Stilbaai Marine Protected Area: Residents' perspectives

Progress report to the Southern Cape Interdisciplinary Fisheries Research Project (SCIFR) and South African Research Chair in Marine Ecology and Fisheries (SARChi ME&F)
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Abstract:

Based on research conducted by myself and colleagues as part of the South Cape Interdisciplinary Fisheries Research Project, I present an overview of residents' perspectives on the Stilbaai Marine Protected Area. The research shows that despite some fragmentation of governance, there are opportunities, and a general willingness, to engage in activities that take care of the local environment, that serve to educate about ocean-positive behaviours and engage visitors more meaningfully on the benefits and value of the Stilbaai Marine Protected Area. Problems that residents perceive to be associated with the Marine Protected Area are noted, and suggestions are made to enhance a sense of caretaking, or *sorgskap*, within the community.

Background:

As part of the Southern Cape Interdisciplinary Fisheries project (SCIFR), funded through the South African Research Chair Initiative by the DST/NRF[2] of which I have been a part since its beginning, I recently spent a total of three weeks in Stilbaai over the course of five months (September 2018 to January 2019) investigating the perspectives of residents towards the Stilbaai Marine Protected Area (SMPA). This period of fieldwork built on my 13 years of research experience in the Western Cape fisheries sector, including a month spent in Stilbaai during my doctoral research.

The initial motivation for my research was to investigate the status of the SMPA at the conclusion of its first decade of existence, and to contribute to the understanding of the local marine social-ecology that the SCIFR project had thus far generated.

In the course of my initial conversations with Jean du Plessis (Stilbaai Conservation Manager, Cape Nature), we discussed the possible outputs of such research and how they could be tailored be of use to his organisation and the greater Stilbaai community. We agreed that

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[2] See appendix for the SCIFR project document that details the intention, progress and outputs of this project.

outcomes detailing problems relating to governance and compliance would not particularly useful in and of themselves. Instead, highlighting positive or constructive insights into the role of the SMPA in the daily lives of Stilbaai residents would be of better use. As such, this document suggests processes or activities that represent possibilities for long-term, sustainable interactions with the SMPA by Stilbaai residents. I talk of this as "amplifying stewardship" or, in Afrikaans, "*om sorgskap te bevorder*" (to develop a sense of taking care).

Introduction:

The SMPA is an interesting case for several reasons. Firstly, it consist of a variety of distinct habitats that function as a system; secondly, it is part of local patchwork of protected areas that cut through and surround the adjacent human settlement; thirdly, it's existence is largely uncontested, making it distinct from a number of South Africa's other MPAs, which are heavily contested by adjacent communities. Sowman and Sunde (2018) note, in their overview of perceptions towards MPAs in several South African communities that had historically enjoyed access to the fishing grounds that were now protected (for example, Tsitsikamma MPA and West Coast National Park), that they encountered "overwhelmingly" negative attitudes towards MPAs in their work. In Stilbaai, however, residents are fairly accepting of its presence *at this point in time*, though there were some objections during the public participation process (Duggan, 2012; Pers. Comm. Jean du Plessis and Colin Attwood with myself).

While there was indeed some displeasure voiced at certain times by, for example, small-scale fishers from Melkhoutfontein, the chaos of the Small Scale Fisheries Policy implementation means that their current lack of permit or clarity on the allocation process and the recent lack of catchable fish, are currently their chief concerns, over and above however they may feel about the establishment of the SMPA (Gammage, 2019). There is also anecdotal evidence that fishers (mainly recreational) consider the MPA a good thing, as there is the assumption that it has created a local abundance of fish populations. This often leads to fishing directly on the boundary line of the Controlled and Restricted areas by recreational and commercial fishers alike. This is 'boundary fishing' behaviour that I have witnessed frequently for myself, and was regularly told about by CapeNature employees, respondent and (in previous research) the local fisheries inspectors.

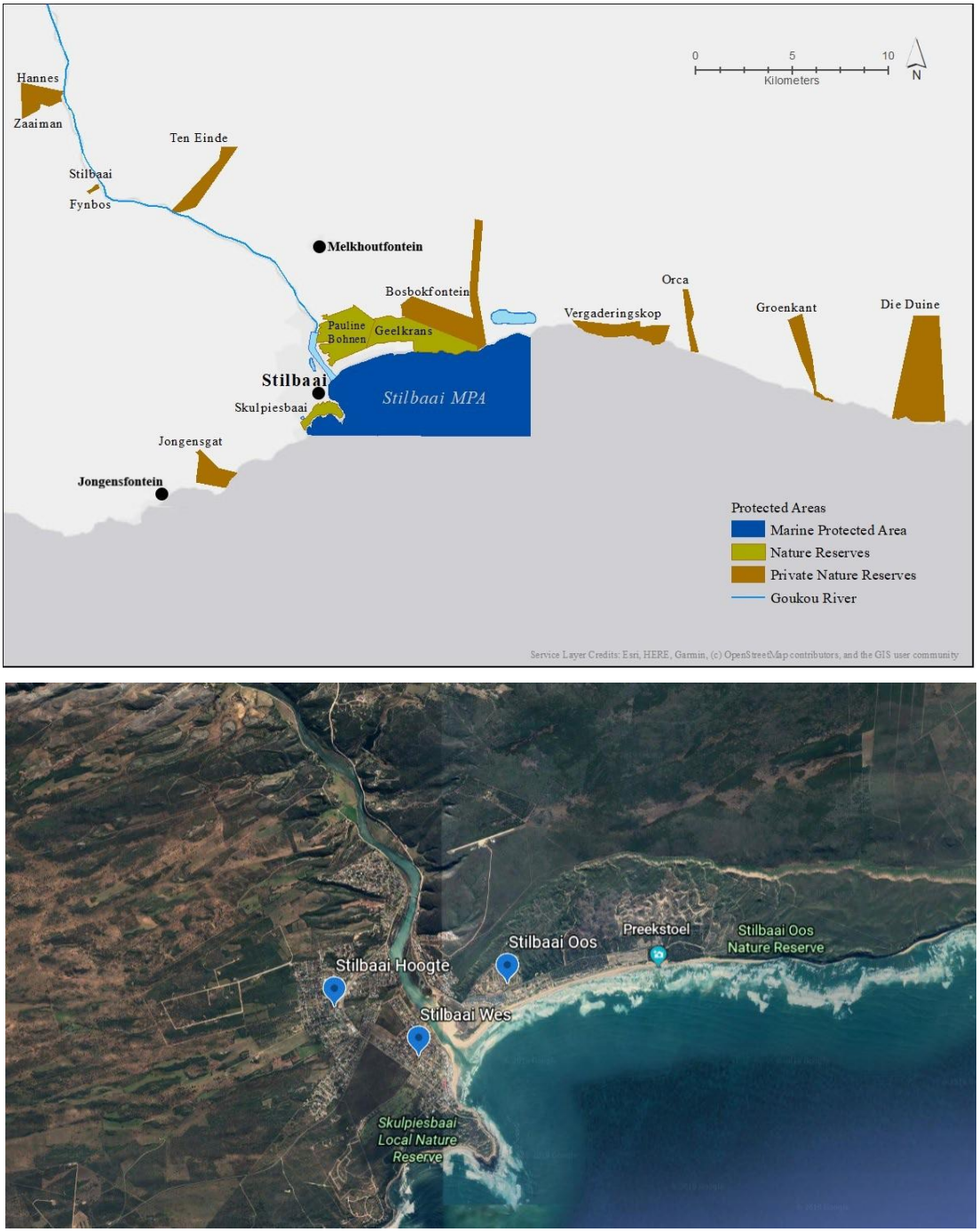

Figure 1:Panel 1Map of Stilbaai and surrounds, highlighting the local protected areas (including Goukou River). Panel 2 Map of Stilbaai showing detail of Stilbaai Wes, Stilbaai Oos, Stilbaai Hoogte and Melkhoutfontein.

