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The knowledge-power nexus: towards a political ecology of South Africa's Integrated Coastal Management policy

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Acknowledgements

I was momentarily tempted to mimic a famous tongue-in-cheek acceptance speech of Spike Milligan's in citing the acknowledgments for this thesis: "I'm not going to thank anybody, because I did it all on my own." Even flippantly however, that would be a very poor reflection of reality. It was Paul Valery who wrote that a poem is never finished, only abandoned. This thesis became for me a poem that it took the best part of a decade to abandon, which I do now with some relief. Accordingly, the list of those deserving of heartfelt thanks is a long one and varied. I thank firstly the Almighty, in whom all things hold together; and who timeously reminds us that there is no end to the making of many books, and that much study wearies the body.

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Preface

The research described in this thesis was carried out at the Department of Geography, Environmental Studies and Tourism, University of the Western Cape, from June 2016 to May 2019, under the supervision of Professor Shirley Brooks.

Declaration

The research presented in this thesis is my own work and has not been submitted in any form for any degree or diploma to any other tertiary institution. Where the work of others has been used, it has been duly acknowledged in-text and by means of a complete reference list. The thesis has been checked for plagiarism by my supervisor via submission to Turnitin.

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List of Acronyms

CMP: Coastal management programme

CSIR: Council for Scientific and Industrial Research

DPSIR: Driver, pressure, impact, state, response

EMPr: Estuary management programme

KZN: KwaZulu-Natal

FDI: Foreign direct investment

GIS: Geographical information systems

ICM: Integrated Coastal Management

ICT: Information and communications technology

ICZM: Integrated Coastal Zone Management

NEMA: National Environmental Management Act

NBA   National Biodiversity Assessment

SANBI: South African National Biodiversity Institute

Abstract

Integrated coastal management (ICM) has been unequivocally established in policy and legislation as the preferred framework within which environmental management in South Africa's coastal environment should be undertaken. The production and dissemination of knowledge is seen as a critical component of the ICM framework, to the extent that 'reliable knowledge' is considered as one of two pillars that underpin the philosophy of the ICM process. The centrality of knowledge to ICM raises questions around objectivity, relevance, subjectivity, hegemony, hierarchy, power and negotiation within the process of knowledge production, as well as concepts of knowledge legitimacy in the promotion of specific kinds of knowledge within the ICM framework. This study responds to the prevailing notion within the environmental management field that the act of managing our environment is an apolitical or socially sterile one, by exploring the relationship between the concepts of knowledge and power as a point of departure. Thereafter, political ecology is employed as a method to contextualise and highlight some of the social processes at play within the ICM process.

Using a discourse analysis approach, semi-structured, open-ended interviews with ICM role-players from civil society as well as the public, private and research sectors are used to identify and unpack key 'storylines' articulated by ICM role-players in the Western Cape. Five main storylines are identified, relating to: i) the criticality of knowledge to the ICM process; ii) the diversity of ICM knowledge and the difficulty encountered during efforts to integrate them; iii) the experience that decision-making in ICM takes place in an intensely political space; iv) civil society respondents' perception of government's role in ICM as punitive and purely regulatory; and v) that ICM is integrated in name only. The views of ICM role-players with regard to the state of ICM in South Africa, as well as the degree of homogeneity or heterogeneity in personal definitions of ICM also emerged from these engagements. ICM role-players were largely unanimous in their negative view of the current state of ICM in South Africa, with positive or neutral sentiments rarely expressed. ICM role-players expressed varied personal definitions of the term, with role-players from the research sector demonstrating the most holistic understanding of the concept.

Reflexive or critical environmental studies of this kind with ICM as their focus are not common. Consequently, this research breaks new ground in highlighting the undeniably social and political nature of the epistemology of ICM. This is undertaken by assessing the types of knowledge employed in the ICM process and analysing the implications of the knowledge production and dissemination processes within the knowledge framework of ICM in a South African context.

Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction

> *Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve.*
>
> — *Max Planck*

1.1. Introduction

This research takes as its point of departure the interplay between knowledge and power in the natural resource governance arena of integrated coastal management (ICM) in South Africa, and the Western Cape province in particular. Notions of objectivity, risk, hegemony, hierarchy, power and negotiation with regard to the management and governance of natural resources are ideas that continue to receive attention from scholars of critical environmental studies (see for example Escobar, 1999; Beck 2006 and 2009; Braun, 2006; and Castree, 2003). In an era of increasing contestation in the narratives that characterise environmental issues at local to global scales (Adger, Benjaminsen, Brown, and Svarstad, 2001), these aspects take on particular significance. Critical environmental studies, within which this thesis is located, have been gaining momentum at least partly in response to what Robbins (2002) terms the tension that arises when supposedly 'neutral' or apolitical attempts to manage the environment result in unintended consequences.

This thesis sets out to advance insight into the often subliminal political context and related aspects of ICM, with emphasis on the intersection of knowledge, policy and power. The knowledge that is generated and consumed within this nexus is produced by a range of actors and stakeholders including researchers, private sector consultants, institutions, project stakeholders, and public sector officials. Of particular interest to this research is a focus on the actors and factors that drive the knowledge production process, with specific reference to its socio-political underpinnings, which, I suggest, are ultimately bound up in power relations. Given ICM's stated focus on knowledge as one of its pillars, the knowledge production process itself is deserving of introspection and critical reflection, as it is the basis for decision-making and policy formulation.

This approach is aligned with the school of thought that focuses on the 'politics and legitimisation' of knowledge-policy-power, after Jones (2009). The politics and legitimisation viewpoint, as articulated by Jones (2009:5), argues that:

> Power is infused throughout the knowledge process, from generation to uptake. Knowledge will often reflect and sustain existing power structures and is used in the policy process in processes of contest, negotiation, legitimisation and marginalisation.

1.2. Integrated Coastal Management, knowledge and power

Set against the backdrop of what scholars have begun to term the knowledge society, the relationship between knowledge and power is an emerging theme within critical environmental studies. Environmental management, particularly integrated environmental management, which attempts to cope with the complexity of environmental systems, is a key area for critical analysis. As in many areas of environmental governance, the field of integrated coastal management relies almost exclusively on the production, analysis and dissemination of information and knowledge for decision-making and to drive implementation and action. ICM is thus deserving of a critical stance in this regard (Billé, 2008).

Literature and policy related to coastal environments is replete with superlatives that talk to the dynamism, complexity, sensitivity and value to human societies of these environments (Goble, Lewis, Hill and Phillips, 2014; Olsen, 2001; Olsen, 2003; Celliers, Breetzke, Moore and Malan, 2009; Celliers, Breetzke and Moore, 2010). These adjectives emphasise the close and complex relationship of human society with the coast and the benefits that have accrued to people from coastal zones and coastlines over millennia (Haslett, 2009). It is in response to the complexity and value placed on the coastal environment that ICM first emerged in the international arena in the early 1970s, importantly in an interdisciplinary setting (Zinzani, 2018; Billé, 2008; Nichols, 1999; Cicin-Sain and Knecht 1998).

At the core of the ICM philosophy are two 'pillars', namely governance and reliable knowledge (Olsen, 2001). In the ICM process, governance and reliable knowledge are used to: i) integrate management efforts of coastal zones, emphasising adaptive ecosystem-based management; ii) inclusively take all aspects of the coastal zone into account, including geographical and political boundaries; iii) promote institutional integration and rational decision-making; and iv) promote sustainability of coastal development and economic growth (Sowman and Malan, 2018; Zinzani, 2018; Celliers et al., 2010, Olsen, 2001). ICM actively promotes coherence of policy and legislation to try to minimise or eliminate competition between different sectors,

authorities and/or vested interests (Mazé, Dahou, Ragueneau, Danto, Mariat-Roy, Raimonet and Weisbein, 2017).

Wesselink, Buchanan, Georgiadou and Turnhout (2013) remind us that the articulation and governance of contemporary environmental issues is closely linked to scientific knowledge, because of the dominance of scientific framings defining our understanding of the natural environment. This is certainly true for ICM, which combines elements of various scientific disciplines to study and manage the coastal environment (Haslett, 2009). In this regard, the centrality of scientific knowledge to ICM policy (Olsen, 2001) raises important questions around objectivity, relevance, subjectivity, hegemony, hierarchy, power and negotiation within the process of knowledge production. Questions around legitimacy in the promotion of specific kinds of knowledge within the ICM framework are key. Wesselink et al. (2013, p. 4) remind us here of the importance of continuous scrutiny of the interplay of science and policy in the political sphere:

> Scientific findings and other forms of knowledge achieve their meaning, validity and relevance in the context in which they are developed, used and applied. Both scientific knowledge production and policymaking are thus dynamic processes of meaning-making in which the production and use of knowledge is interpreted and interwoven with the generation of ideas about what the problem is and how it might be addressed … Interpretative approaches, with their emphasis on meaning-making and contextuality, can reveal significant aspects of power struggles within the policymaking process.

In South Africa, ICM has been unequivocally established in policy and legislation as the framework within which environmental management and regulation in the coastal zone must be undertaken. While this is aligned with international trends for managing coastal zones, this has been undertaken in what I suggest is an 'epistemological vacuum' that buys into ICM as a normative and unproblematic governance framework, without due consideration to the more nuanced socio-political aspects of the concept. Plaan (2018) notes that in a process such as ICM that engages with a variety of stakeholders and role-players, knowledge becomes the fulcrum around which meaning is contested and new knowledge is created. In a South African ICM context, this contestation raises questions around who the producers of ICM knowledge are; how it is generated, disseminated and used; and what role knowledge plays in the governance aspect of ICM. The relationship(s) between producers of knowledge, decision-

makers and recipients of policy is therefore of central importance to this research and is contextualised in the following section which further unpacks the study rationale and problem statement.

1.3. Study rationale and problem statement

Despite the fact that the adoption and implementation of ICM has taken place in coastal countries across the globe (Goble, Hill and Phillips, 2017), critical studies that focus on the epistemological and ontological assumptions of ICM and the implications of these underlying and subliminal factors for policy-making are not common. Authors who have delved into these complexities draw attention to: i) the lack of critical analysis of ICM principles, and the dangers of accepting these principles as 'Holy Writ', i.e. as normative and unproblematic (McKenna, Cooper and O'Hagan, 2008); ii) the variety of meanings and interpretations of ICM, and the lack of empirical evidence to show that ICM implementation directly results in improvements of ecosystem condition (Christie, 2005); and iii) the many problematic assumptions inherent to ICM, particularly around the homogeneity of key terms such as 'community' and the definitions of users' rights (Lowry, Pallewatte, and Dainis, 1999).

Having worked in the field for the last decade, I became increasingly frustrated by the relative absence of critical thinking in terms of these aspects of ICM, and increasingly attracted by the insights generated in the critical environmental management literature. In particular, I felt that an epistemologically reflexive and critical stance to the field of ICM was lacking. Whereas ICM is most often defined and conceived of as socially neutral, apolitical and unproblematic, my experience in engaging with ICM role-players over a decade suggested otherwise. Accordingly, the 'otherwise' became my rationale for undertaking this research.

In addition, as the ten-year anniversary of South Africa's ICM legislation first taking effect approaches — this year also marks twenty years since the publication of the first Coastal Policy Green Paper — the timing is appropriate to reflect critically on the implications of the epistemological vacuum that appears to have characterised adoption and implementation of the concept. This study thus responds to the prevailing notion within the environmental management field that the act of managing our environment is an apolitical or socially sterile one, by exploring the relationship between the concepts of knowledge and power as a point of departure.

1.4. Aim and objectives

The aim of this research is to advance insight into the process of knowledge production and dissemination in ICM in South Africa, through the lens of the constructivist paradigm which assumes the social construction of knowledge and political ecology which is part of the critical approach adopted. In order to achieve this aim, three objectives are put forward, which have informed and guided the research. These objectives are:

1. To investigate the 'way we know' about integrated coastal management in the South African context (i.e. its epistemology).
2. To identify the dominant discourses (storylines) within South African integrated coastal management by exploring the perceptions of integrated coastal management held by various participants and recipients.
3. To reflect on the implications of dominant discourses and the importance of conceptual reflexivity in ICM knowledge production and dissemination.

1.5. Thesis structure

This chapter introduced the research and outlined the underlying problem statement and study rationale. The aims and objectives that inform the research were also presented to provide a point of departure for the remaining chapters.

Chapter Two reviews literature germane to the research and establishes the theoretical framework for the study. It is divided into two main sections, namely the social construction of knowledge; and political ecology. The first section sets the scene for the research by considering the relationship between knowledge and power, as well as the emergence of scientific knowledge as a dominant and powerful knowledge system. The second part of the chapter problematises the science-society dualism described in the preceding section by introducing the concept of political ecology as a lens to demonstrate the fundamentally interconnected nature of society and the environment. Perspectives from post-structuralist political ecology highlight the ways in which the natural environment is constituted through struggles over material practices and struggles over meaning, as well as how unequal power relations are so often linked to conflicts over access to and use of environmental resources. Chapter Two concludes by contextualising the concepts of the social construction of knowledge and political ecology within the realm of the coastal environment.

Chapter Three provides further context for the research by examining the concept of ICM. The development of ICM and its principle features are explained, followed by an examination of

its epistemology. A brief overview of the development of ICM in post-apartheid South Africa follows, culminating in an overview of the National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008 and Amended Act No. 36 of 2014; hereafter referred to as the ICM Act).

In Chapter Four, the research methodology is described in detail. Due to the focus on the interplay between knowledge and power in the natural resource governance arena of integrated coastal management, the methodology used to undertake the research draws on qualitative methodologies for data collection and analysis, using a post-structural, hermeneutic approach. Discourse analysis is used as the means to analyse primary data derived from twelve in-depth, open-ended interviews with ICM role-players.

Chapters Five and Six present the research findings. Chapter Five describes and categorises role-players' personal understandings of ICM, as well as their opinions on the state of ICM in South Africa, while Chapter Six identifies the storylines that emerged from the research to offer qualitative insight into key aspects of the current ICM milieu. Chapter Seven concludes the study. The research findings point to the importance of conceptual reflexivity in ICM knowledge production and dissemination.

1.6. Importance of the study

Lawhon, Pierce and Bouwer (2016) remind us that environmental narratives tend to favour voices of authority. A central tenet of this study is that there are few voices more authoritative in the environmental discourse of ICM than those rooted in the scientific method. The privileging of scientific voices in this space is not intrinsically problematic; but the prevailing societal view of scientific knowledge — which depicts science as 'pure', socially neutral and apolitical — certainly is, at least to my mind. The literature and findings of this study point to this dominant view of scientific knowledge as a contributing factor to the tension that exists between the various stakeholders that are immersed in ICM projects and processes. I maintain here that these actors become divided and/or form alliances based on professional, sectoral or epistemological positions, drawing battle lines that result in struggles over the legitimacy of their respective knowledges. The above-mentioned themes are explored at length in this study.

Chapter 2: Knowledge, power and science — theoretical approaches to environmental policy-making

"Knowledge is not made for understanding; it is made for cutting"

— *Michel Foucault*

"Environments are not passive wrappings, but are, rather, active processes which are invisible. Their ground rules, pervasive structure, and overall patterns elude easy perception."

— *Marshall McLuhan*

2.1. Introduction

This chapter lays out a theoretical framework comprising of two main fields — theoretical perspectives on the social construction of knowledge; and a political ecology approach to knowledge and power. The theoretical lens provided by this literature provides the analytical and conceptual means to address the research questions. Examining the construction of knowledge alongside the parallel creation of hierarchies of power allows for an appreciation of what Bryant (1998) describes as the multiple ways in which the environment is constituted through struggles over material practices and struggles over meaning; as well as how unequal power relations are so often linked to conflicts over access to and use of environmental resources. A normative management framework such as ICM is therefore fertile ground for a critique informed by political ecology, as such an approach allows us to probe power relations in the environmental management and governance field.

2.2. The rise of the knowledge society

In contemporary society, the vast majority of industrial, economic, development and cultural activity relies extensively on information, expertise and skills (Stehr, 2001). These concepts, by virtue of the interrelationship of their constituents, may be loosely grouped together under the banner of 'knowledge'. This situation has prompted the emergence of the term 'knowledge society' which describes a society in which the traditional modes of production — including industrial activity — have been supplanted by the production, commodification and exchange of knowledge (Stehr, 2001). Western economies in particular, rely extensively on the transmission, analysis and development of the brainpower provided by human knowledge (Dunsky, 2008), it is argued, while "transformations of matter and energy are now subsidiary"

(Ravetz, 2001, pg.4). Gibbons et al (1994) maintain that the inception of 'knowledge industries' has generated markets for knowledge that are now wider and more differentiated than ever before, driven by the intensification of international competition in business and industry where knowledge is produced through processes such as research and development.

The scope of this research does not permit attention to the full range of complexity of the sociology of knowledge. While a sub-discipline in its own right, the sociology of knowledge is of interest to this research only insofar as it demonstrates and elicits the linkages between knowledge and power, a theme explored in the next section. The pre-eminence and ubiquity of knowledge as a commodity in contemporary society renders an examination of the concept of knowledge in the context of this research appropriate.

2.3. Knowledge and power

The intrinsic link between knowledge and power is a theme explored extensively by the French philosopher Michel Foucault. Foucault postulated that the link between knowledge and power is not trivial, but that the two concepts are indivisible, to the extent that he considered them as a single concept, *viz*. 'power/knowledge' (Irwin, 2006). This is effectively illustrated by Foucault's statements that 'knowledge is not made for understanding; it is made for cutting' (Simons & Masschelein, 2006); and "there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations" (Irwin, 2006, pg.501).

Knowledge, as a "constructor and validator" of reality, also assumes a role as a mediator of power (Pedynowski, 2003a, pg. 738); while those who use knowledge to gain understanding and meaning assume the dual role of translators and agents with the power to influence actions based on the acquisition or deprivation of knowledge (Comrie, 2010). As our way of making sense of phenomena in the world around us, the pursuit of knowledge is thus inherently linked to the pursuit of meaning (Braun, 2008). These are not entirely new concepts: the nineteenth-century German philosopher Friederich Nietzsche maintained that meaning is simply a synonym for power, and a concept can only have meaning if it has power (Comrie, 2010).

Given the innate link between knowledge and power, of interest is the ways in which knowledge (and, by extension, power), is used in a society which relies widely on the production and exchange of knowledge. The following section focuses on a particular knowledge system in order to illustrate the knowledge/power correlation. This system is known simply as science.

2.4. What is science?

A characteristic of Western societies is the interchangeable use of the terms 'science' and 'knowledge', words which are often also combined to form 'scientific knowledge' (Gibbons et al., 1994). This section focuses on the broad topic of the production, use and management of knowledge considered to be 'scientific'. In order to attain some grasp on this deceptively complex and contested topic, literature from a range of sources has been reviewed. This covers topics which can be loosely grouped under the corpus of the sociology of scientific knowledge, which looks at the nature of scientific knowledge as generated in social processes of interaction, learning and research, and thus as situated and dependent on the relations between social actors (Bruckmeier & Tovey, 2008). More broadly, this approach falls under the ambit of postpositivist[1] studies of science, in which scholars explore the implications of using or practicing science in the context of today's knowledge society.

The next section presents a modest proposal to grasp the underlying philosophy of science through defining what this term means for this research, as well as a description of some of its key features. Some of the implications of the philosophy of science, which have resulted in a significant change in the ways that science and society interact, are also explored.

2.4.1. *Unearthing the Philosophy of Science*

Pestre (2004, pg.364) writes that what is missing from existing studies of science and the sociology of knowledge is "the production of a series of large pictures about the regimes of knowledge production and regulation within the institution of science". What this author is alluding to in his call for a metanarrative of the sociology of scientific knowledge is that science is not merely a type or category of knowledge, but that there are power relations inherent to practicing science (note the author's choice of the terms 'regime' and 'institution'). In order to situate this concept on more solid ground, it is necessary at the very least to grasp the magnitude of the influence that science has had, and continues to have on society, as well as what is commonly understood to constitute science. To this end Harding (2008, pg.75) best describes the influence that science has had on society:

> Science has spoken, with growing urgency and conviction, to society for more than
> half a millennium. Not only has it determined technical processes, economic systems

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[1] A post-positivist approach to research combines elements of positivism and interpretivism to form an approach that rejects the notion of absolute truth, while retaining many of the rigorous benchmarks of 'pure' positivism. (Panhwar, et al., 2017)

and social structures, it has also shaped our everyday experience of the world, our conscious thoughts and even our unconscious feelings.

What then is this influential concept that has shaped the very fabric of traditional and modern societies? At a conceptual level, science may be thought of as the descendant of the universal human impulse to understand ourselves and the world around us. More generally speaking, there are many components included under the umbrella term of 'science' and it is therefore necessary to define the limits of what the term means in the context of this research. Thus, for the purposes of this research, the term 'science' refers to conventional Western, orthodox science, characterised in terms of the predominantly Newtonian, mechanistic, reductionist and linear approaches utilised to conceive of and explain natural phenomena in the quest for meaning. In this sense, to be 'scientific' implies a distinct form of knowledge production, and refers in essence to a complex of ideas, values and norms which have arisen to control the diffusion of the mechanistic Newtonian model to more and more fields of enquiry, and to ensure its compliance with what is considered 'sound scientific practice' (Gibbons et al., 1994). Escobar (1999) terms it the 'modern epistemic order', while Berkes et al. (1998, pg. 412) descriptively word it as "a machine theory applied to nature".

Science as we know it today was preceded by 'natural philosophy' and has its roots in post-Renaissance Europe, emerging towards the end of the 1700s, and also has strong links to the rise of capitalism (Escobar, 1999; Harding, 2008). Instrumental in the birth of this modern, so-called 'Fordist' science were "linear perspectives and objectification of landscapes linked to realist painting; the initiation of large-scale monitoring; and the passive role assigned to 'nature' through the production of landscape art" (Escobar, 1999, pg.6).

What are the ramifications of the dominance of this worldview for the production of knowledge and power in contemporary society? In order to elucidate this question, a closer look at the philosophy of science itself is needed.

2.4.2. *Exceptionalism and Triumphalism*

Approaching the sociology of scientific knowledge from a Marxist-feminist perspective, Sandra Harding (2008) makes use of the terms 'exceptionalism' and 'triumphalism' in describing the current philosophy of science. Exceptionalism refers to the belief that Western science alone among all human knowledge systems is capable of adequately grasping, explaining and indeed, producing reality (Harding, 2008). For Harding, triumphalism means the underlying assumption that the history of Western science comprises a narrative of

achievements with no significant adverse consequences or shortcomings (Harding, 2008). For the exceptionalists and triumphalists, the liability for any negative results of scientific endeavour and the resultant human activity (such as famine, poverty and environmental destruction) can all be laid at the door of the political and social (mis)use of 'pure' scientific knowledge (Harding, 2008, parentheses added).

In subscribing to these underlying philosophies (whether consciously or subconsciously), scientists and their proponents conflate 'science' with 'Science' (Harding, 2008). That is to say, in the transformation to Science, science emerges not just as a knowledge type, but a knowledge regime with a culture and rule system all of its own. There is significant overlap between the features of exceptionalist and triumphalist science, and science as a 'Mode 1' knowledge system, explained below.

2.4.3. *Science as a 'Mode 1' Knowledge System*

In reflecting on the 'new production of knowledge', Gibbons et al (1994) distinguish between Mode 1 and Mode 2 knowledge production. For these authors, Mode 1 is identical to what is meant by science, as its cognitive and social norms determine what count as significant problems worthy of analysis, who shall be allowed to practice science, as well as what constitutes 'good science' (Gibbons et al, 1994). Mode 1 knowledge production is therefore regarded as socially exclusive, disciplinary in its effects, homogenous, and hierarchical. Its relevance to society at large is essentially determined by its relation to the cognitive and social norms that govern scientific research (Gibbons et al, 1994). Desportes and Colenbrander (2016, pg. 126) elaborate:

> Mode 1 [knowledge] relies on scientific and expert knowledge to attain new insights. The process is most often followed within rigid bureaucratic systems and relies heavily on Information and Communication Technologies (ICT) and Geographical Information Systems (GIS).

By contrast, "Mode 2 knowledge production, instead of being situated in technical scientific institutions, emerges via increasingly heterogeneous practices" (Desportes and Colenbrander (2016, pg. 126).

There are certainly echoes of exceptionalism and triumphalism in the categorisation of science as Mode 1 knowledge production, and perhaps Pestre's earlier description of science as a regime now sits more comfortably. Couching science within the frameworks of Harding's

exceptionalism-triumphalism and Gibbons et al's (1994) Mode 1 knowledge production has allowed a an initial understanding of science. This line of thought is developed further in the sections below which focus on the more specific features of the philosophy of science, beginning with the common portrayal of science as objective and socially sterile.

