



Final research report on a study to boost local economic development through marine resources: A perspective of the Local Government SETA

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...sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations...

National Environmental Management Act

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Introduction

Small scale fisheries (SSF) in Africa play a critical role in food production, economic development and in the keeping of many traditions and cultures alive. Within the top ten world producers of fish from inland fisheries, Africa comprises three countries: Uganda, Nigeria and Egypt (www.foa.org). Collectively, total production of inland fisheries in Africa is estimated to be approximately 2.5 million tons per annum. Employing millions of people as fishers or within the value chain, it has often been cited that fish is the most traded commodity in Africa, much of it being informal.

Furthermore, what makes small scale fisheries so relevant to the people of this continent is that, while the high seas around the continent are productive, the fish caught there are largely caught by international trawlers and often are not landed in continental Africa. Marine fish that are landed in Africa are also often prepared for export to the international market at premium prices, therefore making it inaccessible to the poor and vulnerable of the continent.

Small-scale fishing in South Africa is practised from Port Nolloth in the Northern Cape Province to Kosi Bay in Kwa-Zulu Natal and plays a very important role in food production, job creation and economic development along the South African coastline. For many coastal communities, fish and fishing is very much part of their history and cultural identity. One example of this is the Kosi Bay fish traps of the Tsonga, a traditional fishery that has existed for many centuries. Small scale fisheries contain more than just the fishing component. It also includes the upstream and downstream economic opportunities. These include the building of boats and their maintenance, fishing equipment sales and the value-added processing of fish further down the value-chain creates many jobs and economic opportunities, particularly for women. While traditionally men have played a leading role in

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the actual fishing, women have a high degree of participation in post-harvest activities, such as the processing and trading.

The history of SSF in South Africa is intertwined with South Africa's history. In the pre-democratic era, small scale fishers were largely excluded from the legal framework. As most SSF were of colour, they faced a situation that the legislation only catered for the needs of commercial and recreational anglers. It was only during the democratic era that government addressed this issue, firstly with the Marine Living Resources Act (MLRA) and then with the Small Scale Fisheries Policy. It was in this policy that SSF really received recognition from government and with that the priority to better manage and develop this sector.

The SSF sector has great deal of competition with other sectors that target the same resources. These include the commercial sector and the recreational sector. In South Africa the participation rate in marine recreational fisheries is thought to range between 500 000 (McGrath et al., 1997) and 900 000 (Leibolt and van Zyl, 2008) anglers. These significantly outnumber the small-scale ($n = \pm 5000$), and subsistence fishers ($n = \pm 15\ 000$) which also target linefish (fishes captured using hook and line) species, and their annual harvest is also far greater. This potential disproportionate harvest – between recreational and SSF – should be an area of concern to fishery managers, especially in view of the socio-economic imperatives that government is trying to achieve. Besides not requiring the fish for their livelihoods, recreational fishers are also different from commercial, small-scale and subsistence fishers as their motivations for fishing are not only catching fish (Arlinghaus et al., 2013). Several other factors, such as relaxation and spending time outdoors in nature also motivate individuals to “go fishing” (Arlinghaus et al., 2016). When fish stocks decline, commercial fishers eventually reach a point when it is no longer commercially viable to go out to sea. However, for recreational anglers, since fishing is not driven by livelihoods factors alone, they continue to fish, possibly fishing harder, applying even greater pressure on fish stocks (Arlinghaus et al., 2013).

The South African government is currently placing much emphasis on the development of the small-scale and subsistence sectors. However, if recreational harvest is not appropriately managed, the potential for expansion or even to sustain the existing SSF

would not be achievable – due to the decline in fish stocks. Therefore, the achievement of social and economic goals in the National Development Plan could be unrealistic. Ultimately, if one wants to benefit needy fishing communities, and address social injustice, addressing the illegal harvest of recreational fishers should be a government priority.

One of the major problems with recreational fisheries is their high rate of non-compliance to regulations. This study has begun to quantify the scale of non-compliance in the recreational fishery sector, and most importantly the relationships between non-compliance of the recreational fishers and small-scale fishers. This is the first study of this nature in South Africa, and it is clear that more work needs to be done in this area of research. Studies have clearly shown that non-compliance in any fishing sector is considered a major factor contributing to the decline of fish stocks. Therefore, the first step to remedy the declining stocks and open up resources for the small-scale and subsistence sectors is to rectify the issue of non-compliance amongst recreational anglers. To address this, this report aims to assess the extent of South Africa's marine recreational fisheries, to quantify the degree of non-compliance, to examine the degree of overlap in the species composition of the shore-based recreational and subsistence fisheries, outline the institutional arrangements and governance structures tasked with promoting compliance in the fishery and finally to recommend a path forward for municipalities to improve the situation.

Situational Analysis

The Branch Fisheries Management, of the Department of Agriculture Forestry and Fisheries (DAFF) is the lead governmental agency responsible for the management of South African fisheries and legally mandated to ensure compliance of fishers with regulations set forth by the MLRA. Aside from protecting the integrity of the country's marine and coastal resources, DAFF is tasked with managing the development and sustainable use of marine and coastal resources and maximising the economic potential of the fisheries sector.

South Africa has the third largest coastline in Africa (2,800 km) among which the angling population is widely dispersed and includes a characteristically diverse range of demographics. Much of this vast coastline is not easily accessible, which includes many

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fishing locations that require the use of 4x4 vehicles or esoteric knowledge of their whereabouts. Other parts of the coastline are dangerous to access due to infrastructure conditions as well as the local treatment of someone viewed as an interloper. Overcoming these challenges for improving enforcement is a heavy burden for DAFF to tackle alone. The result is that some areas receive significantly less attention than others with regard to law enforcement.

This lack of enforcement in some areas has led to an increase in the contravention of the regulations set forth in the MLRA as users' illegal activities continue undetected. This poor enforcement leads to a "tragedy of the commons" scenario, which will ultimately result in an overutilization of the resources, which could have devastating impacts at various levels of the economy and for vulnerable coastal communities. If this behaviour continues; unobstructed by law enforcement, acting as a violator could become the societal norm (Bova et al., 2017). Contraventions to linefish regulations have been documented back at least 20 years when a study found that roughly 32% of recreational fishers admitted to illicit angling behaviour (Brouwer, Mann, Lamberth, Sauer, & Erasmus, 1997). Since then, with decreasing levels of compliance, it is likely that there has been an increase in non-compliance within the South African recreational fisheries.

Fish stocks throughout the world have declined and South Africa is no exception. Information that is available and is based on historical assessments suggests that the populations of 18 of the most important linefish species are classified as collapsed, 1 species is classified as over-exploited, 6 are optimally exploited and 2 are under-exploited (Anon, 2016). The problems of overexploitation are exacerbated by the large overlap in the species composition between the commercial, recreational, small scale and subsistence fishery is also a major concern. It means that all sectors are competing for the same resources and as government tries to develop small-scale and subsistence fisheries as part of its plan towards eradicating extreme hunger and poverty, which is one of South Africa's Millennium Development Goals, this may tip the fish populations over the point of no return.

Unsurprisingly, SSF are increasingly finding it difficult to be economically viable, however, as this is largely the only trade they know and with few other opportunities

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available, they have no option but to continue to fish at potentially lower profits. With this loss in income, SSF are in some cases “forced” to fish outside the regulations to ensure they can provide for their families. The tensions and frustrations that the SSF then face are often directed at municipal and local government, which to them, represents the face of the government. These frustrations are sometimes shown as service delivery protests, which local municipalities are tasked with resolving.

There is now anecdotal evidence that the children of SSF see no future in fishing and are not entering this sector. As jobs and incomes are diminishing, the future existence of a tradition of small-scale fishing comes into question. This lack of tradition in a growing youth population could result in negative social impacts in a society where many youths’ lifestyles include the abuse of alcohol and drugs. These are social issues which will further burden the budgets of local municipalities.

