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University of Cape Town

Above the surface, beneath the waves:
Contesting ecologies and generating knowledge conversations in Lamberts Bay

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RGRJEN001

A minor dissertation submitted in partial fulfillment of the requirements for the award of the degree of Master of Social Science

Department of Social Anthropology

Faculty of the Humanities

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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Abstract

Based on fieldwork conducted over two months in 2010 in Lamberts Bay on the west coast of South Africa where the cold Benguela Currrent asserts its presence in water and wind, this dissertation aims to describe the ways that people come to know fish and the sea differently. Building on ideas of enactments and practice based knowing as theoretical approaches, the work proposes that people assemble different versions of the environment in which they live because practices lead to alternative ways of being and making sense of the world. Where there is difference, contestations over knowledges and ways of knowing as either right or wrong can result. Where states often work with science based knowledges, other ways of knowing are largely excluded when it comes to making decisions in South African fisheries. Many people such as those fishing in Lamberts Bay for a living, remain out of knowledge debates. The first chapter explores knowledge contestations as generative events (Whatmore 2009) and explores the contexts in which knowledge debates criminalise people – policing as well as epistemological policing can result (Latour 1999, Comaroff and Comaroff 2004). Chapter 2 looks at fishers' descriptions of how they come to learn the sea, and fishing through their bodies. The discussion juxtaposes that with contemporary scholarship (Ingold 2000) on ways in which the sciences, under the star of modernity, have made invisible embodied ways of knowing. Yet, along with Bruno Latour, I argue that moderns have never been truly modern, and that embodied ways of knowing are familiar across the fishers' knowledge-science divide - and thus provide a space for common ground in knowledge debates. Chapter 3 seeks to describe the ways in which practices generate different versions of "nature". In dialogue with John Law & Marianne Lien (2010) I argue, that for many of the people with whom I worked, current writing on vibrant materiality (Bennett, 2010) serves to provide a means of understanding how people may see objects as subjects. Such a way of rethinking subject-object relations makes it possible to understand fishers' engagements with the sea as a relational ontology that serves as an ethical way of approaching fish and the sea. This may provide a means of viewing and approaching conservation from a different angle, bringing humans and non-humans into the debate. The dissertation argues that a natures-cultures approach to ways of understanding marine ecosystems can enable parties to be brought to the negotiating table on more equitable terms than is allowed by an approach that privileges a singular "Science" as the only way of knowing fisheries and the sea.

Introduction

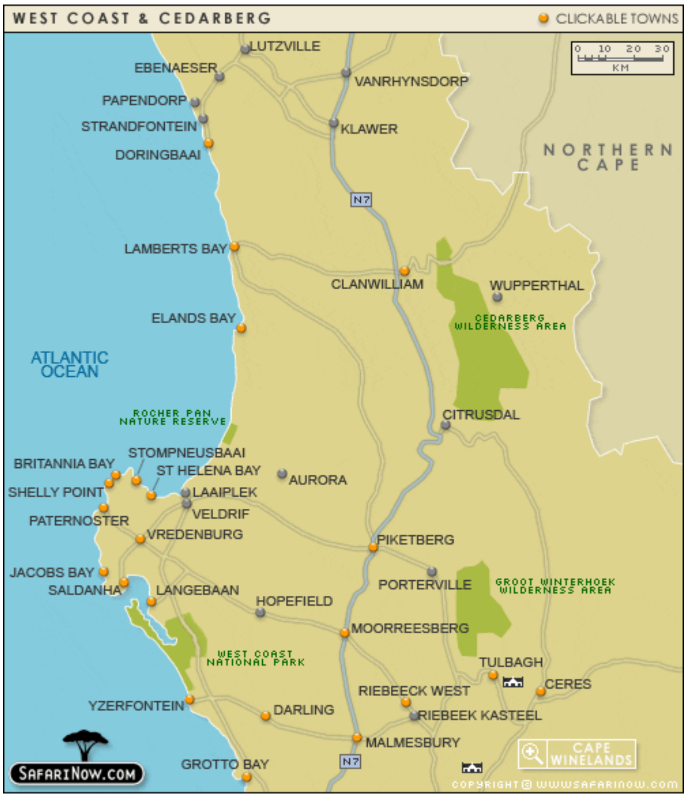
Multiplicities, commonalities and connections: Marine researchers, anthropologists, fishers, fish and the sea

It was on a freezing day during the middle of 2010 that I began fieldwork in Lamberts Bay. South Africa had just begun hosting the soccer world cup, making it difficult at times to talk with people when they wanted to watch a game. Having travelled from Cape Town where the city had been taken over by soccer fever – South African flags being carried by many, vuvuzelas heard everywhere and people making trips into town for the fan walk – I was surprised that it was the sound I noticed first: that Lamberts Bay was quiet. One could well say this was because it is a small town and I was used to the sounds of Cape Town however, there was more to this quietness than just a lack of noise. Going to the harbour and the beach I heard and saw no fishing and where a factory was present, there was no activity issuing from it. As I continued with fieldwork and got a better sense of the town, it became apparent why it was so quiet in many ways – regarding fishing, little was happening.

This dissertation is about fishing, fishers and fisheries. In South Africa, fishing has become a widely reported topic. Stocks are in many cases in crisis while fishers depend on fishing for their livelihoods. With long-term changes to the eco-system, these problems, in some areas are becoming even more pressing. My research in Lamberts Bay was focussed on listening to and learning what fishers there know of the sea and its inhabitants and how they come to know it. Over the course of the following chapters I shall illustrate how people assemble different versions of the environment, and will argue that these different natures need to be considered in fisheries management.

My dissertation is the product of multiple projects, people and connections. On one level it is part of a project focussing on interdisciplinarity – forging links between the social sciences and the natural sciences. More specifically, marine biologists were keen to work with anthropologists around notions of fishers' knowledge, as a way of complementing the research they were engaging with, where fish stocks, in many instances, are in crisis. The second aspect to the project involved examining knowledges and ways of knowing. As a collaborative project, four graduate students and I have worked with the Department of Zoology and the Marine Research Institute at UCT, looking at contestations over knowledge in marine resource management and fisheries sectors. Our project entailed thinking through debates on the nature/culture binary and how it may be possible to move past this, as well as relativist/universalist writings which place people as being entirely different or completely the same respectively, focussing instead on how different ways of knowing ecologies can come to be.

This project is not a new one. Over the past three years Marieke van Zyl worked on fishing in Kassies Bay, Tarryn-Anne Anderson conducted fieldwork at Kalk Bay harbour, Oliver Schultz worked at St Helena Bay and I did research in Simonstown looking at relational ontologies and the relationships fishers I worked with experience with the sea. In the course of 2010 and 2011, Tarryn-Anne Anderson, Kelsey Draper, Gregory Duggan, Sven Ragaller and I have worked at various fieldsites along the Benguela ecosystem. It is unusual for anthropology students to conduct similar research to each other and simultaneously, since the norm in the discipline of anthropology has generally been site-specific, small-scale research. Due to our collaboration with fisheries scientists in the Ma-Re Institute, where large-scale studies are the usual choice, we decided to attempt small-scale research at multiple sites asking similar questions at different points along the Benguela current coast (Anderson et al 2011). Against the background of these conversations, I made my way to Lamberts Bay for the winter of 2010.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SALDANHA
LANGEBAAN
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Map 1: Lamberts Bay. along the West Coast to the north of Cape Town, South Africa

Lamberts Bay

Lamberts Bay is located along the west coast of South Africa, approximately 3 hours’ drive from Cape Town. Originally a farming town, Lamberts Bay moved to fishing, with the snoek run occurring annually along its shores, following the abundant anchovy on which they forage. Fishing was so lucrative that Oceana, a fish processing company, set up a factory there where fishmeal and other fish products were produced. Many of the older fishers with whom I spoke were employed at Oceana until its closure in the early 2000s, after a southerly shift by the fish. The industry followed the fish, to Oceana’s factory at St Helena Bay, also along the west coast.

Running beside Lamberts Bay is the Benguela upwelling system that plays a substantial role in the species found in Lamberts Bay waters and how they come to be there. Typically regarded as the cool coast of South Africa, surface water temperatures range from approximately 11°C to 21°C. These cool waters originate from the Benguela current, which flows from the southern ocean,. With southern trade winds blowing parallel to the coast towards the equator in spring and summer surface water is driven offshore due to the rotation of the earth. This water is replaced by upwelling of cooler water from below (Shannon 1989). These trade wind events are pulsed, resulting in active upwelling (cold water inshore) alternating with relaxation (warmer water inshore) in a cycle of approximately 10 days' duration. With cool water inshore during phases of active upwelling, often offshore water is much warmer, with a front between the upwelled and the oceanic water masses occuring at approximately 50 -70 km offshore. Both the inshore temperature changes and the exact position of the front can affect fish inhabiting this region, affecting their movements when sharp temperature spikes happen. Significantly, the upwelling results in nutrients from the deep water masses being swept up, providing a rich feeding ground for phytoplankton and zooplankton. Small pelagic fish, such as anchovy and sardine, feed on plankton and are very abundant on the Namaqua shelf, on which Lambert's Bay is situated, downstream of the upwelling centre of Cape Columbine, and at the northern end of St Helena Bay which is the most productive area on the west coast in terms of plankton, and therefore, food for small fish. It is the abundance of these small pelagics that gave rise to the fish factory in Lamberts Bay, which produced canned sardine and fishmeal until the mid-2000s. This cold, nutrient-dense water also can result in substantial fish stocks predating on small pelagics, such as Cape Snoek (*Thyrsites atun*), as well as a rich life on the sea bottom, sustaining West Coast Rock Lobster (*Jasus lalandii*).

The coastal region from the southerly St Helena Bay through to Doring Bay, along which Lamberts Bay is situated, has a history of fluctuating stocks. This is in the nature of short-lived, small pelagic species such as anchovy and sardine, and in turn these variations also affect their predators. Oxygen levels have been recorded in this region since 1957, with lower levels having been reported (Decker 1970). This concurs with same-time mass walk-outs on the part of rock lobster. Pitcher and Nelson (2006) explain how it is not just the development of dinoflagellate blooms (red tide) that causes mass mortality of rock lobster. During the 1960s, 1970s and 1980s, there were approximately two such walk-outs per year. These numbers doubled in the 1990s (Cockcroft et al 1998: 686), with fewer incidents during the early 2000s (Cockroft et al. 2008). This suggests that the Lamberts Bay region has a history of periodic lowering of oxygen levels, with resultant walk-outs.

Similarly, the region is known for experiencing significant changes in snoek catches. In 1872, oral testimonies were recorded with fishermen saying that snoek move from being in abundance to nothing. Catches recorded from 1900 onwards suggest that snoek fluctuate and decline regularly but with no predictable pattern in place (Shannon 1989). The availability of anchovy and sardine, in turn affect snoek stocks, as well as the abundance of seabirds which likewise feed on these small fish, The effect is felt in variable guano harvests off Lamberts Bay (Crawford 1989). Environmental factors, too, play a role in stock numbers, however, there have been no significant changes in recent years that reflect anything different to stock fluctuations recorded over the last century.

Fishing is one of the industries upon which South Africa and its coasts have been built and for several centuries, the ocean’s stocks have been harvested. Fish stocks in many regions of South Africa and the world are in crisis. Factors including long-term changes to the environment, overfishing and pollution have all played a role. In multiple cases, limiting fishing has not been effective because poaching happens and in some instances, overfishing has been so extensive, moratoriums have been implemented too late (Schultz 2009). Also, stopping fishing is not a simple decision since large numbers of people depend on fishing for both an income and food. By preventing fish from being extracted, social concerns in the form of poverty, hunger and illness result. Rosemary Ommer in *Coasts Under Stress* (2007) illustrates the ways in which social and ecological health are intricately linked and when one of the two is ignored, both are affected. For this reason, some marine researchers have come to the realisation that because social aspects come into play in fisheries management, these cannot be ignored. An ecosystems approach to fisheries (EAF) takes into account ecological as well as social aspects in fisheries and in 2002 South Africa committed to implementing this approach.

Based in the social sciences, my research was geared towards working with people in Lamberts Bay who fish for a living, learning their concerns and what they know of the sea. In South Africa, many fisheries are run using a science based knowledge and local fishers’ knowledges tend to be excluded from decision making processes, despite efforts by Marine and Coastal Management to hold public meetings, since fishers and scientists tend to talk past one another (Van Zyl 2008), and fishers are excluded from decision making processes. Within this context, researching what fishers know was vital. Within an EAF, local, experience based knowledge can be taken into account, to supplement scientific research data, since EAF proponents acknowledge that people who fish for a living spend most days at sea and as a result have observational knowledge, tracked over years of working on the ocean.

The Marine Living Resources Act and Marine Coastal Management[1]

Fish stocks in many instances are in crisis with climate change being recognised by most of the scientific community as an immediate and serious global concern. As a result, legal frameworks have been developed to try and ameliorate fish stock crises, through the removal of rights to fish for many subsistence fishers through the rights allocation processes that occurred with the Marine Living Resources Act (van Zyl 2009, Schultz 2010). The MLRA aimed to address environmental and economic concerns around the sea and how to distribute resources accordingly. In Lamberts Bay, many people who had fished throughout their lives were stopped from doing so with the advent of the MLRA. Permits were limited and those who were classified as being a 'historically disadvantaged individual' (HDI) were given rights to fish. In South Africa, these classifications were based on a complex set of criteria with the result that many fishers who did not fit into the HDI category were excluded, despite having fished for most of their lives.

The MLRA sought to ameliorate the injustices of the apartheid era, support a neo-liberal agenda and encourage entrepreneurship through fishing. The problem with this was that very few people benefitted – some were given no rights while others were given single species permits which were used within the first week of a fishing season, as was the case for many of the people with whom I worked in Lamberts Bay. This allowed no further fishing throughout the year, because multiple species permits were rarely granted (Isaacs, Hara and Raakjaer Nielsen 2005). Fishing is managed and rules are policed by the Department of Agriculture, Forestry and Fisheries (DAFF), although at the time of fieldwork it was Marine Coastal Management (MCM), with the consequence that people who have fished all their lives found themselves criminalised for continuing (Schultz 2010, Van Zyl (2008), Rogerson 2010, Anderson 2010).There are regulations which different fisheries have to adhere to – sometimes weight, boats and bags are given as legal limits to fishing. When changes were implemented, large fishing companies managed to protect themselves by combining multiple single permits. As a profitable industry, government did not make staying in operation difficult for fishing corporations (Isaacs and Mohammed 2000: 3).

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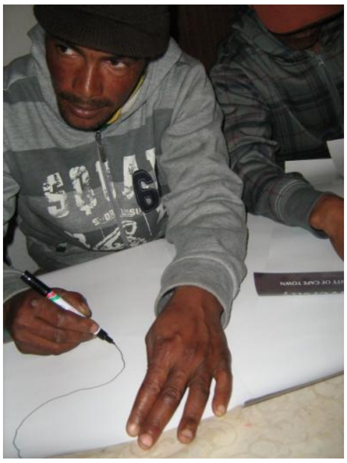
[1] MCM (Marine Coastal Management) has split into DEA (Department of Environmental Affairs) and DAFF (Department of Agriculture, Forestry and Fisheries) as of April 2010. At the time of fieldwork, the split was just occurring so the fishers with whom I worked and I both used the terms MCM.