Methods:

I used a mix of methods: online and hardcopy versions of the same survey; interviews (of various lengths) and participant observation.

I began my research by launching an online survey into Stilbaai residents' perspectives on the MPA. The survey was divided into three sections – one each for residents, new property owners and visitors. The questions asked about what water-based or extractive activities the respondents partake in; about their knowledge around the reasons for the establishment of the MPA; their perspective on it; how their knowledge of and feelings towards the SMPA compared to their knowledge and feelings towards the local terrestrial protected areas. For new property owners, there was the additional question of whether or not the SMPA influenced their purchase; for visitors (new and returning), the additional questions was whether or not the SMPA had influenced their decision to visit. I distributed this survey using *Survey Monkey* and I marketed on the "I Love Stilbaai" Facebook page and via an email-based snowball-sampling process.

I also made SCIFR-labelled "post-boxes" with hard-copies of the survey that I placed at the Library and Tourism Bureau. I had visited other sites, but these declined to host them, largely due to issues of space. From these post-boxes, I eventually got 16 completed forms. Both the online and hard-copy surveys were written in English, but respondents were encouraged to answer in Afrikaans if they preferred. The two ladies who work at the Tourism Bureau on a permanent basis, and have done so for many years, were eager to speak about the MPA and my research, providing a space for my surveys and 'letterbox' in the midst of their information and activity pamphlets and brochures. My surveys were left there for two months between November 2018 and January 2019, in order to be available during the busiest months for Stilbaai in terms of visitors.

In my subsequent visits to Stilbaai, over weekends in November and December as well as the first week of January 2019, I spent my time observing behaviour in and around the SMPA, conducting several interviews with members of local organisations and conducted about 15 informal short interviews with beach-goers. A central tenet of anthropology is summed up by the idea that there is a difference between what people say, what people do, and what people think they do. To this end, the anthropological method of gathering ethnographic data relies on observing as much as interviewing. Furthermore, the observation cannot only be from a distance, but must immerse the researcher in the circumstances that they are observing as much as possible, in order for a fuller understanding of what the participants are experiencing to augment documentation of their thinking and observation of their behaviour. This is participant observation, often referred to as 'deep hanging out' (Geertz, 1998). To this end, I spent much time on the beach, either walking and sitting, approaching the spaces from different directions, observing what I learnt from the space as if I were encountering it as visitor or

resident. It was on the beach, the riverbank or at the harbour where I conducted my informal chats with those willing to spend some time talking to me.

The organisations or businesses whose members I interviewed were: the Stilbaai Surf Club; Stilbaai Bewarings Trust (SBT); Tannie Lena se Huis; Gouritz Cluster Biosphere Reserve; CapeNature; NSRI; the yet-to-be formalised Stilbaai Beach Clean-up; the Tourism Bureau; the Library. These individuals were chosen for a variety of reasons. For some, the reasons were based on their organisations outdoor activities that either had a conservation focus or took place in or around the SMPA (the surf club, the SBT, NSRI, the beach clean-up organiser). The staff who work at the Tourism Bureau were interviewed for their regular interaction with visitors to Stilbaai, and their historical knowledge of the town before and during the establishment of the SMPA. The two senior managers at Tannie Lena se Huis, an early childhood development NGO in Melkhoutfontein, were interviewed to find out more about how the youth of Melkhoutfontein view the SMPA and what kind of conservation-focussed activities are organised by or involved Melkhoutfontein community members.

These interviews would begin with questions similar to the set in the surveys, asking the respondent about what they thought of the SMPA, what they knew of it, how they interacted with the space, what they considered the advantages and disadvantages of it, and what they perceived as positive or negative behaviour towards it. The interviews were more conversational than formal, and would inevitably branch out to discuss what conservation-oriented activities the respondents was personally involved in, and what further possible activities they could see as having a positive impact on the relationship between residents and their immediate natural environment.

It was initially intended to also interview the fishers of Melkhoutfontein, to understand their perspectives on the SMPA. However, due to the number of factors (general frustration with the slow implementation of the Small Scale Fisheries Policy, the need to work, research fatigue amongst some of the fishers), there was a reluctance on behalf of the individuals I was put in contact with, to engage in my research, especially when previous research has already questioned them on their relationship with the SMPA (Hobday et al., 2016; Aswani et al., 2018; Martins et al., 2019).

A large part of the research was done as a ‘desk-top’ study, by engaging the results from these previous bodies of research related to Stilbaai: dissertations (Kemp, 2007; Duggan, 2012; Duggan, 2018; Gammage, 2019; Ward, 2018); articles (De Vos, et al., 2014; Gammage et al., 2017; Aswani et al., 2018); and survey results (Martins et al., 2019). Literature on the ecological status of the SMPA and Goukou estuary (CSIR, 2011; Tunley, 2009) and the

establishment of the SMPA (du Toit & Attwood, 2008), was also engaged with to understand the ecological functions and processes of the system (river, estuary and marine environment) and the anthropogenic impacts on these that have been documented or are predicted.

Results:

General attitudes towards the SMPA

A significant feature of Stilbaai's relationship to the SMPA is that the town is surrounding by protected areas – the sea, Geelkrans and Pauline Boehnen nature reserves, the Goukou river, the beaches, Skulpiesbaai (Fig. 1). Unlike other towns that are adjacent to protected areas, in Stilbaai the many types of protected areas are next to it, around it and run through it.

Table 1: List of methods and number of responses.

Method	**Responses/Participants**
Online Survey	24
Hardcopy Survey	16 Complete 8 Incomplete
Informal Interviews ("Beach chats")	15
Formal Interviews (Excluding talks with Jean du Plessis)	11

The centrality of the MPA to the community means that residents enjoy a wide range of ecosystems services, even if they do not actively engage in outdoor activities or are conscious of such services or benefits. Examples of such ecosystem services include, amongst others: climate regulation; opportunities for fishing or outdoor activities; erosion control; economics benefits, for example tourism-derived income or increased prices for river- or seafront properties (Barbier et al., 2011). There is also recent research that suggests significant physical and mental well-being benefits associated with spending time in, on or near the sea (Denton & Aranda, 2019).

The variety of forms of engagement means that there are a number of different organisations or groups that have taken on roles of stewardship towards the MPA or aspects thereof. The variety of activities that engage the space are mainly: walking (including birdwatching), swimming, kayaking, boating, fishing (including bait-collecting), diving, surfing, kite-surfing.

The main trends in response concerned residents' experiences of well-being in relation to the SMPA; the contrast between the perceived importance of the terrestrial reserves and river/estuary as opposed to the perceived lesser importance of the marine section; the presence of voluntary care-taking habits; the lack of knowledge among visitors with regards to the reasons for and value of the SMPA. Most respondents generally understand the reason for its creation – voiced in a variety of ways, but all touching on its role in preserving a habitat for important species and ecological functions (such as the estuary serving as a nursery or breeding ground).

Table 2: List of organisations with whose members Marieke Norton conducted interviews. Orange indicates government departments or branches, municipalities or organisations working under a government mandate; green indicates local interest groups; blue indicates local formal and informal organisations that were interviewed for either their direct involvement in tourism, outdoor activities or their long-term experience of Stilbaai.