As previously mentioned, the management of fisheries in South Africa is a national competency under the Department of Agriculture, Forestry and Fisheries (DAFF). All functions of the fishery component of DAFF are centralised. There is currently no provincial delegation. While this does not mean that DAFF does not engage with the provinces or for that matter with local government, there is criticism that this engagement is not substantial. Considering that South Africa has an extensive coastline and that its Exclusive Economic Zone (EEZ) extends 200 nautical miles (370km) out to sea, the area of management under DAFF is significant and as such, it has been argued, that DAFF should consider decentralising its management responsibilities. This decentralising to the provinces and local government would best work for inshore and coastal resources and in particular issues such as recreational and small-scale fisheries.

For many coastal municipalities, their most important resources are derived from the sea. A dichotomy occurs when their mandate is to lead local economic development (LED) while they are in fact largely excluded from the planning, management and development of the utilization of their marine resources. This mismatch between a direct function of local government and a national department is a lost opportunity. Current Integrated Development Plans (IDP) of many coastal municipalities do not include a large focus on the management small-scale and recreational fisheries. However an often mentioned threat

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to the sectors' sustainability has been the inability to prevent illegal use and harvest of coastal resources

The Integrated Coastal Management (ICM) Act that was promulgated in 2009 offers a new approach to managing the activities of people in the coastal zone. One of the main objectives of ICM is to provide within the framework of the National Environmental Management Act, for the coordinated and integrated management of the coastal zone by all spheres of government in accordance with the principles of co-operative governance. Municipalities are expected to develop a Coastal Management Plan (CMP) aimed at effectively managing local coastal and estuarial resources in conjunction with DAFF and other coastal resource managing parties.

It is argued that decentralising some of DAFF fisheries functions, or at least developing a strong working relationship between DAFF and local government would be a win-win scenario for the management of resources. Some of the workload would be taken from DAFF allowing for more efficient allocation of budget resources and local governments would effectively plan the best way to beneficially manage their marine resources.

What is being advocated is not to provide local government a *carte blanche*, as they would still need to work within the Marine Resources Living Act (MLRA) and the Small Scale Fisheries Policy, but rather through training and technical support to better equip them for managing inshore coastal resources for utilisation in a way that optimises sustainable development.

The transition from a strongly centralized system to a multi-tier system (including local municipalities) of management and development of inshore resource utilization has the potential to unlock much needed local opportunities. Local governments are geared up for LED and as a result, such a transition could translate into jobs, economic development and a more sustainable approach to marine resource utilisation.

Aside from SSF, the development of the recreational fisheries sector, which in effect is a tourism activity, can increase job creation and economic development. However, this will not be possible without improved management and for this to be done successfully local

government will need to play a role. The same is true for the small scale fisheries sector as its relevance to livelihoods and social cohesion cannot be underestimated. However, the resources for these sectors need improved management and methods to add value to the catch of small scale fishers by incorporating them into the value chain should be explored. By doing this, the fishers should be able to earn more for their fish, thereby increasing the economic value of the sector.

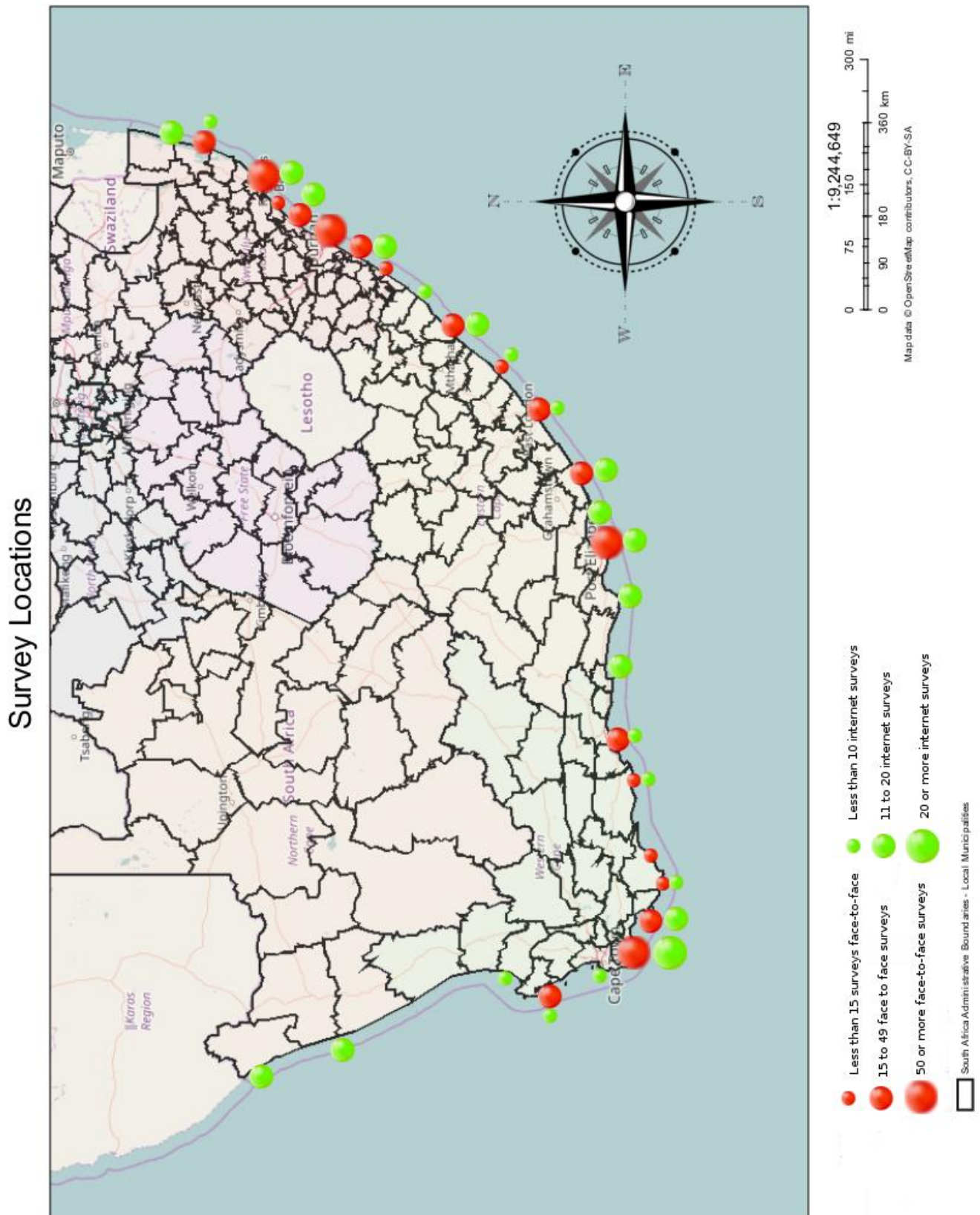
A major drawback of recreational fisheries management is the lack of enforcement by fisheries managing bodies to prevent the illegal harvest of fish. Any contravention of the regulations set forth in the MLRA can result in collapsing fish stocks which can have catastrophic effects on coastal communities and the economy of South Africa as a whole. Determining the severity of non-compliance in the recreational fishery is the first step to understanding how to better manage the sector. It is also important to understand the impact that a lack of enforcement presence has on the behaviour of fishers.

Methodology

Study Area

The study, which took place over a five month period, covered the entire coastline from Port Nolloth on the West Coast of South Africa around the southern coastline and up to Kosi Bay on the East Coast (Fig. 1). Popular fishing spots at the three major coastal municipalities of Durban, Port Elizabeth and Cape Town represent much of the coastal recreational angling population in South Africa were included in the study. Additionally, less densely populated areas which contain fishing spots popular for recreational fishers, such as the Transkei, Zululand, Garden Route and West Coast were targeted for survey participation. The fishing areas where surveys were undertaken were then categorised by geographic setting in order to analyse the data. Geographic setting refers to corresponding population and infrastructure levels of the surveyed location. These categories include “Urban”, “Peri-Urban” and “Rural” locations.