[2] The MLRA (1998) in section 18 excluded artisanal fishers because it only included recreational, commercial

Masifundise and working with those living and fishing in Lamberts Bay

Most of the people with whom I worked were keen to talk about what they knew of the sea because they were not going out to sea as much as they once did. Few fishers in the area have multiple permits and some do not have any. Several people with whom I spoke had a long history of being at sea. They were fairly old, in their 70s and 80s, and remembering dates and places where events took place was sometimes difficult for them. To counter these limitations I used multiple methods during fieldwork, beyond participant-observation. One of these methods was mapping. While the younger generation of fishers could read and write, the older generation of fishers I worked with cannot read and write, they were however, good at drawing and constructing maps. By making maps of Lamberts Bay, we were able to talk about some of the areas where fishers once worked. I also walked along the coast with some of my informants, allowing them to show me spots where they had worked, triggering memories of special days at sea. Being a woman, I was to some extent limited in my fieldwork. It is a long-held tradition for many fishers that women may not fish, although Rosie, the only women fisher in Lamberts Bay is a testament to the contestation over the rule. I decided to forgo fishing trips: partly not to rock the boat, but also since by going out to sea I would have taken the place of someone else who could have been fishing. This did however, prevent me from watching what happens at sea. Ernest and Hennie, two of the men with whom I spoke many times, tried to make up for my not being able to go to sea by showing me how they fish and the equipment they use on land. Talking with my male peers upon return from the field, who had also worked with fishers, I realised not going to sea had its benefits. Apart from not having to worry about sea sickness, I was told about fish spots and where they were (these are the areas where fishing is usually successful). For my male colleagues, fishers were often secretive, not wanting to share the good fishing spots because they were at sea, and theoretically speaking, could steal them. I suspect that as a woman I was not perceived as a threat and therefore was made privy to more details.



George drawing the Lamberts Bay region so that he could add fishing spots.

Since I do not speak fluent Afrikaans, the local language, I worked closely with a fieldworker from Masifundise. Masifundise is a non-governmental organisation (NGO) that has been working with fishers in Lamberts Bay to involve them in the process of restoring their rights. With certain scientific advice generally informing policy makers, it has become integral to Masifundise's work to get fishers' recognised as knowledge producers and participants in rights allocation. Masifundise has been involved in 2 court cases, where fishers have tried to get back fishing rights[2] (http://www.masifundise.org.za/documents/policyengagoverviewweb.doc). Prior to this, interim relief was granted through dialogue with the Director General of the Department of Environmental Affairs and Tourism. In the background, the court case Masifundise and Coastal links had been working towards, kept pressure on the Director General and MCM (Now DAFF). The court cases were won, on the basis that new policies were in the process of being developed. This was in response to government cutting permit rights quite suddenly, leaving many small-scale fishers without a source of income. In this way, Masifundise takes a strong position in getting fishers involved in fisheries management as well as providing a means of sustainable income. In July 2010, an equality court order was signed, whereby the minister and DAFF were ordered to grant permits to fishers who were excluded due to a policy passed in 2005. As of 12 September, the final draft small-scale fishery policy was handed to constituent members. This is necessary for the policy to be implemented by DAFF (http://masifundise.org.za/?p=326 and http://masifundise.org.za/?p=246). Nico, the

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[2] The MLRA (1998) in section 18 excluded artisanal fishers because it only included recreational, commercial and subsistence fishers in the debate. As a result, Masifundise in conjunction with the Artisanal Fishers Association of South Africa and the Legal Resource Centre launched a class action litigation against the minister involved with the MLRA. This case was brought to the equity court as well as the High Court. (SCA Case no: 437/2005 Equality Court no: EC1/2005f).

fieldworker from Masifundise with whom I worked, facilitated many of the conversations with people in Lamberts Bay, when Afrikaans was spoken. While I experienced the limitations of working through a translator, where one has to trust what the translator tells you, Nico and his ties to Masifundise were invaluable to my fieldwork experience. With rights having been lost, fishers are often disinclined to talk, seeing researchers as people wanting to learn from them, then taking away their rights, as I was told during my honours fieldwork. With Nico, trust had been established between himself and fishers in Lamberts Bay; because Nico trusted me, the people spoken with did too, making gatekeeper issues of little concern. Nico is from Lamberts Bay; he went to school there and later engaged in some fishing. Easy-going, setting people at ease, people in Lamberts Bay feel comfortable talking with him, especially since many of them have known him since he was a child. This was one of the main reasons I chose to work in Lamberts Bay; by having the support of Masifundise and Nico, I knew I could work with fishers, where in many cases researchers in other regions have been kept at a distance. For most fishers, researchers are equated with science and many fishers understand scientists to be at the root of their having lost rights. This is because some scientists inform management decisions and where research has shown that stocks are in crisis, TACs have been reduced. This has meant livelihoods for a great number of fishers have been lost. While this is by no means the fault of all researchers or all scientists, fishers often perceive it this way.

Introductions: meeting with fishers, engaging with scholars and reading the literature

Over the course of my stay in Lamberts Bay I worked with several people, all of whom had at least one thing in common: fishing. There are different types of permits in the Lamberts Bay region: handline fishers in Lamberts Bay can have commercial rights, or fish on the interim relief agreement, or on a recreational licence. If they also fish rock lobster, they need to have a rock lobster right (in addition to the handline right). If they are fishing hake as well, they would need a hake handline fishing right on top of that. The handline commercial right is not tied to specific species, so they can fish most species.

As there are several kinds of fishers, it is necessary to introduce the people with whom I worked individually. Some have fished for longer than others have been alive so periods spoken of varied. The oldest amongst these people is Dikkie. Dikkie worked on the sea as a fisher, a skipper and a boat owner. He has owned *bakkies* (the small, two-people boats running on a motor or using paddles) as well as larger, 10-people boats. When talking in a group it was Dikkie everyone would turn to for the final answer on something. As the oldest person with a fishing background, he was considered the most knowledgeable of the sea and fish.

Hennie W was also part of the older generation of fishers. He was born and grew up in Lamberts Bay and fished there most of his life. Hennie W became most enthusiastic – speaking loudly and swearing at times when conversations turned to rights and TACs.

Hennie O, also an older man, had different story to Hennie W in that he was not from Lamberts Bay. He began working at a farm, at one of the small towns inland, close to Lambert Bay. He heard stories of how fishing was the best way to earn money as fish were plentiful, and moved to the Lamberts Bay coast where he learned to fish. He told stories of how he was scared the first time he went to sea but also of how he mastered the art of being on a boat and was able to save fellow fishers on one occasion.

Willem was part of the older generation of fishers. He provided dates of many events and he had many memories of working for the fish factory once operating in Lamberts Bay. While he enjoyed fishing, he did not encourage his sons to go into fishing, saying fishing no longer provides a livelihood. Willem also fished in Lamberts Bay his entire life, being born their too. He, next to Dikkie, was considered the most knowledgeable of all the people fishing as he had fished for the longest period.

Ernest was part of the younger generation of fishers. He considered the men above his teachers and found it difficult to oppose their views for fear of being seen as disrespectful. He was one of the few people with whom I worked who used the term ‘climate change’, attributing changes to it.

Rosie, around Ernest’s age and the only woman fisher in Lamberts Bay was proud to be fishing. She spoke about how she could have been a domestic worker but chose rather, to go to sea. At sea she felt free and she knew that she could never work within the structures of jobs that have time constraints.

Kelvin was probably the happiest of the people with whom I spoke. He always had a smile on his face. In his early forties and a practising Rastafarian, he said he could never do anything besides fishing because he enjoyed it so much.

Joanne has not fished for a living but her father did as did her brothers, her husband and her sons. She spoke nostalgically of how there used to be plenty of fish at the estuary where she lived and how they fish less now that restrictions on fishing are in place.

George and Jacques were the youngest of the fishers with whom I worked. George was Rosie’s nephew and they told me how George’s father died at sea. For this reason, George said he cannot leave fishing because he felt tied to the sea through his late father. Jacques was in his thirties and worked on small boats in Lamberts bay. He also worked at St Helena Bay on occasion, where he worked on a larger vessel to try and earn extra money.

It was with these 10 people that most of my research was conducted. There were moments when language got confusing, becoming funny even; sometimes someone got excited about what they were talking about and spoke in English (some of my informants could speak English but chose not to because they regarded it as a ‘white’ person’s language) so that what they were saying would not be interrupted by translations. Nico, accustomed to translating, would begin translating the English into Afrikaans, only realising after a few sentences that we were all laughing at him because he did not need to translate.

Willem (left), Hennie O and Hennie W where Hennie O makes his nets.

Research on fishers in the South African fisheries has been pursued by several research groups. At PLAAS, the Institute for Poverty, Land and Agrarian Studies based at the

University of the Western Cape, research is geared towards learning the challenges within fisheries, particularly for small-scale fishers. Many small-scale fishers, felt the effects of permit loss acutely and PLAAS has provided a space for concerns and challenges to be researched and addressed. Moenieba Isaacs, Mafaniso Hara and Jesper Raakjaer Nielsen (2005) wrote of the effects of permit loss and redistribution for small-scale fishers in the Western Cape. There are many reasons for this. Where the new South African government, post-apartheid, was expected to redress past injustices, it focussed on privatisation, encouraging fishers to start up small businesses in fishing (Isaacs and Mohammed 2000). According to Isaacs et al (2005), there were problems because not everyone who had fished for a living prior to apartheid's end was presently allocated rights to do so. Isaacs et al (2005) write of these issues and argue that racial classifications can become problematic in these instances because not everyone who fished was necessarily categorised as historically disadvantaged. In other words, people who had fished were not always of the previously disadvantaged race, according to government classifications and they lost out when rights post-apartheid, were provided. Contrary to the state's take on it, Isaacs et al (2005) argue that to deal with the growing poverty of fisheries in South Africa, the state needs to take on an interventionist role in making changes within large fishing corporations, that did not need to change with the MLRA, by supporting small-scale business ventures, moving away from a neo-liberal format. The reason the large fishing corporations did not need to change is due to permits. Certain rules within the MLRA were implemented, allowing individual fishers a single permit, generally for fishing one species. Small-scale fishers, in many cases, did not have large enough permits to fish comfortably for a living. Fishing corporations however, were still able to fish because they were part of the commercial category of fishing, whereas small-scale fishers were (and are) categorised as neither commercial nor recreational fishers, hence receiving permits for neither. This is why research with small-scale fishers has become so important – while policy recognises the need to change, it happens slowly and during this process, many fishers are left with no permits or interim permits, and the difficulties of this require attention. More than just an issue of permits, Isaacs and Hara (2008) also suggest that on the small-scale, factors such as HIV/Aids impacts need to be considered in fishing communities when looking at policy. It was during my own fieldwork that the importance of this kind of research was further highlighted. Many people in the fishing community spoke of how their families are ill but they do not have the money to seek medical attention. Focus on small-scale fishing communities is, in this way, necessary so that policy can be fully informed of all the challenges of small-scale fisheries and co-management can be implemented. It is argued by Hara (1999) that because of these specific sets of challenges, it is vital that management be regarded differently for subsistence fishers, and that the management of industrial fisheries cannot be transplanted to the small-scale fishery, requiring a focus on co-managing fisheries. The trouble is that while it may be recognised that small-scale and industrial fisheries cannot be managed in the same way, the process of change is slow. One of the reasons for this is that allowing the voices of all those involved in small-scale fisheries to be heard is a hard task to fulfil. Writing more recently, Hara and Raakjaer (2009) explain that another reason for difficulties in changing the approaches to different fisheries, is that it is hard for small groups and new entrants in fisheries to influence a policy that needs to change from capital-intensive based fisheries to one that also considers the conservation of marine resources and the social aspects to fisheries, such as hearing fishers concerns and the health and well-being of fishers. This is because economic factors play a significant role in fisheries debates and policy making procedures have to take into consideration a factor that South Africa would like to remain competitive with other fishing-intensive countries while also needing to address the challenges of small-scale fisheries and marine conservation (Hara and Raakjaer 2009).

Working in The University of Cape Town’s Environmental and Geographical Science Department, Merle Sowman, Maria Hauck and colleagues (2002) have made important contributions to the project of getting fishers recognised as knowledge holders who need to be involved in fisheries management. They have been one of the main groups of researchers in South Africa to engage in notions of co-management, in papers such as *Coastal and fisheries co-management in South Africa: An overview and analysis* (2001) and *Waves of change: Coastal and fisheries co-management in South Africa* (2004) which has helped hugely in bring social aspects of fisheries to the fore. It has helped because coming from environmental and geographical science, these projects were able to carry weight in science based discussions where the social-sciences are traditionally not involved. This has resulted in fishers being asked to collect data and provide opinions when it comes to management decisions. The result if this is not done, they argue, may be poaching and illicit fishing because small-scale fishers could be criminalised (Hauck 2008). Hauck (2004) argues that government needs to play a greater role in fisheries in order to see sustainable fisheries management where the needs of all in fisheries are met. Hauck et al (2002) made recommendations to the Subsistence fisheries task group (SFTG), which was involved in management. Taking into account social aspects of fishing, their research was instrumental in getting fishers voices heard.

Lance van Sittert's paper *Leviathan bound: Fisheries reform in South Africa* (van Sittert 2002a) makes an argument that in the St Helena Bay region of South Africa, with the MLRA and post-apartheid changes to fisheries, large corporations benefitted. Small-scale fishers were in many instances left without employment, having fished most of their lives (van Sittert 2002b). He also argues that local histories need to be incorporated into fisheries debates. It is difficult to do this now because most debates are centred on science-orientated research and interests and because while attempts are being made to hear fishers, there is not space for working with these (van Sittert 2003). There are however strong attempts to change this. Astrid Jarre and colleagues from the natural sciences are working with an "EAF": an Ecosystems Approach to Fisheries, with the goal of providing a framework through which human and non-human factors can be taken into consideration in South African fisheries management (Shannon et al 2010). They also look at ways of working with multiple forms of data and working across different scales (Perry et al 2010, Jarre, 2008). These writings have not been the only ones – Shaheen Moolla from Feike, a group of natural resource management advisors, has been vocal in illuminating the problems facing South African fisheries management (Cape Times 3 June 2011). Apart from excluding small-scale fishers, he argues, management is also failing in terms of administration, with the fisheries department of South Africa having many vacant posts.

Pursuing a trans-disciplinary dialogue, Astrid Jarre and Lesley Green (Social Anthropology, UCT) have led a multi-sited project that encompasses ten studies of coastal communities along the Benguela Current coastline, from Stil Bay in the southern Cape, to the Walvis Bay in Namibia. As part of an early phase of that project, my honours dissertation (2009) spoke to the plight of fishers in Simonstown, south of Cape Town, who have lost rights. Tarryn-Anne Anderson (2010) has worked with fishers and their logbooks in Kalk Bay, in the southern reaches of Cape Town, looking at the ways in which people have to act within management rules that do not necessarily work for fishers because their views on management have not been fully incorporated into discussions. Working in Walvis Bay in Namibia, Kelsey Draper (2011) looked at the interactions that inform today's fisheries, and our group paper, *Conservation conversations: Initial findings on contestations over fisheries science along the*

Benguela coast, attempted to show both the disconnects and the partial connections apparent in Southern African fisheries.

In Canada, similar work was led by Rosemary Ommer (2007) in a large-scale, multidisciplinary study beginning in 2000 that focussed on social-ecological restructuring along the west and east coasts of Canada in the aftermath of the cod collapse. The project considered both environmental and social health. These were used as the platform for designing management strategies that complement both, i.e. working on the basis that without both ecological and social health, neither can be fully 'healthy'. Management strategies needed to be designed to work with and incorporate both environmental and social aspects. Canadian sociologist Barbara Neis has looked at ways of learning from fishers and finding ways of quantifying their knowledges so that they are usable in management and stock assessment. Neis (1999) provides means of accessing information from knowledge holders and also how to check the consistency of trends in what is reported. Based in Canada where the Atlantic Cod of Newfoundland fishery was fished out, her work has provided valuable literature on how South African fisheries may prevent stock collapse by engaging with multiple knowledge holders.