Department of Environment, Forestry and Fisheries	**Fisheries Branch**	**Hessequa and Stilbaai Municipality**	**Cape Nature**
Department of Water and Sanitation	**Gouritz Cluster Biosphere Research**	**National Sea Rescue Institute**	Goukou Protected Areas Advisory Committee
Stilbaai Bewarings Trust	Goukou River Property Owners Association	Stilbaai Belange Forum	**Tourism Bureau**
Tannie Lena se Huis	**Stilbaai Municipal Library**	**Stilbaai beach cleanup**	**Stilbaai Surf Klub**

Residents appreciate the river and beaches, and express that these natural features add to their wellbeing through providing spaces for being outdoors, taking exercise, enjoying nature and interacting with nature (often with a spiritual or religious element, that can be understood in Christian terms as communing with God or appreciating His creation). The natural features of the town are for many one of the main reasons for moving or retiring here. However, with the construction and development boom that the town is experiencing, the pressure on these natural features is mounting and so what draws new residents and visitors here is what will suffer the

most with such increased numbers. Specific examples of the increased development can be seen in Stilbaai Oos, on the hills as well as along the beachfront, the proposed development above Skulpiesbaai, and in the Stilbaai Hoogte (Heights) above the town's business centre.

Differing perspectives on the marine section compared to other areas

Residents feel much less strongly about the marine section of the MPA than the river or Skulpiesbaai, though on average most respondents did say it was good thing even if it did not feature strongly in their lives. This indicates that respondents think differently about the river, estuary and Geelkrans Nature Reserves as compared to MPA, which is backed up by several respondents (surveys and interviews) that noted that the MPA is an abstract concept in a lot of ways as most people don't "go there". There is a clear indication amongst respondents that the no-take MPA is seen as a separate area, even though it is just a differently managed part of the overall protected area. This means that the idea of the catchment area, river, estuary, beaches and MPA being an integrated system is not understood or known.

When I returned to retrieve the letterbox from the Tourism Bureau in January 2019, I found it empty. The staff at the Bureau expressed dismay, but said since it was mostly visitors who came to get pamphlets/brochures, that they weren't surprised. The inference was that visitors are not that interested in the SMPA and so would not want to take the time to fill out surveys. In response to my queries about how often they are asked about the SMPA, one of the ladies said never and the other indicated that she had probably only been asked a few times over the last decade. She said that when asked, the questions were largely focused on what activities were allowed or available, and she would give them an official (DEA/CapeNature) informational brochure to learn more about it.

The municipal department or agents that are responsible for monitoring part of the river's edge (such as checking that the public are not walking their dogs off leads, littering or taking bait from closed areas) do not conduct their inspections or enforcement activities as stringently as the CapeNature officials. Additionally, the local Fisheries Branch Compliance Office is only staffed by two inspectors, and their jurisdiction also includes adjacent areas such as Jongensfontein and Gouritzmond. Their ability to work overtime or on weekends is limited by operational budget deficits, and they do not have access to patrol vessels, and so the slack if picked up CapeNature. CapeNature tends to do all compliance work over weekends and after-hours as necessary.

The results from the survey and from the conversations I had on my first fieldtrip (informally, on the beach and along the river), led me to conclude that while the residents of

Stilbaai felt a particular affinity with the river and the beach, they were very indifferent towards the MPA. This surprised me, as I had not thought that there would be such a strong differentiation between the beach and the MPA. Most visitors spoken to regard the environment around Stilbaai as beautiful, but are unaware of the reasons for or significance of the MPA. Many visitors come from non-coastal areas, and Stilbaai represents a large part of their experience of the South African coast and the ocean, especially in the case of children. Often, largely out of ignorance, such visitors will partake in harmful activities, which is something I have often encountered in my research over the last 13 years, on beaches, slipways and breakwaters all along the Western Cape coast. While many visitors do know that there is an MPA, their experience of it is confined to the river, estuary and beaches, and so they express an indifference towards the marine section. However, they do comment on the beauty of the town and its surrounds, and the generally pristine appearance of the beaches – as noted above, despite not being particularly concerned or engaged with the MPA, the benefits of its existence are still felt.

Concerns regarding noncompliance:

Respondents did note some problems related to the SMPA. Several issues related to misbehaviour or perceived misbehaviour were noted. While some of these were incorrect, in that they were based on misinformation, ignorance or assumption, they are important to note and engage with as such perception are likely to exist for a reason and to potentially determine behaviour.

I was often asked if it was possible for private citizens to be deputised to perform non-compliance functions, such as making citizen arrests, so there is certainly an element of the community that are vigilant with respect to non-compliance and are keen to act to prevent or react to it. However, based on the examples of what respondents considered non-compliance and the subject matter of concerned phone-calls made to Jean du Plessis, it is also important to note that often the behaviour being reported is not non-compliance but legal behaviour. Therefore, it can be inferred that even among aware and vigilant residents, what is legal and what is not, is not always known or clear. This also relates to what many respondents had a lot to say about oyster collecting in the area. Many respondents complained about the oyster collectors that they witness passing through. However, there are individuals who do hold permits for collecting oysters along parts of the shoreline, and these activities are monitored by CapeNature and the Fisheries Branch. Though they may appear to be destructive, often their activities are not breaking any regulations.

This issue of oyster harvesting along the shore was a cross-over concern (i.e. mentioned across the age, gender, race and activity range). While there are permit-holders who legally harvest oysters along the shore here, people voiced the assumptions that these persons were taking out too many and carelessly inflicting excessive damage on the rocks when doing so. While there is certainly a level of non-compliance along this coast from the Rietvleivywers to Skulpiesbaai (as communicated to me during conversations with Cape Nature officials during this research and by Fisheries Branch inspectors during my doctoral research), this is at much lower levels of amount, frequency and violence that other sections of coast (as argued previously in Norton, 2014). There is the issue of "boundary fishing" on the edge of the MPA's, also mentioned. This is despite the boundary line not being located on a particularly productive part of the MPA – this part of the MPA is in fact a sandy ledge, as opposed to the rocky shelf that dominates the rest of it (wherein fish and their food sources shelter and feed).

From the research, it is clear that there are certain activities or areas that are considered by residents to be under-policed, and others that are considered over-policed. The determination of these two, once again, differed according to who is speaking. For example, of those respondents who indicated they engage in recreational fishing, several noted that speedboats on the river and illegal fishing in the MPA were problems. From the set of older respondents who largely engage in MPA through the act of walking either the beaches or the river's edge (and not fishing), the complaints most frequently noted were the degradation caused by what they consider to be excessive bait collections on the tidal flats of the eastern bank and littering.

Through conversations with Jean du Plessis, my own personal observations previously with my doctoral research on marine resource law enforcement (Norton, 2014) and during this most recent research, there is an acknowledgement that some non-compliance in relation to fishing takes place. Such behaviour includes catching protected species, extractive behaviours in the no-take zone and exceeding bag limits (especially for bait). However, despite what some respondents thought, I believe that between the work of CapeNature and the Fisheries Branch inspectors (based at the harbour), it is largely under control. This may be to a lack of particularly lucrative specie such as abalone or lobster, but it is encountered – in particular, with transgressions into the MPA by vessels, or when alikreukel is exposed by spring-tides. There is no such thing as 100% compliance in any sector – commercial, small-scale or recreational. Therefore, while there is fragmentation, and there is certain governance structures or processes that could be made more efficient and/or transparent to both the public and people

engaged with governance, the system is functional (though, of course, capacity and funding could always be increased to the benefit of the social-ecology).