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Survey Methods

Determining the extent of non-compliance in the recreational fishery is a challenge that researchers and fisheries managers have approached in several different ways (Gavin, Solomon, & Blank, 2010). Routine contacts by law enforcement are a typical measure of compliance levels, however limited levels of enforcement allows violators to conceal evidence of their criminal behaviour rendering the data unreliable (Cowles, Beattie, & Giles, 1979). Covert and direct behavioural observations are another method applied in order to formulate the number of violators (Agnew, 2000); however, the capital intensive nature of this approach has reduced its feasibility for use on a broad scale (Allard & Chouinard, 1997). A less resource intensive procedure for obtaining compliance rates is through the administration of surveys. During these surveys anglers are requested, to state whether or not they have been compliant with regulations, while researches assure them of confidentiality (Bova, Halse, Aswani, & Potts, 2017; Solomon, Jacobson, Wald, & Gavin, 2007).

Within the study time frame, using random roving creel surveys, over 600 participants of the coastal rock and surf fishery were questioned face-to-face. The term *creel survey* is applied to sampling surveys that target recreational anglers. The name comes from the woven wooden basket, called a creel that anglers use to hold captured fish while they continue fishing. Traditionally, these surveys are conducted on-site at access points along the water (Jones, 2006). For these surveys, researchers would begin at one end of a fishing location and interview all anglers encountered during their walk to the other end. The questionnaires requested information on a participants compliance behaviour with regards to seven different regulations that these anglers are expected, by law, to adhere to (Permits, Size Limits, Bag Limits, Closed Seasons, Prohibited Species, Closed Areas and Bait/Tackle restrictions). This was done by asking whether or not they had violated a regulation at least once in the previous 12 months. Only participants who identified themselves as recreational fisherman were included in the survey.

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When requesting information in survey questions which is subject to public disapproval, researchers must take care to ensure that the answers given by the respondent are honest. Self-reported responses recorded through direct questioning methods are most commonly subject to social desirability bias (SDB) due to the implication of guilt to criminal activity (St. John, Edwards-Jones, Gibbons, & Jones, 2010; Thomas, Gavin, & Milfont, 2014; Warner, 1965). Typically, due to self-preservation concerns, survey responses will under-record socially undesirable activities and over-record those perceived as socially desirable (Sjöström & Holst, 2002).

Various techniques have been developed in attempts to eliminate or control the potential for bias when requesting such sensitive information by making questions less direct (St. John et al., 2010). The “unmatched count technique” (Ahart & Sackett, 2004; LaBrie & Earleywine, 2000), variations of the “random response technique” (Blank & Gavin, 2009; Coutts & Jann, 2011; Moshagen, Hilbig, Erdfelder, & Moritz, 2014; Schill & Kline, 1995; Solomon et al., 2007; Thomas et al., 2014), “norminative technique” (Bova et al., 2017; Droitcour Miller, 1985; St. John et al., 2010) and the use of a ballot box are methods most commonly utilised in behavioural research for providing the respondent with greater perceived confidentiality.

A comparison of these methods by comparing direct observation of an angler to their stated behaviour indicated that a ballot box method yields the highest rate of honest answers as well as it being much less complicated than other methods (Bova, unpublished data). As a result, the ballot box method (BBM) was chosen as the method for obtaining honest answers about angler compliance behaviour. The BBM allows the survey respondent to fill out a confidential portion of the questionnaire themselves, without the interviewer having any knowledge of their response. After the respondent completes the questions, they “tear” the page from the survey, fold it and then place it in a pre-locked box that resembles a voting ballot box. This guarantees the respondent with confidentiality and encourages honest answers. Each questionnaire contains a unique control number so that the folded page that is placed in the ballot box can later be reunited with the survey it originated. The BBM has been used successfully in health studies that examine sexual behaviour (Gregson, Zhuwau, Ndlovu, & Nyamukapa, 2002).

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Aside from enquiries about regulatory compliance, anglers were questioned on their perceptions of detection, enforcement and penalties relating to violations of the various recreational fisheries activities. Questions regarding how often anglers have witnessed laws being enforced, what they perceive their chances of being caught breaking a regulation are and their perceptions of the associated penalties for breaking regulations were included in the questionnaire. This series of questions was to determine whether or not a perceived low risk of penalty resulted in a higher rate of non-compliance. The questionnaire also gathered data on how legitimate they perceived the regulations to be as well as whether or not they feel that compliance with the various regulations is important.

Participation was voluntary, however, due to an offered incentive in the form of a "lucky draw" competition, nearly all anglers agreed to participate. The participation rate of surveys is of great importance to researchers. High response rates, such as the one in this research, ensure that results are representative of the target population, which will produce accurate and useful results. Additionally, these data were supplemented through the use of online surveys. A website was created which hosted the online survey and the survey page was shared among social media groups as well as online forums that relate to recreational shore angling.

Data were organised into different geographic categories. They were analysed at the national level, the coastal provincial level (where sample size was relevant) (Table 1) and then by geographic setting (Table 2). Geographic setting refers to corresponding population and infrastructure levels of the surveyed location which were categorised into "Urban," "Peri-urban," and "Rural."

South African shore angling participation estimates

The number of recreational anglers by province and nationally were estimated using two methods. The first method used the available recreational permit purchase data from DAFF for the 2015/2016 year. The number of individuals that purchased a permit was enumerated and this was corrected using the estimates of non-compliance for the regulation of having an angling permit. The second method used a nationwide online questionnaire that was sent out to recreational anglers in 2015/2016. This questionnaire aimed to estimate the economic

spend by anglers. However, it also recorded the names and birth dates of each angler who filled in the survey. The names of the anglers that filled in the questionnaire were matched to the recreational licence data and the proportion of anglers without a recreational permit was used as a multiplier to estimate the true number of recreational anglers from the permit data. This data was calculated by province and then nationally.

The overlap between marine shore-based recreational and subsistence fisheries were examined using a desktop analysis. Published works on the catch composition of the fisheries were obtained and the overlap of important target species for each fishery was determined.

Results

Results from the national level, which includes all participants, indicates that overall non-compliance was generally high, with approximately 43% of respondents admitting to violating at least one regulation on at least one occasion over the previous 12 months. Roughly 14% admitted to contravening multiple regulations at least one time over that same period. The most common violations include: fishing without a permit (14.7%), keeping (14.1%) or using undersized fish as bait (13.2%) and exceeding bag limits (9.9%) (Fig. 2).

Permits are required in order for fisheries managers to properly regulate the recreational fishery. The Eastern Cape had the highest prevalence of fisherman violating this regulation with 22.2% admitting to having fished without a permit. Kwa-Zulu Natal anglers indicated a significantly lower rate of fisherman operating without a permit (7.6%). As far as geographic setting is concerned, there was not a significant difference between the percentages of violators of the permit regulation.