Also coming from Canada, St. Martin et al (2007) are useful in their problematising of similar issues faced in South Africa. While it is recognised that interdisciplinarity is necessary in fisheries management, the social sciences may need to change research methods and data collection tools. Since the sciences are working towards incorporating the 'human factor' into science, social science methodologies need to become more useable to the sciences. Murray (2011) complements this in his study that recognises how socio-ecological engagements have shifted social practices amongst fishers. In this way, the values and ethics of people in this regard can change with different approaches to the environment, in changing circumstances. Questions of research at large scales is one challenge still to be addressed. Fikret Berkes (2003a and Berkes and Davidson-Hunt 2003b) too raises challenges of how one might deal with scale and bringing humans into ecology. His contribution here, is how one works with environmental ethics while still harvesting the ocean. Berkes' (2011) more recent work highlights that the separation of the social and the ecological is a misnomer and the more research works towards integrating the two, the more relationships between humans and the biophysical can become reciprocal. More work towards interdisciplinarity is key according to Berkes (2011) as is recognising the similarities between the social and the ecological. Also useful is Murray, Neis and Johnsen (2006), who show how fishers' knowledge coevolves with their practices. As a result, with changes in fishing practices to more technologised means of fishing, some of these ways of knowing are being lost.

It is with this literature in mind along with South Africa's current state of affairs regarding fisheries that I move to the chapters of this dissertation. In Chapter 1, questions of epistemological and state policing are raised. In Lamberts Bay, people fishing often considered rules and management to be illogical in terms of fish behaviour. In this chapter, I unpack some of the disagreements between people fishing and DAFF rules and how it may be useful to regard the base of these disagreements in terms of how people enact versions of the environment differently. Chapter 2 examines embodied ways of knowing and how these are often appear to be disregarded. For these fishers, knowledge was learned through experience and engaging with the sea. Knowledge was learned through the body and this chapter looks at how this happened. In Chapter 2 I shall show how people may enact reality differently and so can see processes in dissimilar ways. On many occasions, the people with whom I worked regarded themselves and informers to management as part of a right/wrong binary. By looking at how people come to know through the body in the case of my informants, I consider how people assemble versions of nature differently through their practices. Chapter 3 considers how one might work with multiple versions of nature. By using the idea of networks, I look at how many of my informants spoke of engaging with non-human actors and how this moves to notions of relational ontologies. Using data from the field, this chapter looks at the concept of vibrancy of matter. In this way, considering multiple natures forms the foundation of this chapter and how one might begin to work with these in the multiple. Moving to Chapter 1, I begin this dissertation illustrating, in a knowledge debate, where the disagreements existed over knowledge of the sea and how it may be possible to work through them.

Chapter 1

Contesting knowledges of the sea

Different ways of assembling versions of the environment

I began fieldwork in Lamberts Bay trying to address questions of climate variables and change and what fishers experienced. Joanne, Dikkie, Kelvin and Ernest began talking about the changes they had observed over their years at sea. These changes, which I shall explore later, ranged from tidal and wave pattern changes through to noticeable differences in fish behaviour. On the other hand, Dikkie for instance, was not convinced that long-term change was afoot. For most of the people who participated in fieldwork with me, there was at least one area of consensus; they disagreed with parts of the rules and regulations of fishing. Most of the rules that Dikkie disagreed with related to administrative procedures: times one may fish; for how long; where one docks, and where one is permitted to fish. Disagreements arose because to a large degree, Ernest and his mates were not involved in the decision-making process of fisheries management. The reason for this was that South African fisheries management works with a group of the sciences and where contestations over knowledge exist, there is no space for working through these. This is because currently, stock assessment and TAC recommendations within DAFF focus runs on one fish stock at a time and according to its numbers, whether or not these have risen, these determine the TAC for a year on that particular species. In some cases a species' condition could be critical, in which case fishing could be banned for the applicable season. In these decision-making processes, however, people fishing in Lamberts Bay, are not given space to voice their concerns or knowledge of fish and the sea.

The incommensurabilities at play seem almost insurmountable, on first encounter. Where fishers had knowledges of their practices and vocations, how they came to learn it was remarkably different to the ways in which scientific researchers had been taught their craft. Although single-species assessment methodologies and practices are contested by many biologists working for DAFF and although South Africa has committed to switching over to an EAF by 2012, DAFF relied on single-species modelling for its stock assessments and quotas (Shannon et al 2006). The policy remarkably minimises the common ground the sciences might find with fishers like those in Lamberts Bay who understood fish in relation to other species and factors. Moreover, the fishers' embodied and practical ways of knowing the sea are not commensurate methodologically with the analytical sciences, and in their local specificity they work on a different scale to that of research scientists who work with data sets at scales of thousands of kilometres of coastline. For these kinds of reasons, among others, fishers' knowledges and sciences find great difficulty in speaking to one another. Without adequate means of translating conceptual, relational and practical differences, scientific knowledge is almost inevitably placed in a binary against fishers' knowledge. This dissertation aims to show, as highlighted in Anderson et al (2011), that the binary is not an inevitability; that there may indeed be ways of supporting dialogue between fishers and scientists.

The discussion has confluences with related debates in other contexts in South Africa, whose constitution allows for 'cultural practices' to be considered in courts of law (Comaroff and Comaroff 2004). Despite a strong argument from South African anthropologists (who in the 1980s and early 1990s opposed the ways in which apartheid mobilised the idea of culture) that culture is fluid, dynamic and without boundaries, South African law provides for cultural argument in legal matters (Boonzaaier and Sharp(1988)

In the South African fisheries activism[3], this plays out as an argument that fishers have an 'indigenous' knowledge that needs to be recognised as much as the knowledges of the sciences (Hauck et al 2002). It is argued that fishers need to have their knowledge used in management where it is helpful (Stanley and Rice 2003). These contributions are important in the process towards getting fishers heard, but the difficulty with them is that they set up and rely upon precisely the terms of the dualism that they seek to undo: a fishers versus science debate. The consequence is in discussions of right and wrong, and assertions of identity-based ownership of knowledge which foreclose possibilities for entering into discussions of how to work with multiple knowledges because one knowledge is seen as right, or more accurate, than another in a given situation.

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[3] Fisheries activism entails those researchers who are working towards getting local fishers' recognised as people who have a valid knowledge of the sea that could be useful, at the same time working towards getting rights restored to fishers or a fisheries management that is sympathetic to different users.

Bruno Latour addresses exactly these questions in his book *Politics of Nature: How to Bring the Sciences into Democracy* (2004a). Here, he describes the ways in which nature is framed within modernism as reality itself. Deeply rooted in empirical methods yet equally dubious of the ways in which the knowledge economy establishes 'Science' in the singular and with a capital S, Latour differentiates between the work done by the sciences and the term Science, which asserts that an objective knowledge has been extracted from nature (Latour 1993 and 1999). The divide of subjective and objective knowledge, within modernist approaches to the sciences, says Latour, sets up the idea of 'culture' against 'nature', in which culture is all that which is not objective and real. Parliament deals with matters cultural, and science, with its social apparatus and profoundly politicised debates, occupies a space outside of frameworks of democratic accountability. Latour's oeuvre is vast and hugely respected precisely for his commitment to thinking outside of the limits of cultural relativism, which is the only option one has if differences are matters of culture Latour's (2004b) *Why critique has run out of steam* is a useful articulation of his critique of a humanities which is preoccupied with questions of representation and therefore unable to speak to the really big questions such as climate change. *Making Things Public: Atmospheres of Democracy* (2005) is a vast collection of essays by leading thinkers both contemporary and historical, regarding knowledge and the ways in which it enters public debates. His oeuvre is too vast to account for comprehensively here, but my study is situated within this.

In this chapter I would like to begin to think about how an understanding of fishers' ways of producing and assembling knowledge might contribute to unlocking the incommensurabilities of fishers' knowledge and the sciences, without resorting to an "IK-Science" divide. Ernest and his sea mates spoke on many occasions about how and why they disagree with current management rules and regulations. Working with these disagreements and how they came about, I argue that the dispute is at least in part due to different practices, through which people enact or practice ways of knowing. Enactment is the process by which people bring reality into being through conversation and communication, and consequent action. Two people may be looking at the same fish, but because one enacts reality differently to another, bringing in different histories, experiences and actions, the same fish may be very dissimilar (Law and Lien 2010). Their paper tracks the ways that salmon (domesticated and undomesticated) are enacted differently. Through ethnographic data I show cases of how different ways of assembling the environment play out and how this results in contestations over knowledge, administrative disagreements and policing. Through looking at these, it further leads to how one might begin to be able to *speak* of different ways of assembling the environment and bring multiple versions to the fisheries management negotiating table.

Lamberts Bay harbour and factory, (left). A bakkie boat just outside the harbour.

Contestations over knowledge

When I began fieldwork in Lamberts Bay during the winter of 2010, I had an initial meeting with ten fishers on my first day. The plan was to get to know each other before discussing the questions centred on my research interests. I was however, promptly directed to the concerns they had regarding their permits and disagreements with state policy. While I was asking questions about their lives, they gave me short answers and asked if we could talk about what they were interested in. Ernest did not seem keen to talk about who he was and what he did, looking bored. When conversations were moved in the direction he wanted, his voice became louder and conversation became lively with people interrupting each other. Some of the issues raised were concerns about being ignored, impractical working hours and how they do not agree with what scientists say in certain cases. The more I listened to the fishers the more it became apparent that they were not simply disagreeing with management because it has not been run in their favour, but that there were real contestations over what is known of the sea and its inhabitants. Van Zyl (2008) and Rogerson (2009) look at ways that the sea is regarded in multiple ways by fishers and how this plays out as contestations over knowledge.

In a similar way, this was the case for Joanne. Joanne and her family invited me to their home one afternoon where they described some of the areas where they do not agree with what is officially said about the area they live in. Their home was cool, providing respite from the heat of the one hot winter day that season, and the circular seating arrangement was soon filled by fishers who came in to talk and take a break from their chores. There is an estuary close to Lamberts Bay and sometimes people fish there rather than at sea. Joanne's family used to fish there often, she says, until their applications for permits to fish in the estuary were denied by DAFF.

> Jo: The researchers have said there is a decline of the fish stocks; we as fishers don't believe that story, what we know is that there is a change in the running of the fish, how the fish have run from the past to the present, there is a change. What the fishers know is that the channel of the river mouth have been unnecessarily closed by some, the northern side of the river mouth has been closed by the diamond workers and that causes problems as that was where the fish entered the river.
> J: is that why the running of the fish has changed?
> Jo: we believe that is the reason why so few fish enter the estuary. The people from the diamond that side, have built a walk way so they could catch fish from that rock and that disturbed the run of the fish. But they have tried to reopen but it seems they weren't successful. It was in the 1960s they closed it.

In this example, Joanne makes it clear that her understanding of changes of the environment differs from that of scientists'. Although her assertions may or may not be accurate, her words highlight a contestation over the reasons for the decline in fish stocks. Joanne and her brothers, who joined the conversation every so often as they entered the house, said that other factors are part of the problem in the stock crisis, such as closing of the estuary, as mentioned by Joanne. The comment below makes a similar point:

> J: Have shorelines changed?
> D: 20 years ago the water come so far up but it doesn't happen anymore because of the *dollosse* for the breakwater that prevent that water can go so far like in the earlier years.
> J: So you think the harbour has played a big role?
> K: Yes, in the earlier years it was a lobster and fish factory but nowadays its a potato factory and the water they pump into the sea has an effect on the fish and lobster in the water so there isn't a huge amount like before and the time we have fish and lobster in our factories people had jobs and we had communities which were better off then nowadays.

In this conversation, factors such as changes in production and polluting the sea were given credence by Kelvin through his observations. Likewise, for Dikkie and Ernest, while working on the sea, changes too were noted, however reasons differ.

> J: Have you noticed any changes in the currents in the last few years?
> D: We know the sea from the past, today is a good sea day, the sea is slap (limp), tomorrow the sea change and it comes with a very strong current and we are used to that.
> E: I want to contribute to this debate; it was in the 2005/2006 season and we had very bad sea days, actually we only had 12 days to catch and we didn't reach our full quotas because of the bad weather and strong currents so that's what we notice. This is what I notice today, in the morning the sea is very good but in the afternoon it is bad and that's what I experience nowadays and also the swells of the waves is much bigger now.
> D: When it is a good sea day you can catch and you can throw your nets in the water and you pull it out and you'll get something, on the next day you go to the same spot and you'll get nothing. They'll be beneath the rocks because of the currents.
> E: This is why we don't agree with scientists; they won't come here and do research like the way we are catching and knowing. For them, they will just get data sheets that there is no lobster but we know there are circumstances that mean the lobster won't bite for the day and we won't catch it for the day because of all the currents and the weather conditions.
> E: And again, in 2005/2006 it was a bad, bad season but the next season it was a very, very great season then in the half of 2005/06 season they tell us lobster migrated to the east and there are no lobster here, but after that they can't explain where the lobster are coming from.
> J: So would you say the currents aren't changing in the long term, they are always variable?
> E: Yes, yes.

In the above examples, changes are acknowledged although the reasoning behind them differs to what marine scientists say. During these conversations, Ernest and Dikkie raised their voices and became angry talking about the seals stealing their fish and competing for them. Below, contestations over the seals come to the fore:

> J: You don't get any mackerel now?
> E: I've got a different version. I started fishing when I was 16 years old and I worked with an old man, old Johnnie Vis and we throw our nets just outside the harbour.
> D: What Ernest says is right, it was all full of sea life here – lobster, fish and you going rowing and you catch but now its different – its not only the bird island; in the front its the birds, in the back its the seals and they are going down and they are catching our fish. They are even catching lobster.
> E: In the past you come to one shoal of fish and you'll find only two to three seals – no problem, and they'll catch one (fish) no problem. Nowadays, you can't go from one shoal to another without seeing more seals than fish (everyone laughs).
> J: Do you think the seals are affecting the fish stocks more than climate change?

> H: Look, if you look at our bird island, one part goes to the seals and they are growing there in numbers – its not a bird island anymore, its a bird/seal island and they are growing in numbers.
> E: I'll say something on that; if you are hungry, you need to go and find food and you need to go on a hunt. North from Lamberts Bay, close by Doringbaai, there are seals, a seal island. My belief is that some of the seals come to Lamberts. I would say this has an effect on the fish stocks because I've read up how much they have to eat per day, the volumes per day. So when you're catching cape bream they'll eat that amount per day so the seals live on the fish stocks. Look at the amount of seals that are here?
> J: Did they used to cull the seals?
> E:Yes, I was part of a discussion when the Doringbaai folks ask for the culling of the seals for using their leather, skin for shoes but MCM have said no because its for nature conservation.

Joanne has lived near Lamberts Bay her entire life. What she has seen and learned over the years was based on her observations of this small region. She recounted how she and her family would travel along the coast to neighbouring towns to catch fish. On these journeys fellow fishers along the way would share news and information of what was occurring along the coast. Joanne observed changes to fish runs and she attributed this to her observations of the river being closed by officials and she had also seen fish decline in number at the same time. The two observations add up and for her, allow it to be said that river closure has resulted in fish stock decline.