Bait collecting was raised regularly as an area of concern, particularly the pumping of sand prawns on the tidal flats on the east bank of the river. Based on my own observations and the anecdotes shared by several respondents, the tendency to pump more than is necessary is fairly common. Though the bait limit is 50 sand prawns, people often pump many more than that and select only the best ones, leaving the rest of the sand prawns and any other life that has been dug up, to die. While the most common pump is made out of the conventional PVC pipe usually used for gutter down pipes, people often make their own pumps. I have seen several examples that exceed this fairly standard size, including some constructed out of big buckets, which means that huge holes get dug in the mud. During busy times, whole sections of riverbank are churned up after a couple of people have pumped their way across it.

Other issues raised:

Due to the recent growth in Stilbaai, it has been noted in several of the surveys and interviews that there has been concomitant increase in the numbers of dogs that are walked along the beach and on the riverbank. One concern was that there could be a potential for increase incidents between humans and dogs, but that is not the concern here. What is, is that many of the dogs who are walked through the protected areas, are done so off the lead. The main concerns expressed here were: that the dogs were chasing small animals and birds; the accumulation of faeces on footpaths, beaches and potentially in the water (which could in turn lead to accumulation of enterococci in the sand (Wright et al., 2009)); that dogs were digging after fauna or in areas potentially sensitive to such disturbance (as I observed myself on two occasions).

The issue of the SMPA information boards was also raised, the main concern being that they are not very engaging, and do not contain information on species found within or value of the MPA. They have a map of the protected areas in question, and a list of GPS coordinates that describe the perimeters of the larger and internal areas. They also have an extensive list of regulations, printed in fairly small font. Currently, only the eels and the whales have any real information provided about them to the public (recently, the whale information board was replaced at the lookout above the harbour).

The other two concerns with regard to the signboards were that they were no longer in very good condition, with several degraded by the elements to the point where some important information was obscured (which I verified for myself). Their placement also seems to assume

that everyone will be arriving in the space by car – for example, there is a signboard at the Preekstoel parking lot, which one would not see if walking along the beach to that point. Other markers related the MPA are the red-and-white striped poles that designate boundaries, and the sign between the restricted and controlled zones that mark the end of the "fishing-allowed" beach. With regard to the boundary markers, only two people brought these up to me without prompting, complaining that they were hard to see, and that many people did not know what they are. At Skulpiesbaai, which is a restricted zone and the site of the ancient *visvywers*, the signboard at the parking lot did not contain any information about the MPA, but was focussed on providing information about the type of ecology that the beach typified. At the lookout point above the harbour/river-mouth, the information board about whales was recently replaced.

Other concerns that were raised by respondents, but to a lesser degree, included the following:

- Litter – Generally, when blame was ascribed for litter on the beach, it was to either visitors to the beach (i.e. not residents but holidaymakers) or to "the Chinese boats" (referring to the assumption that illegal Chinese fishing boats were dumping the rubbish at sea). Litter on the riverbank is generally less, except for particular areas where braai facilities are available and the car park by the municipal jetty.
- Over-crowding on the river – Respondents were concerned that the increase in numbers of residents and/or visitors would result in many more craft on the river (kite-surfers, kayaks and motorised vessels) and that this would endanger swimmers.
- Closing of the river mouth – This was not mentioned by many respondents, but those that brought it up were very clear that they had noticed significant changes to river mouth in terms of size and depth, as well as the increase in the size of some sand-banks upstream (with mention made of the recent drought and decreased freshwater flow in the river having been some of the reasons for this). It is not known what effect this would have on the SMPA itself, but it is certainly likely that local catadromous fish species (White Steenbras, Kob) or migratory specie such as the eels or *palings* resident at the Tourism Bureau, would be affected (Stilbaai Marine Protected Area Management Plan, 2008; Lamberth and Turpie, 2003).
- Over-abstraction of water by users upriver (in catchment) and with riparian properties (in the protected area). See also Ward (2018).
- Building into coastal zone, particularly in Stilbaai Oos.
- Sewerage – Especially with regards to further planned development in Stilbaai.

- Inappropriate riverside structures, such as ad hoc anti-erosion measures, private jetties or floating docks.

Discussion:

The informal interviews that were conducted ad hoc on the beaches and riverbanks with people engaging in the outdoor space were more chats than interviews. While most people responding positively to my initial greeting, there was a general reluctance to conduct longer conversations – I surmise that this was largely due to being interrupted while engaging in leisure activities, about a topic that they did not feel particularly strongly about. It must be noted that those who chose to take the survey or speak to me, were most likely those who were already interested in or concerned about the local environment, and therefore more likely to partake in care-taking activities (than those who chose not to take part in the survey interviews, or chats).

The marine section of the SMPA was often referred to in terms that made clear it is has less of a presence in residents' experiences that the other sections of the protected area, as noted. This indicates that if people can't go there, we need to bring the MPA to them – in pictures, in video, with information or activities. Not only art made from beach litter, but art in general is a fantastic way to engage publics (Song, 2008; Innwood, 2008). For example, the book "*Waarheen die Wind Waai*", an anthology of Stilbaai-related stories produced by the Stilbaai *Skryfkring*, is an example of a collective engagement in sense of place that produced a beautiful product.

The issue of bait-collecting needs to be further investigated and monitored. The mud is rich with biota, and disturbing it to such an extent inflicts damage to an ecosystem that is often disregarded but performs important functions for the estuary. With increasing numbers of recreational fishers, it is not inconceivable that this pressure will start have longer-term negative effects, on the populations of species living in the mud and on the wider ecosystem of the mud flats and estuary.

What I observed and was told about, is that there exist many opportunities for residents to "do good" (i.e. pick up litter) either in their own capacity or as part of a local organisation or club. There is a clear sense of duty and caretaking evident amongst respondents, and the informality of many of these activities is what makes them sustainable in the long-term. Doing what one can, when one can, has been shown to be an effective way of doing things, especially in a context where more formalised programmes of action may need resources, capital or infrastructure that is not available (Hahn, 2011; Funder & Marani, 2015).

Governance, networks and volunteerism

Another aspect of my research was to map out the networks of formal and informal governance related to the SMPA. What I have found, is that the governance of the local environment, inclusive of the protected areas in question, could be characterised as a patchwork.

These "patches" are determined along institutional, social and physical lines. In terms of institutional patches, there are at least three officials institutions that are mandated with managing activities in the local environment: CapeNature, operating under the mandate of the Department of Environmental Affairs[3] is specifically tasked with overseeing the protected areas; the local municipality; the Fisheries Branch, previously part of DAFF[4]. While the MPA itself is under the jurisdiction of the DEA/DEFF, the mandate has been devolved to the authority of the provincial conservation authority, CapeNature, and the areas where limited fishing is allowed, is managed by both CapeNature and the local Marine Compliance office, staffed by Marine Compliance Inspectors of the Fisheries Branch's Compliance Directorate[5]. Additionally, some of the responsibility for managing the riparian areas of the Goukou river is the responsibility of the Stilbaai Municipality. Effectively, however, the day-to-day management of the MPA is largely done by the local contingent of CapeNature officials, who also manage the Geelkrans Nature Reserve (as well as other areas outside the immediate area with which this report is concerned).