Minimum size limits were introduced by fisheries managers to prevent the overharvest of various species by protecting them at vulnerable stages of their life-cycle and allowing them to reach sexual maturity (Homans & Ruliffson, 1999). The Western Cape anglers

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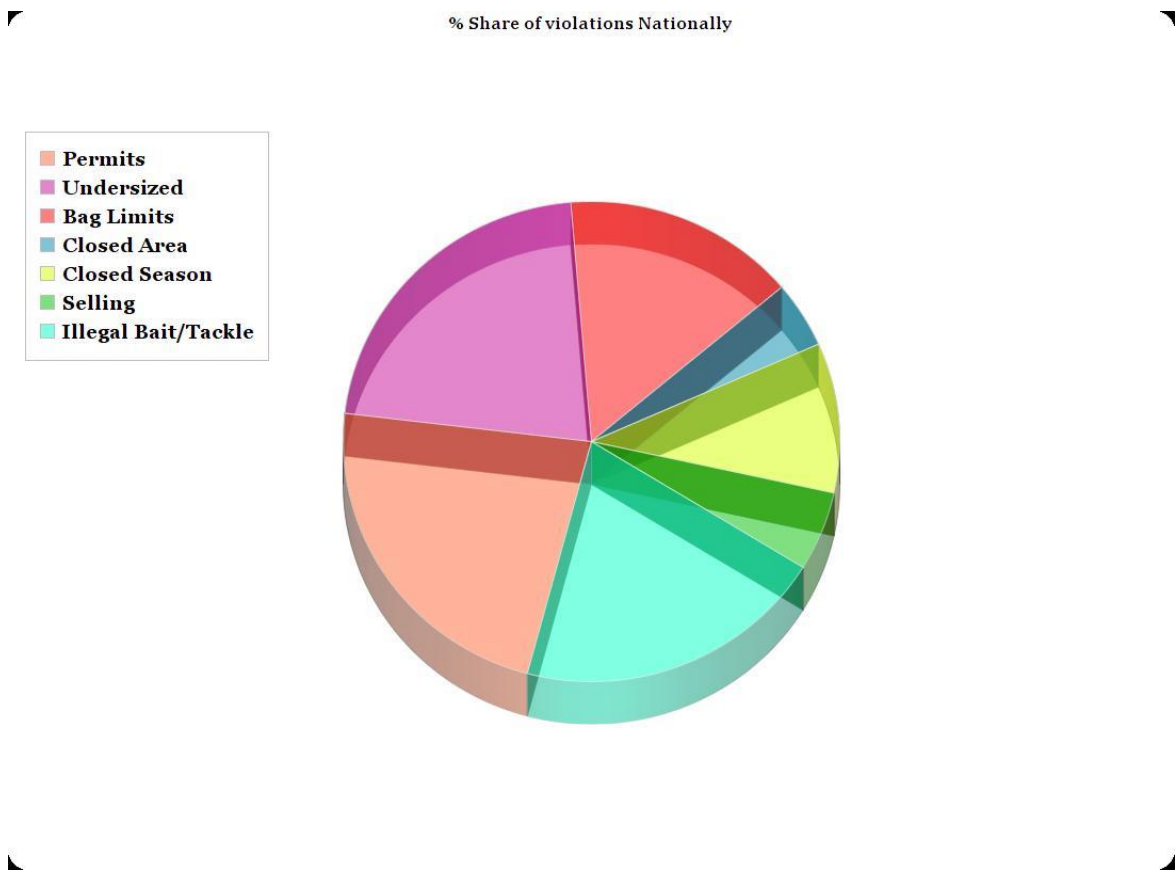
were the least compliant (15.5%) of minimum size regulations followed by those from KZN (14.1%). Anglers did not consider using undersized fish for bait as “keeping” them and therefore acknowledged their use of undersized fish in the “Illegal bait and tackle” category. Here anglers from KZN were by far the largest violators, where 18.70% of all anglers interviewed admitted to using illegal bait, followed by anglers from the Eastern Cape (15.6%). Urban anglers were also most likely to violate minimum size limit regulations (14.2%). Geographic setting did not however seem to influence likelihood of using illegal bait or tackle.

Individual daily bag limits are intended to reduce overall fishing mortality of fish populations. The Western Cape (10.9%) and KZN (10.5%) anglers were the higher violators for this regulation. In rural areas, many fishers admittedly kept more than their daily bag limit (14.7%).

Fishing in closed areas, keeping fish during their closed season and selling fish were violations that were less likely to be committed by anglers. The highest percentage of violations of these regulations occurred in the Western Cape (Table 1).

Figure 2: Pie chart showing the percentage of the violations committed by recreational anglers at the national level

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Table 1: Percentage of violators per regulation at National and Provincial levels

Violation	National	EC	WC	KZN
Permits	14.7%	22.2%	15.5%	7.6%
Undersized	14.1%	10.3%	15.5%	14.1%
Bag Limit	9.9%	5.6%	10.9%	10.5%
Closed Area	2.9%	2.4%	3.8%	1.8%
Closed Season	6.5%	4.7%	9.2%	3.5%
Selling	3.5%	1.6%	5.0%	2.3%
Illegal Bait/Tackle	13.2%	15.6%	7.5%	18.7%

Table 2: Percentage of violators per regulation at each geographic setting

Violation	Urban	Peri-urban	Rural
Permits	14.7%	12.6%	14.1%
Undersized	14.2%	10.9%	10.5%
Bag Limit	7.6%	8.2%	14.7%
Closed Area	1.8%	1.1%	5.7%
Closed Season	6.6%	4.4%	5.2%
Selling	2.5%	0.6%	4.7%
Illegal Bait/Tackle	12.8%	13.1%	13.0%

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The majority of the recreational anglers felt that there was a very low probability of being detected when breaking a regulation. This was primarily due to the low levels of perceived enforcement. KZN anglers felt that there was a higher chance of detection for fishing without a permit. This province also reported a significantly lower amount of violators for the permit regulation.

Anglers at some fishing locations indicated that the current fines for corresponding violations are too low or that they weren't even aware what the fines would be. Many participants indicated that they had not heard of anyone ever being fined. The fishing areas where anglers perceived the lowest risk of being detected while breaking a regulation also had higher amounts of reported violations per person. Likewise, perceived high levels of enforcement have a lower number of admitted violations (Table 4).

Table 3: Perceived chance of detection by law enforcement for violating regulations

Chance of Detection	Permits	Undersized	Bag Limit	Closed Area	Closed Seas	Selling	Bait
Very Low	42.0%	43.6%	39.7%	28.5%	38.2%	46.7%	44.3%
Low	27.7%	32.2%	33.9%	27.6%	34.2%	34.0%	33.3%
Not High or Low	9.2%	9.1%	11.0%	13.1%	12.1%	10.2%	11.0%
High	16.5%	12.0%	10.8%	25.6%	11.7%	7.1%	8.3%
Very High	4.4%	3.1%	4.6%	5.2%	3.8%	1.9%	3.1%

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Table 4: Percentage of violations by participants that perceived "High Enforcement" vs. participants that perceived "Low Enforcement."

Violation	High/Very High	Low/Very Low
Permits	8.1%	12.6%
Undersized	9.2%	12.1%
Bag Limit	8.3%	15.7%
Closed Area	1.7%	3.8%
Closed Season	3.4%	7.5%
Selling	2.8%	5.2%
Illegal Bait/Tackle	9.5%	13.5%

Although perceptions of current enforcement levels in many fishing areas are low and in some cases fishers have taken advantage of this for illicit activities, the majority of the recreational angling population agreed with the legitimacy of the regulations and that fishers should remain compliant. Open ended suggestions by the participants often included comments about increasing the levels of enforcement. This was not only argued on behalf of ensuring the success of the regulations, but also due to the fact that many fishers indicated that they would feel safer with a law enforcement presence around. It appears that overall, increased levels of enforcement would be supported by recreational anglers.

The estimated number of marine shore-based recreational anglers ranges from 263 542 (first method) to 310 376 (second method) individuals. Based on the results from the first method Kwa-Zulu Natal has the most shore-based recreational anglers (95 183), followed by the Eastern Cape (79 432), Western Cape (72 423) and the Northern Cape (16 504).