2.4.4. *Science and objectivity*

Western science is almost always portrayed as objective, impartial and value-free; in stark contrast to other knowledge types and systems (Comrie, 2010; Harding, 2008; Escobar, 1999; Escobar, 1995). This notion of objectivity and impartiality of knowledge deemed scientific stems from the commonly held societal perception that science is immune to the influences of values, opinions and subjectivity (Comrie, 2010). However, the definition of what counts as objective scientific knowledge was not, as Harding (2008, pg.16) so eloquently puts it, "handed down from on high on stone tablets at the origins of modernity in the West". On the contrary, the perception of science as an objective knowledge system is as a result of a purely social process, perpetuated by the underlying philosophy of science.

In laying out their analysis of post-positivist science studies, Latour and Woolgar (2004) describe this process by positing a number of fundamental binaries that constitute the underlying philosophy of the science we know today. These binaries reveal the underlying philosophy of science, epistemically arranging themselves in contrasting positions with regards to certain traits and characteristics of other knowledge types. Examples of such binaries or dualisms include fact/value, science/nature, objective/subjective, rational/irrational, and modern/traditional (Latour and Woolgar, 2004). By espousing the former trait over the latter in the case of each of these binaries, the proponents of this type of science (i.e. exceptionalist and triumphalist) subconsciously instil in their audiences and recipients the notion of science as a factual, objective, rational and modern knowledge system.

Latour and Woolgar (2004) describe the prevailing philosophy of science as one of positivism, in that Western science is promoted as the complete terrain of what should count as rational knowledge and competent expertise. Yet as they point out, science as a knowledge system, a powerful actor and an agent in contemporary society is infinitely more complex than the construction of binaries and the domination of a particular knowledge type. Such perceptions of objectivity and purity work to elevate the position of scientific knowledge and create the opportunity for hegemony and exploitation. Hegemony is understood here as the privileged status of one knowledge or type of knowledge over another or others (Wesselink, et al., 2013).

Through the 'objective' claims to 'truth' described above, science achieves dominion as the source of information on which decision-making is based, whilst simultaneously projecting an image of objectivity and rationality which arises from the perception of science as 'uncontaminated' by social concerns (Harraway, 1991; Eden, 1998). This feature of science is elaborated in the remainder of this chapter, beginning with the powerful addition of another binary which is subsumed under the philosophy of science.

2.4.5. *The science-society binary*

One of the strongest critiques of science as a hegemonic knowledge regime relates to the prevailing worldview of science and society as inherently separate, or, to put it differently, the conceptualisation of science as the antithesis of society (Braun, 2006). Scientists are wont to conceive of science as a socially void process that exposes "underlying objective knowledge about how the world works" (Comrie, 2010, pg. 37). This is achieved by framing assumptions about biophysical reality within hypotheses and testing these assumptions with empirical data (Escobar, 1999). There is however a problem with this empiricism. Harding (2008) posits rather bluntly that scientific inquiry is not comprised of value-free chunks of hardware, but that science is rather a social institution with many features found in other social institutions. A further feature of the philosophy of science relates to the way in which it disguises the socially constructed parts of its knowledge claim by naturalizing and universalizing them (Pestre, 2004).

An additional binary can be therefore be added to those listed previously by Gibbons et al (1994) as indicative of the philosophy of science: that is, science/society. This binary involves a projection and appropriation of science as diametrically positioned with respect to politics and the social. In critiquing this image of Western science, Harding (2008) maintains that any description of science that rejects the notions of science and the political as inexorably intertwined — mutually constitutive of the world in which we live and fundamentally unable to operate independently — is severely lacking.

These two opposing views bring to light the ontological problem so characteristic of modern science – this being that our persistence in conceptualising our knowledge of the natural world as separate from matters of justice, of power, and our interests, has led us to believe that they are discrete, when in fact they are inherently and entangled with each other on many levels (Harding, 2008). Put differently, in contemporary science, only pure facts are permitted 'on the

inside' of science, while all other social, cultural and political values and interests are contained out in society (Harding, 2008, pg. 34).

The science/society dualism is best illustrated in the actual practice of science, which involves a natural tendency to "appropriate to itself as merely technical matters decisions that are in fact social and political ones" (Harding, 2008, pg. 25). This is perhaps in response to the inherent complexity of modern reality, whereby scientists and analysts tend to reduce and deconstruct the delicate network of natural, political and social phenomena into tidy compartments, where there exists only science, only economy, and only social phenomena (Harding, 2008). The promotion of the science/society dualism therefore perpetuates the belief that the epistemological vehicle of Western science alone is situated sufficiently 'outside' of society to allow scientists to resist the universal human tendency to project onto the natural world cultural assumptions, fears and desires, or so-called social 'contamination' of a pure knowledge system (Harding, 2008). This, critics argue, is a delusion.

What are some of the repercussions of the science/society binary? The implications of the compartmentalization of science and society as described above include severe limitation of the explanatory value of scientific inquiry. According to Haluza-DeLay and Davidson (2008, pg. 633), this is brought about by "a failure to consider the means by which social and natural systems are mutually constitutive". These sentiments find echo with Pestre's (2004, pg. 353) assertion that "the social is not a supplementary dimension of scientific activity, but rather the other side of a coin that needs to be understood in its entirety". Gibbons et al (1994) lend support to these assertions by noting that science is in fact impregnated with social syntax, as the act of producing knowledge is undertaken by configuring human capital. Harding (2008) conjures a vivid image in asserting that science bears social fingerprints.

A more sinister repercussion of the science/society dualism is the emergence of Western science as a kind of governance system which illegitimately bypasses democratic processes, particularly when objectivity is supposedly maximised by excluding social factors from the production of knowledge (Harding, 2008).

2.4.6. Critiques and crises

Whilst the sciences of the West have been the primary focus of the chapter thus far, it is noted that they are but one knowledge system among many (Harding, 2008). It is clear that invoking the name of science in this context has social consequences, as the term is both value-laden and power-laden. Adoption of this knowledge regime often results in the privileging of Western

science above other knowledge systems. It is the features of science such as this which has led to the emergence of science as a hegemonic knowledge regime, and subsequently of the critics of science who challenge the authority claimed by scientists to alone provide legitimate and accurate accounts of reality (Harding, 2008). In particular, there has been an increasing clamour from non-Western scholars from so-called developing countries who seek to illuminate the plight of the recipients of the products of Western science, produced within privileged cultures of scientific enquiry (Escobar, 1995; Escobar, 1999).

Whatmore (2009) terms these critiques 'voices from the margins', as they cast only a trivial shadow on the dominance and hegemony of science. The position of science at the apex of the pyramid of power relations inherent to knowledge production is further illustrated by Gibbons et al (1994) who posit that a history of knowledge production since the 17th century could be written almost exclusively in terms of the efforts of proponents of non-scientific knowledge production to gain recognition of their knowledge systems as 'scientific'. The attempt to incorporate so-called 'indigenous knowledge systems' into mainstream science is one such example.

There are those that suggest that such critiques have arisen as a result of what has been called a 'crisis of confidence' in science, or more specifically the "crisis in official scientific expertise related to the increase in uncertainty and the loss of trust" (Ravetz, 2001, pg.1). There is a crisis of confidence in science and it emerged in the West some time during the 1960s and 1970s, during which time a broad social movement criticised science as a socially authoritarian and elitist institution in the service of the powers that be (Pestre, 2004). Demands for more social accountability against a background of environmental controversies are among the contributing factors listed by Gibbons et al (1994) as the genesis of the crisis of confidence in science. Harding (2008, pg.167) maintains that the crisis of confidence in science has had the effect of "eroding the independency and authority of the 'Republic of Science' in the knowledge society".

This loss of public trust in science is undoubtedly also related to the emergence of the 'global environmental crisis' (Haluza-Delay & Davidson, 2008) and the inability of conventional scientifically-informed management practices to solve problems. The loss of public confidence in science may be interpreted as a critique of the very building blocks of science, ranging from scrutinising and questioning the methodologies employed in the praxis of science; to probing the often hidden and unacknowledged ontological and epistemological assumptions that

underpin, inform and influence interventions and practices – the philosophy of science as it were (Comrie, 2010). In fact, the notion of 'crisis' itself came under attack during this period, with criticisms rooted in problematizing the very nature of 'science' and its underlying positivist philosophy (Guthman, 1997).

Rather than simply another social revolution attempting to challenge science's position of power in society, the crisis of confidence in science has become a concerted attempt to debunk the universal, epistemological and moral values intrinsically attributed to science as a 'pure knowledge', and in so doing, to undermine the everyday confidence in science "as an activity capable of separating fact from fiction and truth from politics" (Pestre, 2004, pg.355). Such critics in effect challenge scientists' authority claims about what science is and what it does, thus challenging the monopoly of science on authority about the natural world (Harding, 2008). These thoughts are echoed by Whatmore (2009) who states that scientific knowledge claims, in concert with the regulatory practices which they inform, become subject to public interrogation and dispute. She goes on to highlight the role of environmentally controversial events in unsettling public trust in scientific expertise, and the relationship of this expertise to the policy-making process (Whatmore, 2009). Put more simply, as perceptions of environmental degradation grow, so too does public anxiety.

2.5. Environmental management in the knowledge society

Much of the type of critique described above is levelled at the use of the knowledge framework of 'science' itself as the overarching and preferred basis for decision-making and intervention (Pedynowski, 2003a). Put differently, the problem is the use of science as the "preferred epistemological vehicle through which knowledge and meaning are extracted from the world" (Braun, 2008, pg. 673). This is very pronounced in the field of environmental management. The ways in which scientific knowledge is used as the basis for environmental management interventions is described in the following section.

2.5.1. Environmental management: a brief introduction and definition

One of the foundations of modern societies is a separation of the concepts of nature and society, comprising the imposition of dichotomies onto the social order because of particular interests, including control and management of nature or the environment (Escobar, 1999). At its most basic level therefore, environmental management may be thought of as the study of human-environment relations, and the quest to better understand and manipulate those relations in order to benefit humans (Braun, 2005). In reality, however, such egalitarian aspirations are

clouded by differential power relations in terms of who decides which sectors of society should benefit from these understandings and manipulations. Environmental management as a process takes place through the production of knowledge about the environment which is in turn used as the basis for decision-making and action. For this research then, environmental management interventions can be conceptualised as 'knowledge projects' after Harding (2008).

2.5.2. *The production of knowledge for environmental management*

As argued, of the multitude of knowledges which have emerged within the knowledge society, scientific knowledge has achieved the most privileged and elevated status, due mainly to the ability of scientific knowledge to initiate action (Stehr, 2001). However, a more detailed examination of this process shows how unequal power relations are inherent within environmental management through the ability of one actor to exert control over the environment of another through interventions based on the production of knowledge about the environment — either through physical imprinting in/on the environment through alterations of the biosphere; or through 'embedding' control within environmental discourses (Bryant, 1998). Foucault's reference to knowledge as a cutting instrument is an especially vivid one when environmental management is considered.

An examination of the concept of scientific environmental knowledge production within this process is given further credence and momentum by Haluza-DeLay and Davidson (2008, pg. 635) who state that:

> Knowledge deserves focus because our very understanding of – much less the ability to attend to – environmental problems requires the rapid generation and dissemination of knowledge regarding social and ecological systems and their interaction, as well as the possible need for an adjusted knowledge domain.

Guthman (1997, pg.47) argues further that because the production of scientific environmental knowledge is intimately connected to the production of interventions, it is therefore "intrinsically bound up with power relations".

This process may also be described as the 'documentary practices' which support environmental assessment, through activities such as the development of technical reports and scholarly papers wherein environmental knowledge and discourses are produced and reproduced in multiple but hardly objective ways (Guthman, 1997). Some studies which explore this line of reasoning go so far as to suggest that the construction and presentation of

environmental issues, problems and crises is not an objective process carried out under the auspices of the scientific method, but is instead a purely social practice. The social construction of environmental problems and crises through knowledge production, and given form through environmental discourses[2], becomes a process which facilitates the control of people and environments because they are seen as problems and crises by certain individuals and groups who become powerful actors (Bryant, 1998).

Bruckmeier and Tovey (2008) illuminate how knowledge within the process of environmental management is socially distributed in varying and unequal forms, and how knowledge redistribution also implies negotiation, redefinition, acceptance or exclusion of specific knowledge for specific purposes. Guthman (1997) argues that the production of scientific knowledge to demonstrate the dimensions of these environmental 'crises' is historically and socially embedded, as well as power-laden. Scientific environmental knowledge now begins to emerge as highly amorphous and dynamic within this social process; a structured set of activities involving a close interaction between technical and social norms which result in negotiation and renegotiation of the 'facts' (Harding, 2008). In Harding's view, the fact that modern science in a sense profits from its monopoly of 'the truth' and the subsequent existence of such 'crises' is in itself problematic; as science is one of the causes, as well as the medium of identification and definition, and the source of solutions (Harding, 2008).

Having established some of the ways in which scientific knowledge is generated, with a particular emphasis on the unequal power relations inherent to this practice, the discussion now turns to the ways in which this knowledge is used for decision-making purposes in contemporary environmental management.

2.5.3. *Decision-making in environmental management*

As described above, environmental management is characterised by the pursuit of solutions to problems and dilemmas through the production and application of scientific environmental knowledge, with a prevailing tendency to reduce complex environmental and social systems to their individual components (Haluza-DeLay & Davidson, 2008). Eden (1998) highlights the notions of rationality, knowledge and certainty as being central to environmental management. When faced with the task of making difficult decisions, managers often turn to scientific

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[2] A 'discourse' is "a collection of ideas, concepts, and categorizations that is produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1993, p. 44)

knowledge for the information with which to make decisions (Robertson & Hull, 2003). This is particularly relevant in the case of environmental management, where scientific knowledge of the environment is without doubt the dominant (some would say hegemonic) basis for action – in this case management interventions, where policy decisions are made based on whose (or which) knowledge is perceived to be 'right' and whose (or what) knowledge can produce the most powerful claims to 'truth' (Pedynowski, 2003a).

Despite this implicit reliance on the production of seemingly value-free and socially exempt 'facts' implicit in this definition of scientific knowledge, the very practice of environmental management requires a degree of engagement with the socio-political process of decision-making in order to initiate action. At some point then, a decision to intervene is made based on what the decision-maker perceives to be the most appropriate course of action, informed by scientific 'facts'. While the neutrality and objectivity traditionally associated with scientific knowledge are widely perceived as the appropriate vehicle for solving complex and controversial issues (Robertson & Hull, 2003), a value judgement is in fact being made on the nature of truth (whether consciously or subconsciously). This only serves to further highlight the inextricably social nature of environmental decision-making when such decision-making is based on scientific knowledge. When such decisions are made based on scientific knowledge, the decision-maker is effectively absolved of moral responsibility for the decision based on their deference to 'the facts' identified by rational scientific knowledge. 'Evidence-based policy making' of this nature is hard to contest: the scientist — in evaluating knowledge claims in this way and basing a decision exclusively on the application of 'sound' scientific methods of truth-discernment backed up by the possession of 'expert' credentials — is afforded proper scientific competence in adjudicating on matters of the environment, and thus moral legitimacy (Rempell, 1996).

In the opinion of Backstrand (2003), these decisions are also influenced by which and whose knowledges are represented as legitimate and authoritative, a view reinforced by Guthman (1997) who argues that actors with knowledge-derived power (through skill and institutional affiliation) are able to assert their ideas as 'facts' and are consequently often the most dominant.

The rational forms of management which result from this process refer essentially to Foucault's notion of 'governmentality', a phenomenon characteristic of the modern knowledge society and manifest through the ways in which vast domains of daily life (including the environment) are appropriated, processed and transformed by expert knowledge and the administrative

apparatuses of the state (Foucault, 1991, cited in Escobar, 1999). Thus, the ways in which the environment has been 'governmentalised' by making it the object of expert knowledge – the ways in which it has been regularised, simplified, disciplined and managed – are important contributors to the power attributable to scientific knowledge (Brosius, 1997, cited in Escobar, 1999). The co-dependent actions of scientific knowledge production and environmental decision-making therefore have important consequences for notions of justice, democracy and equality in environmental management, an issue which is dealt with in more detail below.

2.5.4. *The politicisation of environmental management*

As previously described, environmental management interventions are initiated, formalised and legitimised through a process whereby policy-makers rely on scientific experts for advice and technical assistance, and citizens (and the environment) are merely the recipients of this process (Backstrand, 2003). As already established, the development and implementation of environmental interventions are inseparably allied with the production of scientific environmental knowledge, both intrinsically bound up with power relations (Guthman, 1997, pg.45). More specifically, this process allows the knowledge claims of experts to manifest themselves in the products and policies we live with and in the socio-material environments that we inhabit (Whatmore, 2009). This is termed the linear model of policy influence, and comprises a one-way flow of information from science, to policy, to society (Eden, 1998). What emerges is the 'normal' science-policy interface or 'top-down' mode of environmental management, wherein a hierarchy of power is established between scientists and non-scientists. Here power, by virtue of the possession of knowledge, rests with the "enlightened experts" who consider scientific knowledge as the only basis for decision-making (Backstrand, 2003, pg.31). Whatmore (2009, pg.590) terms this hierarchical arrangement of power "the normative redistribution of expertise" in which scientific knowledge production is disseminated from the ivory towers of the academy, and finds willing recipients in the decision-makers of commercial and governmental entities and institutions.

This situation has significant implications for the dissemination and legitimization of scientific knowledge, as observed by Haluza-DeLay and Davidson (2008, pg. 644):

> As the complexity of environmental issues grows, so too does the pre-eminence of scientific expertise and the differential access to the knowledge products of science ... the tendency to devise technocratic solutions to environmental problems has the effect of removing decision-making power from citizens or their elected representatives,

creating a societal dependence on scientific expertise for information on the nature of social and environmental risk.

Bryant (1998, pg.88), in reflecting on the politicization of environmental management, draws attention to the identification of environmental problems, crises and plans for resolution of these problems by the scientific elite as a "highly political act that may or may not be grounded in scientific 'fact' — that is not to say that these problems do not exist, but that their selective identification and representation is a political process". It is in this way that practitioners of science appropriate political projects through environmental management, a semantic reshuffling which Harding (2008) describes as positioning the term 'environmental management' as merely a more palatable placeholder for the term 'science'.

This view is reinforced by Braun (2008, pg. 668) who highlights the "power-laden nature" of environmental discourses which further serve to polarise the scientists and non-scientists, while Pedynowski (2003a, pg.736) refers to the knowledge transactions of the linear policy process as "machinations of power". The impropriety of the arrangement between experts and decision-makers described above is also highlighted by Harding (2008) in stating that the (false) modesty of those who 'speak only about facts' (i.e. scientific experts) leads astray those must make judgements about values (decision-makers).

During the linear policy process, the production of knowledge inevitably becomes politicized (Eden, 1998) to the extent that "the boundaries between scientific institutions and policy-making are blurred" (Backstrand, 2003, pg. 27). In a more conceptual light, the lines demarcating science and society have become ever more porous, to the extent that the borderline has all but disappeared (Harding, 2008). The habitually subliminal political elements of environmental management (which relies almost exclusively on the production of scientific knowledge) are constantly redefined and reinvented at local scales through different modes of action and perceptive devices (Pestre, 2004). Put differently, the process of scientific environmental knowledge production reflects and often reinforces social and economic inequalities, in the sense that the hierarchy-building results of knowledge claims may form the basis of socially divisive public policy such as environmental management discourses (Bryant, 1998). During the highly politicised linear policy process, the claims of science are taken up as facts within numerous arenas and mediatory forms, resulting in new arrangements which are intrinsically social. In so doing, these new arrangements of knowledge "remodel society just as much as they remodel the institution of science" (Pestre, 2004, pg.357). It is this situation

which has allowed an elite minority who "hold the title of scientist to speak on behalf of universal humanity and the environment" (Backstrand, 2003, pg. 27).

Given the privileged position of science and scientists described above, and given the use of science as an 'interpreter' of environmental realities, scientific information is able to assume moral authority in the context of environmental decision-making and resource management (Pedynowski, 2003a), a reality which is further indicative of the inherently social nature of science. As Comrie (2010, pg. 38) expresses it, "the power of science derives from its ability to attach meaning via its own social process". It is the socially embedded character of these scientific claims which are the basis for decision-making, in concert with their intrinsic hierarchy of power relations that begins to generate conflict not only around issues of science proper, but also around knowledge which is more political and economic (Guthman, 1997). Further political and social elements within science, and by extension, in environmental management, are thus highlighted. Of concern in this process is the fact that decisions which affect and influence how we live are made based on scientific knowledge that effectively bypasses the democratic processes to which political decisions are meant to be subjected (Harding, 2008).

The notions of social embeddedness, unequal power relations and hierarchical credibility described previously as definitive characteristics of the use of scientific knowledge, stand in stark contrast to the notions of rationality, neutrality, objectivity and freedom from values and social concerns espoused by the proponents of exceptionalist and triumphalist science. Thus far, the discussion of the philosophy of science and the features of the scientific method as they have been employed in the knowledge society has resulted in a focus on the negative aspects of science. It is however necessary to examine the other side of this coin in the interests of balancing the prevailingly critical viewpoint presented thus far. Science is not without value and this should be acknowledged.

2.5.5. *In the defence of science*

The crisis of confidence in science and the politicisation or social contamination of one of the products of science in environmental management, as discussed at length in previous sections, are not adequate grounds for an abandonment of the use of orthodox science and the scientific method in environmental management. Backstrand (2003, pg. 38) reminds us that "the systematic features of the scientific method in terms of the capacity to observe, explain, describe and represent the world, reflect an unprecedented accumulation and progress of

knowledge". Further reasons for avoiding advocating the wholesale abandonment of science in environmental management are presented in the remainder of this section.

It is worth noting that many of the critiques of science may in part be attributable to the homogenization of the term 'science', which is generally accepted as encompassing disciplines as diverse as chemistry and psychology (Pedynowski, 2003b). By totalizing the concept of science, and perpetuating an image of science as an amorphous, homogenous phenomenon, the critics of science exhibit "a general disregard for the diverse epistemic cultures and practices so casually subsumed under the broad rubric of science" (Pedynowski, 2003b, pg. 739). Harding (2008) maintains furthermore that it is both inaccurate and misleading to group the diverse activities that comprise the scientific enterprise under a single label. The aforementioned critiques of science and the resultant crisis of confidence in the scientific method have debunked the 'false mystique' of science (Comrie, 2010) and have highlighted the risks in considering science as independent of people and society (Ravetz, 2001). There is however undisputable evidence that promotes the usefulness of scientific knowledge as an interpreter of reality and a translator of meaning. As Comrie (2010, pg. 41) points out:

> Science may not wear the emperor's clothes of social neutrality, independence and truth, but it still has an impressive wardrobe of overalls and workboots to wear.

Comrie (2010, pg. 35) also suggests that many of the failings of science may result from "a passive neglect of the philosophy of science" on the part of scientists themselves. This situation is also at times perpetuated in the public eye through the media which often portrays scientific knowledge as the absolute and authoritative source of information on environmental matters (Pedynowski, 2003c). Whilst scientists are acutely aware of the complexity of their work, non-scientists are often in a different position and may tend to perceive the science as more certain than it actually is (Robertson & Hull, 2003).

Moving from the discussion of the philosophy of science, the remainder of this chapter further problematises the science-society dualism by reviewing the theoretical approach of 'political ecology' as a critical lens to demonstrate the fundamentally interconnected nature of society and the environment.

2.6. Introducing political ecology: the entanglement of nature and society

Political ecologists argue that historical studies of nature and the environment have tended to underplay or exclude the role of human influence, essentially adopting the stance of an

'apolitical ecology' (Robbins, 2002). Political ecology juxtaposes the political and the ecological, problematising this epistemological stance by examining the ways in which the biophysical has been incorporated into history, and how biology and history are entwined with one another (Escobar, 1999). Two major theoretical foci underlie the concept of political ecology — namely, political economy, which emphasises the links between the distribution of power with productive activity; and ecological analysis which focuses on "bio-environmental relations" (Greenberg & Park, 1994, p. 1). Bryant (1998, pg. 82) adds to this notion by identifying the underlying logic of political ecology; that "the consideration of political forces should be paramount in determining the link between human-environment interaction and the spread of environmental degradation".

Political ecology is therefore concerned with understanding the dynamic relationship between society and nature. Two key assumptions are adopted in this regard: that politics and the environment are everywhere thoroughly interconnected in a mesh of bio-cultural-political complexity (Bryant, 1998; Greenberg & Park, 1994); and that political processes drive environmental change and ecological conditions (Robbins, 2011). Harvey (1993, p25) summarises the empirical thrust of the political ecology project most succinctly:

> All ecological projects and arguments are simultaneously political-economic projects and arguments, and vice versa … ecological arguments are never socially neutral any more than socio-political arguments are ecologically neutral. Looking more closely at the way ecology and politics interrelate then becomes imperative if we are to get a better handle on how to approach environmental and economic problems.