While the Stilbaai MPA is designated by a continuous boundary that includes the marine area, the shore, the estuary and the river, the geographical features in addition the differing levels of restrictions (Controlled, Restricted), in relation to differing activities (boating, fishing, bait-collecting, certain recreational activities) and infrastructure (private and public jetties or building on riparian properties), means that management activities or responses are variable within the space. This variability intersects with the various institutional jurisdictions or responsibilities to create further complexity in the governance structures and activities. Then, in addition, there are the social factors of the community to consider. The small local population is overwhelmed at seasonal holiday times by a massive influx of visitors. Additionally, the community of "Stilbaai" is in fact three settlements with their own distinct sense of community: Stilbaai and Jongensfontein that are almost exclusively white;

[3] In June 2019, President Cyril Ramaphosa reshuffled the Cabinet and removed the Fisheries and Forestry from the Department of Agriculture, Forestry and Fisheries to re-join Environmental Affairs, forming a new Department of Environment, Forestry and Fisheries. At the time of writing, it was still unclear how institutional arrangements, protocols and mandates were going to be transferred, shift or change.

[4] See above footnote.

[5]Previously of the Department of Agriculture, Forestry and Fisheries, but as of 2019, part of the Department of Environment, Forestry and Fisheries.

Melkhoutfontein, established as a place of settlement for the previously disenfranchised people of colour and which remains racially and geographically distinct from Stilbaai.

Therefore, there is a gap between the levels of enforcement in adjacent areas, leading to a discrepancy in how the regulations are applied. Since the public shows a tendency to be confrontational on such discrepancies, at times the enforcement in one area drops to coincide with the other, instead of the latter stepping up their tasks.

I argue that Stilbaai could benefit from leveraging off the opinion of residents that there are gaps in the network of local environmental governance, in that it has motivated residents to act on their concerns for the local environment, by organising formal or informal groups or activities that engage in a combination of stewardship, outreach, education and pure enjoyment of the natural landscape. While these groups do not all engage with each other, and so cannot be called a network in the formal sense, the size of the town means that they are aware of each other and often friendly with individuals in another group. The groups include: regular beach clean-ups; the surf club that has taken responsibility for the section of shore where they enter and exit the sea; the local conversation committee (whose ambit extends beyond issues related to the MPA); the local NSRI office that engages in some outreach and educational activities; the educare facility in Melkhoutfontein that tries to get the children in their programme to the beach. Many of these activities are formalised, such as the Stilbaai Bewarings Trust, while others are partially informal (organised events taking place irregularly or at short notice) or entirely informal (one or two people deciding to pick up litter or give a short talk to a school or at the library).

Informality can be an advantage, in that people play to their strengths and engage more over a longer period of time, due to not feeling overworked or obligated. Research has shown that informality in volunteer setting can help maintain enthusiasm as events or activities are often spaced out and require short bursts of engagement instead of a sustained and often increasingly load of administration and effort that can stem from formalised organisations Hahn 2011; Krasny et al. 2014). However, one would ideally have a mix of both formal and informal volunteerism. When considering how to make such activities attractive, a useful conceptual framework to bear in mind is that of Bramston et al. (2011), who present a tripartite classification of environmental concern – for self, for others, for the biosphere (p 784). The authors go on to further specify three main motivations for environmental stewardship: to develop sense of belonging; caretaking of the environment; expanding personal learning. Krasny et al. (2014, pp 16-17) further list social mechanisms by which motivations can

augmented or strengthened to spur people to action: social-ecological memories; sense of place; iconic species.

The SMPA may not be the only thing that draws visitors to Stilbaai, but certainly it could be the thing that sticks in their mind and draws them back. There are real opportunities in working with visitors to Stilbaai, directly or indirectly, to communicate some knowledge about the oceans that they can take home, and ocean-positive behaviours, that they can educate others on.

In the following section, I present a series of opportunities through which this can be attempted.

Amplifying sense of place and stewardship:

Already, there are several iconic species or sites relating to the marine environment for which Stilbaai is famous, or of which the residents are proud: the whales; the hammerhead shark, the eels at the Palinggat, the *visvywers* and Skulpiesbaai, the regular/resident seal, Preekstoel beach and the area's relation and proximity to the globally archeologically significant site of Blombos Cave. At the Skulpiesbaai parking lot, for example, there is a great information board on the ecology of rocky shores, but no information on the *visvywers* or on the protected area status of the beach (and what the red/white striped poles on the beach mean). The *visvywers* are an exceptional example of a livelihood practice that dates back to the Stone Age (Kemp, 2007) that could, and should, be leveraged for building a sense of history and place – importantly, this process will also pay greater homage to the original inhabitants of the area and their descendants. While there is certainly the issue of the maintenance of the fish traps and the question of how such labour should be remunerated, the historical significance and future value of them (as a place of interest and learning) cannot be over-emphasised. As Gammage (2019) discusses, there is potential for it be a tourism or fishery-related livelihood activity, for the soon-to-be-formed Melkhoutfontein small scale fishers cooperative. Such opportunities potentially include remuneration for maintenance, sustainable extraction of certain species and paid tours and/or talks.

The Tourism Bureau, located in the historic Palinggat homestead in Stilbaai, is a vital node in the local network of organisations. It contains the tourist information centre, the small Stilbaai museum, and the famous Palinggat where freshwater eels are fed by hand every day at 11:00. Here, a clear sense of place and history, are combined with an iconic species. It is one of the few activities (besides the river-, beach- or sea-based activities already noted) that is mentioned on "what to do in Stilbaai" lists that ones comes across on the Internet. Observing

the enthusiasm with which children and adult visitors engage in the feeding and watching of eels is a clear indication of how valuable this space is in capturing a sense of wonder in relation to the local environment. Furthermore, the historical photos of the development of the town and the displays on the Blombos excavations, amplifies the sense of place and history – but could be updated and built on. The eels present an opportunity to create a storybook based on their life-story in relation to Stilbaai – telling their story, Stilbaai's and the marine environment's. The production and sale of such a book could be a process by which a sense of belonging, of caring for the environment and personal learning could be brought together. There is a precedent for such a project: the publication of *Waarheen die Wind Waai* (Where the Wind Blows To), an anthology of stories about Stilbaai and surrounds put out by the Stilbaai Skryfkring (Writing Club). Such a product also importantly has the potential of generating profits through the sale of copies that could be folded back into activities that benefit the SMPA, or the cause of environmental outreach, in some way.

Signage:

The issue of signboards was brought up in the online and physical surveys, as well as in conversation with the staff at the Information Bureau, by the chairperson of the Conservation Committee (*Bewarings Vereeniging*) and with persons on the beach or riverside paths. This echoes the mention made in the 2009 Marine Protected Areas State of Management Report: "Signage could be improved by providing bold illustrations of do's and don'ts and indicating the position of the reader on the map" (Tunley 2009, p 91).

The signboards lack any form of information or engagement aimed at non-extractive resource users. The engagement is currently premised on technical knowledge (GPS coordinates) and rules about what not to do. This does not foster a relationship of interest, and presents the MPA as a place where activities are regulated, not a treasure trove of biodiversity and/or beauty. Furthermore, the text-heavy nature of it and the height at which the boards are erected, means that there is nothing to engage the youth, particularly small children. Though there is a concern for the potential 'visual pollution' that could be caused by an excess of boards along the river or beaches, there is, I believe, a strong case to be made about the links between visual stimulation, learning and inter-generational stewardship. We should be looking at getting people excited about the MPA, in terms of the value that it can/does add to their life or beach visit. The intergenerational aspect, the fact that attitudes and values change over time and from one generation to the next, is a 'slow' social variable that must be considered when working with maintaining concern for the ecology (Tam et al. 2018).