Ernest perceived his environment differently to Joanne. His view of the fishery was based more on a habit of everyday observations. Ernest says when he used to wake up each morning the first thing he did was look outside to get a feel for the weather waves, sea temperature and winds. in order to gauge likely fish behaviour This made the question "have you seen long-term changes to fish?" a difficult one – on one level there have been changes, they happened every day, and on another, nothing significant had changed in recent years because change was always occurring. To make the claim that climate change is happening was hard for Ernest because the reality of fish stocks is that it they were constantly in flux. For Dikkie, his understanding of the changes in the Lamberts Bay fishery too was due to his habit of attending to a particular set of issues. Foremost in his account was that the Bird Island became a seal island and that he had he seen seals eating fish as well as lobster. Based on his daily sightings and interactions with seals, Dikkie's account of the Lamberts Bay environment centred on the role of seals in consuming fish.

Hennie, however, brought different influences, histories and events together, making for another version of reality when he saw seals at Bird Island. Over the course of some 40 years in Lamberts Bay, he too observed a rise in the number of seals. Knowing that seals also catch fish, when stocks decline, he attributed this to the simultaneous rise in seal numbers.

While the fishers' accounts tend to reduce ecological change to one particular issue which in turn becomes amplified in the environmental histories that they tell, likewise, Latour reminds us, 'the nature" of change is reduced and amplified in the processes attending scientific research (Latour 1999). Scientists do research at a fieldsite, and, like the four fishers' whose accounts appear above, they need to observe reality in order to learn. As they work, they collect data which are recorded; the collecting of data happens through equipment and different processes along the way. By the time a report is written, a series of events have occurred, bringing collected data to the point of being a paper which is circulated, amplifying its reduction. In this way of coming to know, another version of the environment is assembled.

For Latour, the mediation of different knowledges is in attending to the processes through which knowledges are assembled, rather than hurrying to compare and contrast particular findings. Building on Latour's work, Sarah Whatmore's project [ref. needed here] expands the concept participatory research and how one goes about engaging in knowledge contestations and debates. With this in mind, I turn to some of the ways one may work with contestations over knowledge, beginning with an account of the kinds of readings, misreadings, understandings and misunderstandings of ecologies, scientific research and fishing policy pertaining to Lamberts Bay.

Alternative perceptions of temporalities and places

The areas in which contestations appeared most often were in terms of temporalities and places where people may fish. As van Zyl (2008) pointed out, time is not constant regarding how people understand it. Long-term changes to the ecosystem versus short-term changes as well as election dates all play a role in how people view and approach time. In this section I unpack some of the contestations that exist in this regard.

Each day that Ernest, Dikkie, Rosie, Jacques and George went to sea they were required to bear in mind the new rules and regulations of fishing, regarding the species they catch as well as where they may go. Rosie and her mates also had to keep time in mind as they were only allowed to fish (rock lobster specifically) during certain times each day as well as (line fish and rock lobster) during particular seasons due to permit restrictions. On many occasions Ernest disagreed with some rules – this was not just based simply on the feeling that rules can be a nuisance, rather, these were also understood to be counter-intuitive. For him, the rules did not always take fish behaviour or sea actions into account. The expectation that fish and the sea could be made to fit in with the schedules and operations of management was, to them, ludicrous and frustrating in that when a snoek run occurs, fishers need to head to sea as there is no way of telling how long the fish will continue their run. For Dikkie and Ernest, management rules required them to do the very opposite of usual fishing practice, which is to go to sea when the fish or lobster are available. Their disputes over appropriate times for fishing were both about daily schedules, and changing seasons.

> E: I've got a problem the way government closes lobster and how they have the seasons for the lobster – they start 15th November and then end 30 June. For me the best is when they must come to season from September because now what we're finding in the winters from this time, the lobster are berried and you can't catch them so they must start the season a bit earlier and close a bit earlier.
> J: Isn't it that the scientists see that as being the breeding season?
> D: The lobster is berried in the near shore now [June]. The season must stop in May, and then start 2 months earlier [September]

Rosie pointed to a similar notion regarding times:

> R: For me Jennifer, the times don't suit the fishers to go to sea at 6 o' clock in the morning and the fishers can't go at 6 cos the water is not going to wait, the fish are not going to wait, for the fishers to go out to sea – its very bad to go to sea when the sun is up cos you won't get lobster like you get in the night. But we can't go out at night because of the rules of the officials. In the case of snoek, maybe the snoek isn't biting early in the morning but late in the afternoon then you must hurry back to the harbour cos you must get in by four but maybe at three the fish are only starting then – so it doesn't suit us.

In the following account, Ernest said that the season for catching lobster is not useful because by the time they can legally catch lobster, the females have already berried. Dikkie took into account changes in lobster patterns. He was therefore unsure why the season has not changed in accordance with the lobster:

> D: The lobster, five years ago you could catch it every day on the same place but its changed a lot; you get it today but then the lobster has moved to another place.
> J: Do you know why that is?
> D: When the lobster is pairing the male and the female separate from each other and the males move away so the females can lay eggs.
> J: Has it always been this way?
> D: it is, for all times.
> R: In the past, it was in another season like May, from November to February you could catch lobster, lots and lots but now with climate change its not happening at the same time but maybe at a later stage or earlier stage so its only the time that is changing from my point of view.
> J: Do you agree with MCM times?
> Jacques: Last year the water was warmer and you could catch geelbek and uh...tunny (tuna) and the tide is lower than it was.

Rosie understood that the best time to catch fish was when the sun was not up. Yet, she may only go to sea when the DAFF (Department of Agriculture, Forestry and fisheries) rules say that she may. In these instances, Rosie asked me why fisheries managers would set fishing times over periods when fish were not around. Her assumption was that the science informing management must be wrong, in that researchers must have thought fish were easy to catch during the sunny hours of each day.

The case of seasons for fishing is an example of this; Rosie debated the best months for fishing yet seasons for fishing were instituted without prior discussion amongst all those involved in fishing. Rosie was sure that if they were allowed to fish for lobster, there would not be a shortage:

> R: From my point of view that won’t happen if government give the fishers the right to harvest the crayfish.
> J: Oh cos there were too many?
> R: But the researchers from government come and tell us each time that there aren’t enough.

> D: But the researchers don’t do their research at the right time – they do it when the lobster berry or throw their eggs away then they move near shore.
> Ja: The government say there is nothing but now, take from Port Nolloth to Hout Bay
> E: Yes, from Port Nolloth to Ysterfontein, Hout Bay, there are fish, snoek.

Where Rosie and Ernest questioned the scientific community’s understanding of fishing temporalities, for others like Dikkie the issue concerned the understanding of the place: the specifics of the Lamberts Bay ecology. For Dikkie, changes in breeding patterns had more to do with where lobster had moved to and why. The involvement of law enforcement officials in implementing fisheries policy is clearly an important component of management, yet the effect, in a context of disputes over the nature of an ecosystem, is that there are only two options available: teaching people to agree with the science and arresting them if they do not comply. This kind of policing has very damaging effects on the relationship between fishers and the conservation community, as Schultz (2009) has shown in his study of the nearby St Helena Bay community, and as Marieke van Zyl (2008) demonstrated in her study of the Kasies Bay fishers. The implication of this approach is that fishers are subject to what Latour calls an ‘epistemological policing’ (2004): a strategy that radically curtails the possibilities for dialogue and discussion. In a context in which changes to the fishery and the climate require detailed local knowledge, the lack of communication undermines the possible benefits to the sciences of the knowledge gleaned in everyday interaction with the sea.

Place too was a topic that was hotly contested. For many of the fishers with whom I worked, fish being low in numbers was not the issue but rather where they were. Jacques and George explained how fishing was made difficult for them due to the specifics of the rules for commercial fishing in the Bay:

> G: […] there are plenty of lobster in the water but what happens is that the fishers must work offshore but the big boats come near shore and put their traps half mile, one mile they put their traps in the water and that frightens the lobster so they don’t come back offshore, so they (the fishers) must travel out 2/3 miles to get to the lobster cos the traps block the lobster to come to shore.
> D: The one mile where the lobster is ’cause the traps block the lobster from the offshore to the near shore.
> J: So you don’t think there are less lobster but you think they’ve been pushed away?

> D: The lobster know they have to protect themselves, they're in the near shore and the other half, when he pairs off and goes offshore.

Dikkie disagreed with how many lobster were in Lamberts Bay as well as why, if they were gone, this might be the case. It is thought that lobster have shifted in a southerly direction but Dikkie thought that they had moved offshore rather than down the coast. Jacques explained how despite his contesting knowledge of the region, he was refused rights to fish on the basis that lobster had moved away from Lamberts Bay. When he was given the right to fish, lobster were not present according to Jacques. George said that changes to the number of lobster were due to large boats fishing offshore, yet he was never able to say anything to management. In South African fisheries people are left without jobs and poaching can result, through cutting fishing rights and instituting laws that prevent people from doing what they consider appropriate.

> G: They say there isn't enough fish but there are all the fish, so where are the fish coming from?
> Ja: The researchers are doing their research in the wrong way because they use traps and do their research offshore, while they are working near shore; what I want is the researchers must go with us on their boats and see what is happening and what the lobster are doing.

George, speaking about the number of fish along the coast where he and his peers worked, made long sweeping gestures with his hands trying to describe through his body how many fish were in the sea, according to him. In this conversation, George was sure of his opinions and disagreed with management rules. For Jacques, researchers might be doing their work incorrectly or in the wrong places. Ernest's disagreement with fisheries management was simply that government said there were no fish yet *he* saw them.

An alternative approach to knowledge disputes, besides that of 'epistemological policing', is to see these disputes as what geographer Sarah Whatmore (2009: 2) calls 'generative events' – moments in which there are possibilities to work with the distrust and scepticism of scientific expertise, and begin to work with the ideas underneath translations and mistranslations For Whatmore, working with the distrust and scepticism such as that described above is valuable because it creates a space where non-scientists can become engaged in scientific process in order to re-establish confidence in science-based policies. She does this by looking at methods of incorporating citizens into the tracing of knowledge claims, allowing students to factor in the economic and political elements influencing knowledge production and placing researchers' own claims onto the knowledge map, so that there too can be examined and questions. In this way, groups are not formed rather, people are allowed to contest and trace where knowledges and produced and disseminated. Where this happens, because publics look at science-based research and question it, uncertainties become apparent. These though, could be seen in a positive light because they keep the knowledge production process happening, provided engaging with publics is maintained (Whatmore 2009: 9). In South African fisheries, where fish stocks are in many cases in crisis, the kinds of interventions proposed by Whatmore may be a good way to generate new knowledges using many people and different kinds of expertise, rather than only those currently informing fisheries management (Griffiths et al 2000).

> J: When would you say the season for fishing should be?
> G: A month earlier – so October to May.
> J: What else is MCM getting wrong?
> Ja: The researchers mustn't do their research on their own again and they must go to sea with the fishers.
> J: Would you be willing to work with the scientists?
> Ja: Yes, Yes
> G: We'd go to Doring Bay and Elands Bay – when the scientists go to sea, they'll go to different spaces.. So at the end of the day they'll get a better idea of what's going on in the waters if they work with the fishers.

Conversations between fishers and science researchers, are not common, in the experience of George and Jacques. In Lamberts Bay a bureaucratic process of marine management offers little space for conversations in which disputes can be processed carefully and diligently, with attention to building consensus about how knowledge can be arrived at, and agreed upon. In the absence of conversations, there is a widespread and stark experience of alienation from the democratic government that people felt would ease their lot (Anderson 2010, van Zyl 2008, Schultz 2009, Rogerson 2009).

People engage with the world and assemble versions of their environments carefully and seriously. Where this is acknowledged, as in the "generative events" approach proposed by Whatmore, it is possible to work with different enactments of reality, and to go beyond the stable, singular reality that science-based knowledges, on their own, seem to form (Strathern

1988). By engaging with the multiple ways that reality is enacted, forms and knowledges can come together in new, dynamic and multiple ways (Verran 1998).

One of the challenges in doing so is to build dialogue between the analytical sciences, and embodied ways of knowing. For the people with whom I worked in Lamberts Bay, this was often the way one learned the sea, and as such forms a central tenet of fishers' knowledge. But how does one build dialogue between modernist sciences that, following Tim Ingold's argument (2007), have sought systematically to remove traces of the body and bodily ways of knowing from their methods of recording data? Chapter 2 seeks to address this concern.

Chapter 2

Embodied ways of knowing: communities of practices and the art of using technologies

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While working in Lamberts Bay, it became difficult at times for me to separate my own thoughts from the ways that many of the fishers there were thinking about fisheries management. To a large extent Ernest and Dikkie saw the debates happening in fisheries management as a matter of right versus wrong. Listening to them, it became hard not to see the situation as one of how fishers know and how marine researchers know, with only one of the two groups being right. Ernest and Dikkie explained how the government, which for them equates to science, is wrong:

> E: Government told the fishers they can't take away one of those lobster because the red tide had the effect and it would poison us, while we know that isn't the reason the lobster moved out. The reason they moved out was there were too many lobster in the water and there wasn't enough oxygen so they moved out to go and get some oxygen. That's what we know.
>
> D: It wasn't the red tide in that case, we know – we ate from that crayfish and we are fine. There
> isn't enough oxygen for their survival so they move onshore.

Ernest framed his knowledge as if there was a stark contrast between what he said of the lobster walk-outs and what marine researchers said. According to them, the lobster, taken from a red tide were not poisonous. Dikkie was so convinced that he was right, he ate the lobster, and as he said, he remained healthy. This is a useful anecdote because despite Dikkie and Ernest perceiving government scientists as wrong, what they said is partially in agreement with what some marine researchers say on the subject (Dekker 1970, Pitcher and Nelson 2006). The point of this chapter is not to go into the details of whether people are right or wrong. As indicated above, the task is to find the partial connections across the apparent divides, and to bring multiple ways of knowing onto the negotiating table.

For many of the people with whom I worked in Lamberts Bay, they understood their situation of rights loss as a binary in terms of who was right and who was wrong. Dikkie understood that if management saw his knowledge as correct, he would get his rights back. In this chapter, I would like to look at how this binary of right versus wrong operates and how, working with these insights, one can look at fisheries debates from a different angle. This chapter sets out an argument that the people with whom I worked in Lamberts Bay draw heavily upon embodied ways of knowing in their practices. What makes this different from those practicing scientific methods is that these fishers acknowledge their embodied ways of knowing, where for the sciences, this is often excluded. This chapter, then, seeks to highlight situations in which practical ways of knowing operate, in the hope that this way of knowing might begin to find a place in the larger conversation on marine knowledges. Rather than pre-judging specific kinds of knowledge as right or wrong, this chapter proposes to explore how one begins to work with multiple ways of knowing and procuring knowledge and how people practice the arts of knowing quite differently.

Embodied ways of knowing

The story of how Kelvin learned the sea, came up in conversation when he and his mates started talking about how one tells when a storm is brewing or when conditions at sea are becoming dangerous. Kelvin closed his eyes, imagining he were at sea, as he told his colleagues and I that he had an instinct for knowing when the weather was changing for the worse. I could see his hands carefully sensing the subtle movements of his boat on the water, while we spoke, hands that have learned to feel these changes on many occasion over the years. The discussion became lively because it took some time and many explanations to fully elucidate what it was that was meant by getting a feeling that the sea is changing. The 'feeling' of sea change is more than an emotion and yet also more than a physical indication. After years of learning to recognise changes to a boat's movements, the way the waves shift and how you feel on the sea according to the sea's movements, Kelvin said he could pick up on these changes so quickly that his knowing seemed intuitive. Talking about his experience on his two person boat, referred to as a *bakkie*, he explained as follows:

> J: By instinct so you mean you get a feeling?
> K: Ja, Its what we have learned with that instinct. I'm sitting with my back to the storm but I think, why is my bakkie moving like that and I'll tell my bakkie mate, "I've got a funny feeling" and my mate will say "you're right, I've got a feeling too", and there the feeling is coming. So even if I sit with my back to something, I still feel it. Its not a movement that is 'right'. And that saves our lives, that feeling saves
> our lives.

