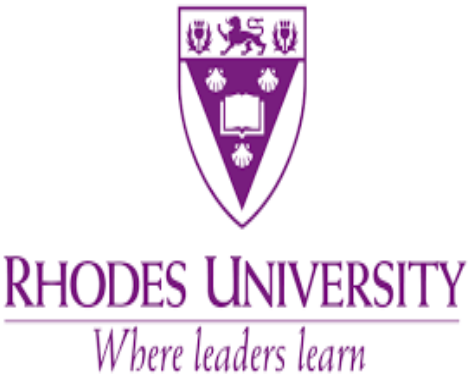
LIVELIHOOD IMPLICATIONS OF A POSSIBLE RAMSAR DECLARATION OF THE SWARTKOPS ESTUARY, EASTERN CAPE, SOUTH AFRICA



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A thesis submitted in fulfilment of the requirements for the degree of

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ABSTRACT

Estuaries are key ecosystem resources but are increasingly coming under threat from human activities which requires their protection. However, livelihood implications resulting from a change in management of natural resources need to be anticipated and factored in conservation planning. The Swartkops estuary in the Eastern Cape Province of South Africa is currently 'open access' but there are plans to protect it through a Ramsar declaration. Using household surveys and key informant interview, this study examines the direct and indirect uses of the Swartkops estuary, perceptions held towards state and management of that estuary, and future visions held by different users of the estuary, as a basis for informing future management options. One hundred and forty people were surveyed using a questionnaire, consisting of both closed- and open-ended questions. Of this sample, 47 respondents were direct users and 93 household survey respondents, chosen from neighbouring residential areas.

Overall, the findings suggest multiple uses of the estuary. Subsistence fishing and selling of bait organisms were key livelihood sources, providing cash income, supplementing dietary requirements and in some instances satisfying cultural values attached to the natural resources in the Swartkops estuary, especially for the poor. The well-off respondents tended to value the estuary for its recreational functions like boating and fishing. Perceived threats to the estuary included lack of visible management and clear policing of natural resources management but these were mainly cited by the more affluent users. Disservices of the estuary mentioned include breeding of mosquitos, drowning and a perceived crime hotspot. Concerning views for the future, improved management of the estuary was consistent between user groups, whilst a potential Ramsar declaration gained majority support. As expected, future visions were proposed with varied expected benefits, with results suggesting the wealthier user groups more concerned about conserving the ecological aspect of the Swartkops. However, due to limited livelihood opportunities, lower income user groups expected an improvement of their livelihoods, including continued access to natural resources in the Swartkops estuary. Such access would be important for crafting novel interventions that could reduce conflict levels between conservation agencies and local communities and in a broader sense; improve the relationship between the state and its citizens. This study concludes that any conservation proposition that advocates for restriction or limited use of natural resources without providing alternative livelihood options will be faced with difficulty. Consequently, the study proposes a

pro-poor approach; whereby marginalised communities are supported with capacity building to make decisions and are integrated in any proposed conservation plans for the estuary.

Declaration

I, Glen Muchengeti Vembo, hereby declare that the work in this thesis was carried out in the department of Environmental Science, Rhodes University under the supervision of Dr Gladman Thondhlana and Dr Georgina Cundill Kemp. The thesis has not been submitted to a university other than Rhodes University, Grahamstown, South Africa. The work presented here is that of the author unless otherwise stated.

Glen Muchengeti Vembo

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CHAPTER ONE
SOCIO-ECONOMIC IMPORTANCE OF ESTUARIES FOR HUMAN LIVELIHOODS

1.1 Importance of estuaries

Worldwide, large tracts of land have been converted to suit and cater for human needs, reducing the capacity of ecosystems to provide sustained services and benefits to people, both economically and socially (Foley et al. 2005; MA, 2005; Ostrom, 2009; Sink et al. 2012; Wright and Wimberly, 2013; Pascual-Aguilar et al. 2014; Needles et al. 2015). With economic development opportunities in various parts of the world, conversion of ecosystems to satisfy human needs has intensified pressure on both terrestrial and aquatic ecosystems, particularly wetlands and estuaries (Barbier et al. 2010, Adekola and Mitchell, 2011).

Estuaries are broadly defined as transitional zones or a tidal sea inlet into the land (Pritchard, 1967). This study defines estuaries as partially or fully enclosed water bodies that are open to the sea either permanently or periodically, and which occur in areas where sea water can be diluted with fresh water from rivers (Pritchard, 1967; Day, 1980; Elliot and Whitfield, 2011). Estuaries are dynamic systems, varying in geomorphological and hydrographic characteristics, which can be classified as permanently open estuaries, temporarily open or closed estuaries, estuarine lakes and estuarine bays (Pritchard, 1967). Estuaries are dynamic and multifunctional systems that meet the needs of a wide variety of stakeholders, particularly in urban areas (Jennerjahn and Mitchell, 2013).