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There are both direct and indirect economic opportunities for local municipalities. Once management responsibility is devolved from DAFF to the municipality, the income from the fines for non-compliance could accrue to the municipality. Although many of the recreational anglers are multiple offenders (eg. every time an individual fishes without a permit, they break a regulation), based on our survey 43% of recreational anglers admit to breaking at least one regulation each year. If we conservatively assume that on average, the 43% of anglers break a regulation twice in each year, then the incidences of non-compliance are staggering. At a national level, recreational anglers break the regulations at least 226 646 times each year. Each of these occasions represents an opportunity for income earning by the local municipalities. For example, the average fine for fishing without a recreational permit is approximately R300, although it varies by municipal district (Durban = R1000, Port Elizabeth = R300, Hamburg = R50) while the average fine for retaining an undersized fish varies (R100 – R1000) depending on the susceptibility of the species. Therefore, if enforcement officers at the local municipality were to apprehend 100 non-complying anglers per month with an average fine of R300 the income to the municipality would be R30 000 per month.

Besides the economic potential of recreational fisheries enforcement by local municipalities, our results show that compliance is higher in areas with high levels of enforcement. This means that increases in enforcement will reduce non-compliance and in so doing free up resources for the small scale and subsistence fishery sectors. For example, if we assume that the anglers who do not comply to size limits (14.1%) , bag limits (9.1%) and closed seasons (6.5%) infringe on each of these regulations by retaining one additional fish on two occasions each year, then the number of illegal fish captured in the recreational fishery would be over 1 500 000. Although this is extremely high, it is however, quite possible that this figure is an underestimate.

The impact of the illegal recreational fishing harvest on subsistence fishers becomes apparent when one examines the overlap of important target species for the two fisheries (Table 5). Two of the three primary target species in the subsistence fishery were also primary target species along the West Coast. All primary target species of subsistence

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fishers were also important targets for the recreational fishery along the Southern Cape, Eastern Cape and Kwa-Zulu Natal coasts.

Table 5: Primary target species (by region) of recreational¹ and subsistence² fishers in South Africa. Red cells indicate overlap between the sectors in each region.

West coast		Southern Cape		Eastern Cape		Kwa-Zulu Natal	
<i>Recreational</i>	<i>Subsistence</i>	<i>Recreational</i>	<i>Subsistence</i>	<i>Recreational</i>	<i>Subsistence</i>	<i>Recreational</i>	<i>Subsistence</i>
White stumpnose	Mullet	Shad	Dusky kob	Shad	Dusky kob	Shad	Shad
Galjoen	Hottentot	White Steenbras	Mullet	Dusky kob	Shad	Streepie	Kob
Mullet	White stumpnose	Galjoen	Galjoen	Bronze bream	Bronze bream	Blacktail	Streepie

1 = Brouwer et al (1997), 2 = Branch et al (2002)

Beside direct competition with the recreational fishery, the known population status of these primary target species is also concerning (Table 6). For those where there is scientific information the populations of all species are either collapsed (< 25% of pristine levels), two are overexploited (between 25% and 40% of pristine levels) and only one species optimally exploited (between 40% and 50% of pristine levels). However, the majority of these assessments were done at least 15 years ago, suggesting that the populations could be even more depleted.

Table 6: Status of most important linefish in the small-scale and subsistence fisheries. Shad = Govender 1997, Dusky kob = Griffiths 1997, Galjoen = Attwood 2003, White stumpnose = Arendse 2011, Hottentot = Winkler et al 2012, Mullet = Lamberth, unpublished data.

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Common name	Scientific name	Last assessment	Status
Shad	<i>Pomatomus saltatrix</i>	1996	Overexploited
Dusky kob	<i>Argyrosomus japonicus</i>	1997	Collapsed
Galjoen	<i>Dichistius capensis</i>	2003	Collapsed
White stumpnose	<i>Rhabdosargus globiceps</i>	2006	Collapsed
Bronze bream	<i>Pachymetopon grande</i>	Not assessed	Unknown
Hottentot	<i>Pachymetopon blochii</i>	2011	Optimally exploited
Blacktail	<i>Diplodus capensis</i>	Not assessed	Unknown
Mullet	<i>Liza richardsonii</i>	2010	Overexploited

Conclusion

One of the aims of this report was to demonstrate the severity of non-compliance in the recreational fishery. However, an initial aim was to ensure that the information that we collected from anglers was in fact accurate. The pilot study, which used direct undetected observation of angler behaviour and then compared this to their stated behaviour using a range of collection techniques, suggested that the ballot box method was the most accurate and therefore appropriate for the surveys. Using this method, our estimates of non-compliance in the South African marine recreational shore-based fishery appears to be a real concern. Based on our findings, South Africa has over 100 000 non-compliant marine shore-based recreational anglers. Based on our conservative estimates, these anglers may harvest over 1 500 000 fish illegally each year. The results also show that fisheries compliance is better in areas that have increased levels of enforcement and that local municipalities can create income earning opportunities and reduce the exploitation pressure on coastal marine resources (and by extension, improve the livelihoods of coastal communities) by initiating enforcement initiatives. Importantly, recreational anglers would also prefer an increase in enforcement activities, which will reduce the conflict around the implementation of these activities.

Small scale fisheries and the recreational fishery are an integral component of South Africa's coastal communities. The composition of these fisheries is laden with South

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African tradition and historical context. In local communities, they provide food, employment, local income and recreation for much of the population yet are often overlooked when it comes to resource management. Current mismanagement or at least a lack of efficient management poses a threat to the sustainability of coastal resources and the future of these fisheries. This is exacerbated by the overlap in targeted fishing effort between the subsistence and recreational fishing sectors (Table 5) and by the poor status of the populations of the target species (many of their populations have collapsed, Table 6).

The results of this study highlight the importance of improving the efficacy of the management of our coastal fisheries. In the absence of visible governance of these marine resources, users will often take advantage of a lack a consequence for perceived personal gains. This type of behaviour in the recreational fishery, if unchecked, can become the social norm (Bova et al 2017) which would represent a devastating future for the livelihood of coastal communities. This is due to the overexploitation of many coastal species without fisheries managers' knowledge. It is obvious from these results that an increase in the level of enforcement will have a positive effect on the compliance of fishers to MLRA regulations.

DAFF is limited in its ability to manage all aspects of South Africa's coastal fisheries resources. The complexity of the coastline and fisheries coupled with their lack of resources makes it incredibly difficult to manage a fishery as dispersed as the recreational fishery. Therefore, improvements within the current enforcement capacity of DAFF are highly unlikely and our research suggests that the low perceived enforcement levels, spells a bleak outlook for the futures of both SSF and the recreational fisheries.

As highlighted in the ICM, municipalities have the ability to formulate integrated management plans at all levels of government to protect their coastal and estuarial resources. It is possible for municipalities to include municipal law enforcement in their coastal management plans. This would eliminate the reliance on DAFF to effectively manage coastal fisheries resources as well as create opportunities for local fishing sectors.

Recommendations

It is recommended that coastal municipalities engage with DAFF to facilitate the devolution of fisheries enforcement responsibilities and that these municipalities include a law enforcement component in their Coastal and Estuarial Management plans in order to ensure the long-term sustainability and utilisation of coastal resources.

Though the South African Local Government Association (SALGA) coastal municipalities need to reach consensus to determine if they want to play a greater role in the development and management of marine resources. It is proposed that by means of a national workshop, this issue could be discussed and then a decision made. At the workshop the roles and functions of DAFF and the LED responsibilities of local government would be discussed and a decision would then need to be made on how best to align these two functions.

There is also a need to further strengthen and capacitate officials at local government. Officials who engage with LED, IDP and tourism need to have skills development regarding marine resource utilisation issues. This skills development would need to be wide ranging. From legislation to biological issues, it has often been found that local government officials are at times not familiar with national legislation (such as the MLRA) and therefore are not in a position to request national departments to fulfil their mandates. There is also a need to train local government officials on some of the basic principles of fisheries management and marine ecology. Having a basic understanding of these principals will assist local government officials in making better management decisions.