Becoming attuned and sensitive to changes in the sea was important to Kelvin who did not have other means of detecting storms in the form of mobile websites and weather channels. The boats Kelvin and his peers use carry two people and are usually not fitted with fish finders or radios. Without other means of doing so, Kelvin claimed to have come to know imminent weather changes through his body. Using the senses is key to those fishing in Lamberts Bay. Nico and Hennie joined the conversation that Kelvin had started:

> J: Okay so is there a way to get back from a storm that the old fishers taught you?
> N: If its stormy you don't go to sea, if a storm comes up when you're on the sea then you have to make certain decisions. But you can see a storm out far with your eyes. Its like on the horizon. You can see it from far, then you can see that that storm is coming from the north, that storm is coming from the north west, that one the south. Then you have to leave, pick up because something is coming.
> J: What do you see on the horizon to let you know something is coming?
> H O: We have learnt a lot, we see something on the horizon. We look at the clouds, you could see the clouds, even the mist, if it comes with points, like fingers showing, then you must know this mist or these clouds are coming with wind, we have to leave. But if it comes in like a bundle then we know its not much wind with that one, but when it comes like that you know you have to leave fast.
> J: How quickly will it come to shore if you see that?
> H O: Quick, very quick. Sometimes you are busy pulling up your anchor, you tie your anchor and its with you. We have experienced it. We have personally experienced it.
> J: Does one of the crew members keep a close eye on the horizon?
> K: Its instinct, all of our fishers, we have to be aware, we have to look around. Its not the job of the skipper only, or the crew members only, we all have to look around. What's important is, you take your position where you are, you see that side, there is Lamberts Bay, then there is that point so you know the position where you are and from there then you move. It happens very much that the mist catches us on the sea but its very important to check your position, then you can follow in that direction. For your position you make a decision about your direction back to shore. Its very much that we have instinct within us as fishers. We follow that instinct.

Other examples of using instinct were relayed by some of the older men. Hennie explained how he and his *bakkie mate* once had to risk their own lives to save those of fellow fishers at sea. Hennie and a friend had been fishing a fair way from the harbour and sensed a storm brewing. They decided to pull up their lines and head back to shore, knowing they had limited time before the storm would hit them. On their way back, Hennie encountered two men who were on their way to the spot the others had just left. He told them they thought the waves were getting too rough to fish but he was ignored. Hennie headed back but felt uneasy about how he had left the others behind so they turned around. In that time, the other fishers' boat had capsized but Hennie and his *bakkie mate* managed to help them onto their boat and get them all back to shore.

Hennie said he had to learn when the weather was changing, relying on his body, instinct and the boat he was in to tell him when these changes began. Without technologies available, his embodied ways of knowing were acknowledged and utilised. It is difficult to speak about embodied ways of knowing and what one means by this because ways of knowing through the body are not quite understood in the frameworks of modernity (Farquhar and Locke 2007) This is because often, as the people with whom I worked described, you know something without being able to verbalise it. The body used to be understood as fixed and stable; Farquhar and Locke (2007) explain how the body is made and unmade, the product of assemblages of practices, discourses, images and institutions – allowing the body and how it knows to be seen as complex and multiple. In the same way, no two bodies learned in quite the same way for those fishing. Perhaps it is possible to speak of these ways of knowing through looking at Kelvin and his mates' environment and their interaction with it.

Most fishers in Lamberts Bay had a mobile phone but none had internet. Apart from the larger boats that a few fishers owned, such as Dikkie, there were no fish finders or GPS navigation devices available. When fishers in Lamberts Bay went out to sea, they had their fishing lines, bait, their mobile phone to call people if they got into serious trouble (as long as they are in reception range), and their boat. Along with these, the remaining interactions happened with fish and the sea. Kelvin, as he described, would look to the horizon, carefully observing the clouds and how these change. He became conscious of how his body was moving in the boat in accordance with the waves and currents below him. He felt on his skin the direction and force of the wind as well as the temperature. Kelvin noticed and memorised these feelings and observations. At first these meant little to him which is why he went out with an experienced fisher while still a novice. With time, Kelvin learned to connect a particular feel of the wind on his skin with how the clouds looked and how his body moved in accordance with the sea. When certain feelings and observations came together, happening simultaneously, these would indicate the beginning stages of a storm. Hennie O described the clouds that indicated a storm – long and travelling with the wind. In a 'bundle' as Hennie O put it, coupled with another set of movements of the water, indicated fair weather. Nico explained how watching the horizon was important when fishing, as the clouds and their direction could tell one when a storm was coming. Nico said how observing his surroundings was integral to detecting impending storms. Nico has fished less than Kelvin and Hennie O as he is younger and did not fish full time, and has less experience. He spoke of using his sense of sight to detect storms whereas Kelvin used his body as a whole as well as his eyes. Kelvin claimed to not have other means of telling him a storm was coming so his body and senses had to become fine-tuned to changes, not missing anything. In some instances, his body became so sensitive to sea changes that he recognised these but saw them as intuition or instinct. Hennie O spoke of using his body, his eyes and, as in the case when he saved the other fishers, his intuition and instinct. It would seem that there were varying degrees of instinct used by fishers as well as the extent to which the body was used when at sea.

Ingold (2000: 415) describes the ways in which the disciplines of the sciences establish instructions and rules for those seeking to place knowledge in the mind. If one were to follow these instructions, one would be proficient in a skill. In Iceland, this is the case for fishers who go to a school for learning to fish (Palsson 1994). Where fishing is practiced widely in Iceland, as in South Africa, the ways that people learn to fish is extensively written on and debates on experiential or theoretical learning are considered. In contrast, for the skilled fisher (or for that matter a skilled driver of a car), he/she is attuned to his/her environment, in dwelling there, able to respond to his/her surroundings instantly, without having to refer back to the mind and abstract rules. For example, when learning to drive a car one has to remember the correct process and order of doing things to drive but after a few months to a year of driving, it becomes possible to drive without ‘thinking’ about how to do so. Learning is practical and so it is entrenched in engaging with one’s environment. As a skilled practitioner, rules can be dispensed with, as one is now interacting constantly with one’s environment. Kelvin could be taught theoretically how to fish, but for him, not until he was actually fishing and learning simultaneously, feeling the waves through his body and his boat, was he able to feel comfortable at sea because he was able to detect a storm. Hennie O spoke of how quickly weather could change while working and how he had to think quickly, using his instinct to help him make the decision of turning back to save his mates. Perhaps his skill, as Ingold (2000) speaks of it above, became so practical, he did not have to think, but felt what he should do, his body fully enskilled in that instance. Dikkie and his fellow fishers shared how they began fishing and how they learned to do so. Dikkie is the oldest fisher in

Lamberts Bay and started going out to sea with his father and several crew members from the community from the age of twelve. He said that the men were tough, saying that to begin with he was not allowed to look up from the boat to look at his surroundings: he had to get a feel for the sea and being on a boat.

Hennie O explained how he and a friend decided to go out to sea one day before being taught to fish as young boys. They decided it did not look difficult and got onto a boat when the owner had come in for the day. Even though the sea was relatively gentle, Hennie and his friend could not control the boat properly and both began to panic because they thought they were going to crash into one of the big ships docked at the harbour and that the waves would engulf them. As the uninitiated, Hennie O thought that learning to steer and navigate were the priority; training in actual fact, focused on getting a feel for the water and being on a boat. Ernest spoke of his first experience at sea:

> E: My first experience at sea I was 7 years old. It started with us playing hiding and we were playing on the boat hiding, there were three of us. It was on a Sunday, Oom Dikkie would know this story, actually we all do. On Sundays they left for Namaqualand, we sometimes call it the Underworld. And we know our fathers would hit us and punish us when they see us so we were hiding but then the boat went with us and we around Doringbaai I think, around the sea and then they saw us but it was too late to return so we went with. It was a bad experience and we started getting sea sick and our fathers were very angry at the time so they fed us milk to make us more sick. It wasn't only a bad experience, it was good because they taught us that time how to fish so they gave us a net and we put a net in the water down by the boat and with that net we caught Cape Bream. At that time there were no phones and they couldn't speak to us on the sea and our mothers were worried so there was another bad experience for us at home. Our mothers were angry with us and they were rough with us but we brought our first fry home so we were happy with that. It was good.

For Ernest, learning to fish involved a process of initiating his body into the practice of fishing. His body had to be made ill in order for him to get his 'sea legs' and through this event, his body began to get used to the sea and how it worked. From the word go, one could argue, Ernest learned of the sea through his body, as he was made ill, getting used to how it felt and what he should do on it. For Ernest as for Palsson in the Icelandic seas (1994: 904,) acquiring knowledge or enskilment, is about more than receiving information. As Ernest went out to sea for the first time, he was actively engaged in his surroundings, taking in details but also working with them, interpreting them as he learned to work with a net. Learning to fish through his father and older fishers, the younger fishers' bodies had to become ill and then learn how to fish. This may be referred to coming to know in "communities of practice" and through mutual enskilment (Palsson 1994: 905). Willem explained how he learned to fish through the community:

> J: And with your father not being around, who taught you to fish?
> W: All the other fishermen, where you can see one man take a bakkie, or a dinghy and you can look at what that man does and so you also do what they do, throw the lines on the water and see.
> J: You learn by watching and practicing?
> W: Yes

In other words, coming to know was practised in a particular way; in Ernest's case he went out to sea without permission and so he was punished but also taught how to fish by older fishers and his father. Willem, because his father was not around, was taught by many people through both watching and practicing with them. Dikkie described how with the advent of the mobile phone, fishers have begun to keep in contact at sea: "And now we use the technology of the cell phone and we call each other and ask how's the catch there and how's the catch here? All depends on the best catches". The cases above suggest that for Kelvin, knowing may be practised through the body and in Ernest's case it is also in conjunction with many people. In this way, with the body being the means by which the reality of sea changes and fish behaviour were brought into being for Kelvin, his knowledges were learned through his body too. For Dikkie and Willem, their learning was also practically based; it was also learned through the community.

The kinds of knowledges that Ernest and Dikkie describe offer a means of assembling environmental knowledge, and establishes a powerfully shared set of understandings which, in turn, translate into practices: what one *does,* in those environments. Given the extent to which modernist ontologies depend upon analytical frameworks for assembling knowledge (even while fisheries scientists themselves might be weekend fishers who rely similarly on instinctive and embodied ways of knowing), the difficulty of speaking different languages of the sea – one embodied, the other analytic – serves to affirm the existence of a binary between fishers and scientists: a binary that this dissertation seeks to problematise. The difficulty is compounded by the framework offered by management and administrative institutions, for which performance is measured in relation to an idea that knowledge can be seen in the singular: that there is *one* correct knowledge; how one comes to learn that knowledge is also considered a singular happening (Law 2004: 455). In South African fisheries, those that informed management were recognised as knowledge producers, while many of the fishers in Lamberts Bay, contesting what was known, were not even considered part of the debates. The issue is that one needs to look at how one actually assembles a version of the environment that allows one to learn and know in a particular way. In these instances, I argue that versions of the environment are assembled through these fishers' experiences and learning through their bodies.

Different kinds of practices

Annemarie Mol (2002), in her book, *The body multiple,* traces the ways that the practice of medicine happens, specifically in the case of atherosclerosis. By shifting between the clinic, where patients are spoken with, to pathology, where specimens are tested and analysed, she looks at how medicine and science are enacted (Mol 2002: 32). In the clinic, where people are expected to provide symptoms on a checklist, in order to be diagnosed, pathologists require a cross-section of an artery. The two spheres in the hospital, writes Mol (2002: 35,36), exclude each other. This is because what patients say and what body parts say are often incompatible, they suggest different results or stages of progression to the disease. Because doctors in clinics look for particular levels of pain and of movement, reported by patients, and pathologists expect to see specific cell types or combinations, the disease is done and understood differently. In some instances, patients speak against body parts and the two departments in the hospital are rendered incompatible. The methods employed, produce different conclusions and yet both methods are scientific, producing contradictions. In this way, a level of interpretation is required to 'fit' a single disease. Where one expects, in a scientific setting to see exact, anticipated results and one does not see these, Mol's books shows that one has to question why this is the case (2002: 49). Mol goes on to suggest that objects and materials are "actively engaged in the enactment of reality".

Mol (2002: 50) is provocative in making sense of enacted knowledges in the context in question. The case study Mol uses may seem far removed from fisheries science and

Lamberts Bay; however what is being argued in the example of atherosclerosis is useful in considering the practical and embodied ways of knowing that Ernest and his mates employed. As a single disease can produce different results and versions of reality depending on how one regards and approaches the illness (through the patient's testimony or through arteries), the Lamberts Bay environment in which fishers work could produce different results depending on the approach taken in viewing and studying it. Ernest came to know fish and fishing in Lamberts Bay through going out to sea since he was a boy; his body was initiated into the process and difficulties of fishing from his first bout of seasickness, the first time he went to sea. During fieldwork, Ernest said he learned the sea through knowing how waves feel when they were changing and how clouds looked when a storm was brewing. Kelvin used his body as a gauge for telling him when the sea was changing, through the means of his boat. He said he could get a good feel for whether fish would be present on a given day by looking at the water and how clear it was, having learned the different kinds of water during his years at sea. For fisheries researchers, who used models and previously recorded data and current samples taken from the bay, they came to know the region too.

None of these versions of knowing the Lamberts Bay region were incorrect – they were assembled differently and alternative practices and actants were incorporated into the process. For Ernest, his experiential knowledge, built up through memory came to the fore, Kelvin made use of his body and the boat he was in to determine the weather, and fisheries researchers used models and sampling equipment in their process of coming to know. Nico made use of his sight and Hennie claimed to rely heavily on his instincts. Different versions of the same environment were assembled with multiple things and ways of perceiving them, through observations made and experiences recounted of boats and equipment and bodies. In Ernest, Hennie O, Nico and Kelvin's experiences, their ways of knowing were more pragmatic in methodology. They used their bodies and their experience, producing a practically based knowledge, some used instinct more while others used sight more, and this formed many kinds of practices of knowing (Mol 2002). For researchers, ways of knowing could be practical but often the ways that sciences are done filters out the practical nature of research and learning. People who claimed to employ practices that were practically based and embodied, such as these four men, were not involved in the process of negotiating a TAC or the state of a fish stock. Law (2004: 137) writes that it is difficult, in cases such as fisheries management, to incorporate multiple ways of knowing because the methodologies are not always commensurable. Calibrating the multiple practices involved in knowing can be hard when an institution may wish to have a singular, final agreement about how much can be fished and how that is best done. What is forgotten or unseen is that “entities are being endlessly enacted and (as part of this) are being differently enacted” which means that a final agreement is not a realistic outcome (Law 2004: 137).

Kelvin said he used his body to learn and it was where he held his knowledge. He also recognised however, that it was through his boat, an actant, that his knowledge was moulded. He spoke, as shown above, of how he did not have GPS devices or fish finders and how he only had a small boat. In his case, the boat was the portal through which his body felt the sea and as a result, came to know. As he said, he had nothing else to use. This is where embodied ways of knowing are important in a discussion on multiple knowledges. Kelvin’s embodied way of knowing made him cognisant of the many actors involved in his knowledge practices because in knowing through the body, he was aware that his body did not learn in isolation to the environment but through it (Latour 1999). This can be seen in Kelvin’s comments regarding the importance of his boat – he spoke of using the rocking sensations of it to detect a storm. For those involved in institutions where reality is represented as if there is a single version, objects and beings being produced and assembled differently is a difficult idea to work with as it makes things more complex. Where many fisheries are in crisis in South Africa, making things complex can be hard to accept because it means taking more time to negotiate with many ways of knowing and the multiple realities being enacted. That Kelvin was aware that entities, such as his boat, were part of the way he experienced his body and acted upon his reality, is useful in beginning to consider the different kinds of practices that are involved in fisheries. It is a case of trying to move beyond questions of right and wrong, and to move toward the notion of multiple versions of reality that are enacted differently. When multiple practices are brought to the negotiating table it could become easier to consider different ways of assembling a version of the environment. When one is learning through doing in the environment, the environment becomes a set of relationships of which one is part, rather than a set of objects to be acted upon. If one considers the possibility that people practice reality differently in different contexts, different practices begin to become more commensurable – or at least, translatable. Groups of right people and groups of wrong people no longer figure largest in the conversation.