Robbins (2002, p. 12) takes this further by building the notion of power relations into Harvey's summation:

> The common thread of political ecology studies is that they are empirical, research-based explorations to explain linkages in the condition and change of social or environmental systems, with specific considerations of relations of power … not only are ecological systems themselves political; our very ideas about them are further delimited and directed through political and economic processes.

The inability of mainstream management practices and discourses to address contemporary environmental problems has led to a burgeoning growth in political ecology research as calls for a more detailed understanding of the political and economic obstacles to meaningful

societal and environmental change grow (Bryant, 1998). Against this backdrop, studies rooted in a political ecology approach have begun to appear with increasing frequency in contemporary environmental scholarship (Lee, 2000; Escobar, 1999). Rather than replacing the mechanistic notion of causality inherent in traditional or 'structural' ecological analyses, Greenberg and Park (1994) argue that the introduction of politics into these analyses advances structure in the form of 'causality' at a number of new levels, broadening the scope for understanding through the lens of political ecology.

Most recently, theory in political ecology reflects the influence of post-structuralism as attention has moved to consider the importance of discourse and representations created by people. In this regard, Robbins (2002, pg. 65) notes that contemporary or traditional environmental studies and analyses which identify the natural and social realms as mutually exclusive merely perpetuate colonial-era notions of the environment and knowledge about the environment:

> Studies of colonial-era writings open a window into the minds, politics and societies of its authors, linked closely to systems of political, social and moral power that propel certain kinds of questions, descriptions and answers. Colonial writing of this kind dichotomises texts and binary colonial discourses by othering people into us/we and them/they — this is how colonial knowledge of the environment was constructed. A human-environment narrative that begins with queries about, or differences from, 'them' is ultimately a hand-me-down of not-yet-forgotten colonialism. These narratives are in essence ideological controls of environmental and social systems

The challenge to this type of thinking has its roots in post-structuralism, which in turn has implications for how knowledge is conceptualised, produced, understood, consumed and disseminated (Robbins, 2002). A post-structuralist approach to political ecology is one in which different forms of knowledge can be explained in terms of their ability to support or break down systems of power (Bryant, 1998). Unpacking contested representations of the environment reveals unequal power hierarchies and allows for a disentanglement of the environment-society interface (Plaan, 2018; Zinzani, 2018).

Scientific studies and analyses undertaken in the manner described above tend to 'package and categorise' certain aspects of nature, before setting them adrift into a confusing maelstrom of formal and scientific knowledge systems (Plaan, 2018). Whereas the natural environment is often traditionally portrayed as 'unproblematic', Brosius (1997) describes how political

ecology is used to make sense of what are in fact politically and socially complex natural environments by highlighting how differentially empowered role-players with divergent interests (such as scientists and decision-makers as well as NGOs and civil society organisations) contest the legitimacy of the claims of others to resources in a particular ecological context, in what is a highly politicised process.

It is noteworthy that the relationship between the natural environment and people is fundamentally dialectical — landscapes and environments are constituted and shaped by socio-economic and political processes, while people are in turn influenced and shaped through their 'embeddedness' in the landscape (Plaan, 2018; Wesselink et al., 2013). This notion has relevance to the following section, which aims to ground the theory of post-structural political ecology in tangible interactions between science and policy with regard to environmental governance, where (hidden) power structures emerge as key influencers of what types of knowledge are incorporated into policy and decision-making.

2.7. Political ecology at the science-policy interface

Nijbroek (2014) writes that power structures, particularly at the local level, influence the transformation of knowledge into policy, law and decision-making. In so doing, these power structures "determine how knowledge is filtered and reproduced, often to maintain the status quo" (Nijbroek, 2014, p. 534). Environmental narratives and discourses are therefore not neutral descriptions of objective reality but are based on human and therefore political or incomplete interpretations of knowledge by actors with powerful interests (Wesselink, et al., 2013). For Robbins (2002), policy becomes a narrative that is in essence represents ideological control of environmental and social systems. These systems and their praxis become normalised, entrenched and 'made true' through discourse such as language, stories, images, terminology and jargon, all the trappings of the traditional scientific method (Robbins, 2002). Wesselink et al. (2013) draw attention to the 'performativity' of this process and these policy discourses, describing them as stories that 'produce effects' as they are articulated. It is of significance to note the effects that flow from the performance of these policy discourses are often subliminal and unintentional (Wesselink, et al., 2013).

Similarly, the enforcement of legislation and the implementation of national and provincial policy at the local level is not a linear or socially neutral process, but rather officials and decision-makers "must translate regulations, scientific knowledge, and national policies into the local context" (Plaan, 2018, p. 583). The performance of these policy discourses into

decision-making and enforcement at the local level is a process that often results in tension and contestation between different role-players in the environmental governance space (Plaan, 2018; Nijbroek, 2014; Escobar, 1999). This contestation over the legitimacy of knowledge plays out in various ways. These include: the juxtaposition of different epistemologies and ontologies (Nijbroek, 2014; Wesselink et al., 2013); the suppression of opposing knowledge and questioning of authority by rival role-players (Plaan, 2018); and a blurring of the lines between the institutional domains of politics and science (Wesselink, et al., 2013).

Additional tension can arise when scientific knowledge and non-scientific knowledge are pitted against one another; with producers and holders of the latter knowledge type tending to be afforded lesser authority and occupying a lesser authoritative claim to objectivity and truth than producers and holders of the former (Plaan, 2018). Linking back to the underlying foci of political ecology, Wesselink et al. (2013) remind us that the interactions between the producers of knowledge and policy-makers is an exercise in "the scientization of politics and the politicization of science" and is particularly relevant for the study of environmental issues and governance (Wesselink, et al., 2013, p. 2). The politicization of science is problematic principally because it portrays itself as apolitical and socially neutral, when in fact it merely obscures the fundamentally political nature of the science-policy interface, with environmental experts not generally viewing themselves as political actors (Pellizzoni, 2011; Wesselink and Hoppe, 2011; cited in Wesselink et al., 2013). This is brought sharply into focus when a narrative of 'interests' is used in environmental policy and governance. According to Wesselink et al. (2013), this occurs when environmental issues and problems are conceived and portrayed as contests between competing interests, with opponents portraying each other's interests in an unfavourable light.

The pertinence to this study of post-structural political ecology is demonstrated in the next section. To close the chapter, it is necessary to show how the social processes of knowledge contestation and hierarchies of power manifest, and to thoroughly probe the knowledge space within ICM.

2.8. Political ecology and coastal management

Nichols (1999) notes that conventional approaches to ICM have presented the coastal area as a definable, manageable and value-laden entity rather than a frontier transition zone between land and sea. Mazé et al. (2017) point to how the politicised nature and the power relations inherent in governing the sea and coastlines invites critical studies of coastal management using

a political ecology approach. Similarly, Billé (2008) and Nichols (1999) highlight ICM as fertile ground for this type of theoretical inquiry. They argue that, some fifty years into the global ICM project, the ontological and epistemological elements of ICM must be questioned and challenged as a way of advancing the theoretical robustness and social relevance of the ICM concept (Billé, 2008).

The dependence of ICM on reliable knowledge as one of its central tenets also encourages a more critical appraisal of its underlying episteme. As Billé (2008, pg. 16) notes, "coastal zone management is built as much upon power struggles and negotiations as it is on scientific knowledge that is essentially incomplete and controversial". The above authors allude to the possibility of positivist influences on ICM, through its forthright reliance on scientific knowledge which, at times, advocates 'more science' and 'integration' as solutions to problems within the coastal environment (Billé, 2008; Nichols, 1999). From a Marxist perspective, ICM philosophy reflects strong linkages with the United Nations international environmental regulatory regime and other controversial international development policy — the primary objective of which, Nichols (1999) suggests, is a reorganization of society and space for the purposes of stimulating economic development (Nichols, 1999; Zinzani, 2018).

For all these reasons, it is therefore important to adopt a reflexive and epistemologically critical stance to an environmental discourse as prevalent and entrenched as ICM. Here I contend that a critical examination of the ICM knowledge space, by applying a social constructivist and post-structural political ecology approach, is appropriate for a number of reasons:

1. The centrality of knowledge to ICM. The link between knowledge and power has already been established (section 2.3), as well as the ways that knowledge production, dissemination and conflict results in unequal power relations. Following Bryant's (1998) approach, different kinds of knowledge within ICM can be explained in terms of their ability to support or break down systems of power.

2. A knowledge space such as ICM which allows (at least in theory) for the articulation of different knowledge systems results in the emergence of unequal power relations, where some knowledge systems are dominant, some subordinate, and some are resistant (Plaan, 2018). Political ecology is well-equipped to analyse this kind of interaction and tension, as its point of departure is an acknowledgement of the strength of political forces in bio-environmental relations (Greenberg & Park, 1994) and the implications of the resultant hierarchies of power (Wesselink, et al., 2013).

3. The biophysical complexity inherent to oceans and coasts renders them difficult to categorise, understand and control. Comparatively little is known about the sea, and by extension, its meeting place with the land, as compared to knowledge about terrestrial landscapes (Plaan, 2018). Uncertainty about the ocean and coastal environment therefore leads to contestation and conflict of knowledge (Plaan, 2018). Different understandings and interpretations around complex marine and coastal phenomena such as sea-level rise have therefore arisen, leading to disputed debates about the ontological and epistemological assumptions of approaches to understanding oceans and coasts (Plaan, 2018).

4. A political ecology approach is appropriate in critically studying an entrenched management framework such as ICM, particularly when issues of environmental risk are considered. ICM in South Africa, through the ICM Act, promotes a risk-averse approach to decision-making in the coastal zone. Robbins (2011) writes that distinguishing 'natural' things from 'social' things becomes difficult when the natural environment is conceptualised as a hazard or threat.

It is against this backdrop that I draw on the recent work of Zinzani (2018) and Plaan (2018) who use political ecology to apply post-structural landscape approaches to coastal and marine spaces through the use of two (rather similar) terms indicating social constructs – 'seascape' (Plaan, 2018) and 'coastalscape' (Zinzani, 2018).

2.8.1. *Seascape*

Plaan (2018) employs the concept of 'seascape' to understand the complex interactions between islanders, authorities and the natural environment in Kihnu Island, off the coast of Estonia in Eastern Europe. Material and social control over the seascape is demonstrated through *inter alia* conservation policies, fisheries regulations, and local ways of managing the environment, which renders the seascape a highly controversial and politicized space (Plaan, 2018). The author focuses on the notion of resistance by local residents of Kihnu to conservation measures and other forms of regulation, such as fishing quotas imposed by government authorities. For Plaan (2018, p. 576):

> The seascape around Kihnu Island has been a source of social formation and inspiration for cultural life but also a place where knowledge is created. At the same time, the sea is also a place where islander identity and livelihoods are continuously influenced by the discourse of conservation regulations and state power.

Plaan (2018) writes furthermore that the cognitive dissonance between the discourses and narratives of the various role-players that operate in or are influenced by the seascape is driven by changes to the biophysical environment; and by attempts to make sense of the natural environment through knowledge-making, particularly categorisation and organisation. He points out that multiple but often overlapping epistemologies — ways of knowing — of seascape among different role-players are the product of these differing knowledge and material practices (Plaan, 2018).

For example, authoritarian conservation measures and quotas informed by formal, scientific knowledge (factual knowledge) is often actively resisted by Kihnu islanders, who employ local ecological knowledge (situated knowledge) to counter the claims of the authorities to objectivity, legitimacy and truth (Plaan, 2018). The resultant tension and resistance result in the transformation of environmental knowledge about the seascape on both sides of the conflict, where situated and factual knowledge merge to form hybrid knowledge (Plaan, 2018). Importantly, the underlying ontology of the seascape is not static, but rather is constantly subject to social mutation as collisions occur between local residents, authorities and other role-players (Plaan, 2018). Plaan (2018, pg. 570) also demonstrates how particular agendas (whether political, scientific, or indeed both) can actually be entrenched and privileged in the guise of democratic consultation with local communities:

> Bureaucratic language and science were used to explain the current environmental situation and to present future plans. The aim of the 'tour' was to hear local voices and as one of the senior marine scientists later said, to include local knowledge and cultural particularities into the planning process. Nevertheless, this new inclusive approach did not necessarily represent a democratisation of scientific governance, and it could actually serve to promote and conceal a particular socio-political agenda. As many community members had earlier expressed, so far no one has wanted to hear their voices, instead teaching them how they should (or are allowed to) live in their 'cultural space.'

2.8.2. *Coastalscape*

In a similar vein, Zinzani (2018) critically explores power and socio-political dimensions of environmental governance by unpacking how 'metabolic transformations' — changes in land use and economic activity such as a growth in aquaculture projects — derive from the implementation of ICM projects in the 'coastalscape' of the Mekong Delta in Vietnam. The

author argues that these metabolic transformations can lead to *inter alia* degradation and pollution of the physical environment; alterations in power dynamics; social differentiation; and economic inequalities. Zinzani (2018, p. 14) alludes here to a fusion of political and biophysical factors — which are termed here 'socio-natural entities' — that coalesce and result in very real negative impacts on the biophysical environment as well as to the aforementioned social changes:

> By reflecting on processes, dynamics and flows within the metabolic transformations of the Mekong Delta coastalscape, a combination of key socio-natural entities such as capital, water and the climate significantly emerges. On the one hand, the recent expansion of global capital in Vietnam … through the rise of new market and trade networks related to intensive aquaculture, benefited and was supported by a progressive shift in availability from fresh to brackish and salty waters. On the other hand, this shift is progressing due to climate change effects such as extreme drought, salinization of soils and freshwater and coastal degradation. Whereas the metabolic transformation is enabling a boom in aquaculture and higher incomes for some groups within communities, in parallel, it shapes coastal degradation and leads to resettlement policies and social marginalisation.

For Zinzani (2018), the wholesale implementation of ICM projects in the Mekong Delta reveals a fundamental tension between the seemingly benign or benevolent policy undertones of conservation, the rhetoric of sustainable development as well as community empowerment; and the subtle endorsement of strategies to stimulate and strengthen international market access, industrialisation, foreign direct investment (FDI) and business opportunities to international capital. This occurs through discursive policy devices where ICM project activities, such as aquaculture, are portrayed in mainstream discourses as socially and politically neutral, and as paragons of green economic growth (Zinzani, 2018). Viewing the 'coastalscape' of the Mekong Delta in this way allows the underlying socio-political fabric of these discursive policy processes to be exposed. Zinzani (2018, p. 7) is concerned to point out that:

> Since ancient times, the Mekong Delta has been produced and developed by a combination of socio-natural and political processes, infrastructural development, diverse political orders, power relations and forms of knowledge inspired by the logic of the social control of nature.

Integrated coastal management projects are simply the latest in a long history of interventions.

2.9. Conclusion

The dual theoretical thrusts of the social construction of knowledge and a political ecology lens on human-environment relationships are used to highlight the fundamentally political nature of contemporary environmental management and governance. The chapter began by throwing into relief the inherent connection between knowledge and power, critically examining the epistemology of a particularly powerful and hegemonic form of knowledge — science. The ways in which scientific and other forms of knowledge are employed as the basis for contemporary environmental management is summarised. The politicised nature of this process is stressed. It is at this point that a political ecology approach is used to reinforce this notion, as it reveals how politics and the natural environment are 'everywhere thoroughly interconnected' (Bryant, 1998). This is illustrated by considering the science-policy interface, where tensions surrounding the objectivity, reliability and purity of different knowledge types give rise to fundamental struggles over legitimacy and claims to truth.

Lastly, these notions are grounded by exploring the work of two authors who use political ecology approaches to show how ICM policies and projects are profoundly political processes and have scant claim to social neutrality or objectivity. The seascape of Kihnu Island and the coastalscape of the Mekong Delta respectively are shown to be socially and politically intricate spaces, in stark contrast to mainstream ICM policy which depicts them in oversimplified biophysical and social terms (Plaan, 2018; Zinzani 2018).

At face-value, ICM can appear socially neutral and is portrayed in policy and legislation as depoliticised (Zinzani, 2018). Wesselink et al. (2013, p. 4) remind us here of the importance of continuous scrutiny of the interplay of science and policy in the political sphere:

> Scientific findings and other forms of knowledge achieve their meaning, validity and relevance in the context in which they are developed, used and applied. Both scientific knowledge production and policymaking are thus dynamic processes of meaning-making in which the production and use of knowledge is interpreted and interwoven with the generation of ideas about what the problem is and how it might be addressed … Interpretative approaches, with their emphasis on meaning-making and contextuality, can reveal significant aspects of power struggles within the policymaking process.

These are the theoretical tools which this research employs to inform its understanding of the relationship between different ICM role-players, and to examine the ways in which knowledge — and power — are exercised through ICM policy and projects in South Africa, particularly the Western Cape.

Chapter 3: The field of Integrated Coastal Management

> *"'Our life, it probably began inside of the ocean,' Johnny said quietly. 'About four thousand million years before now. Probably near hot places, like volcanoes, under the sea.' I turned to look at him. 'And for almost all of that long time, all the living things were water things, living inside the sea. Then, a few hundred million years ago, maybe a little more – just a little while, really, in the big history of the Earth – the living things began to be living on the land, as well.'*
>
> *I was frowning and smiling at the same time, surprised and bewildered. I held my breath, afraid that any sound might interrupt his musing. 'But in a way you can say that after leaving the sea, after all those millions of years of living inside the sea, we took the ocean with us. When a woman makes a baby, she gives it water, inside her body, to grow in. That water inside her body is almost exactly the same as the water of the sea. It's salty, by just the same amount. She makes a little ocean, in her body. And not only this. Our blood and our sweating, they are both salty, almost exactly like the water from the sea is salty. We carry oceans inside of us, in our blood and our sweat. And we are crying the oceans, in our tears.'"*
>
> ― ***Gregory David Roberts, Shantaram***

3.1. Introduction

A firm grasp of ICM history and principles is necessary prior to presentation of the research findings. This chapter thus focuses on ICM policy and practice. The first section of the chapter overviews the evolution of the ICM concept and outlines its principal features. Thereafter, the theory of knowledge, i.e. the epistemology and ontology of ICM, is examined to highlight some of the more nuanced and underlying aspects of its theory and praxis. The chapter concludes by describing the development of ICM in post-apartheid South Africa and the Western Cape province, emphasising the centrality of the ICM Act to coastal governance and management, as well as some of the main critiques of the South Africa's ICM legislative framework.

3.2. The development of ICM and its principal features

It is the recognition of the inherent value of coastal and marine environments to society — along with insight into their innate complexity — that has driven the demand for governance frameworks that are integrated, participatory and adaptive (Sowman & Malan, 2018). Haslett (2009) notes that the study of coastal zones is arguably one of the best examples of interdisciplinary environmental science, combining aspects of *inter alia* geology, physical and human geography, oceanography, climatology, sociology, economics, engineering and planning. Worldwide, ICM has gained traction as the preferred governance and management framework for coastal regions on the back of its recognition of the dynamic, complex and sensitive character of coastal systems (Zinzani, 2018; Sowman and Malan, 2018).

ICM has a mixed or hybrid lineage, emerging in the early 1970s and maturing in discussions over the following decades in an interdisciplinary setting as a result of the fusion of input from a variety of natural and social sciences, as well as various NGOs, policy-makers and international organisations (Zinzani, 2018; Billé, 2008; Nichols, 1999; Cicin-Sain and Knecht 1998). According to Celliers et al. (2010), ICM is not a science or a scientific discipline as such, but has been described variously as a 'paradigm'; a 'planning and management process' (Celliers, et al., 2015); a 'governance approach' (Zinzani, 2018); and a 'rational decision-making process' (Cicin-Sain & Belfiore, 2005).

With these descriptions in mind, generally speaking, at the core of the ICM philosophy are two 'pillars', namely governance and reliable knowledge (Olsen, 2001). In the ICM process, the aim is to use governance and reliable knowledge to: i) integrate management efforts of coastal zones, emphasising adaptative ecosystem-based management; ii) inclusively take all aspects of the coastal zone into account, including geographical and political boundaries; iii) promote institutional integration and rational decision-making; and iv) promote sustainability of coastal development and economic growth (Sowman & Malan, 2018; Zinzani, 2018; Celliers et al, 2010, Olsen, 2001). ICM actively promotes coherence of policy and legislation to the extent that competition between different sectors, authorities and/or vested interests is minimised or eliminated (Mazé, et al., 2017). Furthermore, the bedrock of the ICM approach is a cyclical policy framework, commencing with identification of baseline conditions and issues and terminating with a revisionary evaluation step (refer to Figure 1).

ICM Policy Cycle
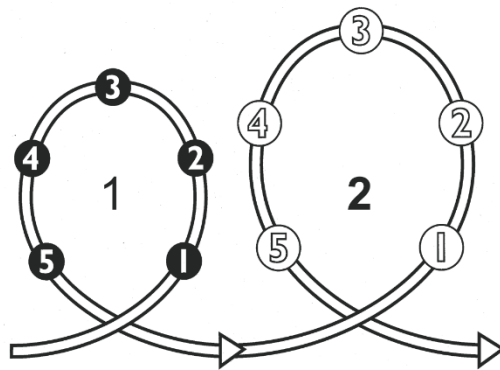
Figure 1: Steps in the integrated coastal management policy cycle

Source: after Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) 1996, as adapted in Olsen et al., 1998, pg. 7

According to the ICM philosophy, these cyclical steps are to be undertaken in a specific manner, informed by a specific set of factors (Stojanovic, et al., 2004). Adjectives used to describe the factors that should inform the ICM approach and policy cycle include the following: i) participatory; ii) long-termist; iii) focused; iv) incremental; v) adaptive; vi) comprehensive; vii) precautionary; viii) co-operative; and ix) contingent (see Figure 2).
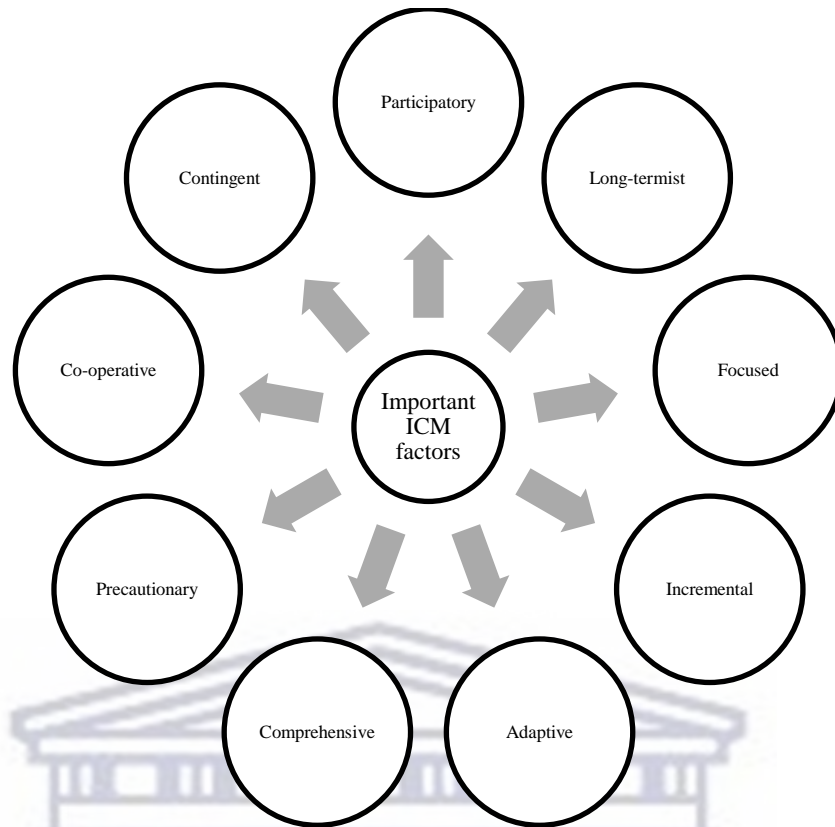
Figure 2: Important factors for integrated coastal management

Source: adapted from Stojanovic et al., 2004,pg. 275

In a similar vein, Celliers et al. (2010) summarise the four principal features of ICM initiatives from key literature, notably the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP,1996), as follows: i) geographical; ii) temporal; iii) sectoral; and iv) political/institutional. Table 1 expands on these features further by providing a description and citing respective sources.

Table 1: Summary of integrated coastal management features

ICM Feature	Description	Source(s)
Geographical	The interrelationships and interdependencies between bio-physical processes in the terrestrial, littoral, estuarine, and offshore environment	GESAMP, 1996
Temporal	A long-term planning and implementation horizon that still allows for adaption to rapidly changing conditions	GESAMP, 1996; Olsen, 2003

ICM Feature	Description	Source(s)
Sectoral	The interrelationships between the various sectors of human society that make use of the coastal area and its resources	GESAMP, 1996
Political/Institutional	Consultation with and participation by government, parastatal and civil society (social and economic sectors, communities) to find agreement on policy development, planning, regulation, conflict resolution, amenities, and the protection of the coastal environment	GESAMP, 1996; Bower & Turner, 1998

Source: adapted from Celliers et al., 2010, pg. 19

Whereas the evolution of the concept of ICM and its principal features is relatively easy to trace, its epistemological assumptions, i.e. the nature and scope of knowledge inherent to a concept, is more nuanced and elusive. The following section delves into the epistemology — and the two central pillars of ICM in particular — in order to highlight some of the underlying assumptions and critiques of the concept.