Highlighting the value of the SMPA:

There are a number of strategies that could be employed so that such signboards engage the public more on the value of the SMPA, rather than just on how one is *not* allowed to do in the space. They should not, in terms of creating a sense of wonder or appreciation, only give GPS coordinates and tell you what not to do – that tell you why the MPA is so important; what you could be lucky enough to see; what you can or should be doing to enjoy the space. In particular, information boards for children that contain images of iconic specie and some information to add to their understanding of the relevant habitat or environment, could be placed underneath the information boards aimed at adults. If one were to go one step further, some strategies to further engage the public (across all ages) beyond the moment and the space, could be:

- instructions for a basic "scavenger hunts" where individuals are tasked with finding certain natural object or places in a process that allows them to discover and learn without extracting;
- a "hashtag" campaign whereby those with the means are encouraged to take and post photos to a social media platform (the hashtag would allow these posts to be archived or aggregated in a way that could be used for further online community building);
- the inclusion of QR (quick response) codes that could take the user to online learning resources (such as https://www.marineprotectedareas.org.za/ or http://mpaforum.org.za/marine-protected-areas/)

Social media are very effective tools for learning and engagement, and tap into the space and time transcending sense of community that can be created by engaging with online platforms. There are even examples of combining a hashtag campaign as described above, with a form of citizen science or citizen-supported monitoring. In Mozambique, for example, the CoastSnap project[6] places fixed metal stands in places from which the relevant section of coast can be seen. These metal stands are made to securely hold a smartphone so that the same section of coast or beach would be photographed regardless of the type of smartphone or height/photographic ability/interest of the photographer. These photos are then uploaded to a dedicated Facebook account or to another account with the relevant hashtag as caption, so that it can be easily found and added to the collective. In this way, citizens create an archive that

[6] https://risingfromthedepths.com/blog/innovation-projects/coastsnap-1/

records the state of a section of coast, allowing a visual dataset on changes to that particular environment to be recorded. This is particularly valuable in spaces where capacity, funds or logistics makes it difficult for scientists or managers to do themselves.

Citizen science campaigns often go hand-in-hand with stewardship programmes, and it a great way to increase the ocean literacy of groups or individuals. Such programmes can impart knowledge on the ecology and on the scientific process, teaching people basic monitoring or data collection techniques that can further create a sense of purpose and community, while contributing to the management of the protected area (and possibly the local schools' curricula, should the opportunity arise).

With Stilbaai experiencing defined periods of increased activity and visitation, there is a need to organise events during these times that specifically target visitors, but that remain relevant to residents also. In particular, beach clean ups in which the collected material is used to create collective or individual pieces of art have been done in Stilbaai before (according to respondents, with much success).

Some other ideas for engaging visitors and residents during the busy season, that were discussed between me and respondents, included:

- Beach art sculpture that result from beach clean ups
- "*Kunskring*" (art group) or "*Skryfkring*" (writing group) activities that result in exhibitions, competitions, publications, marketable products and, in the case of writing groups, public readings, need not be marketed at residents only but could generate involvement amongst holiday visitors. Any monies made could, after recouping expenses, be added to the fundraising activities of involved groups or towards a specified goal.
- Screenings of SMPA footage (such as the underwater "BRUV" footage which Jean du Plessis has shown in a number of places around the town already) or other ocean or MPA related films or documentaries, either spread out through the year or as a concentrated schedule (like a mini documentary festival).
- Outreach programmes that teach ocean safety or surfing to children unfamiliar with or with limited access to the sea.
- A letter writing campaign, where the public is encouraged to write a letter to their favourite place in Stilbaai or a particular marine fish or animal, which could also be gathered into an account or anthology of some kind.

Conclusion:

There are several features of Stilbaai which make it, if not unique, special. The potential for ocean positive actions currently outweigh the observed problems, though it must be cautioned that this balance could easily shift should development of new housing or industries (such as sand-mining) be allowed without stringent spatial planning that takes ecological systems into account.

The governance structures of protected areas in Stilbaai, in particular the MPA, is complex and currently somewhat fragmented. General findings of this research shows that this complexity has led to a context of informal stewardship that provides certain opportunities for voluntary caretaking. A few concrete suggestions emerged from the research, that could aid both the formal governance structures and the nurturing of voluntary stewardship:

- Improve communication, with regards to the SMP (ensure the signboards are in a good condition; include more engaging information with regards to how visitors can enjoy the benefits of the features).
- Launch initiatives to highlight the value of the SMPA to residents and visitors (a storybook about the eels; holiday-time events such as beach clean up or art projects; screenings of relevant documentaries or footage)
- Launch initiatives to elevate the importance of the visvywers in the local "sense of place" (an information board stating their origins and significance, especially in terms of the archaeological significance of this piece of coastline; talks about them and their role in providing livelihoods and sustenance by fishers who historically maintained and fished them; training in their maintenance)
- Engage the public, particularly visitors, more meaningfully on the value of and reasons for the SMPA (possibilities for which have been discussed already at some length in this report).
- Design a fit for purpose training programme for willing local residents to capacitate them to contribute to the monitoring of state of the SMPA through a citizen science campaign (particularly such methods as could be conducted via or aided by photography).

Since my intention is to is motivate those not currently concerned with the local environment enough to take up either active care-taking or, more passively, adopt ocean-positive behaviours, I am interested in thinking about those on the outside of formal volunteerism. I consider such individuals to be more likely to become first engaged with informal volunteerism before becoming formalised.

In other words, to motivate individuals to volunteer for stewardship (formal or informal, individual or group-based), appeals must be made to their experiences of belonging and learning, by leveraging sense of place and history. Framing the local marine social-ecology as a system populated by important species is way to start.

Possible next steps:

As next steps, I would suggest a meeting, or even a focus group, of residents (including local business owners) and relevant local organisations or authorities, to workshop feasible ideas for events or projects that take these recommendations into account. I am available to help organise or run such an event, if needed. Furthermore, there are marine conservation grants available, specifically geared towards improving the relations with the marine social-ecology.

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Appendix

September 2019

Southern Cape Interdisciplinary Fisheries Research (SCIFR) Project

Overarching Research Questions

- How are natural and social changes in the southern Cape shaping and interacting with marine social-ecological systems?
- More specifically, how are selected natural resources users in this area responding to global change and how are they shaping change in their region?
- How can the knowledge of the current state of the social-ecological system be used to build a more resilient, sustainable system?

Context

Natural and human social systems are not mutually exclusive. As such, they cannot be thought of, nor worked with, separately (Ommer and Team 2007, Ommer et al. 2012). This project recognises that these systems are overlapping spheres of mutual influence that are connected through multiple inter-linkages at multiple temporal, geographic and governance scales. The study of these systems (termed social-ecological systems) requires working with multiple bodies of knowledge, several methodologies and the expertise of stakeholders which include academics from various disciplines and natural resources users (e.g., Ommer and Team 2007).

Fisheries remain a major source of food, income and livelihood for millions of people across the world, most particularly those in developing countries (Garcia et al. 2003). Past failures to recognise that the oceans form an integrated social-ecological system (Berkes et al. 2003), as well as the social-ecological linkages within such systems, has led to a situation where ocean resources are depleted and dependent communities, negatively affected.(Van Sittert 2002, Isaacs 2006, Jarre et al. 2013, Duggan et al. 2014). The southern Benguela along the South Africa's western coast is no exception.