The discussion above makes a case that bodily knowledges are bound up in the technologies that people use. Dikkie, Hennie and Ernest's stories, all illustrate how they had to master using and being on a boat. They also had to spend time learning how to make hooks, nets and lines for fishing. I spent one Friday at Hennie O's house where he and Ernest showed me how they made nets. Using a crochet hook, Hennie O was known for the nets he made using old nets that he found at sea. Without looking at what he was doing, he maintained conversations, all the time weaving nets. Ernest explained how line fishing had changed over the last fifty years. The hooks for baiting have changed from mimicking small fish to using weights. Fishers gauged the successfulness of their equipment, with different baiting techniques moving in and out of fashion. What needs to be recognised, is that these were technologies used for fishing. When compared with large trawlers and GPS devices one could easily forget that. It is in mastering how to use the technologies of fishing that one recognises someone is ready for fishing. Palsson (1994: 910) writes that the mark of a skilled fisher is his/her ability to make the technology being used an extension of the hands. For the novice, fishing is about the technology – getting a piece to equipment to catch a fish, rather than working in conjunction, simultaneously with technology. When someone has become skilled in their practice, technology is a part of their body (Polanyi 1958: 59). Kelvin spoke of feeling the sea through his body; his boat had become so much a part of him that he did not recognise it as separate to him, the means by which he felt the ocean. Hennie O felt so much in tune with the ocean in feeling a storm brewing that he saw it as instinct, not a feeling felt through his boat and lines. In these cases, perhaps, these two men were skilled in that they seem to have made their boats an extension, or part of themselves.

Hennie O weaving his nets

The current usage of the term technology refers to the rationalisation of the process of production that was never apparent in the skill of craftspeople. In doing this, the act of being physically involved in the process of doing or making is lost. Technology has come to be seen as removed from human involvement and agency (Ingold 2000: 296). Kelvin, Ernest and Hennie, could be seen to be without technology because it was not evident in the form of GPS devices and fish finders. More evident were their hands, which were integral to their work; their bodies were physically engaged in their technology and the technology they did use seemed to have become a part of or extensions of their bodies. Knowing when storms were coming, and how to tell when a day would be good for fishing, or at what time to go out to sea, could be seen by both outsiders and fishers themselves, as using skill and experience rather than technology because the technology is not primarily doing the work. Over the course of fieldwork a fisher never said that he or she was using technological equipment to fish – hands were deemed most important, so much so that Hennie proudly showed me how a fish had bitten his finger one day as he threw a line out. That it was through the line connecting him to the fish that his hand was bitten was taken for granted by Hennie, as the line was, in a sense, part of him. Willem too spoke of how he was bitten regularly over his career because his hands were so engaged in his work, interacting with the sea. Part of learning when the sea was turning rough, for Kelvin, was being in a boat – it was the specific movements of being in a boat that lead to his feeling the changes in waves and currents in the body. Hennie O too recognised sea changes through the waves while in his boat. Likewise, it was through the medium of nets and lines that Dikkie learned to feel and tell how fish bite, when they would do so and during what conditions (Ingold 2000). Dikkie explained how he would use his lines to tell the water conditions; his lines, if they sank indicated good fishing conditions, and floating lines were signs of rough seas and currents, and bad fishing.

Ernest showing me one of the types of hooks he uses.

Technology, I would argue, was in use on the sea, for Hennie O, Kelvin, Ernest and Dikkie. These men claimed to rely on embodied ways of knowing and instinct. Our discussions were not focussed primarily on technology for fishing. Since the practices of recording knowledge in the formal sciences ‘discipline’ the body to exclude bodily ways of knowing, it can seem as if scientists are not using embodied ways of knowing. In this way, their technology can appear separate from their bodies, yet, it is not, and this makes space for a commonality between people in fisheries. Some of the people with whom I worked are seen to be without technology because they acknowledge their bodies in coming to know while others have practices that mean to exclude their bodies, making their technology seem the primary means by which they learn. For fisheries management and the sciences informing managers, the practice of knowing is considered singular and objective. This comes from a modernist project in which nature and culture are separated. While the practices of the sciences do not necessarily or exclusively work this way, it is often understood that a singular reality can be learned and described (Latour 2004). This has the effect of foreclosing the possibility of considering multiple practices.

Michel Callon (1986) provides an example of this in his study of scallops at St Brieuc Bay where researchers tried to grow scallops to replicate a study done in another region. Despite the methods being identical and the processes involved repeated, the scallops did not grow. While this provides an interesting discussion thinking about marine organisms as nonhuman actors (an idea which I shall develop in chapter three), Callon’s study is also an example of how results are hardly ever repeated in exactly the same ways. If the scallops were to grow, the methods would probably need to be changed from the prior study. Even though the sciences and their methods can be considered homogenous, practices are not always the same. This illuminates Palsson's (1994: 904) point that accumulating knowledge happens in conjunction with many people (and actants) and so knowing is a group practice which cannot be replicated in the same way as different persons would be involved, shifting results even if only slightly. As there are many scientists, there too are many practices for knowing (Mol 2002). With this in mind, it becomes possible to work with the idea of there being multiple practices in coming to know and some of these are more similar than realised. These happen through many humans and nonhumans within the sciences (and elsewhere) and embodied ways of knowing may be part of these practices.

The ways that Kelvin, Dikkie, Hennie O, Willem and Ernest described their many embodied ways of knowing are useful on many levels, one being that it may provide a means of accessing data. On another level, these practices provide a space for considering practical knowledges. While a practical knowledge can be ignored in favour of an 'intellectual' knowledge, very few people can claim to never use their bodies to operate in the world. By learning to use equipment for collecting data, an embodied way of knowing has been learned through having to acquire skills in the body to use a device, albeit unacknowledged. The act of learning to weave a net was remembered in Hennie O's fingers as he wove and spoke simultaneously. In acknowledging practical knowledges, partial connections could be possible and this may help in strengthening ties when different knowledge producers enter into debate, when commonalties are seen. When different ways of knowing are seen and acknowledged, bringing multiple and different practices of knowing to the table may become possible. When contestations over knowledge happen and they can be seen as generative events, as mentioned in chapter one, different practices of knowing can be worked with so that more can be learned, and more dialogues may happen (Whatmore 2009). For these sorts of dialogues to happen, acknowledging some of the different natures people worked with is needed. In the next chapter, I consider some of these.

Chapter 3

Networks and relations with sea inhabitants: The sea as actor, Actors in the sea

Writing on the sociology of translation, Michel Callon (1986) examines some of the problems social scientists face in doing research on science and technology. Two concerns that he raises centre on questions of who speaks for whom in research, and symmetrical research (Law and Lien 2010). Working in St Brieuc Bay, three marine biologists, trying to increase the production of highly valued scallop, come to learn that they are not the only actors in the production process. In fact, there are three groups of actors involved – the biologists, returning from research, observing how scallops anchor themselves along other bays; the fishers at St Brieuc, who are actors who know the value of scallops, and are thus happy to harvest them but also see the benefit of artificially anchoring them, and the third group: the scallops. Theoretically they should anchor themselves, however, this does not turn out to be the case. After attempting the project of growing scallops to anchor at St Brieuc, the scallops refuse to do so. Where they were silenced, through the biologists speaking for them, in reference to their predicted behaviour, the scallops end up speaking for themselves by not acting in the way the researchers desire for their hypotheses, and the way the fishermen want them to act for economic reasons. While the project began asymmetrically, through the biologists considering themselves the only players, the fishermen being a side-line annoyance, the research became symmetrical in that the three actors each received equal weighting; deriving from the recognition that each played a significant role. The fishermen, harvesting too much and too early affected the expected outcomes, and the scallops did not produce the byssus to anchor.

Callon’s (1986: 7) paper speaks to a number of issues pertinent to this chapter. The two I reflect on are complementary – assemblages and networks. Callon manages to trace the assemblages of different actors through observing the actions that take place in the case of St Brieuc. Rather than just interviewing the biologists, he follows their activity at the bay. Likewise, the fishermen are observed for their harvesting movements and the scallops, of which all other actors involved were also watching, were traced in terms of their decision of whether or not to anchor[4]. It is this sort of network that Bruno Latour calls for, and which later, I shall show, is how many of the people with whom I worked in Lamberts Bay, engage in their work.

This chapter seeks to look at how one might consider alternative ways of working with and engaging in knowledge debates. It may seem that ways of knowing are at odds when one considers how scientific research happens and when one looks at cases such as those of people fishing in Lamberts Bay. In the conversations that follow, it will become possible to see how people with whom I worked, engaged with fish and the sea in their daily practices. These engagements involved far more than people; they included boats, nets and hooks. Water, waves, temperatures and fish were part of the networks this chapter seeks to describe. In the anecdotes provided, seeing partial connections between what one may call relational ways of knowing and how researchers work, may begin to be illuminated by looking at the practices people engage in that produce different versions of nature. Importantly, this chapter looks at how one might begin to be able to work with multiple natures.

Networks and actors in the sea

With multiple actors, there are multiple networks that require following and it is my intention to show how one can begin to work with multiple realities. Hennie described how he worked and how he assembled a version of reality that involved many actors. It could be assumed that fishers consider themselves the only actors that affect good and bad fishing days. This understanding would depend on their fishing skill and how they operated on a given day. These are important factors however, they are not the only ones. Much time was spent deciding on which lines and hooks to use to catch fish. There were a few options: spinners, Ernest told me, were out of fashion while I was there and were used more for recording depth. One sinks the spinner and then observes to see at what level fish are biting. The other option is to attach bait to a hook and wait for the fish. Spinners were used when fish that enjoy chasing are being caught; the spinner simulates the movement of smaller fish and larger ones follow suit, eventually biting and being raised onto the boat. For Hennie, who spent a

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[4] While using actor network theory, it needs to be noted that one of the difficulties with it is the question of 'choosing'. A scallop cannot grow when the ecology is unsuitable. The issue of whether or not agency can be attributed is something that needs to be considered although within this thesis, there is not space to do so.

Friday morning explaining these options to me, their equipment was acknowledged as playing a role in how effective one's fishing attempts were.

> H O: There are differences in ways we catch in the past and ways we catch in the present and that is that in the past we didn't use bait we used the spinners and we made our own with the copper pipes and we put some bait into it and we make our own way for catching snoek. Nowadays we are all going with bait and that's why the snoek are staying longer, cos we feed them.
> J: Spinner?
> H O: Its like a fish in the water.
> J: So why do you use bait now, 'cause presumably the spinners worked?
> HO: They work, the spinners are still working but with the bait it is much better because you stay in one spot. With bait you keep the fish under the boat and the smell of the bait keeps them. Your bait stays in the water and the fish will come.
> J:So the snoek are staying longer because of bait?
> H O: Yes
> J: How many years are you using the bait now?
> H O: My father was working with bait all those years but then we come, the younger ones and move around and say the older people are sitting around like they are watching TV so we don't want to work like that and we are rowing and catching with spinners. And that's where we make the mistake but we were strong and we were young but our father worked with bait; we came and changed that.
> J: Was it better with bait?
> H O: Yes it was better.

Hennie O accorded the type of equipment they used to catch fish as having a vital role in keeping snoek in the bay for longer. Hennie O illustrated the fishes' movements by putting two hands together and curving them through the air as if it were water and then showed how the snoek would bite it with a biting action with his mouth. Hennie O explained that a spinner was useful but it required more work because he would have to move the boat so that fish would follow the spinner and eventually bite. The older generations of fishers, according to him, used bait and this attracted fish without one having to move as much at sea. In Hennie O's case the mood of the fish was considered in terms of whether they felt like chasing their food or not. Ernest added to this; he explained how choosing bait and attaching it to a hook were vital to successful catches. In these cases, hooks, baits and spinners were considered factors and actors in fishing. Hennie O could not rely on his skill alone, he had to weigh up the type of catching mechanisms. Ernest too placed importance on bait; he showed me the bucket where he would chop and store bait at sea. As Hennie O pointed out, whether or not one used bait was important. For him, fish behaviour differed from one species to another and one needed to consider this when deciding how to catch fish. The spinner or the bait used was therefore regarded as having an important role in successful fishing trips. If bait was used but a fish liked to chase its food then a line without movement would not bring a large catch. In conjunction with the role baits and spinners played in fishing, sometimes, as Hennie O said, fish did not feel like biting and on other days catches were plentiful because fish stayed for longer. Dikkie explained to me one morning how it is at sea when fish do not want to bite. Pointing with his fingers, as if the sea were below him, he spoke of how he could see fish but they would swim around the hooks, refusing to bite. Dikkie in this instance, regarded the multiple actors and the networks he was part of in fishing each day. He recognised that baits and fishers played a role but if a fish did not want to bite "nothing would help". Because Dikkie considered the moods of fish, Ernest placed emphasis on baits and Hennie O regarded lines and spinners, these were acknowledged in affecting fishing trips. More than a piece of equipment, a spinner interacted with fish, making for a successful catch according to Hennie. As lines, bait and spinners were regarded as actors, Dikkie understood fish to be actors. He saw fish as more than something to be fished at the control of people and their lines; fish had the ability to make choices.

> D: But one thing I can tell you, you can have all this equipment and fish finders and everything but let me tell you, as an old fisher, if the fish decide they won't bite then nothing will help. You see them with your eyes moving around the bay and they won't come cos they don't want to. The next day they all come.
> We know the sea, on this week, Monday to Friday, we know in this spot its calm and we'll catch and then there is a change in the weather and it turns bad and on that same spot you will catch nothing but it doesn't mean there are no rock lobster. And if they don't want to go there, they don't want to go there and there is nothing you can do about it. And we know the way of the rock lobster, we have learnt it over the years, its in the mid-section and then it is off shore. The rock lobster is moving around and as fishers we know we have to look for it. It like going to bush and hunting and for weeks there will be nothing and then the fishers will say the rock lobster is coming in shore and we don't know where they are going – inshore, offshore but we know they'll come back.

This anecdote, illustrates how Dikkie acknowledged that not catching rock lobster did not mean that they were not there. On many occasions, according to Ernest, lobster did not want to bite, and so chose not to.

> E: We can't say what decisions they make down under but you can catch today, dinghies full, you can make your boat full of fish and the next day and the next day you will get nothing and you know the fish are there. Yesterday a fisher told me they went to the north and they caught kingklip and the fish were biting and everyone was catching fish. For ten minutes they were catching fish, after that the fish disappeared, they're gone and they stay a ½ hour catching nothing. We don't know what is in the head of the fish.