3.3. The epistemology of ICM

Since its genesis in the 1970s, ICM has been implemented at virtually all geographic scales and contexts, is supported by an organised community of scientists and practitioners and has thus achieved a first stage of maturity (Billé, 2008). Zinzani (2018) describes ICM as complex, heterogenous and problematic, primarily due to the inherently multi-scalar nature of the concept. Indeed, the diverse group of stakeholders who sketched the first conceptual contours of ICM recognised the complexity and interconnectedness of the marine-coastal-terrestrial interface. They responded by developing the central tenets of a management framework that was overtly cognizant of this inherent intricacy, by positing that "collecting *science* for the coast must be similarly complex and interconnected, necessitating a multi-disciplinary approach at the science-policy interface" (Bremer & Glavovic, 2013, pg. 41, emphasis added).

As suggested in the previous chapter, the dependence of ICM on reliable scientific knowledge as one of its central tenets also encourages a more critical appraisal of its underlying episteme. Bremer and Glavovic (2013) draw on the work of Stojanovic, Ballinger, and Lalwani (2004) to underscore the fundamental influence of science-based, technocratic management paradigms

on ICM from the inception of the concept. Billé (2008, pg. 16) asserts that this reliance on scientific knowledge has far-reaching implications:

> Coastal zone management is built as much upon power struggles and negotiations as it is on scientific knowledge that is essentially incomplete and controversial.

The above critiques point to positivist influences on ICM, through its unabashed reliance on scientific knowledge which, at times, advocates 'more science' as a solution to problems within the coastal environment (Billé, 2008; Nichols, 1999). In response, Bremer and Glavovic (2013, pg.44) note that certain ICM scholars do recognise the potential dangers inherent in the dominance of a single knowledge type:

> A group of ICM scholars have challenged the primacy of science as the sole legitimate provider of knowledge and advocated a more participatory science-policy interface. On one hand, the scientific community has acknowledged that a representation of the coast as a complex social–ecological system brings significant uncertainties, which science alone cannot overcome. On the other hand, since the 1980s ICM scholars have increasingly discussed knowledge as socially derived, rather than an exercise in objectivity; negotiated by social groups in political arenas, with the scientific community one social group alongside many others.

ICM's reliance on the second pillar of governance (see Olsen, 2001) has likewise attracted critique. Mazé et al. (2017) posit that ICM's 'indebtedness' to the notion of governance can mask the power of expert (i.e. scientific) knowledge by idealising co-operation among sectors, institutions and other actors. This process, while designed to build consensus and improve co-operation, does not consider the resultant hindrances due to power relationships, nor the ways that certain actors may be excluded from the process (Mazé, et al., 2017). Zinzani (2018) highlights how efforts to de-politicise ICM merely resulted in more subtle political influences, in power asymmetries and unequal stakeholder relations. Critiques of ICM in this vein are not common, however, and the volume of discourse in support of ICM often drowns out alternate views (Nichols, 1999). Yet ICM is particularly in need of epistemological reflexivity, as suggested by Billé (2008, pg. 2) who notes that:

> In a field such as ICM which is teeming with normative points of view, preconceived notions, good intentions, presupposed morals and ideological rhetoric, an understanding of the mechanisms and social processes in play … is important.

As Bremer and Glavovic (2013) argue, reflexively considering the governance and knowledge aspects of ICM has important epistemological implications for the way we conceive of the coastal environment and make decisions about it. In practice, this means the recognition of the decentralised nature of knowledge in the ICM space, and acknowledgment that the various types of knowledge are underlain by their own values and norms (Bremer & Glavovic, 2013).

Having established an understanding of the evolution, principal features and epistemological landscape of ICM, this study requires that these elements of ICM are situated and defined in a South African context.

3.4. ICM in South Africa

The history of ICM in South Africa is rich and complex. The scope of this study does not permit a detailed examination of this history in its entirety[3]. The emergence and development of ICM in South Africa during the post-apartheid period is the point of departure here. The post-apartheid period is defined as the period after South Africa's first democratic elections in April 1994, which ushered in a government founded on, *inter alia*, the principles of: i) human dignity, the achievement of equality and the advancement of human rights and freedoms; ii) racial and gender equality; ii) equality before the law and supremacy of the Constitution of the Republic of South Africa (hereafter 'the Constitution'); and iii) universal adult suffrage (the right to vote), a national common voter's roll, regular elections and a multi-party system of democratic government (Government of the Republic of South Africa, 1996).

Prior to this period, all aspects of life in South Africa — including planning, management and governance of natural resources — were played out against the backdrop of the oppressive and unjust apartheid regime. Goble et al. (2014) describe this context, and particularly the apartheid mode of spatial planning, as shaping the uneven distribution of and access to development opportunities along South Africa's coast. Sowman and Malan (2018) contend that ICM policy formulation in South Africa during the post-apartheid period has been driven by two main factors: i) the evolution of the ICM concept internationally; and ii) the aforementioned principles and imperatives of the new South African Constitution. Goble et al. (2014) note furthermore that while the Constitution does not refer explicitly to ICM or the coastal environmental *per se*, it nonetheless underpins ICM in two important ways. The first and most

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[3] See Glavovic (2006, 2014); Bremer and Glavovic (2013); Goble et al. (2014, 2017) and Sowman and Malan (2018) for further reading on the history of (integrated) coastal management in South Africa.

fundamental way in which the Constitution informs ICM in South Africa is through the Bill of Rights (Government of the Republic of South Africa, 1996), where Section 24 states that everyone has the right:

    a. to an environment that is not harmful to their health or well-being; and

    b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

        i. prevent pollution and ecological degradation;

        ii. promote conservation; and

        iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The second way in which the Constitution informs ICM is through Sections 40 and 41 which detail its emphasis on the promotion of co-operative governance (Goble, et al., 2014). In 1997, a year after the promulgation of the Constitution, the South African government embarked on an extensive participatory consultation and engagement process to develop and publish the first democratic (integrated) coastal (management) policy document, the White Paper for Sustainable Coastal Development, which was finalised in 2000 (Colenbrander, 2018; and Glavovic, 2014). Arguably one of the most significant outcomes from this process was the formulation of a set of guiding principles for coastal management, which were in turn adapted from the National Environmental Management Act (NEMA) principles (Celliers, et al., 2009). These principles include: i) [recognising a] national asset; ii) economic development; iii) social equity; iv) ecological integrity; v) holism; vi) risk aversion and precaution; vii) accountability and responsibility; viii) duty of care; ix) integration and participation; and x) co-operative governance.

Figure 3 overleaf provides more detailed descriptions of each principle as it applies to ICM in South Africa:

PRINCIPLE	DESCRIPTION
National Asset	The coast must be retained as a national asset, with public rights to access and benefit from the opportunities provided by coastal resources.
Economic Development	Coastal economic development opportunities must be optimised to meet society's needs and to promote the wellbeing of coastal communities.
Social Equity	Coastal management efforts must ensure that all people, including future generations, enjoy the rights of human dignity, equality and freedom.
Ecological Integrity	The diversity, health and productivity of coastal ecosystems must be maintained and, where appropriate, rehabilitated.
Holism	The coast must be treated as a distinctive and indivisible system, recognising the interrelationships between coastal users and ecosystems, and between the land, sea and air.
Risk Aversion & Precaution	Coastal management efforts must adopt a risk averse and precautionary approach under conditions of uncertainty.
Accountability & Responsibility	Coastal management is a shared responsibility. All people must be held responsible for the consequences of their actions, including financial responsibility for negative impacts.
Duty of Care	All people and organisations must act with due care to avoid negative impacts on the coastal environment and coastal resources.
Integration & Participation	A dedicated, co-ordinated and integrated coastal management approach must be developed and conducted in a participatory, inclusive and transparent manner.
Co-operative Governance	Partnerships between government, the private sector and civil society must be built in order to ensure co-responsibility for coastal management and to empower stakeholders to participate effectively.

Figure 3: Summary of principles for coastal management in South Africa

Source: The White Paper for Sustainable Coastal Development, adapted in Celliers et al., 2009, pg. 7

The transition from a White Paper where clear ICM principles were set down, to a legally-binding Act of Parliament, in the form of the National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008 and Amended Act No. 36 of 2014; hereafter referred to as the ICM Act) in 2008[4] took almost ten years. Glavovic (2014, p. 354) describes the period of this 'legislative hiatus' thus:

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[4] While the official year of promulgation of the ICM Act is 2008, it is noted that the Act entered into force in February of 2009.

Progress towards institutionalisation of the policy and effective implementation on the ground was, however, delayed by, among other things, the government's broader environmental law reform efforts and the struggle to deliver basic services to historically disadvantaged South Africans. Nearly 10 years later, after many iterations of draft legislation, the ICM Act came into force.

Figure 4 provides a graphical summary of the evolution of ICM in South Africa from the aforementioned post-apartheid period in the early to mid-1990s, to the promulgation of the ICM Act in 2008. It is noteworthy from this summary that the evolution of ICM did not occur in a policy or legislative vacuum but was influenced by — and influenced in turn — a suite of policy and legislation related to the management and regulation of natural resources.

1990s	**Greater recognition of the coast as a dynamic, multi-dimensional resource that was inadequately managed by existing segmented legislation**
•Constitution of the Republic ofSouth Africa, (Act No. 108 of 1995) • Marine Living Resources Act (Act No. 18 011998) •National Environmental Management Act (Act No. 107 of 1998) •National Water Act (Act No. 36 of 1998)	
2000s	**Development of a new coastal policy for South Africa**
•The Control of Vehicles in the Coastal Zone Regulations (2001) •Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) •Protected Areas Act (Act No. 57 of 2003) •The Biodiversity Act (Act no. 10 of 2004) •Integrated Coastal Management Act (Act 28 of 2008)	

Figure 4: Evolution of integrated coastal management in South Africa

Source: Adapted from Goble et al., 2014, pg. 35

Sowman and Malan (2018) add further detail to the above summary in Figure 5 by providing a timeline of significant ICM activities and outputs within South Africa in the post-apartheid period. This timeline adds resolution and granularity to the predominantly legislative summary presented in Figure 4 by highlighting a number of important institutional, research and policy developments in the field of ICM in South Africa during the same time-period, highlighting the fact that the evolution of ICM in the country extends well beyond the development of legislation.

	1991–1994	Negotiations on a process to develop a comprehensive National Coastal Policy
	1993	Establishment of a Coastal Committee to oversee the policy-formulation process
1990s	1993	South African Network for Oceanic Research (SANCOR) 'Sea and the Coast' and other research programmes established
	1994	General Policy on Control of Vehicles in the Coastal Zone (Environment Conservation Act No. 73 of 1989)
	1996	First regulations controlling activities in Sensitive Coastal Areas (SCAs) promulgated
	Late 1990s	Formation of Marine and Coastal Management (MCM) Chief Directorate within DEAT
	1998	Publication of Coastal Policy Green Paper
	2000	Publication of Coastal Policy White Paper
	2001	Sustainable Coastal Livelihoods Programme (SCLP) initiated
2000s	2002	Working for the Coast (WftC) programme initiated
	2001–2004	Control of Vehicles in the Coastal Zone Regulations
	2000–2006	CoastCare Programme of awareness, education and training developed and implemented
	2008	Promulgation of NEM: Integrated Coastal Management Act (Act No. 24 of 2008)
	2009	Appointment of first Provincial Lead Agent for ICM (Western Cape)
	2010–2016	Appointment of Provincial Coastal Committees (PCCs)
	2011	MINTECH Working Group 8 established
	2011	Establishment of a Chief Directorate: Integrated Coastal Management and Directorate: Biodiversity and Coastal Research in DEAT
	2013	Publication of a National Strategy for Coastal Awareness, Education and Training
	2013	Promulgation of Estuarine Management Protocol
2010s	2014	National Coastal Management Programme of South Africa gazetted
	2014	Development of a new national Oceans and Coastal Information Management System (OCIMS)
	2014	Publication of a Coastal Access Strategy to improve access to and along the coast
	2014	Production of a National Marine Research Plan for South Africa
	2014	Promulgation of the ICM Amendment Act
	2015	Publication of guidelines for the development and implementation of EMPs
	2016	Coastal provinces gazette their Provincial Coastal Management Programmes
	2017	Dumping-at-sea regulations gazetted

Figure 5: Timeline of key ICM milestones in South Africa between 1994 and 2017

Source: Sowman & Malan, 2018, pg. 127

While Figure 5 highlights the broad scope of policy and legislation linked to ICM, it is pertinent to this research to shift focus to the ICM Act itself. The following section describes aspects of the ICM Act germane to this research in more detail.

3.4.1. *The Integrated Coastal Management Act*

Following an extensive policy development phase, the ICM Act[5] entered into effect in February 2009 and represents the inaugural legislative mechanism devoted to the management and regulation of the coastal zone in South Africa, delegating authority for governance and care of the coastal environment to the State (Goble et al., 2017; Colenbrander, 2018). The ICM Act establishes a 'nested' system of governance, assigning specific coastal management functions to the national, provincial and local spheres of government, including the creation of dedicated government institutions to house and promote ICM (Celliers, et al., 2015). Importantly, the spirit of the ICM Act is people-centred and pro-poor, explicitly emphasising the importance of the coastal commons and the role of the State as trustee of the coastal environment for all citizens (Glavovic, 2006; Goble et al., 2014; Sowman and Malan, 2018). Against this backdrop,

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[5] Refer to Appendix 1 for a full summary of the ICM Act.

Appendix 1 provides a summarised overview of the ICM Act per chapter, in order to highlight the scope of this extensive legal framework.

While the establishment of the ICM Act was undoubtedly a watershed moment and significant milestone in South Africa's ICM journey, some authors have problematised certain provisions and aspects of the Act. Glavovic (2014) and Colenbrander (2018) note with some concern that the 'end-product' of the ICM Act was substantially different in important ways from the White Paper upon which it was based. This manifests through the domination of the state — particularly national government — in the development of the legislation, with power largely concentrated in the national minister, thus flying in the face of the principles of co-governance espoused by the White Paper (Glavovic 2006, Colenbrander, 2018). It is noteworthy for this reason that the original 'User-friendly Guide to the ICM Act' (Celliers, et al., 2009) and the 'Updated User-friendly Guide to the ICM Act' (Department of Environmental Affairs and Royal HaskoningDHV, 2017) encourage the reader to engage with the White Paper for Sustainable Coastal Development to familiarise themselves with the principles for coastal management beyond the legislative framework of the ICM Act. With this in mind, Figure 6 summarises the underlying rationale for the establishment and enactment of the ICM Act. A simple analysis of the types of language employed for the rationale reveals a notable slant towards top-down government and regulation, with terminology such as 'control', 'prohibition' and 'responsibilities' being mentioned in describing the reasons for the Act's establishment.

Figure 6: Rationale for the establishment of the ICM Act

Source: Department of Environmental Affairs and Royal HaskoningDHV, 2017, pg. 3

Colenbrander (2018, pg.8) finds this significant, particularly with regard to the sections of the ICM Act that relate to the governance of coastal risk:

> The 'language' contained in the provisions of the ICM Act, in relation to coastal risk and vulnerability, differs markedly from the vocabularies contained in the [White Paper for Sustainable Coastal Development] Policy. There is a significant shift in language that focuses on 'co-governance' and 'public–private partnerships' that underpins the [White Paper for Sustainable Coastal Development] Policy to a diametrically opposing 'regulatory,' 'top down,' and 'punitive' language, as contained in the provisions of the ICM Act in relation to coastal risk and vulnerability ... The discourse of 'participatory democracy' of the early 1990s, although replicated in the [White Paper for Sustainable Coastal Development] Policy, is non-existent in the ICM Act in terms of governing and regulating coastal risk and vulnerability.

Advantageously for the state, the ICM Act contains strategic provisions that release the state from any liability with regard to owners of private property that are at risk from coastal hazards

(Colenbrander, 2018). Zinzani (2018, pg.13) is at pains to point out that a hierarchical, state-centric situation of this nature is a far cry from the original intentions of the ICM concept, as "ICZM was globally promoted and adopted mainly as a framework aimed to decentralise state control and boost private actors' role and market opportunities."

Primary data collection for this study — focusing on the understanding and perceptions of ICM of various actors in the ICM process — was collected in the context of the Western Cape province in South Africa. The following section consequently provides an overview of the Western Cape that provides context on the provincial: i) coastal and offshore environment; ii) ICM roles and responsibilities; and iii) goals, objectives and priorities for ICM.

3.4.2. ICM in the Western Cape

The Western Cape has a coastline that stretches for more than 1000 km from the border with Namibia at Alexander Bay on the West Coast, to Nature's Valley on the East Coast of South Africa (Figure 7). The Western Cape coastline is the longest of South Africa's four provincial coastlines, and arguably the most biodiverse due to the meeting of the warm Agulhas and cold Benguela ocean currents in the region, which causes nutrient upwelling (Celliers, et al., 2010; Western Cape Department of Environmental Affairs and Development Planning, 2016). Figure 7 highlights the aspect and extent of the Western Cape coastline as well as the status of offshore and coastal benthic habitats based on the National Biodiversity Assessment (NBA) of 2011. The prevalence of vulnerable, endangered and critically endangered habitat statuses adjacent to the coastline suggests that: i) coastal and offshore benthic habitats are heavily exploited; and ii) these habitats provide important ecosystem services to human populations in the province.
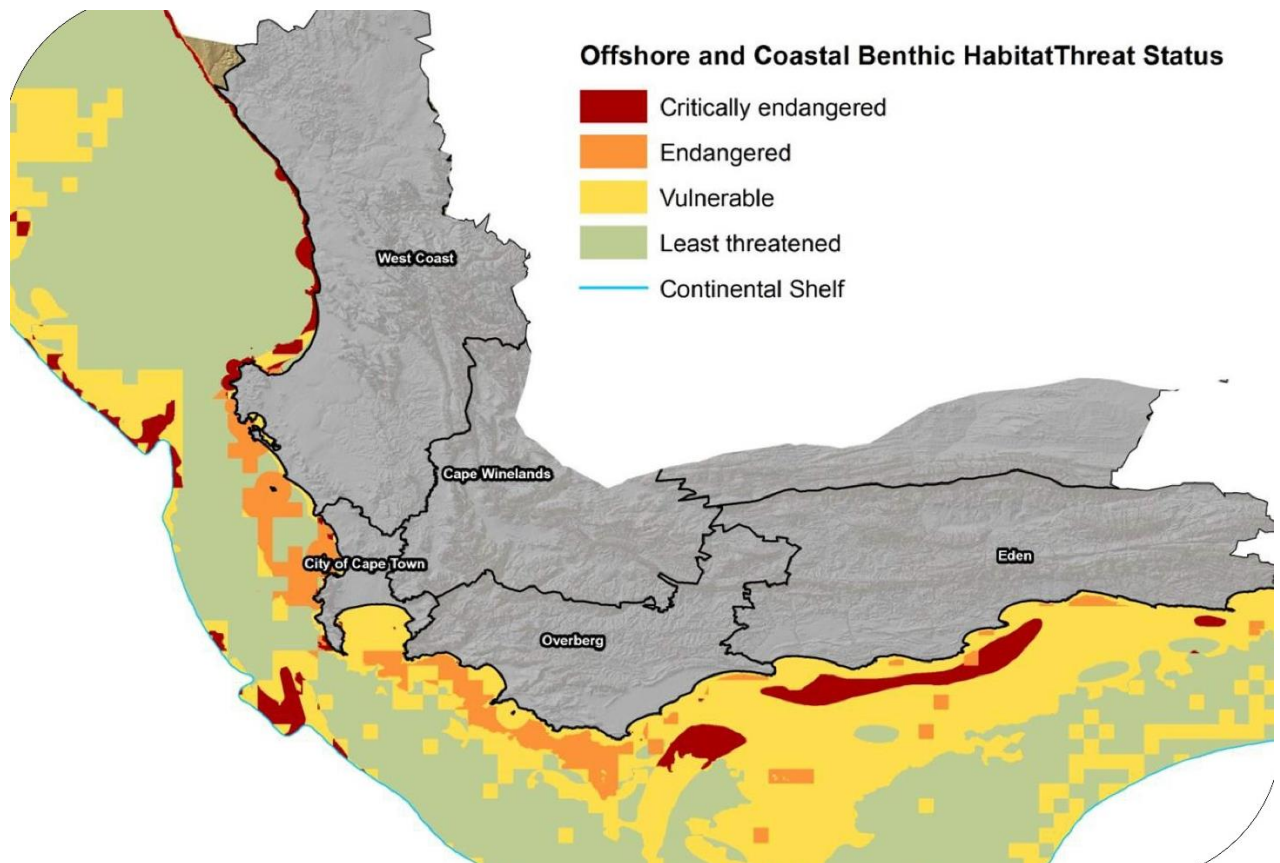
Figure 7: Overview of the Western Cape offshore and coastal benthic habitat threat status
Source data: National Biodiversity Assessment 2011 (Sink, et al., 2012)

The coastal and marine environments of the Western Cape are furthermore highly productive ecosystems, home to extensive fisheries resources; kelp, penguin and seal colonies; fynbos; and indigenous coastal forests interspersed along the coastline. (Jones, 2018; Western Cape Department of Environmental Affairs and Development Planning, 2016).

Along with national and local spheres of government, provincial government is a key roleplayer in the implementation and enforcement of the ICM Act. As one of four coastal provinces in South Africa, the Western Cape government is responsbile for, among others, the following aspects of the ICM Act within its provincial jurisdiction: i) management of the coastal protection zone; ii) establishment and functioning of Provincial Coastal Committees (PCCs); iii) development and implementation of Provincial CMPs; and iv) coordination of actions between provinces and municipalities. Appendix 2 provides a detailed overview of the responsibilities of provincial government in terms of the ICM Act.

In addition to the above-mentioned legislative responsibilities, the Western Cape government has defined goals and objectives to achieve its ICM mandate through its Provincial CMPG.

These goals and objectives are thematically grouped according to nine Priority Areas, namely: i) social and economic development and planning; ii) cooperative governance and local government support; iii) facilitation of coastal access; iv) climate change, dynamic coastal processes and building resilient communities; v) land- and marine-based sources of pollution and waste; vi) natural and cultural resource management; vii) estuarine management; viii) capacity building, advocacy and education; and ix) monitoring, compliance, and enforcement.

Table 2 below provides further context on the goals and objectives associated with the above-mentioned ICM Priority Areas for the Western Cape.

Table 2: Summary of Priority Areas and ICM Goals and Objectives for the Western Cape

Priority Area	Goals and Objectives
Social and economic development and planning	Economic development, work creation and the sustainable planning and development of coastal settlements is promoted
Cooperative governance and local government support	Promote institutional innovation for cooperative governance in integrated coastal management
Facilitation of coastal access	Promote coastal access and accessibility that is both equitable and sustainable
Climate change, dynamic coastal processes and building resilient communities	Promote resilience to the effects of dynamic coastal processes, environmental hazards and natural disasters
Land- and marine-based sources of pollution and waste	Minimise the impacts of pollution on the coastal environment
Natural and cultural resource management	Ecosystem goods and services and cultural assets are sustained as the basis for coastal economic development and livelihoods
Estuarine management	Coordinated and integrated estuarine management optimises the ecological-, social- and economic value of these systems on an equitable and sustainable basis
Capacity building, advocacy and education	Develop capacity and promote public awareness and education for integrated coastal management
Monitoring, compliance, and enforcement	Monitor the State of the Coast (SoC) and promote compliance with coastal- and other regulations

Source: adapted from Western Cape Department of Environmental Affairs and Development Planning, 2016, pg. 15

The biophysical, legislative and policy context of the Western Cape described in the section above provide insight into the legal and policy landscape within which this study was undertaken.

3.5. Conclusion

This chapter provides an overview of the development of the inter-disciplinary ICM concept in the 1970s, through to its widespread international adoption in the 1990s. The underlying theory of knowledge — the epistemology — of ICM has been shown to be grounded largely in formal, scientific traditions, despite recent calls for reflexivity with regard to the power dynamic created by reliance on purely empirical knowledge systems. Similarly, critics point out that ICM's dependence on governance and decentralised approaches to resource management can in fact entrench unequal power dynamics and promote exclusion of certain stakeholders.

