	0				
			Carpenter		
Mackerel			Catch - kgs/holder/yr	1,0	Fieldwork
Catch - kgs/holder/yr	33	Fieldwork	Proportions to agents + retailers	0,7	Impression from interviews
Proportions sold	1	Impression from interviews	Proportions to community	0,3	
Proportions for own consumption	0		Proportions for own consumption	0,0	
White Mussel			***Mackerel***		
Catch - mussel/holder/yr	5489	Fieldwork	Catch - kgs/holder/yr	130	Fieldwork
Proportions sold	0,9	Impression from interviews	Proportions to agents + retailers	0,8	Impression from interviews
Proportions for own consumption	0,1		Proportions to community	0,2	
			Proportions for own consumption	0	

Outputs:					
Gross income per rights holder: IRP			**Gross income per rights holder: Traditional commercial**		
Snoek	40,80		Snoek	0,00	
Cape bream	554,88		Cape Salmon	15 960,00	
Cape Salmon	17,50		Cape bream	59 400,00	
Kob	40,00		Carpenter	0,00	
Carpternter	542,50		Kob	840,00	
Mackerel	330,00		Mackerel	1 170,00	
White mussel	4 940,10				**IRP boat owner**
Mass consumed per rights holder kgs			Annual total runnining trip cost	36 000,00	10 200,00
Snoek	0,60		Annual cost (incl. 25% crew cost)	8 201,50	255,00
Cape bream	7,20		Depreciation cost	41 699,67	0,00
Cape Salmon	0,00		**Net cost (without depreciation)**	44 201,50	10 455,00
Kob	0,00		**Net cost (with depreciation)**	85 901,17	0,00
Mackerel	0,00		Boat commission earned	19 342,50	5 339,88
White mussel	548,90		**Total Gross income per RH**	77 370,00	6 465,78
			Total Gross income per RH & commission	96 712,50	11 805,66
Total Gross income (incl. comsumed) per individ	7 022,48		**Total Gross Income all RH (without commission)**	154 740,00	38 794,68
Total Gross income per individual RH	6 465,78		**Net income per RH (without depreciation)**	52 511,00	1 350,66
Total Gross Income all RH	161 644,50		**Net income all RH (without depreciation)**	105 022,00	8 103,96
Commission to boat owners	762,84		**Net income per RH (commission & depreciation)**	10 811,33	0,00
White mussel cost	2 700,00		**Net income all RH (commission & depreciation)**	21 622,67	0,00
Net income per RH	3 002,94		**Net income per RH (no commission, with depression)**	-8 531,17	0,00
Net income all RH	75 073,50		**Net income all RH (no commission, with depreciation)**	-17 062,33	0,00

Princing: Inputs

PRICES	Average IRP price/kg	TLP price/kg	Comments. All information from interviews
Snoek	12	20	Fieldwork
Cape bream	13,6	18	Fieldwork
Carpenter	17,5	0	Fieldwork
Cape salmon	55	42	Fieldwork
Kob	40	42	Fieldwork
Mackerel	10	9	Fieldwork
White Mussel	1	0	Fieldwork

Expenses: Inputs

Boat owner expenses		White mussel expenses		Comment
Permit cost	535,5	Travel distance (around	160	Only expense travel, use hands to harvest the mussels
Boat value (incl. vehicl	405416,67	Ave. number of trips mad	12	The average number of trips take by the interwied IRP holders
Maintenance cost -per	7250	Diesel (R/trip) (2,7l bakk	250	Andre scott
Equipment value (Capi	11580	Petrol (R/trip) (1,1l Fiat U	200	Ray
Bait -per trip	250	Av. fuel (R/trip)	225	
Petrol -per trip	350			
Fishing equipment - pe	255	**Net cost (R/year)**	2700	
Crew cost (catch)-per tr	0,5			
crew numbers	4			
monthly levies	200			
number of trip made TLF	60			
Catch: Levy (0-2tons)	161			
IRP Number of trips	17			