In these conversations, Ernest seemed to speak of the fish as if they were people. He said that he could not tell what a fish would do because, as the anecdote above illustrated, fish could be erratic. In his case, Ernest framed the unpredictability of fish in terms of fish who made choices. At times one could almost forget one was talking about fish, due to the level of choice accorded fish and the way fish were referred to as 'he' rather than 'it'. Dikkie regarded the mood of fish and lobster as important when they went out to sea where he said lobster could hide, choosing not to make themselves visible. When the sea changed, as Dikkie put it, lobster were capable of hiding and so not seeing any did not guarantee they were not there. For Dikkie, his practices of going out to sea each day and observing the Lamberts Bay region, led to his producing a version of nature in which lobster and fish chose whether or not to make themselves known. By observing lobster over time, Dikkie came to assemble these observations and practices into a version of the environment that accords fish moods and decision making abilities. Ernest also assembled a version of the Lamberts Bay environment in which fish were completely unpredictable. One could trace the behaviour of fish but sometimes, as with the kingklip example, fish behaved in different ways. Ernest claimed to understand fish as having a mind of their own that fishers would never quite understand. Hennie said that he had to regard fish and the equipment of fishing when he went to sea. In a similar conversation with other members of the fishing community, a conversation regarding lobster walk-outs, a fairly common occurrence in the region, spoke to the same thoughts raised by Dikkie and Ernest.

> J: So you don't think there are less rock lobster but you think they've been pushed away?
> D: The lobster know they have to protect themselves, they're in the near shore and the other half, when he pairs off goes offshore.
> J: The scientists are saying there are less rock lobster, but you don't agree with them?
> All: No!
> Jacques: They put a buoy in the sea, the government put it there and where they put the bell buoy it was a fish bank – Ou Piet se plek – they were catching fish there but now they took

> the buoy away and now the fish are in smaller amounts there...and the other thing, the government always told us there aren't enough or not enough for all and what happened a few years ago in Elands Bay, the rock lobster moved out of the water in large, huge amounts, and then government told the fishers they can't take one away from those lobster because the red tide had the effect and it would poison, while we know that isn't the reason the lobster moved out. The reason they moved out was there were too many lobster in the water and there wasn't enough oxygen so they moved out to go and get some oxygen. That's what we know.
>
> D: It wasn't the red tide in that case, we know – we ate from that crayfish and we are fine. There isn't enough oxygen for their survival so they move onshore.

Jacques said that the lobster walk-outs that happen every few years were evidence that there were many lobster in the sea, despite being told by researchers that this was not the case. In Jacques' view there were so many lobster, that they ran out of oxygen which is why they left the sea. Dikkie suggested that the reason why fishing moved from inshore to offshore was because lobster tried to protect themselves. Jacques, in this example, through his practices as a fisher, watched the lobster walk-outs over the years and come to the conclusion that this was due to a lack of oxygen due to too many lobster. These factors produced for Jacques a version of his environment in which lobster were plentiful and capable of choosing what to do and when to do it, making lobster, in Jacques' eyes subjects. Dikkie's version took security on the part of lobster into account when he came to a conclusion regarding walk-outs. Jacques, Dikkie, Ernest and Hennie O assembled accounts of nature in which the creatures they caught had moods for some, decision making skills and the ability to hide for others, like Dikkie. They have accorded lobster and fish human-like traits and for this reason, saw their fishing practices as having more than one group of actors. While Ernest and his peers' skills were important in fishing, as chapter two suggested, they were not the only actors involved in their practices, so too were lines and spinners. As Dikkie said, sometimes a fish did not want to bite. In these instances, Dikkie had to be patient and accept that fish would affect their catch no matter how hard they tried to fish.

By interacting with their equipment, sea and its inhabitants, these were not regarded as objects to be used and fished respectively. Instead, for Dikkie, Ernest and Jacques and Hennie O, they enacted a sea as subject. John Law and Marianne Lien (2010) explain how a salmon is not necessarily a fixed, stable being but rather, is enacted by people differently, making it multiple. For example, salmon are enacted in such a way by the sciences that salmon are made to enter into a universalised rhetoric. This happens through the scientific naming process; a history in names is established and salmon come into being in the present as the coming together of histories and previous experiments. For people fishing in Lamberts Bay, fish were enacted in such a way that they had human qualities and were seen as affecting catches. ‘Companion feeding’ where fish come to the surface to feed, making themselves known is done in Norway. In this way, salmon are given an agency where they choose to come to the surface to feed, separating the distinction between fish and human, where fish are normally unseen below the surface of the water (Lien and Law 2010: 12). Likewise, Dikkie watched the fish he hoped to catch and observed their behaviour, allowing the mood of the fish to become apparent, giving a fish the chance to decide when to make itself known. Dikkie came to know fish differently to the ways his colleagues do. Ernest took into account inanimate objects too like his nets and spinners, as did Hennie O. As Dikkie generated a version of nature, so do Hennie O and Ernest – sometimes similarly and at other times differently. As they worked with many actors, Dikkie and his mates learned to trace the networks of fishing. When fish did not come to their usual spots, they had to look at the fish and their moods, the baits they were using and the conditions of the sea. In these instances, a network beyond the self was established (Latour 1999).

For Ernest, his ways of assembling versions of his environment were such that a network of multiple actors became apparent in his conversations. Hennie O regarded himself as one among many actors, human and nonhuman that affected fishing. In this way, for Hennie O, Dikkie, Ernest and Jacques, a network of sorts seemed to be assembled, whereby they said they took multiple actors into account, following their actions. By regarding networks, this does not mean Ernest and his mates were wrong, nor does this apply necessarily for the sciences because the ways of knowing are different. For scientific researchers, it is known in the practical sense that it is more than themselves that affects research outcomes – fish need to be present for research to actually happen. The practices of the sciences however, require objectivity and a filtering process of sorts results. In this way versions of nature are assembled that regard nature as a singular object. In this version, multiple actors, as a result of this, are not acknowledged and what is seen are outcomes (Latour 1999). These are some of the versions of the environment that were and are assembled, the fishers’ in Lamberts Bay examples were some of these.

Relational Ontologies

For many of the people working in Lamberts Bay, while they did not see the sea or the fish there as persons, they seemed to share a relationship with them that was more than one of fisher and catch. This, I argue is another nature to be considered. Willem spoke of how they needed to go out to sea with positive attitudes and with a smile on their faces or else fishing would not be successful. This is because, according to Willem, the sea, fish and lobster could sense moods and act accordingly. In particular, the sea was given a type of agency, whereby the sea has a love-hate relationship with people. It could become confusing at times during fieldwork because one person could be talking about how the sea gave him so much trouble and a minute later, Rosie, the only woman fisher, would be talking of how much she loved the sea and how she felt free there. After a while, no longer a complete outsider, these apparent contradictions began to appear complementary to me. As Willem put it:

> Sometimes the sea will give you so you can save, on other days nothing, so you can come back on those days that you have saved for.

The sea, in this example was a provider to Willem, generous on some days, and on other days, said Willem, would be unsuccessful. The sea was bountiful but it did not allow fishers to have excess fish, meaning planning ahead and saving was always necessary. Often, while we spoke, Willem's face became animated and excited when he spoke of the sea and how it works with him. In this way, Willem and Hennie spoke of their relationship with the sea:

> W: Its like the sea is in love with us because before he will take you he will warn you and then if you are reckless, careless then something will happen to you, but at least he has warned you.
> J: The sea almost gives you a chance.
> W: Yeah.
> H: I'll share a personal experience of where the sea, he warned me. One day we were working close to Muisbosskerm, south of Lamberts Bay. There are lots of reefs and we work, putting a set of nets there. There is a wave coming but its not breaking, its coming and we could see. I told my bakkie mate that we have to leave and we leave. At that time another bakkie came and that morning they smoked something, you could see. I went to them and I warned them, I said guys we've just been out there and we see the sea is standing up so I warned them and they ignored me, went in there and I warned my bakkie mate, I said you don't go after them we wait outside. They went a little bit deeper but we

> could still see them, they put their nets in the water. Then suddenly, the waves start to break and it turned them upside down. Capsized the whole boat, but from the head down, right over and we had to rush back to save them. The point is the sea warns you and you have to listen to that.
> W: I wouldn't say the sea is like a person but the sea it will tell you its my area, I'm in control of it and we have to listen to that. There are so many chances that the sea will show you.
> J: It communicates with you in a way.
> W: Yes.

In the conversation below, one sees how Jacques and Ernest accord seals living in the bay with more than a need to collect food. The seals in this example actually learn how to get fish from fishermen and the best ways to do it. The seals directly affect fishers fishing attempts and the safety of their hands; Jacques and Ernest acknowledge this fact.

> J: The seals are really clever, the one seal, we don't know where he got his education but you can put your net in the water and the you put down your bait and without destroying your net he will take out the bait.
> E: The seals aren't stupid, in the past I've caught mullets and you catch mullets with a net so when they come into the net there heads get stuck and they can't go back so you can't pull them, you have to push them through the nets. So the seals catch mullets from the nets, they pull them out and they are well educated. If you fight with seal, hit him with rocks, disturb him, then he will cause trouble for you and destroy your net. But if you leave him he will just take your bait.
> J: If the boats come in with catches of snoek then you can come and see what the seals are doing in the harbour. We have a way that we wash the fish, we take it and hit the water with it. Now the seals are clever, they won't come for the head or the middle part of the snoek, they will come for your hand so that you have to let go. And twice now, recently, there were seals who bit fishers.

A significant point, from the preceding account, was how Jacques acknowledged the affect seals had in their fishing attempts. Seals needed to be factored into one's fishing ventures as they interacted with both human and nonhuman sea-users, as if they had "an education". Ernest described how seals were clever in stealing fish. From what they said, it would seem, Ernest and Jacques did not separate themselves from the 'nature' around them. In the way the modernist project seeks to separate subjects and objects, Jacques and Ernest and Willem acknowledged their daily interactions with those traditionally deemed objects. This is one way that people in their practices produced versions of nature. In these versions, seals learned from people watching them carefully, finally stealing their fish, according to Ernest. For Willem, the sea worked with him. For those practicing scientific methods, they produce versions of nature as object. This means that the version of nature that Jacques, Willem and Ernest assembled through their practices, for the sciences, was not possible because nature as an object is not multiple or human-like. For Dikkie and Ernest, the account of nature they enacted was different:

> D: One thing I’ve noticed about the lobster but, I don’t know if they can see. They have two horns, if you’re on the left side, the left one will move and if you’re on the right side the right one will move which means they sense something. They feel and see with those two horns. lobster also sometimes live under the sand in the water and all you can see is the two horns moving and they’ll move. Nowadays when its out it’ll eat and stuff but when its under the sand you’ll catch nothing. It doesn’t want to eat.
>
> E: I want to follow on from Oom Dikkie with the lobster living under the sand in that on the same day, in the morning you will catch nothing on a particular spot. In the sand there is nothing, around the seaweed. But in the afternoon there may be a change in the wind and then on that same spot you don’t know where the lobster come from, we get bags full. They come from under the sand.

In this anecdote, there appeared to be a relationship at play between lobster and human, Dikkie had to observe closely how the lobster behaved and the lobster was accorded a choice in when it surfaced; sometimes, a lobster “doesn’t want to eat”. The lobster was given respect in this regard through Ernest’s acknowledgement that it was not just themselves who determined the catching of lobster; it was a two way street. This is what a relational ontology entails; Gregory Bateson exemplified this in his writings of how communication moulds everything and everyone. Lobster, fish and the sea may all be regarded as “communicative subjects rather than the inert objects perceived by modernists” (Hornborg 2006: 22). Lobster, in the example above were not just objects to be caught but subjects to be considered from multiple angles while out at sea, to determine whether or not they would choose to bite. Moods were considered and as with the seal example for Ernest and Jacques, seals were understood to observe and recognise fishers and their actions. With an understanding of fishing being produced by the relations one has with other actors, in a sense, fishing was constantly being produced, made up of multiple interactions each day (Strathern 1988). Dikkie interacted with the sea and its inhabitants, the reality of these being produced in a relational way so no two fishing trips were the same, making predicting fish and lobster behaviour close to impossible for him. Ernest agreed with this, commenting on how one cannot rely on a single fishing spot and Jacques understood this through his interaction with seals. With multiple actors determining an interaction, the concept of cause and effect, with expected outcomes, was not common in Lamberts Bay fishing because in relational ways of being, fishers amongst others affected an event. (Strathern 1988: 268).

Lamberts Bay

Much of what precedes this section, comes I think, to be buttressed by understandings of vibrancy, another nature to look at. Vibrancy, in this regard comes from Jane Bennett's (2010) *Vibrant Matter*, in which she looks at the way objects, as we traditionally know them, can be seen to possess a vibrant materiality. Humans and nonhumans contain this vibrancy which is the ability of all things to play an active role in happenings and life. A vibrancy cannot be seen or tested for but when an apparent object acts, the commonality of all in possessing this vibrancy is seen. While fishers did not speak explicitly of perceiving all matter to have a vibrancy, I argue that their ethics reflected this. I begin by looking at these ethics, in order to illustrate vibrant matter.

> J: So the sea with waves actually cleans itself?
>
> E: Yes, we've got a belief that part of cleaning the sea, all the things that don't belong in the sea she throws away, but if she can't clean something then its like the sea carries out the dirty stuff – irons and things like that.
>
> Jacques: If someone drowns, if that person does not come out within 8 days then the sea will be rough for those 8 days.
>
> E: And relating to your question about the sea as a person, if the sea is giving a body back to us and we didn't collect it within 3 days, she will take it back again and you will never find that body.
>
> J: Takes it back as her own.

During this conversation, Jacques spoke about the ways that he saw the sea as a being that gives people a chance. Ernest said that the sea keeps itself and the environment clean. If a person died, their body would wash to shore but the sea did not wait forever and if people were not prompt in collecting the body, the sea took the body back. Jacques seemed to sea the sea as having a possessive element and a sense that when on it, to some extent, people belonged to the sea. In assembling a version of nature, Jacques and Ernest's practices create a version such that the sea interacts with fishers. Likewise, another anecdote illustrates a similar sentiment:

> J: Is the sea alive to you then?
> E: In my experience I'll say yes, I see the sea as another person because if you are catching and your catches are low or you aren't catching anything then we say the sea needs to take something, we know there must be some sacrifice and that she will take some.
> Jo: Yes, the sea takes and the sea gives for example, last year the catches of snoek were good but we lost two lives and this year the catches of snoek have been good and the sea took one life. The sea takes and the sea gives.

Similarly:

> Jo: I see the fishers always as people who push their luck because for the whole week, a certain spot you can't get there, then suddenly it becomes calm and you went there and if you are there, the sea will make his normal routine and become rough.
> E: The sea has a way of warning us for example we were catching mullets where the waves become rough, very close to shore and there were signs before because the waves became bigger and we noticed but we didn't care because now we were thinking of survival and the catches were good and suddenly it was nearly too late for us because we ignored the signs. I nearly didn't make it, the bakkie had capsized and what saved me was I was under the bakkie and there was a space where I could breath.

In these examples, it is clear that the sea acted of its own accord and responded to both people and circumstances. When unhappy with a particular situation, the sea reacted by taking a life – a give and take relationship – or made fishing difficult, according to Ernest. With the current politics surrounding fishing and global fish stock crisis, as Ernest pointed out, the sea was unhappy "with the way things are" which manifests as climate change:

> J: What will the sea's reaction be do you think to all the pollution and oil spills?

> E: We see everything, the tornadoes, the storms all that, you could call it climate change but for us its a sign that the sea is unhappy with the way things are.
> J: The sea rebelling.
> Jacques: The sea doesn’t feel happy about things that happen now. He is polluted with politics also.