Given that this study is contextually grounded in a local setting, the development of ICM in post-apartheid South Africa has been summarised, with a specific focus on key policy (the White Paper for Sustainable Coastal Development) and legislation (the ICM Act). The common ground and disconnects between the policy and legislative ICM landscapes are highlighted in the discussion. In so doing, this chapter raises important questions with regard to how the epistemology of ICM, particularly its reliance on formal, scientific knowledge, plays out in ways that are both highly political and inherently at odds with the ICM principles of co-operative governance and integration and participation. The chapter concludes with an overview of ICM in the Western Cape to provide further local context for the sections which follow. The next chapter describes the research methodology adopted for the study.

Chapter 4: Research Methods

> *"He always speaks thus," Otheym apologised. "I don't speak," Bijaz said, "I operate a machine called language. It creaks and groans but is mine own."*
>
> **— Frank Herbert, Dune Messiah**

4.1. Introduction

This chapter lays out the methodology used to undertake the research. The inherent complexity of social and human phenomena has prompted calls for evidence-based research to respond to questions which are difficult to answer, and are most fittingly answered using qualitative methods of analysis (Fingfeld-Connet, 2014). The current study has its roots in such a difficult-to-answer question, as it is fundamentally concerned with the interplay between knowledge and power in the natural resource governance arena of integrated coastal management. The research approach thus draws on qualitative methodologies for data collection and analysis, using a post-structural, hermeneutic approach. This chapter explains the choice of such a methodological approach, before briefly describing the notion of the social construction of knowledge which underlies discourse analysis and the qualitative analysis framework. The methodology chapter concludes by considering the author's positionality and the limitations of the research.

4.2. Qualitative analysis

Qualitative or interpretive methods usually function on the basis that the natural order of reality is conceived of and understood by different people in different ways (Robinson, 1998). Due to the variety of 'realities' that people experience, interpretive methods which are able to give special consideration to the knowledge and understanding of individuals and groups are required. Evaluators using qualitative or interpretive methods strive to understand any particular phenomenon as a whole, searching for the totality or unifying nature of particular things (Patton, 1990). The advantages of adopting a qualitative approach to research include the fact that it allows for the study of selected issues in an in-depth, rigorous manner without the constraint of "predetermined categories of analysis" (Patton, 1990, pg.11). Such an approach has the potential to contribute to depth, openness and detail of qualitative enquiry. According to Patton (1990), at least three kinds of data collection are common in qualitative

research: in-depth, open-ended interviews; direct and/or participant observation; and the collection and analysis of written documents.

With its location in critical environmental studies firmly established, the proposed research lends itself to a qualitative mode of enquiry, using interpretive methods to achieve the research aim and objectives. Qualitative research methods in the field of environmental management are not widely explored, but the use of post-structuralist political ecology as a framework to explore power relations in environmental issues, indicates their appropriateness in the context of this study. Scholars have argued that a qualitative research methodology can add important perspectives to critical studies of environmental management processes and their reception by society (Brooks et al, 2010).

For this research, semi-structured, open-ended interviews form the basis of primary data collection. The following section describes the process employed to collect primary and secondary data for the research.

4.3. Data collection

Semi-structured, open-ended interview questions were chosen for this research as the mode of primary data collection. Such an approach allows researchers to elicit responses from interviewees that highlight thought processes, beliefs and perception in a neutral way, i.e. with as little guidance and influence from the researcher as possible (Barriball & While, 1994).

A set of ten open-ended questions was developed based on the research aims and objectives, as well as the experience of the researcher in undertaking ICM projects (see Table 3 below). Question 1 is an introductory question, aimed at initiating the dialogue with respondents, as well as gaining a sense of the respondent's personal understanding of ICM. Questions 2 to 4 use the concept of ICM role-players and are designed to explore the respondent's own understanding and whether he/she sees the ICM space as one consisting of a diversified or narrow range of actors and role-players. Questions 5 and 6 are a variation on the theme of role-players, looking at ICM from the perspective of specific disciplines such as natural science, economics, and planning; with the aim of finding out whether any specific discipline is perceived to be dominant or more influential in the ICM space than others. Questions 7 to 9 are related to the centrality of knowledge in the ICM process. They probe whether ICM knowledge is homogenous or heterogenous, and who the producers of ICM knowledge are in South Africa. The interview questions conclude with Question 10, which asks respondents to

list five phrases or statements that they feel represent the state of ICM in South Africa. Table 3 below lists the aforementioned interview questions.

Table 3: List of semi-structured interviews used to obtain primary data for the research

Interview questions
1. Can you describe your personal understanding of the term 'integrated coastal management'?
2. Do you agree with the statement that coastal management in South Africa has a number of different role-players that drive policy and practice? Why or why not?
3. In your experience, who are the main role-players in South African coastal management?
4. Can you describe the role that you and/or your organisation plays, in your own words?
5. Do you agree with the statement that coastal management is an interdisciplinary field? Why or why not?
6. Would you say that any particular discipline/sector is dominant? Why or why not?
7. In your experience, what role, if any, does knowledge play in the coastal management space?
8. In your experience, is knowledge that informs coastal and estuarine management homogenous, or do different kinds of knowledge play a part?
9. In your experience, who produces knowledge for coastal & estuarine management in South Africa, and how is it produced?
10. What five phrases or statements would you use to describe the current state of coastal management in South Africa, in its broadest sense?

Interview respondents were identified first at the sectoral level, and then individually. Four main societal sectors involved in the ICM process in South Africa were identified using a combination of peer-reviewed literature, ICM policy and the researcher's prior experience in designing and implementing ICM projects[6]. These sectors are: i) government; ii) research/academia; iii) the private sector; and iv) civil society (Table 4). In the interests of representivity of these sectors, three participants were drawn from each.

Table 4: Overview of ICM sectors and number of respondents interviewed

#	Sector	Respondents
1	Local and provincial government	3
2	Research/academia	3
3	Private sector companies	3
4	Civil society representatives	3

---

[6] At the time of writing, I had been working in the field of ICM in South Africa for ten years, designing and implementing projects across all three spheres of government.

In order to identify individual respondents, the researcher employed a combination of 'purposive' and 'snowball' sampling methods. Purposive sampling refers to the selection of a sample on the basis of prior knowledge of the population in question, or the purpose of the research (Babbie, 2004). When the members of a target group or population may be difficult to locate — particularly in relatively small or difficult to define populations — snowball or referral sampling is appropriate, according to Babbie (2004). A process of 'accumulation' is employed here, whereby additional potential respondents are identified by requesting that initial respondents suggest other people who might be interested in participating in the study or who exhibit the key characteristics that may meet the study aim (Forman & Damschroder, 2015; Babbie, 2004).

In this instance, where the researcher was unable to identify potential respondents based on existing relationships or networks in a particular sector, certain respondents were asked if they could suggest appropriate respondents for the research. This was especially the case for the civil society sector, where I as the researcher had few pre-existing relationships. In such cases, respondents from the government and private sector were helpful in providing me with the names and contact details of potential respondents in the civil society sector. Table 5 provides an overview of the 12 interviews conducted for the purposes of primary data collection for this research. Interviews are numbered, followed by the relevant ICM sector and an organisational or individual category to provide further context.

Table 5: Summary of interviews by sector and organisational/individual category

#	Sector	Affiliation/organisation	Date and place
1	Civil society	Ratepayers association	25 September 2019, Milnerton
2	Civil society	Ratepayers association	25 September 2019, Milnerton
3	Civil society	Hospitality business	02 November 2019, Milnerton
4	Government	Local government	06 August 2019, Cape Town
5	Government	Provincial government	05 September 2019, Cape Town
6	Government	Local government	31 August 2019, Plumstead
7	Private sector	International consulting firm	03 September 2019, Rondebosch
8	Private sector	Local consulting firm	22 August 2019, Plumstead
9	Private sector	Local consulting firm	20 August 2019, Plumstead
10	Research	Research organisation/think-tank	22 August 2019, Claremont

#	Sector	Affiliation/organisation	Date and place
11	Research	Higher education institution	02 August 2019, Bellville
12	Research	Higher education institution	28 August 2019, Bellville

The 12 interviews described in Table 4 and Table 5 were conducted between August and November 2018, at times and locations convenient to the interview respondent. The duration of the interview was between 60 and 90 minutes, and respondents were given various options from a disclosure of information perspective. Two respondents — both from the civil society sector — chose to remain completely anonymous and declined to have the interview digitally recorded. The remaining ten respondents were comfortable for their names and professional affiliations to be disclosed by the researcher if required, and for the interview to be recorded. Respondents were also asked if their answers were to be considered as their personal opinion or the viewpoint of their organisation, to which all respondents elected to have their responses recorded as their personal opinions.

Following the interview, the researcher transcribed responses to the questions verbatim, along with ancillary dialogue not directly related to the ten questions described above. Where no recordings were permitted, the researcher transcribed handwritten notes taken during the interview. The interview transcripts formed the core corpus of data on which this study draws.

4.4. Data analysis

Data analysis is at the core of the qualitative analysis process, and entails the classification and interpretation of linguistic material in order to draw conclusions about the meaning of the material and what it represents (Flick, et al., 2014). Discourse analysis was used as the primary data analysis method to analyse and interpret the primary data collected for this research. Hajer (2002) pioneered discourse analysis in the field of critical environmental management studies and his insights have been taken further by scholars in this field. Hajer pointed out the environmental policy-making is a field ripe for discourse analysis, as policy-makers both draw on and create 'stories' about relationship between society and environment. Discourse analysis consists, broadly, of classification according to the type of language employed, with the main categories consisting of: i) epistemic notions; ii) storylines; iii) myths and metaphors; and iv) policy vocabularies (Hajer & Versteeg, 2005). Table 6 provides further detail of some of these language categories.

Table 6: Summary of discourse analysis language categories

Discourse: markers, structures and patterns in a discussion	
Discourse	An ensemble of ideas, concepts and categorizations through which meaning is allocated to social and physical phenomena, and which is produced and reproduces in an identifiable set of practices
Metaphor	Understanding and experiencing a particular thing/event in terms of another
Storyline	A condensed narrative that links an event to one or more discourses and thus provides the basis of 'discourse coalitions'

Source: adapted from Hajer & Uitermark, 2008, pg. 59

The use of discourse analysis for this research is particularly appropriate given that concepts such as 'nature' and 'the environment'— although social constructs — anchor very real and powerful discourses and practices (Escobar, 1999). Similarly, Jones (2009, p. 5) views the framework of discourse analysis as "seeing knowledge and power as intertwined, with considerable power held in concepts and ideas seen as relevant for policy". This approach enables dominant storylines to be identified and explored, in this case leading to the identification of the various types of knowledge embedded in the ICM process. With regard to the epistemology of ICM, an analysis of ICM discourses will also add to our understanding of its episteme, as knowing the underlying epistemological and cultural practices of a concept can provide important historical context (Escobar, 1999).

Discourse analysis also allows for dominant actors in the process of knowledge construction to be identified, together with any 'discourse coalitions', in which actors strategically agree on key storylines (Hajer & Uitermark, 2008). The discourse analysis language category (Table 6) deemed most appropriate for this research was 'storylines', due to its ability to illustrate how role-players construct and coalesce around a specific interpretation or point of view related to ICM.

With respect to governance and its role in the ICM process, Desportes and Colenbrander (2016) point to the importance of environmental discourses, and the knowledge-building processes which they rely on, in tracking ICM governance outcomes. Lawhon et al. (2016) note that imaginaries — stories — of the environment are experiential, and as such, are revealed by examining discourses about them. Concepts such as ICM and sustainable development are negotiated between role-players or actors embedded in the process, in struggles over their meaning (Desportes & Colenbrander, 2016). Finally, Wesselink et al. (2013) and Plaan (2018)

highlight that discourse analysis enables researchers to unravel the elements of knowledge and power embedded within stories about, and actions upon, the environment in order to reveal their roots and their politics.

In order to avoid predetermined notions (i.e. confirmation bias) and any 'epistemological contamination', an inductive reasoning approach was employed. Inductive or '*in vivo*' reasoning is defined as developing ideas, theories or codes from the analysis of primary data itself, as opposed to beginning with predefined concepts or hypotheses, i.e. an '*a priori*' approach (Forman & Damschroder, 2015). Intensive work on the interview transcripts enabled common themes within and between responses to the questions asked to emerge. In line with the discourse analysis approach, these themes were identified according to various 'storylines' that began to emerge as the responses were analysed. Storylines were then colour-coded by the researcher and cross-referenced against the sector of the respondent in order to assess whether any significant commonalities or juxtapositions occurred within or between sectors.

At times the interviews became wide-ranging discussions. This was possible due to the open-ended nature of the interview. Dialogue that resulted from questions on respondent's personal understandings of ICM, as well as their opinions on the current state of ICM in South Africa, proved to be particularly fruitful for this type of analysis, highlighting the notion of contestation between role-players and sectors. These findings are presented in the first of two results chapter for this research. More nuanced findings emerged by analysing the five main storylines from the 12 interviews and cross-referencing them by sector. This was done by categorising relevant excerpts from interviews according to common elements or epistemologies in order to define specific storylines.

Theory was also important in analysing the findings, which reflect back on the ideas discussed in Chapter Two of this thesis. A secondary analysis was undertaken by reviewing and summarising findings from relevant literature which conformed to or opposed the findings of this research in meaningful ways. Each storyline is discussed in detail in Chapter Six that lays out the discursive findings of the research. The limitations of the research are described in the following section.

4.5. Limitations

Babbie (2004, p. 151) reminds us that broad coverage of the various dimensions of a concept requires multiple observations pertaining to that concept. In this regard, it could be argued that this research is limited by employing a data collection approach that represents a 'snapshot in

time' of the ICM concept in South Africa, rather than multiple observations of the ICM concept. Similarly, the relatively small sample size of 12 interviews could also be viewed as a research limitation. The approach of conducting single interviews with 12 participants was chosen to: i) allow for in-depth and open-ended dialogue; and ii) to contain the scope of the research which was temporally constrained. Babbie (2004, pg. 372) notes that such an approach is not unusual for a qualitative study, the strength of which lies in "revealing insights, rather than arriving at conclusions based on statistical analyses of large populations". Marshall (1996, p. 524) too notes with respect to qualitative studies that "improved understanding of complex human issues is more important than generalisability of results". In addition, responses from a limited number of ICM role-players are an incomplete proxy for an extensive understanding of individual understandings of ICM and the state of ICM in South Africa. Nevertheless, there are few studies of this nature and it is believed that this underutilised approach provides a rare window of insight into ICM role-players' experiences and opinions.

My positionality as an ICM practitioner may also be considered a limitation, in the sense that analysis and insight may be skewed and coloured by previous experiences. While this may be true, it is my location within the field that also allowed me unique insight into the more nuanced aspects of ICM in South Africa, as well as access to interview respondents who may otherwise not have been reachable. In the qualitative approach, information is understood not as pre-existing somewhere 'out there', but as being 'co-constructed' through the interaction of the researcher with the informant. In this regard, the shared background and in-depth understanding of the field was an advantage in terms of the conversations generated during the research process.

Lastly, a considerable limitation to this research was that no role-players from national government were interviewed as part of this research. This was due predominantly to the majority of pre-existing networks and contacts of the researcher being in local and provincial government, as well as the time-sensitive nature of the research.

4.6. Conclusion

This chapter presents the methodology used to undertake the research, which is situated under the umbrella of qualitative modes of inquiry. The suitability of a qualitative approach to this research was explained, with particular reference to the ability of qualitative approaches to render depth, openness and detail of analysis. The details of primary data collection, including the sampling strategy and interview process, was discussed thereafter. Discourse analysis was

described as the primary means of data analysis, in combination with findings from similar research. The limitations to the research were discussed by way of conclusion. The next chapter is the first of two results chapters. It highlights contestation with respect to role-players' personal definitions of ICM, as well as providing insights into the state of ICM in South Africa.

Chapter 5: Contested terrain? ICM definitions and opinions

> *"I know nothing in the world that has as much power as a word. Sometimes I write one, and I look at it, until it begins to shine."*
>
> ― *Emily Dickinson*
>
> *"Mark Twain once opined in his homey way: "The difference between the right word and the almost right word is the difference between lightning and the lightning bug."*
>
> ― *Dan Simmons, Hyperion*

5.1. Introduction

This chapter considers the degree of homogeneity or heterogeneity in personal definitions and opinions of ICM between the four kinds of ICM role-players interviewed, in order to establish whether there was a common understanding of the concept between local ICM role-players and recipients. In addition, it explores the extent to which perceptions on the state of ICM in South Africa were contested or aligned. As the first of two results chapters, this chapter employs the notion of contestation to interpret role-players' personal understandings of ICM, as well as their opinions on the state of ICM in the Western Cape. Parallels can be drawn with recent work by Cousins (2017) that examines the structure of discourses among and between individual actors involved in shaping urban stormwater governance. In that case, the focus was on how integrated water resource management (IWMRM) is construed differently and is perceived unevenly among role-players in the IWRM space. As a point of departure, this chapter contextualises the definitions and opinions of ICM role-players that follow by describing some of the interactions between the researcher and prospective respondents both prior to and during the interview process. These interactions serve to highlight some of the aspects that point to ICM being a loaded or power-laden term. Conceiving of ICM in this fashion is largely at odds with official definitions of the term, which tend towards universality, social neutrality and altruism (see Section 3.2). The chapter begins by presenting the range of definitions and personal understanding of ICM expressed by the role-players interviewed for this research. Thereafter, their opinions on the state of ICM are examined in a similar fashion,

before concluding with a brief discussion of the possible implications of a contested or heterogenous understanding of ICM.

5.2. ICM definitions — between the wet and the dry

Invitations to participate in this research for the most part were received positively by respondents. However, a few individuals were hesitant to participate, and reacted somewhat emotively, particularly to the term 'coastal management' which suggests that ICM brings with it a degree of discursive and etymological baggage. Four interviewees expressed reservation at the prospect of being interviewed for the study, with phrases such as "other people know so much more"; "I'm not a coastal specialist"; and "are you sure I can add value?" common to pre-interview interactions with these respondents. Post-interview, these respondents largely did an about-turn, with a private sector respondent going so far as to request a copy of the interview transcript, as the interview helped them to realise how much they actually knew about the topic of ICM.

The exception was a prospective fisheries research respondent who, when the topic of coastal management as the central tenet of this research was broached, declined to be interviewed on the back of their view that fisheries was an altogether separate discipline and not to be mixed in or lumped together with a study on ICM. In addition to the common unease between the researcher and the researched, this suggests that this particular individual subscribed to a rigid interpretation of ICM role-players.

Ironically, this siloed or sectoral view of ICM is at odds with nearly every accepted definition of the concept, which promotes inter-sectoral integration and collaboration as a foundational feature of ICM. Albeit with regard to the management of natural hazards in coastal zones and not fisheries as such, Warnken and Mosadeghi (2018) warn that a prescriptive implementation or application of any one aspect of coastal management (such as fisheries) can oversimplify and relegate coastal management to a single component where many are called for. The 'hardened categories' referred to above may also be linked to poorly defined coastal boundaries and imprecise management concepts, which Kay and Alder (2005, cited in Goble et al., 2014) attribute to the fact that conceptualising coastal management is often challenging on the basis of its dynamic nature and the competing demand for coastal resources. Adding to this, while recalling their interaction with local government officials, a private sector respondent reflected thus on the challenges of ICM implementation:

*Some of the local officials don't actually understand where the space [the coastal zone] is. So I think it's a lack of understanding more than anything. (**Interview 8: Private Sector — 22 August 2019, Plumstead**)*

While accepting the invitation to participate in this research, two respondents from the civil society sector also exhibited a comparatively narrow interpretation of ICM. One respondent went so far as to say that coastal management does not exist in South Africa, due to a perceived lack of focus on beach and dune management in favour of regulation:

*I understand coastal management from Australia and America and Britain, not from South Africa. Coastal management doesn't exist in South Africa. (**Interview 2: Civil Society — 25 September 2019, Milnerton**)*

Terminology can also be problematic in defining the geographical extent of where ICM applies and is implemented. Drawing attention to ICM nomenclature, a government respondent highlighted that some ICM terms might in fact be too broad for practical use:

*I think there's also a problem with the phrases that we use – especially the term 'coastal management'. In some ways anyone and everyone does coastal management – especially the term coastal zone management. The coast in my mind is an indivisible system in terms of the influences on that system, whether you're looking 60 km inland to a dam or a catchment, or to what happens offshore. (**Interview 4: Government Sector — 06 August 2019, Cape Town**)*

It is against the backdrop described above — of ICM being a potentially uneasy and controversial topic — that the discussion now shifts to an analysis of the responses received to the introductory question on the personal ICM definitions and understandings.

While the concept of ICM is defined at length in scholarship, policy and legislation with some convergence concerning key principles (Shipman & Stojanovic, 2007), it is unsurprising given the diversity of stakeholders and role-players affiliated to the ICM process that the concept would have distinct meanings to various stakeholders (Christie, 2005). There are variations in the nomenclature and terminology used by the different entities and organisations to define the concept of ICM (refer to Section 3.2), despite the fact that the various definitions are underpinned by common or similar aspects and components. In view of the legislative and policy entrenchment of ICM in South Africa (Colenbrander, 2018; Sowman & Malan, 2018; Goble et al., 2014; Celliers et al., 2009), a degree of uniformity or common understanding of

the central tenets of the framework was to be expected — particularly among and between government officials with ICM mandates, and private sector ICM practitioners. However, any idea that the understanding of ICM role-players would be homogenous were gradually dispelled as the interviews proceeded, with the particular sector emerging as the primary distinguishing variable.

For example, private sector respondents focused on the aspects of ICM that relate to management, and the distinctiveness of coastal management compared to terrestrial management — 'between the wet and the dry':

It's mostly related to the decisions and the actions taken in the coastal sphere, and coastal sphere then means physical space as well as the institutional, government interaction/relationships. And coastal, that obviously means that fuzzy bit between the wet stuff and the dry stuff. **(Interview 7: Private Sector — 03 September 2019, Rondebosch)**

It is integrated environmental management but in a spatial area specifically. So it's related to the coast as such, the coast being that intersection between the wet and the dry, the terrestrial and marine environment. Integrated relates to all these different sectors/issues working together in a way to try and resolve things together. The management is an obvious one in terms of managing the systems/people/processes in this spatial environment which is the coast. **(Interview 8: Private Sector — 22 August 2019, Plumstead)**

By contrast, personal definitions and understandings of ICM gleaned from civil society were significantly narrower and focused primarily on beach management and pollution:

[ICM is] the maintenance and safeguarding of the whole coastline with respect to beaches, pollution, erosion, anything else that may impact on it. **(Interview 1: Civil Society — 25 September 2019, Milnerton)**

Another civil society respondent lamented what they perceived as the lack of information and guidance on beach and dune management in ICM policy and legislation:

On coastal management websites from Australia, there is page after page about how to look after the dunes and the beach, in South Africa there's nothing. **(Interview 2: Civil Society — 25 September 2019, Milnerton)**

Responses to the question about personal ICM definitions and understandings from government sector respondents were largely characterised — perhaps understandably so given government's ICM mandate — by references to the multi-sectoral, governance and collaboration aspects of the ICM framework:

ICM is the degree to which you can collaborate both laterally and vertically across jurisdictional domains in the coastal space, not defined by boundaries, absolute or physical... There are various scales to that – local, provincial, national and the ability to get all different spheres of government on the same page as well as with different actor groups – academic, civil society and so on. (***Interview 4: Government Sector — 06 August 2019, Cape Town***)

So what we try to do and from what I would like to see, is being able to have all persons or institutions who have a space within the coastal zone to be able to collaboratively work without stepping over each other. Basically achieving the good management of that space in terms of ensuring that things are fairly done, that development is done in a proper manner — a sustainable manner— that takes into account good planning and scientific knowledge in order to make decisions. (***Interview 5: Government Sector — 05 September 2019, Cape Town***)

Of the four sectors of role-players interviewed, research sector respondents had the broadest and most eclectic personal understandings of ICM, even when describing their definition of a subset of ICM, estuary management:

Estuarine management, as a subsection of coastal management, for me is looking at a particular estuary and understanding the context of that estuary from a catchment to coast approach. Understanding that the estuary cannot exist without the river coming into it and the ocean being a part of it. So for me estuarine management is about managing the pressures on a particular estuary, understanding what the drivers are for those pressures, and using a DPSIR approach – drivers, pressures, impacts, state, and responses. (***Interview 11: Research Sector — 02 August 2019, Bellville***)

By way of summary, Table 7 presents 11 key aspects of role-players' personal understandings of ICM and compares these against the respective sectors. To this inter-sectoral comparison is added an intra-sectoral dimension, where a black dot represents one respondent including a particular ICM aspect in their personal understanding of the term. Two black dots represent

two respondents' inclusion of that particular ICM aspect in their personal understanding; and so forth.