There is still further research required to determine how to better understand the interplay between recreational and small scale fisheries. Fisheries management is a dynamic process. Relationships between sectors are complex and as such, there is need to better understand this relationship. How to best manage fisheries and ensure that resource utilisation is optimal to the country, while simultaneously addressing the needs of the users, requires research or accurate information for decision makers to make informed decisions.

There is also need for further research to determine just how municipalities will need to prepare for and maintain this extra responsibility. At the local government there tends to be

a deficit of skilled people and as such, there will be need of further investigation to evaluate the needs in order to enable local government to rise to this challenge.

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Appendix -Presentation

The recreational fishery is an important economic sector



- Deep Sea R6,8 bill
- Surf/Shore R2,5 bill
- Light Boat R285 mill
- FW Bank R3,9 bill
- Fly-fishing R3,5 bill
- Artificial Lure R267 mill
- Bass R1,2 bill
- Carp R260 mill
- Match Angling R22 mill
- Underwater R52 mill
- **TOTAL R18,8 b**



Research on the potential of inshore linefish species for LED and to identify the role of Local Government



DAFF is the national competency

DAFF sets the rules regarding recreational fisheries.

- Bag size
- Minimum size
- Open / closed seasons
- Species lists
- Not selling fish
- Regulations around bait



Why are there rules?



- Bag limits (protect species from overconsumption)
- Size limits and closed seasons (protect various species during vulnerable life stages)
- Closed areas (allow sanctuaries for population recovery)
- Bait and tackle restrictions (which limit the amount of effort)
- Permits (allow for proper management of fish stocks based on participation levels)

Is DAFF providing effective compliance in the recreational fishery sector?



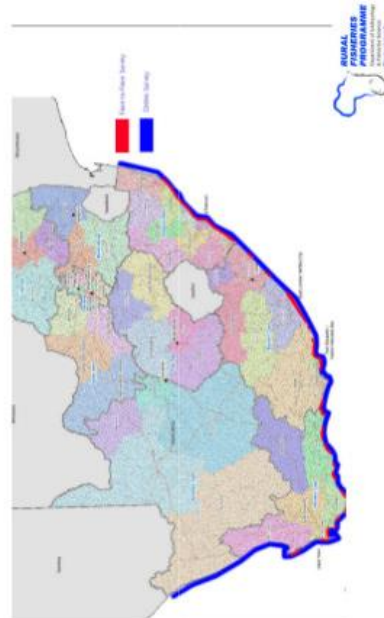
- The recreational fishery sector occurs along most of South Africa's coastline.
- It's an important contributor in the tourism industry
- Compliance is poor
- What is the "cost" of poor compliance

Methods

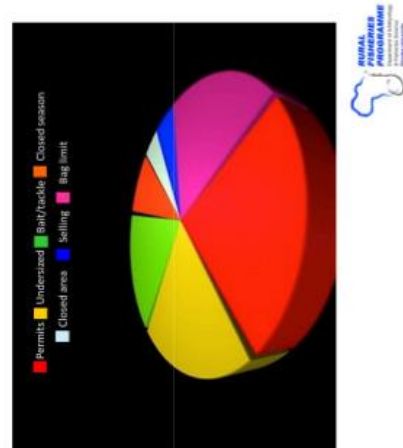
- Administration of both face-to-face and online surveys
- Focused on on recreational fisherman
- In order to obtain honest responses, ballot-box method was employed
- Questions regarding observed enforcement of regulations were also asked in order to associate a link between perceived enforcement and illegal behavior



Study site



Results



Over 700 surveys completed
Roughly 43% of anglers admitted to being non-compliant to at least one regulation on at least one occasion over a 12-month period (14% >1)
Most common violations are permits, size limits and bait/tackle restrictions



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Geographic setting

Violation	Urban	Peri-Urban	Rural
Permits	14.70%	12.60%	14.10%
Undersized	14.20%	10.90%	10.50%
Bag Limits	7.59%	8.20%	14.70%
Closed Area	1.78%	1.10%	5.73%
Closed Season/Prohib spec.	6.55%	4.37%	5.21%
Selling	2.52%	0.56%	4.69%
Illegal Bait/tackle	12.80%	13.10%	13.00%

National and Provincial

Violation	National	EC	WC	KZN
Permits	14.70%	22.20%	15.50%	7.60%
Undersized	14.10%	10.30%	15.50%	14.10%
Bag Limits	9.85%	5.56%	10.90%	10.50%
Closed Area	2.89%	2.36%	3.77%	1.76%
Closed Season/Prohib spec.	6.53%	4.69%	9.17%	3.51%
Selling	3.45%	1.57%	4.98%	2.34%
Illegal Bait/tackle	13.20%	15.60%	7.47%	18.70%

Perceived enforcement

Chance of detection	Permits	Undersized	Bag limit	Closed Area	Closed Seas	Selling	Bait
Very Low	41.65%	43.60%	39.65%	28.52%	38.24%	46.72%	44.32%
Low	27.97%	32.17%	33.85%	27.55%	34.23%	33.98%	33.33%
Not high/low	9.20%	9.11%	11.03%	13.10%	12.05%	10.23%	10.98%
High	16.48%	12.02%	10.03%	25.63%	11.60%	7.14%	8.29%
Very High	4.41%	3.10%	4.64%	5.20%	3.82%	1.93%	3.08%

- Using 5-point Likert Type scale ranging from ("Very Low" to "Very High" participants were asked the likelihood of being caught violating each regulation.
- Overall perceptions of regulations actually being enforced were low (>70%). Over 40% indicated "Very Low"

Effects of perception

- 54% of fisherman stated that they "Never" or "Rarely" (less than twice a year) see the fishing regulations being enforced.
- Of these 54% who perceive detection of activities to be "Low" to "Very Low" based on lack of visible policing, 69% violated at least one regulation.
- Majority of the participants stated that fines are low and ~10% didn't know what the fines would be (due to lack of formal structure).



Potential drivers behind non-compliance

- Perceived detection and enforcement of regulations and expected penalties
- Knowledge of regulations
- Perceived legitimacy of regulations
- Social acceptability of violating regulations



Status of most important linefish in the small-scale and subsistence fisheries

Common name	Scientific name	Last assessment	Status
Shad	<i>Pomatomus saltatrix</i>	1996	Overexploited
Dusky kob	<i>Argyrosomus japonicus</i>	1997	Collapsed
Galloen	<i>Dichistius capensis</i>	2003	Collapsed
White stumpnose	<i>Rhabdosargus glabiceps</i>	2006	Collapsed
Bronze bream	<i>Pachymetopon grande</i>	Not assessed	Unknown
Hottentot	<i>Pachymetopon blochii</i>	2011	Optimally exploited
Blacktail	<i>Diplodus capensis</i>	Not assessed	Unknown
Mullet	<i>Liza richardsonii</i>	2010	Overexploited



Overlap between species of fish caught

- The main fish that are targeted for consumption in the recreational fishery are often the same species that small-scale fishers target.

Top target species (by region) of recreational and subsistence fishers in South Africa

	West coast	Southern Cape	Eastern Cape	Free State
Recreational	Subsistence	Recreational	Recreational	Recreational
Shad	Shad	Shad	Shad	Shad
Dusky kob	Dusky kob	Dusky kob	Dusky kob	Dusky kob
Galloen	Galloen	Galloen	Galloen	Galloen
White stumpnose	White stumpnose	White stumpnose	White stumpnose	White stumpnose
Bronze bream	Bronze bream	Bronze bream	Bronze bream	Bronze bream
Hottentot	Hottentot	Hottentot	Hottentot	Hottentot
Blacktail	Blacktail	Blacktail	Blacktail	Blacktail
Mullet	Mullet	Mullet	Mullet	Mullet

Red indicates significant overlap!!!!