The past two decades have witnessed a suite of challenges in South Africa's fisheries following changes in both the human and biophysical spheres of the system (e.g., Van Sittert et al., 2006, Hutchings et al. 2012; Jarre et al. 2013; Mead et al. 2013; Sowman et al. 2011, 2013). These challenges include amongst others, shifts in the distribution of various commercially-significant marine resources (Howard et al. 2007; Blamey et al. 2012), increases in intra-seasonal wind and temperature variability (Reason & Hermes 2011; Moloney et al. 2013; Jarre et al. 2015), the implementation of the 1998 Marine Living Resources Act (MLRA), the commitment to implement an ecosystems approach to fisheries management (WSSD 2002), the 2000 linefish emergency declaration and the subsequent 2003/4 restructuring of the commercial handline fishery (DEAT 2005a,b), backdropped by ongoing economic challenges. The research questions focus on mounting concerns over the well-being of natural resources and resource users - particularly fish and fishers - to explore new ways of addressing these concerns.

The Benguela Current Large Marine Ecosystem (BCLME), one of four large marine ecosystem boundary current systems, is dominated by coastal upwelling. This extraordinarily productive region sustains important fisheries for Angola, Namibia and South Africa (http://www.benguelacc.org). It displays high variability and consists of four subsystems of which the Agulhas bank off the southern Cape coast is one (Hutchings et al. 2009, Jarre et al. 2015). The research area for the Southern Cape Interdisciplinary Fisheries Research (SCIFR) project is an important but under-researched part of the social- ecological system of the Agulhas Bank. SCIFR specifically focuses on coastal fishing communities located in Witsand, Slangrivier, Vermaaklikheid, Stilbaai, Melkhoutfontein, Bitouville, Gouritsmond and Mossel Bay along the southern Cape coast (Fig. 1). The research also includes an agricultural component which focuses on farming communities located in the Duiwenhoks and Goukou catchment areas.

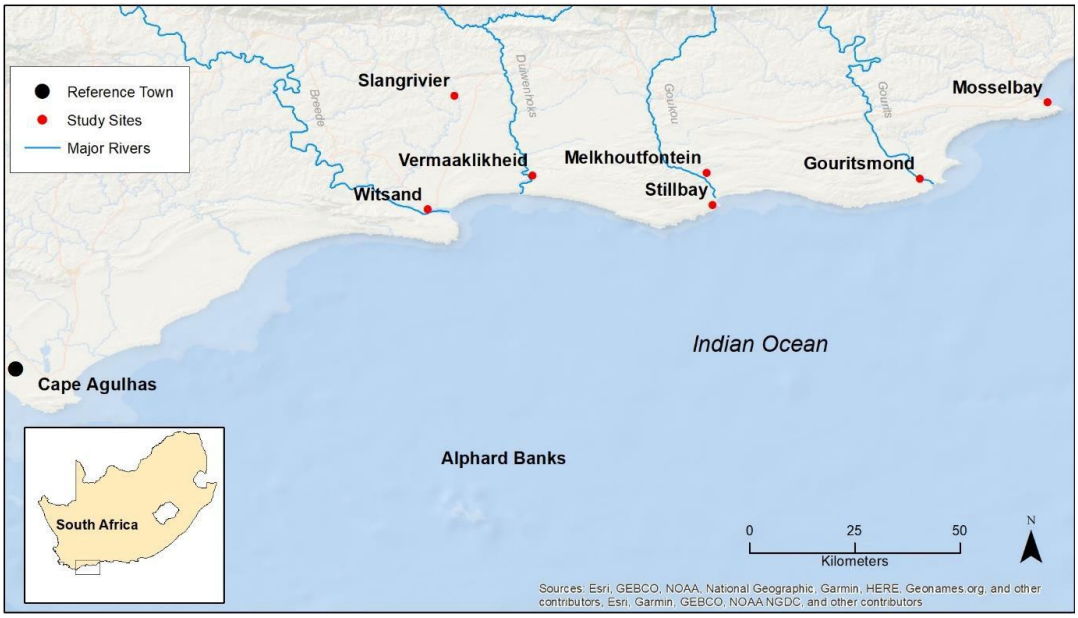

Figure 1 Map of the SCIFR research area. Mossel Bay - large urban centre situated on the coast; Bitouville - situated next to Gouritsmond at the Gourits River mouth ; Melkhoutfontein - situated approximately 8 km from Still Bay on the coast, Vermaaklikheid - 7 km from the coast as the crow flies, but fishers often travel 47 km by road to launch in Still Bay; Slangrivier - situated 26 km inland as the crow flies, fishers travel 38km by road to Witsand where boats are launched at the Breede River mouth. Adopted from Gammage (2019).

Approach

Ecosystem and human well-being are often placed at risk by strategies that aim for maximal production and short-term gain. A resilient social-ecological system – one that can buffer against multiple stressor, or adapt or transform accordingly – is synonymous with ecological, economic and social sustainability (Berkes et al. 2003).

By approaching challenges using social-ecological systems thinking and engaging several academic disciplines as well as fishing communities, this research aims to contribute to finding viable means of working with diverse kinds of knowledge and stakeholder concerns in the region. The approach has already generated new understanding and should in time result in improved sustainability.

As illustrated in Fig. 2, the SCIFR project draws on broad disciplines whilst using common themes and methods. The research centres on the marine social-ecological system in the area, specifically coastal fisheries. An agricultural component of this coastal system was also incorporated to gain insight into the larger network interplay between terrestrial and marine systems.

The SCIFR project seeks to work even-handedly with different ways of knowing, recognising that no one perspective can contain the requisite expertise required to understand a complex marine social-ecological system and manage human interactions with it accordingly. Thus, rather than viewing selected natural resource users as mere data repositories, we aim to work with them as knowledgeable experts in their own right, alongside experts from other disciplines. This research aims to inform various decision-making entities at different scales with the idea to enhance resilience and sustainability in this region.

Figure 2 Framework for the SCIFR project (from Jarre et al. 2018)

Research Team

In consultation with researchers and local fishers, a range of academic disciplines have been identified with the aim to address the key SCIFR research questions. These include:

Table 1 Disciplines involved in SCIFR

Already involved in project	Future involvement/collaboration
Knowledge co-production (fishers, school learners)	Economics
History	Environmental change management
Environmental geography	Education
Environmental & social anthropology	Performing Arts
Environmental science	Science communication
Fish(eries) biology	
Marine ecology	
Oceanography	
Structured decision support	

Highlights of progress achieved so far

How are natural and social changes in the southern Cape shaping and interacting with marine social-ecological systems? More specifically, how are selected natural resources users in this area responding to global change and how are they shaping change in their region?

- The handline fishery in the southern Cape was dominated by inshore trawl fisheries from its beginning in the early 1900s (Visser 2015).
- Historic co-dependence between inshore trawling and commercial handline fishing continues and is skewed in the favour of the trawl fishery (Duggan 2018).
- The history of Still Bay as a recreational/holiday area versus Mossel Bay as a regional commercial hub feed through to the present (Visser 2015).
- Agricultural re-structuring in the southern Cape already took place in the 1980s, i.e., before the first observed marine ecosystem regime shift (Ward 2018).
- The research confirmed decadal-scale environmental regime shifts in the mid-1990s and mid-2000s (Ward 2017, Lyttle 2019), which were corroborated by local climate knowledge of farmers and fishers. While no clear trends of change over time were found in rainfall and temperature series, decadal variability was present, and after the mid-2000s, the onset of autumn rainfall was found to have shifted to a month later (Ward 2018).