Table 7: Summary of responses received of personal ICM definitions between and within role-player sectors

ICM Aspect	Government	Private	Research	Civil Society
Holistic & integrated management framework	●●●	●●	●●	●
Collaboration & coordination of role-players & objectives	●●●			
Conflict reduction/harmony/unity	●●			
Informed & fair decision-making	●	●	●	
Social, biological & institutional diversity/complexity	●	●●●	●	●
Spatially explicit	●	●●●	●	
Norms & standards			●	
Conservation		●	●	
Beach & pollution management				●●●
Regulation				●●
Sustainability	●	●	●	

Table 7 shows that according to the 12 respondents interviewed, the most widely recognised and accepted aspect of ICM is that it is a holistic and integrated management framework. This aspect was included in the personal definition of all three government sector respondents; two private sector and two research sector respondents; and one respondent from the civil society sector. A similarly widespread aspect of ICM is related to the social, biological and institutional diversity/complexity of the concept, drawn from personal definitions across all four sectors sampled, with all three private sector role-players mentioning this aspect.

Table 7 indicates furthermore that ICM aspects which are directly or indirectly related to cooperative governance — such as collaboration between role-players, coordination of ICM objectives, and conflict resolution — were well recognised by government sector role-players but were absent from the personal definitions of role-players in the other three sectors. Similarly, respondents from the civil society sector emphasised the local scale aspects of beach and pollution management in their personal definitions of ICM, but did not mention more

strategic, macro-level aspects such as coordination of role-players and objectives. Perhaps illustrative of limited familiarity with ICM policy discourses which promote governance over government, it is noteworthy that only respondents from civil society included 'regulation' as an aspect of their personal understanding of ICM.

Figure 8 compares the aspects of ICM definitions by sector to graphically illustrate which aspects of respondents' personal definitions were emphasised or understated, and to what extent this emphasis or understatement is aligned with other ICM role-players in different sectors. This Figure shows that government, civil society and the private sector emphasise a different basket or grouping of ICM aspects, illustrated by the divergent radar lines. The research sector demonstrated the greatest alignment with other sectors, notably with government and the private sector in relation to the aspects of sustainability, complexity and spatial explicitness.
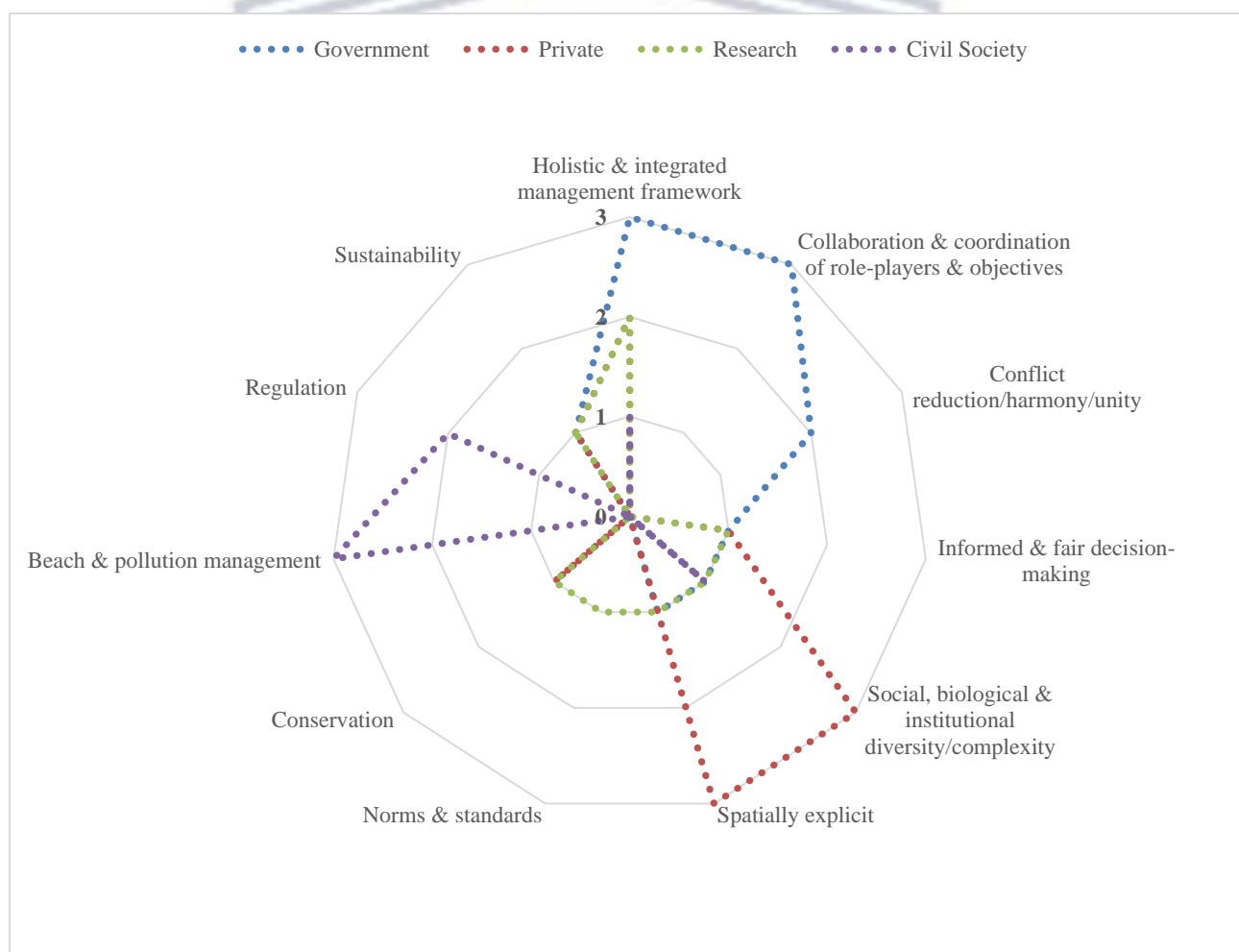

Figure 8: Radar diagram depicting areas of convergence and divergence between role-players' personal definitions of ICM

It must be noted that this research points to these examples not to criticise 'incorrect' definitions and understandings of ICM, but rather to highlight the relatively low degree of convergence (seen in Figure 8). The findings suggest that ICM as a concept is generally contested among the role-players that were interviewed, notwithstanding the broader perception of ICM exhibited by the respondents from the research sector.

5.3. ICM opinions

The role-players interviewed for this research were chosen on the basis of their direct or indirect involvement in the ICM process. Their opinions on the state of ICM in South Africa are therefore of interest to the research insofar as they have potential to offer primary insight into some of the successes, failures and lessons learnt from designing, implementing, or receiving ICM initiatives and projects.

The findings of this study can be compared with those of Sowman and Malan (2018), presented below. In their strategic review of progress in the ICM policy and legal landscape in South Africa, Sowman and Malan (2018) point to significant progress and a number of milestones achieved since 1994. This review encompasses *inter alia* an assessment of the policy mechanisms and institutional arrangements in place to support implementation of the ICM Act at local, provincial and national level over the short, medium and long-term. Of the eight policy and institutional actions/measures identified as indicators of ICM progress, five are categorised as 'partially achieved', while the remaining three are designated as 'not yet achieved' by Sowman and Malan (2018, refer to

Figure 9).

	Short-term (2000–2001)	Medium-term (2002–2005)	Long-term (2006–2020)	Progress to date
	Setup phase	Consolidation phase	Self-sustaining phase	
Local	Clarify responsibilities of local authorities with respect to ICM	Establish local coastal forums ('municipal coastal committees' in the ICM Act) in as many areas as possible	LCCs established in all areas and fully functional	Partially achieved
	Local management structures to manage demonstration projects	Co-management initiatives set up, including PPPs	Co-management initiatives and PPPs in place and financially self-sustaining	Partially achieved
Provincial	Designate lead department for ICM in the four coastal provinces	Coastal units established in each lead provincial department	Fully capacitated and funded coastal units in each lead department	Partially achieved
	Establish coastal working groups (i.e. PCCs) in each coastal province	Functional PCCs	Fully functional and funded PCCs	Partially achieved
		Establish a system of voluntary coastal officers	Effective operation of voluntary coastal officers	Not yet achieved
National	Restructure and build capacity of the Marine and Coastal Management (MCM) Branch (now Oceans and Coasts Branch) in the DEA as the lead ICM authority	Restructured and fully functional ICM national lead agency	Fully functional ICM national lead agency, with strong links to provincial lead agencies, business and civil-society partners	Partially achieved
		Established NCC to promote ICM and facilitate cooperative governance	Fully functional and effective NCC	Not yet achieved
			Mechanisms to generate funds for self-sustaining coastal management work	Not yet achieved

Figure 9: Progress in implementing planned institutional arrangements for furthering integrated coastal management in South Africa at local, provincial and national levels

Source: Sowman & Malan, 2018, page

Whereas the aforementioned authors derive their findings on the progress of ICM implementation in South Africa largely from desktop sources, this research relied on in-depth exploration of the views of role-players on this issue. A more neutral terminology was chosen deliberately in framing the discussion, as reference to ICM 'progress' was considered to be biasing the views of respondents.

Opinions on the state of ICM were derived from asking the 12 respondents to list five phrases or words that came to mind when describing the current state of ICM in South Africa. Their responses were categorised according to a colour-coded spectrum as positive, neutral or negative — with a primary category and secondary category to account for some of the nuances of the responses received (Table 8).

Positive sentiments were identified by words or phrases such as 'aspiring'; 'improving'; or 'enthusiastic'. Neutral sentiments were assigned based on indeterminate words or phrases and/or balanced viewpoints like 'diverse'; 'champion-driven'; and 'good intentions but poor implementation'. Likewise, negative sentiments on the current state of ICM were recognised by the use of words such as 'fragmented'; 'lack of implementation'; and 'institutional disarray'. Where responses were overwhelmingly positive or overwhelmingly negative — i.e. where little

or no distinction between primary and secondary categories was discernible — a single category was assigned. (Refer to the far right, centre and far left of Table 8)

Table 8: Overview of the spectrum of categories assigned to role-players' opinions on the state of ICM in South Africa

Positive	Positive-neutral	Neutral-positive	Neutral	Neutral-negative	Negative-neutral	Negative

An approach of this nature mirrors recent research into the discursive landscape of IWRM, where role-player's perspectives and opinions "exist along a spectrum in their commitment towards certain discursive claims regarding the management of stormwater" (Cousins, 2017, p. 39). The detail of the responses regarding ICM is explored in my detail in Table 8 which summarises the responses received from asking the 12 role-players to articulate their opinion on the state of ICM in South Africa. Overall, Table 8 indicates that the prevailing or most common opinion on the state of ICM was characterised by unequivocally negative sentiments, particularly from research and civil society role-players who omitted positive or neutral keywords or phrases from their responses altogether.

Table 9 also indicates that government and private sector role-players were more nuanced in their opinions of the state of ICM, with all six respondents from these sectors returning responses that include both a primary and secondary category and emphasising more neutral terminology. It is noteworthy that only one respondent's opinion on the state of ICM was characterised primarily by positive sentiments.

Table 9: Summary description of respondents by sector and opinion on the state of ICM

Interview #	Sector	Opinion of state of ICM	Keywords/phrases
1	Civil Society	Negative	▪ Disjointed implementation ▪ Narrow focus ▪ Politically-driven
2	Civil Society	Negative	▪ Lack of understanding and knowledge ▪ Negligence & apathy ▪ Prescriptive
3	Civil Society	Negative	▪ Unhelpful ▪ Incoherent ▪ Top-down and regulatory
4	Government	Negative-neutral	▪ Sectoral ▪ Lack of implementation ▪ Uncertainty ▪ Good policies

Interview #	Sector	Opinion of state of ICM	Keywords/phrases
5	Government	Neutral-positive	▪ Champion-driven ▪ Personality-based ▪ Inter-disciplinary ▪ Improving
6	Government	Negative-neutral	▪ Institutional disarray ▪ Organisational immaturity ▪ Getting there
7	Private	Positive-neutral	▪ Aspiring ▪ Enthusiastic ▪ Diverse
8	Private	Neutral-negative	▪ Increasing complexity ▪ Champion-driven ▪ Frustrating
9	Private	Neutral-negative	▪ Confronting the challenges ▪ Good intentions ▪ Uncoordinated information
10	Research	Negative-neutral	▪ Lack of implementation ▪ Process logical but not equitable ▪ A long way to go
11	Research	Negative	▪ Conflicting policy ▪ Weak governance ▪ Lack of human resources
12	Research	Negative	▪ Ineffective implementation ▪ Operational challenges ▪ Manpower issues

Figure 10 summarises the outcomes presented in Table 9 and presents the results in diagrammatic format to illustrate the prevailing sentiment of the ICM role-players on the state of ICM in South Africa. That sentiments towards the state of ICM are dominantly negative is shown by the relatively large size of the red and orange segments, which account for two thirds of respondents. Conversely, positive sentiments were expressed only by two respondents, of whom one voiced positive views on the state of ICM as a secondary category only.
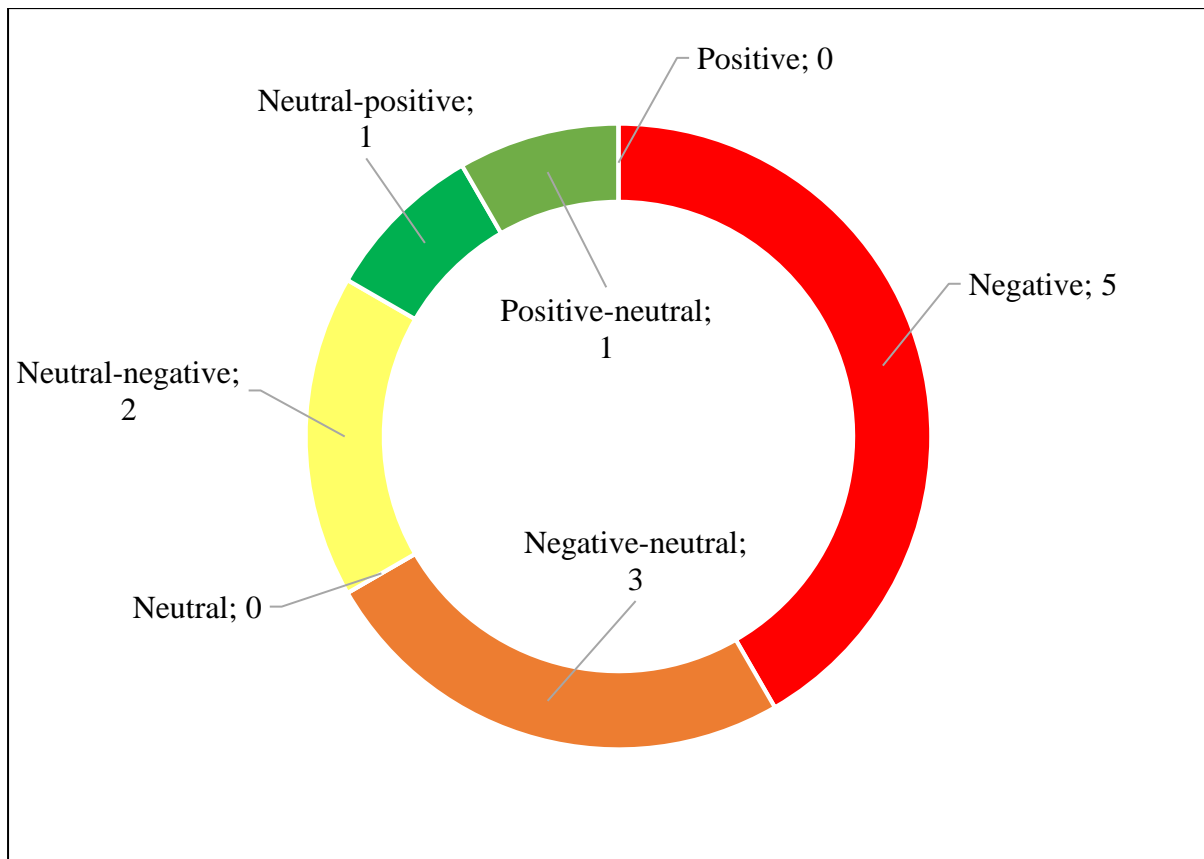
Figure 10: Opinions of 12 ICM role-players on the state of ICM in the Western Cape

Despite drawing on a different methodology, the findings presented in

Table 9 and Figure 10 are largely aligned with Sowman and Malan's (2018) suggestion that while progress has been achieved in creating an enabling legal and policy environment for ICM, meaningful engagement with civil society role-players has largely not taken place. Terms used by civil society respondents such as 'negligent and apathetic', 'prescriptive' and 'unhelpful' are testament to this. These sentiments may well be in response to what Colenbrander (2018, pg. 8) refers to in stating that "a hierarchical mode of governance prevails within the coastal risk and vulnerability domain in South Africa", which is also reflected in the type of language employed by the ICM Act, which described as 'regulatory,' 'top down,' and 'punitive'.

Sowman and Malan (2018) qualify their findings on the progress of ICM implementation by pointing out that ICM implementation and integration within the broader policy space is not a linear process. In other words, certain outcomes are achieved only in certain areas or aspects, and perhaps only partially. This finds echo with the opinions of government and private sector

respondents in particular; who balanced primary negative sentiments with neutral or positive secondary sentiments such as 'inter-disciplinary'; 'champion-driven' and 'good intentions'.

5.4. Conclusion

In considering the notion of contestation with regard to ICM, this chapter presents the results of dialogue with role-players from civil society as well as the government, private and research sectors. Section 5.2 deals with the personal understanding or definitions of ICM by the role-players described above and shows that ICM as a concept was largely contested among respondents; and that definitions of the term are likely to be influenced by sectoral contexts and points of view. Evans (2009, pg. 791) notes that sectoral context is not only the primary influencer of how different role-players are perceived and nested within a management framework, but also "how they themselves view and respond to governance strategies". This suggests that ICM means different things to different role-players, which is unlikely to have positive results for ICM implementation where alignment and integration of principles and strategies are the bedrock of the concept. The following chapter of this research employs 'storylines' (Section 4.4) as a discursive concept and a lens to offer further qualitative insight into critical aspects of the ICM framework.
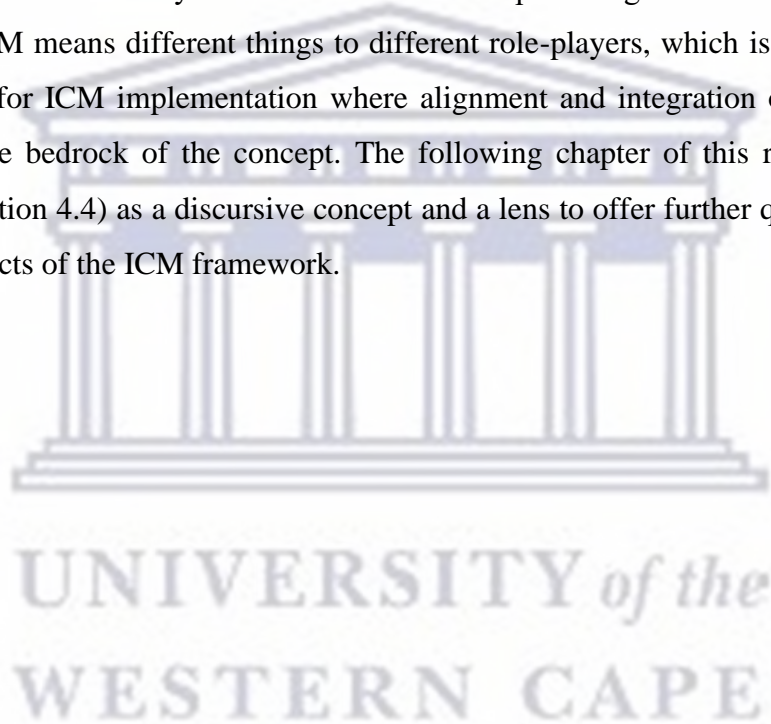
Chapter 6: Narratives of ICM in South Africa

> *"We live in an incommensurable mix of nature, politics and discourse."*
>
> — *Sandra Harding*

6.1. Introduction

This chapter employs 'storylines' as a discursive concept and a lens to offer qualitative insight into key aspects of ICM in South Africa and the Western Cape in particular. Storylines are a method used within the broader discourse analysis approach to abbreviate or explain complex opinions or worldviews. Hajer (2005, pg. 448) describes storylines as "a condensed sort of narrative that connects different discourses". The storylines presented in the following sections emerged from in-depth dialogue with 12 ICM role-players from four sectors involved in ICM in the Western Cape. As the social construction of knowledge is a central theme of this research, questions related to knowledge within ICM were used as a point of entry into these experiences. In addition to this focus on the ICM knowledge space, a number of inductively-derived findings emerged around the themes of complexity, inclusivity, integration and political drivers within and peripheral to the ICM process. While it is tempting to ringfence each storyline and describe it in a discrete or dichotomous fashion, this would be a poor reflection of the complex reality where many of the factors described in each storyline are entwined and interconnected with others. With this in mind, five storylines — some of which have sub-themes — are discussed in the following sections. Each storyline concludes with a brief personal reflection of my own experience on the topic, to provide further context to the reader.

6.2. Storyline 1: Knowledge is at the core of ICM

As the social construction of knowledge is a central theme of this research, questions related to knowledge within ICM were used as a point of entry into these experiences. A recurrent thematic response that cut across all sectors was the assertion that knowledge plays a fundamental and foundational role in the ICM process. The pivotal role of knowledge within ICM was expressed in various ways by respondents across all four sectors. All underscored knowledge as the cornerstone of decision-making and management activity; the basis for the development and deployment of governance strategies; the foundation for understanding human and biophysical dynamics; and the vehicle for bringing in the right kinds of expertise

for successful coastal and estuarine management. Two private sector respondents articulated their views in this vein as follows when asked about the role of knowledge in ICM:

*It plays a big role, a really big role. Like with anything, you can't do anything without knowing what you do and don't have. You can't implement anything without doing the research, you have to have knowledge behind you. Even with something simple like baking a cake — if you don't know what ingredients you need, and you don't know what equipment you need — you're not going to bake that cake. So for me, knowledge is critical, you need to have various aspects of knowledge, and those various aspects can come from your different experts; definitely you need your knowledge to be able to do management of the coastline. (**Interview 9: Private Sector — 20 August 2019, Plumstead**)*

*It's important because you need a good understanding of the dynamics, both people dynamics and the physical dynamics, and without that you're going to miss a lot. You can go down tangents that really have fatal flaws. So it is, you've got to know something about the coastal space, you can't just come in as a project manager with no comprehension because then you're going to miss out on the right kind of expertise that you need to pull in. And the sharing of knowledge, the access to information, also is quite important for resources management and that's ultimately why we're looking after the coast because you want to protect the resources and [if] the information about the state of resources or what is being done to manage them isn't available then again you're not making decisions or moving forward from a point of kind of good knowledge or good understanding. (**Interview 7: Private Sector — 03 September 2019, Rondebosch**)*

A respondent from the government sector took these sentiments a step further by pointing out that sharing of knowledge reduced conflict between ICM role-players and stakeholders in an estuary management forum by bringing together previously fragmented and divergent bodies of knowledge. This is in line with the observation of Sowman and Malan (2018) that coastal governance structures such as estuary management forums are known to play important roles in facilitating joint problem-solving as well as the exchange of knowledge, values, and views:

Knowledge plays a massive role, what I found what was interesting ... when we set up the estuary management forum, is prior to that everybody was holding little bits of information. And everybody had their own ideas and their own things to contribute. But

*nowhere was it all put together. And that lead to quite a bit of conflict, people became very agitated about their particular hobby horse which was the slice of coastal management that they could see in their daily lives. (**Interview 6: Government Sector — 31 August 2019, Plumstead**)*

Government sector respondents affirmed the importance of knowledge, but also argued that knowledge for decision-making and management purposes in ICM must be appropriate contextualised (Christie, 2005) and outcomes-based. As one respondent who described the role of research institutions in producing knowledge for ICM noted:

*Research institutions (and universities as well) are also a big contributor, but for me they are very much focused on high level, very scientific topics that don't assist us in actually implementing certain things. That doesn't provide us data to help us make decisions. You know if it's a science degree or a Master's in science, they're going to do some high, weird thing on the population of whatever. (**Interview 5: Government Sector — 05 August 2019, Cape Town**).*

Some respondents stressed the importance of continuing to generate new knowledge about the coast, again placing the generation of knowledge at the core of ICM:

*New knowledge is absolutely important, we can no longer rely on past knowledge…it's one thing to generate the knowledge — that's why research and tertiary institutions are so important, and of course there are lots of private sector individuals that also lend to that debate in their own capacity, either as private consultants or environmental agencies, etc. — but ultimately it is developing tools that are capable of addressing some of the new knowledge that we now find ourselves producing. Also to accommodate our policies as a consequence of this new knowledge. You can't declare a marine protected area with the same tools you had 20 years ago…so those are the sort of things resulting in new knowledge or at least the assimilation thereof, which speaks to how we best adapt our policies and procedures to now meet those new demands. (**Interview 12: Research Sector — 28 August 2019, Bellville**)*

My personal experience echoes many of the sentiments of this storyline. I would attribute a large proportion of the conflict and contestation that I have witnessed within ICM projects to debates over the legitimacy of different kinds of knowledge. The deployment of 'specialist' knowledge is a common strategy in these debates and conflicts, sometimes also leading to the

deployment of 'counter-specialists' to refute or dispute the knowledge put forward by the original ICM specialist. Academic qualifications and 'scientific' credentials are characteristic of many of the knowledge specialists who enter the ICM arena.