- Non-compliance with these regulations undermines the very reason for their existence.
- Results in collapse of fish stocks for recreational fishery all the way through to small-scale fishery. (Threatens food security)
- Collapse in fish stocks lead to collapse of fisheries (recreational, subsistence, small-scale and commercial) which will have catastrophic effects on the economy. (Lost jobs and income)
- Understanding the rates of compliance to regulations and how to improve them is necessary in order to prevent this from happening.



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When there isn't enough fish for small-scale fishers



What if...

- Local government engaged with DAFF and played a bigger role in managing and developing marine resources?
- Local government employed fishery inspectors, on a cost recovery basis?
- Local government accessed government funded training programmes to up skill its staff?
- What if the reduced fishery pressure from recreational anglers is used to offset the needs in the small scale fishery sector?



Marine Living Resources Act

Delegation of powers

79. (1) The Minister may—

- (b) by notice in the *Gazette*, delegate any power conferred upon him or her in terms of this Act, excluding the power to make regulations, to an authority in the local sphere of government.



Richthersveld's plan

- Support the 70 learnerships in fish processing at Port Nolloth
- Support the upgrading of the fish processing facility and the jetty
- The Richtersveld is a conservation area. The main economic sectors are: mining, agriculture, fishing, tourism
- The availability of fish from the sea is also becoming problematic and this make aquaculture a viable alternative to traditional sea-fishing methods.

DAFF FISH FARMING DEVELOPMENT PROGRAMME
RICHTERSVELD MUNICIPALITY ESTABLISHED
DEVELOPMENT PLAN 2002/2003



How strong is your engagement with DAFF?

- Are there agreements with DAFF on how much of the commercial fishery catches that operate offshore from Port Nolloth is landed in the town to keep the factory commercially viable?
- Are there engagements with DAFF on the workings of the subsistence fishery in Port Nolloth?



Municipalities...the front desk of government

- When government fails to deliver, regardless of which tier of government is responsible, local government bear the brunt.



Conclusion

- In the development, management and surveillance of the recreational fishery, the role and functions of local government is significantly underutilized.
- The inclusion of local government in compliance of the recreational fishery could improve the small scale fishery. By improving the SSF sector it would directly enhance LED.
- Local government would need to take the initiative and approach DAFF.



-Report on meeting with Richtersveld Municipality,
24 March, Port Nolloth



Report prepared by:

Q. Rouhani



Report on meeting with Richtersveld Municipality, 24 March, Port Nolloth

Introduction

Within the scope of this study, was to engage with the local Municipalities to assess what the current situation on the ground was and to get feedback from them with regards to the results and recommendations of the research. For the Northern Cape Province, the municipality selected was Richtersveld Municipality. Within this municipality is Port Nolloth, the largest fishing town in the Province. There is a large commercial and small scale fishery sector in Port Nolloth, targeting species such as the west coast lobster and snoek. These fisheries are limited to the near shore, due to the size of boats and fishing permits they have. There is large industrial fishery in the Northern Cape Province that operates further out to sea, but these trawlers essentially operate from Cape Town (Western Cape Province) and as such all of their catches are landed in Cape Town – and there in lies the problem for Port Nolloth.

Meeting held in Port Nolloth

To prepare for the meeting with the local municipality and to ensure that the research team was better informed, meetings were held with representatives from the small scale fishers as well as the compliance officer from DAFF.

Meeting with Ms Rosie Malan, a small scale fisher / fish shop owner

23 March, 2017 at the fish factory.

Ms Rosie Malan, owns a small boat and is recognised as a small scale fisher by DAFF, has an exemption and a quota, and also operates a fish shop. She buys fish from the local fishers and sells them to commercial buyers and to the general public as well. In her interview she indicated the following:

- A fish processing factory was built in Port Nolloth around 1915 (at that time her mother used to work in the factory).
- The factory used to land hake, snoek, yellowtail, mousebunker, angle fish, “red” fish and kray fish.
- There were large ships that operated off the coast of Port Nolloth, bringing the fish to the factory, the last ship to bring fish to Port Nolloth was called the Oviston, in 1996.
- Since then, fishing ships have been operating in the area, but they now land their catches in Cape Town. This has resulted in the factory closing, many jobs were lost and the economy of the town has suffered greatly.
- DAFF has allocated 77 fishers in Port Nolloth with Small Scale Fisheries (SSF) exemptions (permits), and another 39 fishers have near shore exemptions.
- Both the near shore and SSF fishers have similar boats. Approximately 4.5 meter boats with 30 – 40 hp outboard engines.
- The SSF have a combined quota of 10,626 kg of crayfish per year. Some of the SSF have individual quotas for 807kg while the others have a quota for 403kg (it was not clear why different fishers had different quotas).
- At the beginning of the fishing season (October) the price that the commercial buyers were offering the SSF for the crayfish was R 350 / kg. Now at the end of the season (April), the price has dropped to R 200/kg. The SSF are essentially price takers, they are not included in the value chain or marketing of their catches.
- Due to the rough seas (and fog), Rosie estimates that they can only fish about 50 – 60 days in a year. This makes earning a stable income difficult.
- The costs of using their boats when they go fishing are high. For each fishing trip, the operating costs are, R 350 for petrol, R 480 for bait and R 50 for oil. This totals to R 880. This does not include the cost of labour to help with the fishing.

Meeting with Mr Cornelius Mfenyana, DAFF compliance officer, 23 March, at the DAFF offices in Port Nolloth

Mr Mfenyana is compliance officer for DAFF and has been stationed in Port Nolloth for the last seven years. In his interview he indicated:

- There are two compliance officers in his office (including himself) and they have to patrol 300km of coast line. From Alexandria bay (which is on the border to Namibia) to the town of Garies.
- He re-affirmed the numbers of SSF and the quotas they are allocated by DAFF.
- As part of the exemptions they have from DAFF the SSF are also allowed to catch 100 snoek, 42 cape bream and 10 yellowtail per day.
- SSF have to come into the harbour by 4pm. Near shore fishers can come in by 5pm.
- In the seven years he has been present at Port Nolloth, there have not been any formal meetings between DAFF and the local municipality to discuss the management and development of the marine resources.

Meeting with Richtersveld Municipality, 24th March, at the local municipality offices.

The research team was liaising the Mr Abraham de Wet, who is the LED / IDP officer for Richtersveld Municipality. There seemed to be some miscommunication with Richtersveld municipality with regards to the date of the meetings, so it was unfortunate that the Municipal Manager or the Strategic Manager were not able to attend, as they were getting ready for the financial end of year processes. However, a representative from the Mayors office and from COGTA were present.

The presentation was made and there followed a discussion on the points raised. Mr de Wet indicated that he would be raising the issues discussed with the relevant structures. Some of the more salient points discussed included:

- The Marine Living Resources Act (MLRA) gives local municipality the possibility of playing a far greater role in developing and managing its marine resources. The only section that local government cannot play a role in with regards to the MLRA is in relation to regulations (such as minimum size of fish that can be caught, quotas, seasons for fishing etc.).
- Currently there is very little (if any) engagement between DAFF and the local municipality. In the seven years that he has been there have not been any substantive engagement between the two institutions with regards to the management and development of fisheries.



Attendance Register

Research Project: the potential of inshore linefish species for LED and to identify the role of Local Government

Date: Municipality

Participant	Institution	Contact Number	Signature
1. Mervin - John S. Bock	Dept. CoGHS TA	bmaivino@yhdoo.com	
2. Graham de Wet	Richt. Mun.	0786260121	
3. Beulah Williams	Richt. Mun.	0730739681	
4. Arthur Rouben	Rhodo Univ.	beulah@richesid.gov.za	
5.		0121437303	
6.			
7.			
8.			
9.			
10.			
11. Arthur Jansen	Moyot	083 723 2510	

Survey

Shore Angler Questionnaire

Department of Ichthyology and Fisheries Science



RHODES UNIVERSITY
Where leaders learn

Consent

The purpose of this research project is to identify various factors involved in the compliance of recreational fisheries regulations. This project is being undertaken by the Department of Ichthyology and Fisheries Science at Rhodes University. You have been chosen to participate in this research since you participate in recreational angling.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. You may refuse to answer any questions.