- There is much lower occurrence of poaching in the southern Cape than west of Cape Agulhas, and these activities are also significantly less violent when they do occur (Norton 2014).
- Drivers of change in the southern Cape's fishing-dependent communities are consistently similar across the area, with town-specific contexts influencing communities' capacity to proactively and positively respond to such change. Some communities are adapting, others are coping or reacting (Gammage 2015).
- Limited trust between commercial linefish skippers hinders collaboration both within their communities, and with researchers and other stakeholders (Duggan 2018).
- Careful research, using various methods, with stakeholders from the southern Cape linefishery has allowed for the co-creation of a causal map which highlights the complexity of drivers of change that influence fishers' ability in the region to earn a sustainable fishery-derived income (Gammage 2019).
- Whilst adequate and appropriate access to fishery resources (access to rights) and economic challenges are foregrounded by fishers, challenges associated to increasing variability in weather, ocean conditions and fish resources are increasingly recognised (specifically when applying various problem framing methodologies that allow for the reframing of questions) (Gammage 2019).

How can the knowledge of the current state of the social-ecological system be used to build a more resilient, sustainable system?

- Overlaying farmers', fishers' and scientific bodies of knowledge on climate variability and change reduced the uncertainties associated with any single set of observations (Ward 2018).
- Knowledge disconnects concerning present versus past variability observed were broadly related to scale mismatches between fisher observations and marine data tendencies, complexities around freshwater availability, and shifting uses of natural resources. Specifically, the interplay of ocean temperatures and rainfall patters that resulted in the folklore of "fishers are happy when farmers are sad and vice versa" has been changing (as has the abundance of linefish) and leaves this folklore less supported after the early 2000s (Ward 2018).
- Rural coastal communities need knowledge related to climate and marine change. This is possible when initiated via schools as trusted nodes in the community but needs to be contextually grounded (Duggan 2018).
- Fisheries Compliance Inspectors are unable to fulfil their mandate due, in large part, to severe management and personnel issues that have been characteristic of DAFF's Fisheries Branch (Norton 2014).
- The current formulation of marine resource laws and regulations does not adequately take into account the different motivations behind non-compliance, nor the difference in scales of non-compliance, encountered in the inshore sectors. Applying a one-size-fits-all approach to penalties can further entrench marginalisation and precarity amongst disadvantaged resource users (Norton 2014).
- A comparative social vulnerability assessment carried out between the small-scale fishers in the southern Cape and their Brazilian counterparts reveal that despite differences in the quantitative estimates of vulnerability, fishers in both countries highlight similar drivers of changes associated with governance. Importantly, the results support the development of local climate change mitigation plans (Martins et al. 2019). Climate stressors can push social-ecological systems into vulnerable states if not well integrated into adaptation strategies, which can have serious implications for food and job security in the southern Cape.
- The use of structured decision-making tools in a scenario-based approach to change is suggested as an appropriate change-management approach, including with fishers who have varying formal education levels, and in contexts where a multitude of uncertainties curtail day-to-day decision-making and long-term sustainability (Gammage 2019).

Milestones and outputs

Year	*Milestone*	*Output*
SARCHI Marine Ecology & Fisheries 1st funding cycle		
2010-2011	Preliminary work conducted in the SCIFR area through Greg Duggan's M.SocSci research	Duggan (2012)
2012	Conceptualisation of SCIFR based on GLOBEC F4 WG and the Canadian "Coasts under Stress" project	
SARCHI Marine Ecology & Fisheries 2nd funding cycle (2013-2017)		
2013	SCIFR project officially started as part of the SARCHI Marine Ecology & Fisheries, with Prof Astrid Jarre as project leader. Louise Gammage begins her MSc as SCIFR's first official student; Greg Duggan starts scoping for his PhD research, Dr Natascha Visser begins as post-doctoral fellow. SCIFR team contributes to the 4th South African Linefish Symposium.	
2014	Marieke Norton completes her PhD research, with one field site in the SCIFR area explicitly referred to in the thesis. Catherine Ward begins her PhD research. SCIFR team contributes to Southern African Marine Science Symposium.	Norton (2014)
Year	*Milestone*	*Output*
2015	Louise Gammage finalises MSc, begins PhD research; Natascha Visser completes Post-doctoral research, collaboration with GULLS project group though postdoctoral fellow Dr James Howard.	Gammage (2015) Visser (2015) Gammage et al. (2017a, b)
2016	Contributions to Benguela Symposium 2016 by SCIFR team.	Jarre et al. (2018)
2017	Contributions to Resilience 2017 Symposium by SCIFR team. Collaborative research with Ivan Martins (IO-USP, Brazil).	Martins et al. 2019
SARCHI Marine Ecology & Fisheries 3rd funding cycle (2018-2022)		
2018	Completion PhD research Greg Duggan, Catherine Ward; Dr Marieke Norton starts as Post-Doctoral research fellow (part-time), Casey Lyttle carries out MSc (minor-dissertation) research project from the African Climate and Development Masters course.	Duggan (2018) Ward (2018) Lyttle (2019)
2019	Completion PhD research Louise Gammage, she starts her postdoctoral research as member of the SCIFR team. Begin dissemination of results and scoping of (possible) new phase with stakeholders.	Gammage (2019) Gammage et al., (2019)

Glossary of terms:

Adaptation: "proactive and anticipatory planning of individual or collective actions based on knowledge or experience of past or anticipated future changes and that will likely result in no regrets or sustainable social-ecological outcomes" (Bennett et al. 2014: 5).

Coastal fisheries: coastal fisheries operating in the research area include the traditional commercial handline fishery, the small-scale fishery and the inshore-trawl fishery, as well as a recreational fishery.

Communities: used in this context, we refer to communities of practise (e.g. a community of fishers or community of farmers). We acknowledge that communities are not homogenous and not necessarily geographically bound.

Interdisciplinary: Draws from different disciplines to work towards a common goal.

Natural resource users: in this context refers to fishers and farmers that form part of the social- ecological system in the coastal region of the research area (including associated catchment areas).

Resilience: Resilience is having the capacity to persist in the face of change, to continue to develop with ever changing environments. **Resilience thinking** is about how periods of gradual changes interact with abrupt changes, and the **capacity** of people, communities, societies, cultures to adapt or even transform into new development

pathways in the face of dynamic change. It is about how to navigate the journey in relation to diverse pathways, and thresholds and tipping points between them. In resilience thinking, **adaptation** refers to human actions that sustain development on current pathways, while **transformation** is about shifting development into other emergent pathways and even creating new ones" (Folke, 2016:4).

Social-ecological systems: "A coupled system of humans and nature that constitutes a complex adaptive system with ecological and social components that interact dynamically through various feedbacks" (Simonsen et al. 2015).

Stakeholders: a group of people with common interests or concerns in something.

Transdisciplinary: "is the understanding of the present world through contextualisation of academic and practitioners' knowledge" (Paterson et al. 2010).

Vulnerability: "the degree to which a system, subsystem, or system component is likely to experience harm due to exposure to a hazard, either a perturbation or stress/stressor" (Turner et al. 2003: 8074).

Acronyms

BCLME: Benguela Current Large Marine Ecosystem

DAFF: Department of Agriculture, Forestry, and Fisheries

DEAT: Department of Environmental Affairs

MLRA: Marine Living Resources Act (No 18 of 1998)

SCIFR: Southern Cape Interdisciplinary Fisheries Research project

WSSD: United Nations' World Summit on Sustainable Development

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