6.3. Storyline 2: Knowledges are diverse and hard to combine

In discussing knowledge construction, many of the respondents emphasised the diversity and complexity of knowledge in the ICM environment. The emphasis on diversity and complexity within ICM makes sense given the multi-faceted characteristics of ICM issues and the multitude of social dynamics at play within the ICM process (Christie, 2005); the highly complex nature of the coastal environment (Goble, et al., 2014); the politicised quality of coastal management and governance; as well as the diffuse nature of ICM knowledge (Bremer & Glavovic, 2013). This therefore constitutes a second storyline that emerged from the discussions about knowledge construction in ICM.

The overarching sentiments of this storyline point to an extremely eclectic knowledge space within ICM. Accordingly, the ICM knowledge space begins to emerge as one where role-players vie for the legitimacy and recognition of different kinds of knowledge, particularly where knowledge will be used in a decision-making context. Government and private sector respondents alluded to this issue of the hierarchy in knowledge production for ICM (Mazé, et al., 2017), as well as the collective nature of knowledge-building within ICM (Bremer & Glavovic, 2013):

> *My experience is that lots of different people groups produce lots of different forms of knowledge. So science is obviously really important, we need to understand how the system works from the biophysical and social perspectives. So there is [formal] research out there both in the private and public sector. We also engaged in research all of the time and that's produced quite a bit of information, but then there was lots of anecdotal information that was really useful — there were lots of triggers of deeper studies where somebody just observes somebody who has no scientific background says, "wow I'm seeing a lot more crabs than I ever did before". Which would lead us to investigate nice and deeply. But there's also a lot of knowledge that we could have really done with that isn't out there. (**Interview 6: Government Sector — 31 August 2019, Plumstead**)*

All research sector respondents subscribed to the prevailing view that the ICM knowledge space is a heterogenous one with different kinds of knowledge being used to inform policy and

practice. Reflecting on the diversity of knowledge producers for ICM, a private sector respondent expressed similar sentiments:

The responsible government agencies, for sure, they deal with this [production of knowledge for ICM] on a daily basis, so their understanding of the sector is very good. Understanding what's happening in the legal space because they sit there and regulate on the law-making side and intergovernmental committees and so on. But in terms of specialists, maybe more on the biophysical side, I think it's unlikely to sit in too many of the government agencies, or government departments. You do have the semi-government agencies like the CSIR, and I guess some others would also be present, who sit on a lot of the specialist information — the 'data'. And the same goes I guess for academic institutions and all the links they have, whether it's academic or just private or people collecting information for other entities. Maybe [it's] not very well coordinated in all cases, but there's a lot of data being collected which might or might not make it to the public domain. (**Interview 7: Private Sector — 03 September 2019, Rondebosch**)

As expressed by another private sector respondent:

Academia produce the raw factual cause and effect type of knowledge. Parastatals like Ezemvelo KZN Wildlife or the CSIR who have impetus to generate knowledge. Secondary knowledge comes from consultants. Another realm/sphere of knowledge generators is institutions like SANBI and biosphere reserves that also generate knowledge. [These] big institutions generate knowledge at a lower resolution. They are focusing 'on the ground.' (**Interview 9: Private Sector — 20 August 2019, Plumstead**)

Interestingly, the same respondent qualified their opinion on the heterogeneity of ICM knowledge by saying that in certain contexts, the same knowledge is repackaged for different projects, and that they viewed the heterogeneity or homogeneity of ICM knowledge as dependent on the producer. At times the diversity of knowledges is not evident:

The same 'pack of cards' ends up being used for different projects. A lot of information comes from the CSIR ... that is taking precedence in all our reports. That was the Western Cape. If you deal with the KwaZulu-Natal guys you might get a different information inventory from them. So it's not homogenous, it depends on who is generating the knowledge. (**Interview 9: Private Sector — 20 August 2019, Plumstead**)

Commenting on the knowledge space within ICM, Bremer and Glavovic (2013) distinguish between a science-based practice that focuses on how to 'use science' for ICM policy; and a participatory model with dialogue between diverse knowledge systems at its heart. Unpacking this dichotomy further, Bremer and Glavovic (2013) highlight the tension between these two ICM knowledge models, where proponents of 'more science' advocate for the creation of new knowledge; while advocates of the participatory model argue that sufficient knowledge exists but is not sufficiently integrated into the process. An example of arguing for 'more science' would be the respondent who noted:

*... so obviously there's different types of knowledge but I think that there is a lot of really strong science and data that is produced in South Africa and I think there's a strong scientific and academic community that works in the space. (**Interview 11: Research Sector — 02 August 2019, Bellville**)*

For Maze et al. (2017), the favouring of one model or the other has implications for the distribution of both knowledge and power within society. Bremer and Glavovic (2013, pg.44) note that the dominance of the scientific method as the singular source of legitimate ICM knowledge is increasingly being challenged in favour of "a more participatory science-policy interface" that is better equipped to deal with the uncertainty inherent to coastal management. This research indicates that there is growing frustration with a science-dominated approach to ICM from some respondents.

In contrast to peers from the government sector, one government official delved into the epistemological realm when asked about the heterogeneity or homogeneity of the ICM knowledge space, expressing frustration at the dominance of science-based knowledge in the sphere. Their point was that empirical or 'scientific' knowledge holds a privileged position within the ICM space, and that this renders the ICM knowledge space homogenous at the macro-level:

*ICM is dominated by a particular orientation of knowledge, and that is fairly homogenous. But if you take away the degrees of influence, and you just minus that from the equation and you look at different knowledge types, it does vary, but the one form of knowledge seems to override all the other knowledge inputs and within that dominant knowledge set it is fairly homogenous – it is based on positivistic forms of enquiry, modelling, and empirical analysis. (**Interview 4: Government Sector — 06 August 2019, Cape Town**)*

This respondent is aware that knowledge is power-laden. Political ecologists are concerned with who determines what counts as knowledge, and how power-relations play out in the knowledge space (Reed & Christie, 2008; Escobar, 1999).

Views from civil society on ICM knowledge differed from the other sectors, perhaps linked to their different personal understandings and definitions of ICM. In discussions on the role of knowledge in ICM and who the producers of that knowledge are, civil society respondents maintained that the importance of knowledge was not being recognised by government officials; was not catered for in legislation; and that the knowledge focus of coastal management officials was too narrow.

The expression of such sentiments accords with research by Colenbrander (2018) on the dichotomous nature of the narratives of public sector officials and civil society in the ICM space at the local level. Colenbrander highlights the "increasing polarity between the state and civil society in relation to the governance of coastal risk" (Colenbrander, 2018, p. 2). This discursive schism is further compounded by internal constraints in the public sector, described in earlier work as "conflicting institutional incentives and perspectives across departments at the local scale" (Colenbrander, et al., 2014, p. 14). These are suggested as possible underlying causes of the issues described in this research by a civil society respondent as follows:

*[The role of knowledge is] not being recognised. The ICM Act describes how officials are supposed to manage their work and gives them authority in certain aspects but doesn't require them to know what they're doing. The Act is very prescriptive, it doesn't require them to read any further…We sometimes get the idea that it's not knowledge [that informs policy], just someone's idea to do it…we've had a big fight with the City of Cape Town to clean this river [the Diep Estuary] for example. It looks blue, but it's dirty. Kids don't read science; they jump in and they cool themselves in summer. A sign was erected saying 'no swimming', but kids don't read signs. They jump in, they get sick, they die. They [the City of Cape Town] don't look at their own documentation. That kind of negligence is a worry. Their own study showed that they wouldn't be able to determine where erosion would stopg. I was able to prove that their model was wrong, useless. They did a lot of their modelling on assumptions, not research which made it also not worthwhile. I insisted on peer review of the technical aspects at the University of Cape Town. (**Interview 2: Civil Society — 25 September 2019, Milnerton**)*

The diversity and heterogeneity of the knowledge space within ICM in the Western Cape described above is well-aligned with my own experience in this regard. I have found the most robust ICM projects to emerge from processes where a range of knowledge feeds into the process. ICM projects where specific kinds of knowledge are privileged or dominant tend to result in convoluted and contested consultation, with limited buy-in from role-players other than government.

6.4. Storyline 3: Decision-making in ICM is a political process

This storyline aligns respondents from all four sectors, who made mention of the influence on ICM of political factors, particularly with regard to the science-policy interface. In other words, all the role-players interviewed are concerned with the politicized nature of the decision-making process. Bremer and Glavovic (2013) opine that the inordinate influence of politics on the science-policy interface within ICM has had negative consequences for decision-making and management, going so far as to label the politicised nature of this space as a corrupting influence. Unequal power-relations enter the discussion here on the basis of the ability of one role-player, i.e. government, to exert control over the environment of another, i.e. civil society. This happens through interventions based on the production of knowledge about the environment which gives rise to physical imprinting in/on the environment through alterations of the biosphere; or the 'embedding' of control within environmental discourses in policy or legalisation, where the hegemony of particular discourses can weaken or strengthen governance (Bryant, 1998; Desportes & Colenbrander, 2016). For example, Desportes and Colenbrander (2016) have analysed the delineation of a set-back line by the City of Cape Town in these terms, showing how control is embedded through dominant discourses, in this case, cartography.

Decision-makers, particularly those in government, were broadly seen by the respondents in this study to be in possession of the 'right knowledge' to make the 'right decisions' or for 'good management' from a coastal management/environmental perspective. However, they were seen to often view that knowledge — particularly scientific knowledge — as only one factor or not to take it into consideration at all for reasons of political expediency. A respondent from the research sector said:

> *There's no space for consensus where everything is taken on board because the guys at the central level are not only making decisions based on environmental importance…it depends on their interests. So the biggest concern for me is that they're making decisions*

based on political decisions. So they might know that a coastal area is particularly vulnerable to sea level rise but they're going to find it particularly difficult to move communities within those areas because of issues related to politics or voting, so they're not going to. So a lot of the decision making is dependent on the circumstances which is understandable in a developing country with the type of politics that we have. **(Interview 10: Research Sector — 22 August 2019, Claremont)**

A civil society respondent was equally frustrated:

I've been asking for the [beach management] budget for three or four years, but I get turned down. I need the budget, so I can understand their [government's] frustrations, because then it becomes a political problem because the money goes where the noise is coming from and I think politicians are making decisions that should be made by experts in the field — by technical staff. **(Interview 1: Civil Society — 25 September 2019, Milnerton)**

Christie (2005) describes ICM as a planning process that involves a broad range of formal and informal institutions, as well as several other sectors of society. Bremer and Glavovic (2013, pg. 43) interrogate this notion further with regard to coastal management interventions, which they depict as being undertaken "within complex and interconnected social-ecological systems". Referring to the 'coastal vulnerability dilemma', Colenbrander (2018) dubs this issue a 'wicked problem', beset by "a multiplicity of environmental, political, social, and governance drivers" (Colenbrander, 2018, p. 4). These authors throw into relief the notion of ICM interventions taking place in an intensely political space.

Tension between environmental and socio-economic development policies can exacerbate environmental problems such as climate change (Wesselink, et al., 2013). The politically-charged nature of decision-making alluded to above is further analysed by Sowman and Malan (2018), with particular reference to decision-making processes around controversial issues. These tend to be "escalated to higher strategic levels for decisions… At these levels, other political and strategic factors influence decisions, which government officials are then required to implement, often at odds with their officials' recommendations" (Sowman & Malan, 2018, pp. 131-132). Adding further complexity to decision-making in the ICM space are vested interests among and between ICM role-players; and 'policy tensions' along sectoral lines in the ICM and development policy spaces.

Economic forces arising out of globalization at the macro-level are described by Christie (2005, pg. 224) as "clearly pre-determining the influence that ICM may have"; and the high economic value of coastal real estate (Colenbrander, 2018). This is best summarised by Sowman and Malan (2018, pg.312): "Economic growth imperatives [in the coastal zone] often outweigh issues of long-term sustainability and social justice" (parenthesis added). These factors may well give rise to vested interests and contestation or alliances between ICM role-players.

These were some of the insights into the political undertones of this storyline put forward by a private sector respondent:

*There's this sort of contested space simply because you have so many different physical environments in a dynamic mix, so you've got all three spheres of government interacting, you've got a lot of civil society groups with vested interests so there's conflicts that arise out of that; some partnerships also. (**Interview 9: Private Sector — 20 August 2019, Plumstead**)*

Similarly, respondents from the government and research sectors confirmed what Sowman and Malan (2018) term 'policy tensions' in ICM decision-making in reference to development applications that pit socio-economic benefits against environmental protection:

*So it's very difficult, and sometimes no matter how many times you want to say 'no' to something, you have to consider the other aspects, the three spheres – environmental, social and economic. So, it's difficult, it's very difficult to say 'no' to something if you know that it's going to benefit the more disadvantaged communities. It's a bit easier to say no to developments like big residential retirement estates and so on that want to have a retirement village on the coast or something. (**Interview 5: Government Sector — 05 September 2019, Cape Town**)*

*So one thing is there's a lot of people that are pushing for the environmental rights side of things in South Africa – a lot of non-governmental organisations, the South African National Biodiversity Institute; those guys very clearly have a strong environmental lens, that is their mandate. But they come up against very strong actors that do not have environmental mandates, that view the first prize within South Africa as to make sure that economic and social development happens. (**Interview 10: Research Sector — 22 August 2019, Claremont**)*

Drawing on the insight from political ecology that the environment and politics are inseparable, and that political factors should be uppermost in understanding the complexity of human-environment relations (Bryant, 1998), this storyline emphasises the intensely politicized context within which ICM takes place. All role-players in the sector have a heightened awareness of this aspect and accept it, whilst expressing some level of frustration.

My own ICM experience mirrors the heightened awareness and accompanying frustration described above. It is, in my opinion, nigh impossible to be meaningfully involved in the ICM process in the Western Cape without encountering the influence of politics. However, not all political influence is problematic to my mind — in fact I believe that it is naïve to view natural resource management and governance as anything other than a political exercise. My view is that politics becomes problematic when it is allowed to go unacknowledged in the ICM process, or when role-players downplay the importance of political influence in decision-making.

6.5. Storyline 4: 'All government does is spout regulations'

Christie (2005) emphasises the significance of trust and long-term commitment between ICM role-players, particularly between individuals (civil society) and institutions (government). To this he adds that trust is a two-way street, and that "downward and upward accountability" is crucial to successful ICM (Christie, 2005, p. 221). In stark contrast to notions of trust and accountability, this research evoked an outpouring of negative sentiment from civil society respondents that took aim at all three levels of government. Their relationship with officials seems characterised by a distinct lack of trust and deep suspicion of government's motives with regard to ICM legislation and policy. Responses aligned to this storyline emerged predominantly from discussions with civil society respondents about the state of ICM in the Western Cape and the role of knowledge within ICM.

The first indication of these sentiments emerged during discussions with a civil society respondent around the knowledge capacity of the officials responsible for coastal management at the local government level to deal with environmental problems. With specific reference to the management of dunes and coastal erosion, they felt that the coastal management policy and its implementation had a number of shortcomings, the sum of which resulted in the policy 'missing the point'. These policy shortcomings related to addressing the symptoms rather than the cause of beach litter and pollution and being unnecessarily prescriptive with regard to the regulation of coastal protection measures:

We knew there was a big storm coming in and you've seen the damage near [the restaurant]. So we asked if they could put some interim, temporary measures in for 48 hours to protect their property and what they wanted to do is put in sandbags, which they did. Apparently, they were told to remove them because they haven't tested the quality of the sand in the sandbags. Now I understand that, because possibly it should have been beach sand, but at the same time they were told to remove that, I can show a photo on the same day, when the plastic that was washed up on the beach was 30cm deepg. But it's out of context, now the plastic is being washed out of the Black and the Salt rivers from the stormwater drains onto the beach, but nobody's addressing it because whose problem is it? They're more concerned that we might possibly have the wrong sand, but there was 1.6 tons of plastic that was removed from Milnerton beach on that day, and they tell them about the sand. So where is the congruency or the common sense in that policy? And nobody's doing anything about addressing that 1.6 tons that was removed that day. The City is very good about cleaning it up, but nobody's addressing the core issue. **(Interview 1: Civil Society — 25 September 2019, Milnerton)**

Plate 1 shows the end-result of collection of litter by members of the public as mentioned by the respondent of Interview 1 above.

Plate 1: Litter collected from the beach near a beach restaurant, Milnerton.

Photo credit: Caroline Marx.

The availability of sufficient human capacity is widely listed as a precondition for successful ICM initiatives and implementation (Sowman & Malan, 2018; Goble et al., 2014; McKenna et al., 2008; Christie, 2005). The key issue of capacity to implement ICM was also touched on by the same civil society respondent, where a perceived lack of strategic or holistic focus by individual officials was having a detrimental effect on accountability:

Individuals focus on their limited area of interest and they don't look at the whole picture and that's a problem — nobody takes responsibility for the overall picture. **(Interview 1: Civil Society — 25 September 2019, Milnerton)**

Referring to the spirit and structure of the ICM Act, another civil society respondent was of the opinion that the Act was merely a bureaucratic instrument that has little to do with management of the biophysical aspects of the coastal zone:

The management in the ICM Act doesn't refer to manging the coast but managing the process of management. It's bureaucracy. **(Interview 2: Civil Society — 25 September 2019, Milnerton)**

A civil society respondent whose business interests were perceived to have been negatively affected by coastal erosion was extremely outspoken and emotional with regard to his interaction with local authorities on the issue, perceiving government as unhelpful and unsympathetic to the needs of coastal landowners:

Government are up their own arses with their own self-importance! We are tired of consultants' stories; we are the people affected [by coastal erosion], not them. We're not interested in the [sea-level rise] models, we pay them taxes to get this shit, this regulation from them. If I'm the one who is sick, I know how I'm feeling; it's the same with coastal management. All government does is spout regulations and make your life a misery, they don't give a fuck about coastal management. They are completely unhelpful, everyone who talks to them hates them. People's lifestyles, money and livelihoods are tied up in coastal areas and these bureaucrats come with their shit...they can go fuck themselves! They're not very helpful. They spout lots of legislation which is incoherent to the average man. They make everybody's life comprehensively difficult, then threaten you with legal action because you're trying to save your health, business, and lifestyle. **(Interview 3: Civil Society — 02 November 2019, Milnerton)**

Pomeroy et al. (2005) note that support for ICM implementation is unlikely to be forthcoming in situations where policy recipients are convinced that policy or legislation does not address local concerns or has no positive impact on their well-being. This storyline is further aligned with findings from Colenbrander (2018) who points to mounting frustration from civil society in Cape Town, who perceive their willingness to engage with government to resolve coastal erosion issues as not reciprocated. They are subsequently "disempowered by the state in their efforts at protecting their own livelihoods" (Colenbrander, 2018, p. 14).

Echoing these sentiments, a civil society respondent felt that decision-makers were leaning too heavily on environmental interests, and neglecting socioeconomic aspects such as jobs and benefits to the local economy:

> *Government want a 'natural beach', and property owners must retreat – which is just a euphemism for building alterations. Jobs will be lost if I have to take the patio of my restaurant away [because of coastal erosion]. Government are just leftist liberals who care about the environment, not people's livelihoods or jobs. (Interview 3: Civil Society — 02 November 2019, Milnerton)*

Some of this frustration and anti-government sentiment may well stem from disingenuous or 'tick-box' engagement with non-government stakeholders. McKenna et al. (2008) describe such insincere engagement with civil society as nothing more than a public relations exercise where decision-makers pursue pre-determined agendas, while Colenbrander (2018) adds that engagement along these lines is 'inauthentic'. These issues are alluded to by a private sector respondent with experience of government consultation with ICM policy recipients from civil society:

> *In all cases it's been frustration [from civil society] that I've experienced [with regard to stakeholder engagement]. Progressively local groups have been worked out of active participation in coastal management, so they're allowed to represent themselves on various forums and meetings and so on, but they've no say in real decision-making on the government side. Stakeholder consultation is often 'tick-box' efforts, it's very difficult to really say who should be involved and to what extent and often you just, you probably have too many stakeholders if you're thinking [the] public, to really involve all of them where they should be. (Interview 7: Private Sector — 03 September 2019, Rondebosch)*

This storyline was largely at odds with my personal experience of Western Cape ICM projects. On the one hand I can empathise with the frustration experienced by civil society when the outcomes of ICM projects do not 'go their way'; but I can also understand the significant pressure on government officials in needing to address overarching policy and legislative goals. Having said that, my view is undoubtedly a privileged one, having been exposed to discussions on both sides of the argument.

6.6. Storyline 5: Integrated coastal management is not integrated

Integration is manifestly a central tenet of the ICM philosophy, presumably in response to the biophysical and institutional complexity inherent to the coastal zone which single-sector or 'siloed' management approaches have largely failed to address (Goble, et al., 2014). What is less clear is exactly what is meant by 'integrated', and whether 'integration' is occurring within ICM in South Africa, particularly within the all-important knowledge space.

The storyline of the (dis)integration of ICM emerged largely from unstructured discussions, i.e. those that weren't necessarily responses to standardised lines of questioning or dialogues. Whereas most respondents included the term 'integrated' in their personal understandings of ICM, terms or concepts that can be associated with an integration priority or imperative were most often raised in a negative context — with particular regard to knowledge. This is exemplified in discussions with respondents around two key issues: the integration and inclusivity of the knowledge space within ICM; and whether lessons learnt at the local level were being taken into account at provincial and national levels (so-called vertical integration).

Mixed responses were received in dialogues relating to knowledge integration and inclusivity, where a number of respondents alluded to factors that appear to impact negatively on the aspirations for this aspect of ICM, while others responded with more positive insights. A distinct difference in perspective on the integration of ICM from a knowledge perspective was emergent between government sector respondents and respondents from the private sector and civil society. Referring to the Provincial Coastal Committee (PCC), a provincial government sector respondent felt that it was a forum that was inclusive from a knowledge perspective, but that knowledge integration and inclusivity hinged on the inclination and ability of role-players other than government to get involved; as well as government's awareness of who the 'correct' people to include might be:

I think there is space for that [inclusion of different kinds of knowledge]. With the Provincial Coastal Committee, again it's a matter of people's willingness and capacity

*to actually participate on the one hand. And on the other hand we need people who have knowledge in specific areas, but we don't always know who those people are. (**Interview 5: Government Sector — 05 September 2019, Cape Town**)*

Insights into the integration of the ICM knowledge space from the private sector were that the intention is there for democratic and inclusive knowledge sharing, but that the issue-driven nature of coastal governance forums; as well as knowledge gatekeeping detracts from this:

*What seems to happen – if there is one specific issue, then that issue seems to dominate the meeting regardless of why the meeting was initially called. The intention might be to share information and integrate, but there might be issues that dominate the agenda, where individuals outshine the institution. This might get in the way of you receiving the information that you planned to receive. (**Interview 9: Private Sector — 20 August 2019, Plumstead**)*

In a more positive light, a local government respondent described the benefits of an inclusive and integrated coastal management space. This was based on personal experience derived from managing a coastal governance forum where integration and inclusivity were explicitly promoted, which: i) helped to promote a common understanding of relevant issues; ii) improved decision-making; and iii) led to greater transparency. The respondent elaborated:

*The dissemination of knowledge…meant that everybody felt like they were being heard and meant that [as a representative of government mandated to regulate the space] I was actually getting to hear what everybody had to say, and I was able to get all the other bits of the coastal management slices of the pie that I wasn't seeing. So I think it made a huge difference to me and to the quality of the decisions that were being made but also it helped everybody to understand why the decisions were being made the way that they were being made. (**Interview 6: Government Sector — 31 August 2019, Plumstead**)*

While most respondents agreed that an integrated and inclusionary ICM knowledge space is beneficial and important, another local government respondent added impetus to views from the private sector and civil society that in general, the ICM knowledge space was better categorised as exclusionary. These are sentiments echoed by Sowman and Malan (2018) as well as by Colenbrander (2018), who point to the lack of civil society representation within coastal governance and decision-making structures and a dearth of 'deliberative processes' as

evidence of a largely unintegrated knowledge space within ICM. The view from a civil society respondent was that where pockets of knowledge integration was occurring, it was driven by individuals, i.e. knowledge integration/inclusivity was not a hallmark of ICM per se:

I found [inclusivity] very much depends on the individuals – some of whom are working really hard and will work very hard to help you resolve the issue but very often their hands are tied, and they'll tell me that they can fix it, but that they don't have the budget. **(Interview 1: Civil Society — 25 September 2019, Milnerton)**

By contrast, the estuarine management component of ICM — particularly at the local level — emerged as a space that three respondents largely considered to be more integrated and inclusive than other components, such as municipal coastal committees:

There are segments or sectors within coastal management that may be more inclusive than others so if I separate it out – for example estuaries in my mind, that's fairly inclusive because they've got estuary management forums and they are quite good at bringing in different role players – much better so than governing or addressing coastal risk, which is much more exclusionary, and there's reasons behind that. So yes, within coastal management, estuaries are examples of quite good inclusion but other sectors within coastal management are a lot more exclusionary. **(Interview 4: Government Sector — 06 August 2019, Cape Town)**

From an estuarine management perspective there is a lot more openness from the Western Cape's perspective in terms of hearing what the issues are and taking cognisance of that. So that system is working. But generally I think the systems don't work that well. **(Interview 7: Private Sector — 03 September 2019, Rondebosch)**

If I think about my experiences in the sector, my gut-feeling probably tends towards exclusive. Just thinking about some knowledge being held very close to people's chests, both inside government and outside government. It depends on a few individuals who feel like the more the information or knowledge is shared, the more people can actually use it for coastal management. In those cases it feels more inclusive, but I think maybe also academia tends to not share widely, just because of the nature of being focused inwards. On the whole, my gut-feeling answer is [that the knowledge management space in ICM] is exclusive…there's a lot to be done to make it a bit more democratic in terms of the knowledge creation and involving people from different entities, bodies,

*components of society to really contribute to this whole body of knowledge. (**Interview** 9: Private Sector — 20 August 2019, Plumstead)*

Despite the integration imperative, my own experience has been that true integration of sectors and knowledge types in IC projects is extremely rare. The concept of integration and what it might mean for individual project contexts is seldom broached in the design of ICM projects or associated consultations, which is a major weakness to my mind.