It would seem, to Ernest, that there was only so much the sea was willing to put up with as it was unhappy. As pointed out, a give and take relationship existed and the sea possessed a moral compass of sorts, reacting to oil spills, over-fishing and pollution. This points to Ernest’s ethical position. It was understood that there were certain behaviours and practices that were not acceptable and if pursued, would receive a response from the sea. For Ernest, polluting the sea, taking too many fish and not treating the sea with respect, resulted in the sea’s wrath. This, I argue was because Ernest understood the sea and its inhabitants to contain a vibrancy that people too possess. For Bennett (2010: 2), her work on vibrancy comes out of the literature that objects are not ‘immune’ to the effects of culture. For example the gendered body is produced through practices, cultural forms, objects, being an assemblage with resistant, negative, force. What is not spoken about, which Bennett focuses on, is the productive, positive, force of things. More than an assemblage created by human practices, things, in their own right have active roles in life. Vibrancy is the positive force that Bennett refers to; it is the ability of objects to act rather than just receive. A fish was enacted into being as a particular version for Dikkie, when the fish looks back as a subject, its vibrancy was seen, it is no longer an object but a thing with positive force. Likewise, the case was similar for Ernest as he worked with the sea. Bennett (2010: 14) argues that humans participate in a shared vital materiality – our actions and doings are not in isolation to the things around us. People are vital materiality, surrounded by it. Ernest reflected this in his way of working with and viewing the sea. As much as he affected fishing, so too did the sea in its ability to give and take, responding to pollution and oil spills. Ethically, what is important is that Ernest and Dikkie were open to the vital materiality of things beyond themselves as humans.

In this chapter, data have illustrated how some of the people in Lamberts Bay respond to nonhumans as if they were humans. For Jane Bennett (2010: 5), all actants produce effects and it takes many things to make something happen. As described above, the act of fishing requires more than fishermen and a boat. Lines, hooks, bait, fish, wind and waves all came together to produce the result of either effective or ineffective fishing. For Hennie, humans were not considered the most important, or only actors at sea (Bennett 2010: 34). Rather, an assemblage or collective was given precedence over the individual. This extended to fishers' relations with each other. As Hennie put it:

> H: On shore, even if we don't visit each other there, on sea we are so close you won't believe it, we are very close to each other when we are on sea.
>
> J: Your work binds you?
>
> H: We have to look after each other there.

When out at sea, fishing was not a case of each fisher out for his/her own gain, rather, constant attention was paid to the sea, fish and one's fellow fishers. For Dikkie, the way he referred to the sea as a person, accorded lobster with choice, saw fishes' moods, all speak to how he tacitly understood a similarity to exist between these different groups of actants, each needing to be acknowledged, providing a certain commonality. In this way, when a lobster or fish did not want to bite on a particular day, respect was given on the part of people to the lobster and fish's right to choose and their vibrancy may have been seen. This takes one back to the beginning of this chapter where Callon's (1986) case of scallops speaking was mentioned. In this example, the vital materiality of the scallops made itself known – the scallops, through their actions, spoke and their positive force was seen. They became in that moment more than something to act upon but something that responds and can be acted with.

Bennett (2010) argues that people could learn to recognise the vibrant materiality in all things, human and nonhuman. As a closing point to this chapter, my aim is less grand. People with whom I worked in Lamberts Bay live and practice versions of nature that allow fish to speak and hooks to act. Their version of nature was but a few among many and it allows one to consider how one might begin to work with multiple natures. In South African fisheries, knowledge debates can frequently centre on a right/wrong binary. As chapter one illustrated, fishers often saw it this way, thinking that if they were right they would have rights restored to them. Where debate is meant to happen according to the New Management Protocol for the South African Linefishery (1998) in the consultative advisory forum (CAF), it has been stopped due to lack of time. In this way, few knowledges are entered into the debates in fisheries. By considering multiple natures – where through their practices, people assemble different versions of nature – it may be possible to move beyond issues of right and wrong to acknowledging that the way people engage in practices will affect how their version of nature is assembled. As this chapter has shown, for fishers in Lamberts Bay, their version has multiple actors, possessing a vibrant materiality. Through the practices of the sciences, a version of nature may be singular and without actors due to scientific practices producing nature as object. The more natures one comes to learn and acknowledge, the more natures multiply, and this could help in learning more of the ocean and stocks in crisis. In this chapter, I hope to have shown some of the natures people assembled and that these were multiple. Moving to a conclusion to this dissertation, I consider issues of commensurability in South African fisheries knowledge debates.

Conclusion

Rethinking commensurability and strategies for dialogue

This study has sought to address the reasons why conversations between fishers and fisheries sciences have been so difficult, with communication so often failing. It is part of a larger conversation, one that will continue through the PhD work of Marieke van Zyl who, in dialogue with Astrid Jarre and Lesley Green is tasked with drawing together the findings of all of the fishers' knowledge studies conducted through this project along the coastline from Stil Bay to Walvis Bay. In that context, this dissertation has sought to open out three interrelated aspects of how it is that fishers come to know the sea, with the goal of considering how, conversations between scientists and fishers might be improved. Through supporting transdisciplinarity, planting seeds of mutual trust between fishers, scientists in the advisory system, and compliance officers this could open the possibility for constructive conversations.

The first chapter makes a case that since fisheries science now directly informs law that criminalises people, the resistance to science, and the ideas of science-lead conservation, is intensified in Lamberts Bay. Such findings are consonant with the findings of Oliver Schultz (2009) in St Helena Bay; Tarryn-Anne Anderson in Kalk Bay 2011; my own prior research in Simonstown (2010) and Marieke van Zyl in Kassiesbaai (2008). Yet, rather than taking a view that scientists are "bad" or "racist" or "unjust", the chapter draws from Bruno Latour's work to formulate a position that single-species fisheries scientists are working with the best intentions but because these scientists are working within a nature-culture divide , a relational way of thinking is foreclosed, and fortress-style conservation becomes the logical conclusion. Since the sea cannot be fenced, surveillance and policing work, informed by science, become one of the means by which the state engages fishers. The effect is that science informs policing work, if people do not agree it is understood that they must be educated to agree, and if they do not comply, they are arrested. The result is, quite literally, an epistemological policing. This is where the MLRA has been under considerable pressure to be rethought, Shaheen Moolla from Feike, (Cape Times 3 June 2011), Masifundise (Masifundise.org.za/papers. 29/08/2011), Sowman and Hauck (2008) driving this process. The question is how to develop policy in ways that generate agreement and compliance, rather than resistance and criminality.

With questions of rethinking the MLRA, as of September 2010, the new draft policy for the small-scale fisheries sector was gazetted. It focussed on areas where management was working and areas that could be improved. In the objectives, small-scale fisheries were taken into account with a community-based approach to harvesting the sea. This shift recognises the value of small-scale fishing both in terms of keeping people with jobs and the possible environmental sustainability of small-scale fishing practices. These moves forward have been apparent in terms of recognising and considering small-scale fisheries ways of working and reallocating rights where possible. It is recognised that reallocating rights is not the only means of alleviating problems and that a more holistic approach is necessary, i.e. ensuring a constant process of support and engagements. While it can be seen that there are improvements, this is an area that could possibly still be worked on, through generating a dialogue that truly considers alternative ways of fishing and understanding the sea of small-scale fisheries (Government Gazette 2010, no. 33530).

Working with the view that the contestation over the fishery and its management is not only a matter of will and imposition of scientific knowledge as a new rule of the sea, the chapter proposes that different approaches to participation and consultation might be productive. This approach, it is proposed, needs to acknowledge that fishers' "nature" does not perfectly match the nature known by formal science: not necessarily because one side is right and the other is wrong, but because people assemble different versions of the environment. Based on the work of geographer Sarah Whatmore, the material suggests that disputes could be regarded as generative events rather than reasons for police operations. When contestations happen, i.e. publics disagree with a position, allowing publics the space to voice their disagreements need to be made so that conversation and debate over the best way to move forward can happen. This is already being done through participatory processes, Whatmore's (2009) approach is very different because it considers ontological differences and suggests these differences are taken seriously. Whatmore's approach offers a fresh way of thinking about participatory research: one that makes space for people outside of formal research to trace and consider the knowledge claims of experts. Such an approach, in this context, might involve a small group of researchers comprising graduates and professional researchers to go to Lambert's Bay with an open ear and open mind, presenting fishers with what is known of the area. From there, fishers would need to be given space to express their agreements and disagreements with these findings. By the same turn, fishers would hopefully be willing to hear out the researchers agreements and disagreements with their views. In a situation where

DAFF (and UCT) are too understaffed and overstretched to send experienced ("senior") fisheries biologists out to sea with the fishers in order to bridge the findings between the rock lobster survey and the local observations, one could possibly set up small groups of fishers with a few graduate students to informally discuss positions on a particular area of research, as I shall suggest below.

Building on the view that what is at stake is not different cultures (defined through identities such as fishers versus scientists) but different means of assembling nature in ways that come to look very different, Chapter 2 centred on embodied ways of knowing and how these are dominant means of knowing the sea among fishers in Lamberts Bay. While it may seem that scientists do not use embodied knowledge, many fish on weekends and most drive cars that require embodied skills to manage specific technologies. The idea of partial connections becomes relevant because it proposes that embodied ways of knowing are not a ‘culture’, separate from scientists, but practices of knowing that are shared; and that it is the specific disciplines of the sciences that impose a division of mind-based from body-based ways of knowing. Fishers who have learned what they know of the sea and fish through years of working on the ocean come to know through their bodies, a fine-tuned instrument of sorts that learned the signs of when a storm was brewing or when fish would bite. Embodied ways of knowing are rendered ‘intuitive’ because they are untheorised and unacknowledged. Drawing on the work of Bruno Latour, this project has sought to give expression to a symmetrical anthropology, which attempts to look at both the sciences and fishers’ knowledges as expressions of intellectual heritage. In this way, it is not that embodied ways of knowing have nothing to offer because they have not been theorised. Rather, it is a different means of assembling knowledge and the kinds of skills embodied knowledge offers are like those of the practised professional. In the ways that embodied knowledges make multi-sensory connections, the art of the sciences is in creating data-points and connecting these.

The third chapter considers the place of a third dualism in the ontology of the sciences: that of subjects and objects. The ways in which Lamberts Bay fishers spoke of the sea and its inhabitants is clearly relational, in the material collected, for in the ways in which they speak, the sea and fish were regarded as subjects more than objects. From a modernist scientific perspective, often fish, lobster and the sea are not regarded as having much effect on fishing practices. Instead, fishers are seen as the determining factor in fishing expeditions. For Ernest and his colleagues, they took multiple actors into account when going out to sea each day. Fish were said to choose when to bite and lobster are accorded moods which made them decide not to bite on certain days. The sea works with people, but it also, according to Hennie, taught lessons. Through such a relational ontology, multiple actors are at play in the fishery, not just humans. I argued that this reflects a specific ethical position that fishers take; drawing on Bennett's (2010) work on vibrant matter, the work suggests that fishers view all matter in the sea, as well as themselves as having a vibrant materiality. This influences the ways that fishers regard and interact with the sea and fish, moving away from notions of viewing these as objects.

Geographer Sarah Whatmore's "generative events" approach asks for scientific reasoning to 'slow down' in coming to conclusions of what is to be considered and how to address management debates (Whatmore 2009: 2). An approach that does not focus on who is right or wrong but how people practice different versions of reality, is, in my view, very important for rethinking participatory public projects where there are contestations over "nature". Writing on Europe and the ways in which environmental management debates in human geography play out, and how over the last decade that has fostered distrust amongst the public, Whatmore writes of how science is no longer regarded as completely accurate. In South African fisheries like Lamberts Bay, the case is similar. People who fish for a living have a thorough knowledge of the sea, but the framing of the debate in very specific terms makes it difficult for them to dispute policy administered by DAFF. Whatmore argues that the way to gain back public trust of science-based policy is to get the public involved in discussions of what it is to know a particular place. In order to do so, she suggests, expertise needs to be redistributed through interdisciplinary work – i.e. both a redistribution amongst the sciences, and through public engagement in the framing of the terms of the debates. Her work offers an approach to a radical rethinking of the concept of participatory management, or public consultation, for it asks people not just to agree to be educated and then comply, but to contribute their ideas and experiences to thinking about local management.

In the South African context, many attempts have been made to have conversations through 'information meetings' or road-shows. The trouble is that these fall apart as neither fishers nor scientists 'hear' each other – as Marieke van Zyl showed in her account of such an attempt (van Zyl 2008). As the framework already exists for dialogue, how one might make these events more fruitful? The findings of this dissertation suggest that an approach grounded in the anthropology of knowledge may be useful. Where technology turns data and knowledge into numbers, practical ways of knowing, as practiced by Lamberts Bay fishers, cannot be translated into a numerical way of knowing. Participatory research, using ethnography, should I argue, be taught to scientists, with a focus on learning that teaches scientists how to hear and work with knowledge that is practically-based. Rather than receiving data that are practice orientated, and not understood because they are not in numbers, if scientific researchers were to learn how to hear and 'learn the language' of practical knowledges things could be different. The means by which people learn differently, from the start, using practical knowledges may be possible, because 'the language' of practical knowledges would be known by scientists. Conversely, many of the fishers may be willing to engage in the kinds of discussions that are ongoing in fisheries management if they are afforded the opportunity to grasp its terms of reference, and contribute to the ways in which it models oceans and changes in them. It is important, I think, to actively try and realise the partial connections that are already present in coastal management conversations. In finding commonalities, dialogue could be easier and more fluid, generating more discussion (Anderson 2011). Issues discussed could range from research findings to methodologies of both fishers and scientists. This is where Latour (2005) is useful as he understands politics to be a concern for things brought up by fluid, dynamic publics. Democracy, in this regard, entails listening to and working with that which is raised by publics. In South African fisheries management, fishers as public, need to be brought into the conversation for a democratic politics, where all people can speak.

The key issue here is that rather than framing the fisheries-sciences discussion in terms of culture or groupings or identities - the multiculturalist argument – a "natures-cultures" approach makes it possible for people to give voice to alternate ways of knowing. This allows different knowledges to come to the negotiating table without putting people in corners before the conversation has begun.

The Lamberts Bay fishers with whom I worked – Dikkie, Ernest, Kelvin, Rosie, Joanne, George, Jacques, Willem, Hennie O, Hennie W - provided a window into the ways that they practiced and generated versions of nature and, as a result, how they came to know in different ways. Their disagreements with DAFF rules and knowledges are important, yet these disagreements are often not worked with by fisheries managers. Where there may be incommensurabilities in fisheries regarding methodologies and recording of data, it is possible to talk across these with an alternative view for engaging with the way people live and act in the world differently.

It should be clear by now that I am not arguing for “fishers’ knowledge” to be seen and conserved in counterpoint to “Science”, but rather to see the continuities in the different practices of coming to know fish and the sea, and to see contestations as spaces in which it may be possible to redefine and amplify the frames of reference of the sciences that are grappling with changes in the sea and the availability of fish. The reframing of the discussion is going to take careful work and while rights loss can be on the table, it will need to be put on hold while a collective knowledge base is built. Food security, marine conservation and just allocation of fishing permits are issues that need to form part of the whole picture and this takes time. However, since marine conservation is here for the foreseeable future, investing time is worth it in order to build better dialogues and relationships between those involved in fisheries. In South Africa, where people have been writing on and contesting fisheries management, these theoretical approaches, that the above chapters speak to, call for a different quality of public dialogue where people are not considered right or wrong but as knowledge holders who have a different angle on a common problem: one that needs to be addressed in ways that enable different actors to speak, and to hear, and to be heard through actively working towards seeing the partial connections rather than differences in knowledges and practices during every conversation. Such a conversation may hold possibilities to shift fishers beyond rights loss conversations, and at the same time, create opportunities for scientists supporting the implementation of a new, more holistic way of managing fisheries, to engage the intellectual histories of their own frames of reference to look for ways in which alternate ways of knowing might be drawn into thinking and management. Seeing the connections coupled with a willingness to shift from what is comfortable and known is necessary and challenging, though very much possible.

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