The procedure involves asking questions about yourself, including your age, education, income and various behaviours and beliefs involving recreational fishing regulations and takes approximately 15 minutes to complete. Your responses will be confidential and we do not collect any information that can be used to identify you personally.

Your privacy is important and all data are kept confidential. To help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only. This research is not affiliated with any law enforcement agency and this information will not be used in any way that could cause harm to you.

If you have any questions about the research study, please contact Christopher Bova (csbova@gmail.com). This research has been reviewed according to Rhodes University ethics procedures for research involving human subjects.

Choosing the "agree" box below indicates that:

- you have read the above information
- you voluntarily agree to participate
- you are at least 18 years of age

1. I _____ with the conditions provided above

Mark only one oval.

- ☐ Agree
☐ Disagree

2. Fishing Location

name of site/beach

3. Is fishing the main reason for visiting this location?

Mark only one oval.

- ☐ yes
☐ no

4. What is your MAIN reason for fishing?

Mark only one oval.

- ☐ Sport/Competition
☐ Socializing with friends
☐ To sell fish to supplement my livelihood
☐ To feed my family
☐ To get out of the house
☐ Other: _____

5. How many times do you go rock and surf fishing per year?

estimate if unsure

6. Which angling magazines do you read?

check all that apply

Check all that apply.

- ☐ I don't read angling magazines
- ☐ Rock Surf and Deep
- ☐ Go Fish
- ☐ Fishing SA
- ☐ SA Baars-Bass
- ☐ INWATER
- ☐ Anglers Talk
- ☐ The Bank Angler - Die Oewerhengelaar
- ☐ The Fishing and Hunting Journal
- ☐ Tight Lines
- ☐ Other: _____

Proceed to Ballot Questions

Hand angler the questionnaire that attached by paperclip, ask them to fill it out truthfully and place it in the box, assuring them that nobody will know their answers as there is no identifying information on the ballot. Also remind them that you are not affiliated with Law Enforcement and nothing they answer will be used in a way that can identify them.

Compliance

7. Choose the response that best applies to your view of recreational fishery law enforcement

Mark only one oval per row.

	Never	Rarely	Sometimes	Frequently	Every Time
I have seen recreational fisheries laws being enforced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Please clarify whether you **STRONGLY DISAGREE**, **DISAGREE**, **SLIGHTLY DISAGREE**, **50/50 AGREE AND DISAGREE**, **SLIGHTLY AGREE**, **AGREE** OR **STRONGLY AGREE** that the following fishing regulations are necessary measures in order to sustainably maintain the recreational fishery

Mark only one oval per row.

	Strongly Disagree	Disagree	Neither agree or Disagree	Agree	Strongly Agree
Fishing License Requirement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Releasing Undersized Fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Closed Seasons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bag Limits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selling Fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Closed Areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prohibited Species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bait and Tackle restrictions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please clarify whether you **STRONGLY DISAGREE**, **DISAGREE**, **50/50**, **AGREE**, **STRONGLY AGREE** or **DON'T KNOW** that the penalties for the following actions are severe?

Mark only one oval per row.

	Strongly Disagree	Disagree	Neither agree or Disagree	Agree	Strongly Agree	DON'T KNOW
Fishing without a LICENSE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping UNDERSIZED fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exceeding your BAG LIMIT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fishing in a CLOSED AREA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping a fish that is prohibited, including during a closed season	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SELLING fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using PROHIBITED BAIT and Tackle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please indicate whether your chances of being caught for the following regulations are: **VERY LOW, LOW, 50/50, HIGH or VERY HIGH**

Mark only one oval per row.

	Very Low	Low	Not high or low	High	Very high
Fishing without a license	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping undersized fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exceeding your bag limit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fishing in a closed area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping a fish that is prohibited, including during a closed season	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selling fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using prohibited bait or tackle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Please indicate whether you feel it is **TOTALLY UNACCEPTABLE, UNACCEPTABLE, 50/50, ACCEPTABLE or TOTALLY ACCEPTABLE** for an angler to violate the following regulations.

Mark only one oval per row.

	Totally Unacceptable	Unacceptable	Neither Acceptable or Unacceptable	Acceptable	Totally Acceptable
Fishing without licenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping undersized fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exceeding your bag limit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fishing in a closed area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping a fish that is prohibited, including during a closed season	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selling fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using prohibited bait or tackle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. If 100 fisherman were checked for a license, how many would not have one?

13. If 100 people fish without a license, how many do you think will get caught by law enforcement?

14. If 100 people were able to catch undersized fish, how many would keep them?

15. If 100 people keep undersized fish, how many do you think will get caught by law enforcement?

16. If 100 people caught a prohibited species, including fish that are only prohibited during certain seasons, how many do you think will keep the fish?

17. If 100 people keep a prohibited species, including fish that are only prohibited during certain seasons, how many do you think will be caught by law enforcement?

18. Have you ever been caught breaking a regulation by law enforcement?
Mark only one oval.

- ☐ Yes
☐ No
☐ prefer not to answer

19. If Yes, which one(s)?
Check all that apply.

- ☐ Licenses
☐ Undersized fish
☐ Bag limits
☐ Closed Areas
☐ Closed Season
☐ Prohibited species
☐ Selling fish
☐ Prohibited bait or tackle

Demographic Information

20. **Nationality**
what citizenship do you claim

21. In which city/town do you reside?

22. Which Fishing Clubs do you belong to?

Eg. RASSPL, SASAA

Mark only one oval.

- ☐ I Don't belong to a fishing club
- ☐ Other: _____

23. Race

Mark only one oval.

- ☐ Black (African)
- ☐ Coloured
- ☐ Indian
- ☐ White
- ☐ Other: _____

24. Gender

Mark only one oval.

- ☐ Male
- ☐ Female
- ☐ Other: _____

25. Age

round to nearest year

26. Employment Status

Mark only one oval.

- ☐ Employed
- ☐ Unemployed and looking for work
- ☐ Unemployed and not looking for work
- ☐ Retired
- ☐ Student
- ☐ Other: _____

27. What is the highest level of education you have completed?

Mark only one oval.

- ☐ Pre-matric
- ☐ Matric
- ☐ Tertiary
- ☐ Postgraduate
- ☐ Other: _____

28. What is your personal monthly income?

Mark only one oval.

- ☐ 0 - 499
☐ 500 - 999
☐ 1000 - 2499
☐ 2500 - 5000
☐ 5000 - 10000
☐ 10000 or more

29. Have you taken this questionnaire before?

Mark only one oval.

- ☐ Yes
☐ No

30. If Yes, When?

Mark only one oval.

- ☐ Less than a year ago
☐ Over a year ago

31. Comments

Note the Comments thought and the section which they are in.

Secret Ballot

Secret Ballot

Your answers can not be used to personally identify you in any way.
Answer questions and place ballot in box.
All answers are confidential.
Please be honest.

1. Have you fished without a license in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

2. Have you kept an undersized fish in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

3. Have you kept more than your bag limit in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

4. Have you kept any fish during their closed season in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

5. Have you fished in the closed area of a Marine Protected Area (MPA) in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

6. Have you sold any fish caught that you caught off the beach in the last 12 months?

Mark only one oval.

- ☐ yes
☐ no

7. Have you used any prohibited tackle or methods in the last 12 months? eg. used an undersized shad as live bait

Mark only one oval.

- ☐ yes
☐ no
-