6.7. Conclusion

This chapter employs five storylines to tease out primary findings from dialogue with role-players from four sectors that are directly or indirectly involved with ICM in the Western Cape. The dialogues reflect the open-ended, interactive nature of the interviews conducted. The first two storylines to emerge focused on ICM knowledge; with particular emphasis on the role that knowledge plays within ICM and the diversity and complexity of the ICM knowledge space. Role-players emphasised the pivotal role that knowledge plays within ICM with regard to forming the basis for sound decision-making, governance strategies and management; deepening the understanding of human and biophysical dynamics; and allowing decision-makers to harness appropriate expertise for successful ICM. Similarly, diversity and complexity emerged as defining features of the ICM knowledge space, with role-players alluding to a hierarchy of knowledge production and dissemination, where scientific knowledge is seen as the most dominant form of knowledge that informs ICM.

Additional features of the ICM knowledge space that were highlighted by role-players were its heterogeneity and complexity with regard to how it is generated and used for ICM. Into that context enters the question of whether ICM is an inclusive space for different kinds of knowledge, or whether certain kinds of knowledge are hegemonic, thereby excluding others. The prevailing narrative of heterogeneity was contradicted to a degree by the perceived hegemony of Mode 1 knowledge in the ICM space, i.e. 'formal', empirical scientific knowledge. The view that the knowledge space in ICM was homogenous and 'dominated by science' was espoused in particular by a government respondent. Civil society role-players felt furthermore that decision-makers were failing to recognise the importance of the ICM knowledge space, and that coastal management officials were not holistic and inclusive enough in their approach to ICM knowledge. The findings in this study of dichotomous views and accompanying tension between civil society and government on the key ICM issue of

knowledge, are closely aligned with recent published research on to the governance of coastal risk in Cape Town (see Colenbrander, 2018).

Drawing insight from political ecology where the environment and politics are assumed to be inescapably entwined, the third storyline focuses on the politicised nature of decision-making in ICM. Political influence was found to manifest and dominate most visibly in the decision-making arena, where political expediency was seen as regularly appropriating the role of reliable or legitimate knowledge about environmental issues. Politics was also seen as a confounding factor in the already-complex decision-making space of ICM.

The fourth storyline described the overwhelmingly negative sentiment expressed by civil society role-players with respect to their engagement with government in the ICM space, captured under the storyline of 'all government does is spout regulations'. The resultant tension and unease between government and civil society in parts of Cape Town has been well documented elsewhere by Colenbrander (2018), Sowman and Malan (2018), Desportes and Colenbrander (2016), and Colenbrander and Taylor (2014).

The fifth and final storyline to emerge from this research scrutinises the integration imperative of ICM by considering the views of role-players on the inclusivity of the ICM knowledge space. Most respondents listed factors that they perceive to impact negatively on the integration imperative of ICM knowledge, with the sector of each respondent emerging as the primary factor in divergent views on this topic. Government sector role-players felt that there was sufficient space in existing governance frameworks and forums for inclusivity of different knowledge types, which is contrasted against views from the private sector that this was not occurring in practice. Estuary management forums were highlighted as the exception in some cases where such forums had proved fertile ground for the sharing of knowledge between role-players from different sectors.

Chapter 7: Conclusion

> *"Sailors on a becalmed sea, we sense the stirring of a breeze."*
>
> *— Carl Sagan*

7.1. Introduction

The rationale for this research was, broadly, to (re)examine my personal experiences in designing and implementing ICM interventions in the light of recent insight from critical environmental studies. In particular, I felt it necessary to adopt an epistemologically reflexive and critical stance to the field of ICM, which I believe is lacking in this regard. Whereas ICM is most often defined and conceived of as socially neutral, apolitical and unproblematic, my experience in engaging with ICM role-players over a decade suggested otherwise. Accordingly, the 'otherwise' became my rationale for undertaking this research.

7.2. Research approach

The point of departure for the study arises from the research aim, which was to gain insight into the process of knowledge production and dissemination in ICM in South Africa, particularly in the Western Cape province. The research aim was realised through the adoption of three research objectives, namely: i) to investigate the epistemology of ICM in the South African context; ii) to identify the dominant discourses (storylines) with South African ICM by exploring the perceptions of ICM held by various role-players and recipients; and iii) to reflect on the implications of dominant discourses and the importance of conceptual reflexivity in ICM knowledge production and dissemination. At the conceptual level, this was undertaken by framing the research within the paradigm of social constructivism and the social construction of knowledge and political ecology.

Methodologically, a qualitative approach was adopted, grounded in the underlying assumption that knowledge is socially constructed and can be analysed and understood through language and discourse. Aligned with the research aim, primary data were gathered through 12 semi-structured, open-ended interviews with ICM role-players from civil society as well as the public, private and research sectors. Data from these interviews was analysed using a discourse

analysis approach to identify and analyse the main 'storylines' articulated by ICM role-players in the Western Cape.

Literature reviewed highlighted the centrality of knowledge to contemporary culture and the rise of 'the knowledge society', particularly: i) 'knowledge industries', which refers to the contribution of knowledge to economic activity (Gibbons, et al., 1994); and ii) 'knowledge projects', used to describe the process of environmental management and governance (Harding, 2008). Against the backdrop of the knowledge society, I drew on the work of Michel Foucault to show how knowledge and power are intimately entwined, and the resultant emergence of the knowledge-power nexus. Scientific knowledge emerged as a particularly powerful type of knowledge, which has spoken — and continues to speak — to society with great moral authority for centuries (Pedynowski, 2003a; Whatmore, 2009). The knowledge-power nexus and the use of privileged scientific knowledge come together in the realm of decision-making for environmental management.

It is at this point that the influence of 'the political' and 'the social' rear their heads, ironically in attempts to frame environmental decision-making as socially sterile and politically neutral (Backstrand, 2003). Consequently, political ecology was introduced as a theoretical framework that is concerned with understanding the dynamic relationship between society and nature; espousing the notions that politics and the environment are innately interconnected (Bryant, 1998) and that political processes drive environmental change (Robbins, 2011). Political ecology's utility as a lens to understand the subliminal processes at play in environmental governance and natural resource management was demonstrated. This notion is grounded in the ways in which environmental narratives and discourses are shown to be dependent on political and/or incomplete interpretations of knowledge (Wesselink, et al., 2013). The appropriateness of political ecology to critically examine ICM was demonstrated by citing the work of Zinzani (2018) and Plaan (2018) who put forward the concepts of coastalscape and seascape respectively. These two concepts highlight the complex social and political elements inherent to decision-making and regulation of the coastal and marine environment.

In discussing, the field of ICM, its principal features and legislative setting in South Africa, the epistemology of ICM was brought to light and was found to have predominantly positivistic influences with a strong reliance on scientific knowledge. The ICM Act, as the dedicated ICM legislation in South Africa, was summarised. A critical critique of the ICM Act was examined,

namely that it represents a significant departure from the policy principles contained in the White Paper for Sustainable Coastal Development.

7.3. Research findings

The first research findings chapter (Chapter 5) focused on the views of ICM role-players with regard to the state of ICM in South Africa, as well as the degree of homogeneity or heterogeneity in personal definitions of ICM. ICM role-players were largely unanimous in their negative view of the current state of ICM in South Africa, with positive or neutral sentiments rarely expressed. This is largely aligned with the recent work of scholars who assessed the progress of ICM in South Africa. ICM role-players expressed varied personal definitions of the term, with role-players from the research sector demonstrating the most holistic understanding of the concept. ICM as a concept was found to be largely contested among respondents from other sectors; with definitions of the term seeming to be influenced by sectoral contexts and positionality of the respondent. This suggests that ICM means different things to different role-players, which is unlikely to have positive results for ICM implementation where alignment and integration of principles and strategies are the bedrock of the concept.

In the next chapter (Chapter Six), five storylines were identified from interviews with 12 ICM role-players and analysed. Two knowledge-related storylines were the first to emerge, focusing on: i) the criticality of knowledge to the ICM process; and ii) the diversity of ICM knowledge and the difficulty encountered during efforts to integrate them. The latter assertion is of concern given that the privileging of one kind of knowledge over another has implications for the distribution of both knowledge and power within society (Mazé, et al., 2017). In this regard, ICM role-players identified a hierarchy of knowledge production and dissemination, where scientific knowledge was seen as the most dominant form of knowledge that informs ICM.

Conventional definitions and concepts define scientific knowledge as inherently objective and free from social contamination. Conversely, the third storyline identified by this research showed that decision-making in ICM — despite its reliance on scientific knowledge — takes place in an intensely political and undeniably social space. Perhaps related to the politically-charged nature of ICM decision-making, role-players from civil society were at pains to point out that 'all government does is spout regulations.' This storyline was characterised by a proverbial torrent of negative sentiment from civil society respondents towards government. The relationship between government officials and the three role players from civil society who I interviewed was undeniably strained and at times openly hostile. This points to a lack of trust

between these two ICM role-players, a scenario which is described in ICM literature as a fatal flaw for the prospects of successful ICM interventions (Christie, 2005). The fifth and final identified storyline puts forward the notion that the knowledge space — already identified as a crucial component of the ICM framework — is not conducive to integrating different kinds of knowledge for decision-making.

7.4. Significance of the research

While this research is more suggestive than definitive, it has resulted in several outcomes that are personally and professionally significant, as well as raising salient questions for future research into ICM. These outcomes and questions are described below.

Of particular practical as well as theoretical significance is the role of political influence in ICM. It is important to adopt a reflexive and epistemologically critical stance to an environmental discourse as prevalent as ICM.

7.4.1. *Politics and 'the social' matter*

Bremer and Glavovic (2013) argue that reflexively considering the governance and knowledge aspects of ICM is important with respect to the way we conceptualise the coastal environment and make decisions about it. In practice, this means that the ICM knowledge space must be recognised as decentralised, acknowledging that the various knowledge types within this space are underlain by their own subjective values and norms (Bremer & Glavovic, 2013). In the context of the knowledge society and ICM, scientific knowledge has often been disproportionately elevated into a position of authority that goes beyond technical expertise into the realm of moral authority. Voices of authority tend to be privileged within environmental discourses (Lawhon, et al., 2016), and the voice of science within ICM is undeniably authoritative. This has been problematised by scholars who point out the fallacy of a knowledge system that purports to be free from political and social influence, and yet does so from the top of the knowledge hierarchy pyramid. This research has brought this tension between science and society to the fore for me personally, as an ICM practitioner, in a number of meaningful ways.

Firstly, the importance of adopting a conceptually reflexive approach (see research objective iii) to my work has been somewhat painfully highlighted through exploring the epistemology of ICM and its associated critiques. The importance of critically examining the underlying assumptions and power relations of ICM principles has emerged as an important first step towards building trust between role-players. This is particularly relevant for my own position

in the ICM process as an 'expert' and stands in stark contrast to promoting interventions that blindly subscribe to ICM principles without reflecting on the potentially exclusive nature of the process, with particular reference to the exclusion of knowledge types not deemed scientific. I have witnessed first-hand the breakdown in trust between project proponents and project recipients on the basis of the exclusion of non-scientific knowledge. This research has sensitised me to these dynamics.

Secondly, the findings related to the shadowy influence of politics on ICM decision-making have highlighted the need for careful consideration of the subliminal power relations inherent to decision-making in the complex and contested coastal environment. Political influences — nefarious or otherwise — can pose a significant risk to successful project implementation in a number of ways. If projects are implemented under an ICM banner and decision-making is subsequently hijacked for political reasons, it is damaging to the project recipients, the concept of ICM and society at large. This scenario is particularly applicable with regard to the knowledge space, which has traditionally allowed scientific knowledge to dominate the policy discourses of ICM by challenging the validity of other knowledge types or excluding them entirely. Wesselink et al (2013) remind us that the suppression of alternative claims to truth has significant negative consequences for policy discourses as well as the environments which they shape; while Stone (2002) advocates for openly acknowledging and embracing politics in the policy process as valuable and creative.

7.4.1. Make ICM integrated again?

A finding of particular resonance from this research relates to the storyline that 'ICM is not integrated'. Whereas the philosophy of ICM is steeped in the notion of integration and idealises co-operation between sectors and role-players (Mazé, et al., 2017), in-depth discussions with ICM role-players suggest that two key areas of ICM are lacking in this respect. The lack of integration was manifest firstly in the ICM knowledge space where role-players from civil society, the private and research sectors were unanimous in their views that ICM was integrated in name only. Secondly, ICM in South Africa was seen to be lacking integration between levels of government (vertical integration). In particular, the lessons learned in implementing ICM projects at the local level were not seen to be taken into account in higher levels of government, i.e. provincial and national. I intend to use the heightened awareness of the potential lack of integration in ICM as an important insight to be kept in mind in future ICM projects.

My experiences as a practitioner, together with the greater insight afforded by this research, leads to the conclusion that: i) politics and social elements are inseparable from any meaningful ICM process; and ii) interventions to incentivise or promote integration of the ICM knowledge space are best driven from the bottom up, and approached reflexively and with caution from the top down. In so doing, and by acknowledging the knowledge-power nexus, it is my hope that this research has contributed in a small way to building better ICM projects in the future. The goal is to devise more balanced interventions with practitioners who are able to contribute to greater transparency and more democratic knowledge projects.

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Appendix 1: Chapter Summary of the ICM Act

Table 10: Summary per chapter of the ICM Act

ICM Act Chapter	Summary
Chapter 1: Interpretation, Objectives and application of the ICM Act	This chapter in the ICM Act lists and defines important words or terms that are used in the Act and sets out objectives for the application of the Act. Furthermore, it clarifies the role of the State in relation to the coastal environment, indicates to whom and where the ICM Act applies and explains that the Act must be read in conjunction with the NEMA and provides detail on how to reconcile conflicts with other legislation.
Chapter 2: The Coastal Zone	This chapter defines the components of the coastal zone in South Africa. It also deals with the spatial aspects, definitions and legal status of the various components of the coastal zone. The ICM Act focuses on regulating human activities within, or that affect the "coastal zone". The coastal zone comprises coastal public property (mainly Admiralty Reserve and land below the High-water Mark), the coastal protection zone (an area along the inland edge of coastal public property), coastal access land (which the public may use to gain access to coastal public property), special management areas, and includes any aspect of the environment on, in and above them.
Chapter 3: Boundaries of Coastal Areas	This chapter provides procedures for demarcating and adjusting the boundaries of coastal public property, the coastal protection zone, special management areas, coastal access land and authorisations of entry onto such land (sections 26-30). It also sets out the considerations which must apply in respect of such demarcations and adjustments. Interested and affected parties have an opportunity to contribute to the process of demarcating or adjusting boundaries. The purpose of sections 31 and 32 is to provide for the formalising in law of such determinations and adjustments through the marking of boundaries on zoning maps and endorsements by the Registrar of Deeds.
Chapter 4: Estuaries	This chapter aims to facilitate the efficient and co-ordinated management of all estuaries. This includes provisions that ensure they are managed in accordance with: (a) a National Estuarine Management Protocol (the Protocol) (see section 33) approved by the Minister(s) responsible for environment and water affairs; and (b) estuarine management plans (EMPs) for individual estuaries (see section 34). The Protocol which was promulgated in 2014 provides a national policy for estuary management and guides the development of individual estuarine management plans. Furthermore, it must be ensured that EMPs are aligned with the Protocol and the National Coastal Management Programme (CMP).
Chapter 5: Institutional Arrangements	This chapter describes the institutional arrangements required by the ICM Act. It outlines a directive for the establishment of a National Coastal Committee (NCC) and Provincial Coastal Committees (PCC) and makes provision for the optional establishment of coastal committees at municipal level as well as voluntary coastal officers.
Chapter 6: Coastal Management	This chapter establishes new management and planning procedures to ensure that development is sustainable, integrated and in the interest of all user groups. It sets out the legal mechanisms for establishing a

ICM Act Chapter	Summary
	proactive planning system for coastal areas that integrates coastal concerns (including the marine dimension) into the existing provincial and municipal land-based and economic development planning procedures in a manner that is consistent with the policy goals of the White Paper. The current land-use planning system in South Africa is a land-based system that essentially stops at the high-water mark. This Chapter is designed to extend that system across the land/sea interface in order to allow for integrated coastal planning and the proactive control of the use of coastal resources.
Chapter 7: Protection of Coastal Resources	This chapter provides measures for protecting the coastal environment from detrimental activities. It also creates procedures for assessing and regulating such activities. Section 58 requires users of coastal public property, owners and occupiers of land, coastal managers and other responsible persons to take reasonable measures to avoid causing adverse effects on the coastal environment in accordance with section 28 of the NEMA. Section 59 provides for the Minister to issue written coastal protection notices requiring measures to be taken to protect the coastal environment (measures to stop or mitigate adverse effects) and coastal access notices to ensure that no person carries out an activity that is or is likely to have an adverse effect on any South African citizen's right to gain access and enjoy the use of coastal public property. Section 60 authorises the Minister or MEC to issue notices for the repair or removal of illegal and abandoned coastal structures, or structures in a poor state of repair. Section 61 empowers the Minister or MEC to undertake such work, if necessary, and recover the costs from the person to whom the notice was addressed.
Chapter 8: Marine and Coastal Pollution Control	Chapter 8 establishes integrated procedures for regulating the disposal of effluent and waste into estuaries and the sea. These procedures relate to both discharge and dumping permits (see also Schedule 2 of the ICM Act). Formerly the disposal of effluent through pipelines and the dumping of waste from vessels into estuaries or the sea were controlled under different pieces of legislation by different Departments. The ICM Act intends to regulate the discharge of effluent into coastal waters from any source on land (section 69) by requiring permits to authorise such discharges. Section 70 prohibits incineration at sea and restricts dumping at sea in accordance with South Africa's obligations under international law. Section 71 provides requirements applicable to dumping permits. The ICM Act authorises the Minister to dispense with prescribed procedure in respect to dumping in emergencies (section 72). For example, vessels in distress due to mechanical failure may need to urgently dump cargo overboard. The Act requires the Minister to develop a National Action List to screen waste and other material on the basis of their potential effect on human health and the marine environment (section 73).
Chapter 9: Appeals	This chapter provides details of the appeal process invoked with the issuing or refusal of, coastal protection notices, repair and removal notices, or authorisations granted in terms of the ICM Act. Chapter 9 empowers the Minister or MEC either to consider an appeal personally or to appoint an Advisory Appeal Panel to advise on the appeal (section 75). The purpose of a panel is to ensure that the consideration of an appeal is informed by technical expertise, where this is required. Pending the determination of an appeal, the Minister or MEC may make an interim order considered necessary to achieve the purposes of the Act (section76).

ICM Act Chapter	Summary
Chapter 10: Enforcement	This chapter makes provision for enforcement of the ICM Act, defines specific offences in the coastal zone, as well as stipulating the penalties that are attracted by the two categories of offences. Chapter 10 also determines the jurisdiction of courts (section 81) and gives the Minister, an MEC or a municipality the power to institute legal proceedings or take other measures in relation to coastal public property, the coastal environment or the rights of the public (section 82).
Chapter 11: Powers and Duties	This chapter clearly defines the powers and responsibilities that are designated to the Minister and the MEC in terms of making coastal regulations and where necessary, to take urgent action. It also deals with the coordination of enforcement actions by the three spheres of government, and the state of the coast reporting. Part 1 deals with the powers of the Minister (section 83) and of MECs (section 84) to make regulations to promote the Act's implementation and prescribes the consultative process that is to be followed when making regulations (section 85). The latter section also contains general provisions applicable to regulations. Section 89 and 91 empower the Minister and MEC to delegate certain functions to ensure effective implementation of the ICM Act.
Chapter 12: Miscellaneous Matters	This chapter deals with so-called 'transitional' matters that do not fall under any of the previous chapters. This includes a variety of matters which are necessary in order to facilitate a smooth transition from the previous management system to the ICM Act. These include provisions dealing with the continuation of existing leases on, or rights to, coastal public property (section 95), the procedures for dealing with unlawful structures on coastal public property (section 96). It also deals with other matters such as the repeal of other laws (section 98, the application of which commenced on 5 February 2016 in accordance with Government Proclamation No. 5 of 2016). One of the benefits of the ICM Act is that it largely replaces two existing Acts (the Sea-Shore Act, Act No. 21 of 1935, except sections assigned to the provinces, and the entire Dumping at Sea Control Act, Act No. 73 of 1980). Section 99 saves certain regulations and actions affected by section 98.

Source: adapted from Celliers et al., 2009 and DEA, 2017

Appendix 2: Summary of the responsibilities of provincial government in terms of the ICM Act

Table 11: Summary of provincial government responsibilities in terms of the ICM Act

Aspect of ICM	Provincial Government Responsibility
Management of the coastal protection zone	Ensuring the protection, management and enhancement of the coastal protection zone. This achieved by developing regulations to control the use, determine and adjust the boundaries of the coastal protection zone as deemed appropriate, as well as designation and inclusion of certain portions of provincially controlled state-owned land as coastal public property to achieve the objectives of the ICM Act. This may also include the appointment of voluntary coastal officers.
Establishment of coastal management lines	Establish coastal management lines by notice in the Gazette to restrict or prohibit certain activities that may have an adverse effect on the coastal zone.
Marking coastal boundaries on zoning maps	Inform municipalities of any coastal boundaries determined or adjusted in terms of S26 of the ICM Act.
Designation of provincial lead agencies	In collaboration with the Premier, ensure that provincial lead agencies for coastal management are designated and function effectively to promote and coordinate coastal management within a coastal province.
Establishment and functioning of Provincial Coastal Committees	Establishment of the Provincial Coastal Committee (PCC), determination of its powers and appointing representatives for the Committee.
Development and implementation of PCMPs	Develop PCMPs aligned with the contents of the ICM Act and NCMPG.

Aspect of ICM	Provincial Government Responsibility
Consistency and alignment between PCMPs and other statutory plans	Ensure that any plan, policy or programme adopted by an organ of state that may affect coastal management is consistent and aligned with PCMPs, which in turn is aligned with the NCMPG.
Consultation and public participation	Adequate consultation and public participation precede the exercising of a power by the MEC, which the ICM Act requires to be exercised in accordance with this section.
Environmental authorisations for coastal activities	Coastal management issues considered in terms of Section 63 of the ICM Act and requirements of this section complied with before an environmental authorisation is issued in terms of Chapter 5 of the NEMA.
Implementation of national Regulations	Implement national Regulations, for example, list public boat launch sites that may be used by the public to access the coastal zone.
Regulations by MECs	Develop regulations for the management of activities within the coastal protection zone and specify general procedures relating to regulations, including penalties for contraventions.
Information and Reporting on Coastal Matters	Prepare a report on the state of the coastal environment in the province which must contain any information prescribed by the Minister.
Coordination of actions between provinces and municipalities	Liaise with coastal municipalities in the province to coordinate actions taken in terms of this Act by provincial organs of state in the province with actions taken by municipalities.

Source: adapted from Celliers et al., 2009 and DEA, 2017