Appendix 3: West Coast rock lobster Base-case models – screen shot

Average price used in the model, with 4.5-5.5m boat size

Permit Holders, Quotas and markets				
	IRP	**NSCR**	**Comments**	**Reliability**
Number (N)	61	95	Fieldwork	Green
Quota per holder (q)	110,4	423	Fieldwork	Green
Mean fraction to PMC (f_{PMC})	1,00	1,00	Fieldwork	Green
Mean fraction to Agents (f_{AG})	0,00	0,00	Fieldwork	Green
Mean fraction to Local markets (f_{OT})	0,00	0,00	Fieldwork	Green
fraction of dead lobster	0,02	0,02	the % IRP PB had for their season catch, 10kg/4857.6kg of IRP Kleinmond lobster season dead	Green
Number of boat owners	6,00	17,00	There are 6 registered IRP WCRL boats	

Inputs:

Pricing, boat owners commission				
Prices Obtained by Fishers	**IRP Mean R/kg**	**NSCR Mean R/kg**	**Comments**	**Reliability**
PMC (P_{PMC})	225,00	225,00	R/kg given between	Green
Agents (P_{AG})	0,00	0,00	Current no agents being used	Green
Others (P_{OT})	0,00	0,00	Current no agents being used	Green
Dead lobster	100	45	This year R,	Green
Commission to boat owners R/kg	50,00	45,00	Fieldwork	Green
Kg levies	0	3,5	Fieldwork	Green
Permit cost	0	1071	Fieldwork	Green

Outputs:

Permit holders:	**IR**	**NSCR**
Non-boat owners		
Gross income per individual RH	24 564,00	93 652,20
Gross income for all permit holders (TI)	1 351 020,00	7 304 871,60
Levies+permits per RH	0,00	2 551,50
Boat owner commission per RH R/kg	5 520,00	19 035,00
Net income per individual (IL)	19 044,00	72 065,70
Net income of all RH without boats	1 047 420,00	5 621 124,60

Boat expenses				
	Boat	Larger boat	Comment	Reliability
Boat Size (m)	4,1 - 5,5	7,80	calculations from boat	Green
Boat cost (incl. car, outboards, trailor)	405 416,67	650 000,00	cost for the boat,	Green
Annual maintenance cost (incl.trailer & vehicle)	7 250,00	19 200,00	calculations from boat expenses	Green
Fuel cost lobster(towing & fishing) - per trip	923,28	1 800,00	Fuel used per trip	Green
Bait cost -per trip	658,49	1 000,00	Average bait cost obtained	Green
Equipment cost (gps	11 580,00	13 400,00	On board safety equipment	Green
Fishing equipment cost - per year	6 486,83	15 600,00	average total equipment	Green
Monthly levies	200,00	200,00	VMS monthly levies - More than half the boat	Green
Crew R/Kg (per trip)	9,60	15,00	average crew is paid	Green
Skipper R/kg (per trip	9	10	average skip	Green
Number of trip NSCF	32	20	Average trip made	Green
Number of trip IRP	15	9	Average trip made	Green

Permit holders:	IRP	NSCR	IRP	NSCR	IRP	NSCR
Commissions received per individual boat owner	50 600,00	87 337,06	50 600,00	87 337,06	50 600,00	87 337,06
Gross income from own quota	24 564,00	93 652,20	24 564,00	93 652,20	24 564,00	93 652,20
Total gross income per boat owner	75 164,00	180 989,26	75 164,00	180 989,26	75 164,00	180 989,26
Gross income for all boat owners	450 984,00	3 076 817,40	450 984,00	3 076 817,40	450 984,00	3 076 817,40
Average cost - bait and fuel	23 991,60	50 527,36	23 991,60	50 527,36	23 991,60	50 527,36
Annual costs	30 137,61	53 641,89	19 661,87	31 579,54	19 661,87	31 579,54
Annual depreciation costs (vehicle, trailor, boat @ 10% per year)	41 699,67	41 699,67	0,00	0,00	41 699,67	41 699,67
Net cost for season	95 828,87	145 868,92	43 653,47	82 106,90	85 353,14	123 806,57
Net income per individual boat owner with permit	-20 664,87	35 120,34	31 510,53	98 882,36	-10 189,14	57 182,69
All boat owners net income with permit	-123 989,25	597 045,75	189 063,15	1 681 000,08	-61 134,85	972 105,75
Net income of all boat owners and non-boat-owners	923 430,75	6 218 170,35	1 236 483,15	7 302 124,68	986 285,15	6 593 230,35
Total income	7 141 601,10		8 538 607,84		7 579 515,50	