Increasing evidence indicates that estuaries can provide multiple ecosystem services in urban landscapes, including supporting economic activities such as tourism and in some instances, cultural ecosystems contributing to the aesthetic beauty of landscapes, making them more attractive for property development (Lamberth and Turpie, 2003; Turpie et al. 2010; Barbier et al. 2011; Thrush et al. 2013; Needles et al. 2015), and are therefore important for coastal settlements. Estuaries have been listed amongst the most productive and valuable ecosystems (Worm et al. 2006; Barbier et al. 2011). For example, estuaries account for close to US$ 800 billion in trade and commerce for the United States of America's economy (McKeon, 2010; Clarkson et al. 2013). As a result of their multi-functional nature, estuaries have been a focal point of human settlement in rural areas and have also led to an increase in urban development along coastal areas (Lotze et al. 2006).

In South Africa, subsistence fisheries in the Knysna estuary have been estimated to account for at least R1 million per year, although the value of properties linked to the view and aesthetic nature of the same estuary dwarfs this amount, which is estimated at approximately R1.4 to R2 billion (Napier et al. 2009). Subsequently, this has led to an increased demand for natural resources within these ecosystems (Kennish, 2002; Lotze et al. 2006) resulting from increased urbanisation and overexploitation, thus affecting the ability of estuarine ecosystem services to cope with the increased demand (Hoeg-Guld-berg and Bruno, 2010; Fraser et al. 2011).

Beyond provisioning services, estuaries also provide other ecosystem services that include regulating, cultural and supporting services. With regards to regulating services, estuaries act as a buffer zone stabilising shorelines, reducing flooding impacts and are crucial in improving water quality as they act as filters through salt marshes and forest mangroves (Zedler and Kercher, 2005; Clarkson et al. 2013). Estuaries also provide supporting services like habitats for different animal and plant species and nurseries for different flora and fauna (Van Niekerk et al. 2013; Kleijn et al. 2014; Nel et al. 2015). In addition, estuaries provide non-material benefits which are critical in addressing how humans interact with and benefit from the environment (MA, 2005; Mlangeni, 2007). Studies have shown that these benefits are often expressed through contact with nature for cultural and spiritual purposes, and for recreational and educational value (Chan et al. 2011; Clarkson et al. 2013; Thondhlana and Shackleton, 2015). Adger et al. (2013) define culture as symbols that express meaning, for example beliefs, rituals and stories that create collective outputs and behaviours towards the use of natural resources. Over the past decades, there has been an increase in the protection of cultural values and acknowledgement of community use of such services, but these values are often not well articulated, and have therefore often not fully been addressed in different management options (Daniel et al. 2012; Ernstson, 2013; Darvill and Lindo, 2015).

Despite the significant role that estuaries play in ensuring ecological integrity and sustaining livelihoods worldwide, they are faced by massive transformations due to human activities, thereby affecting their ability to fully function with regards to providing provisioning, regulating, supporting and cultural services (MA, 2005; Worm et al. 2006; Waycott et al. 2009). Indeed, estuaries have been listed among the most threatened ecosystems (Lotze et al. 2006; Halpern et al. 2008). Increased industrialisation and urbanisation, and subsequent pollution levels have put estuarine ecosystems under enormous ecological pressure (Kennish, 2002; Benton-short and Short, 2013). Because of this, South Africa, as a signatory to the Ramsar

Convention, has seen a substantial number of wetlands and estuaries declared Ramsar sites, a declaration that has been embraced following the length and breadth of the South African coastline, in recognition of the potential of estuaries to provide natural resources for human livelihoods (Lamberth and Turpie, 2003; Sowman, 2006; Van Niekerk et al. 2013).

1.2 Estuaries: South African Context

South Africa has approximately 300 functional estuaries along its 3000 km coastline which have important ecological and socio-economic roles (Larnas and Turpie, 2009; Van Niekerk and Turpie, 2012). Three biogeographical regions characterise the South African coastline, namely the cool temperate west coast, the warm temperate southern and south-east coast and the subtropical east coast (Van Niekerk et al. 2013). Like other estuaries in the world, South African estuaries provide a full set of ecosystem services including economic opportunities such as subsistence and commercial fishing, vast nursery grounds rich in nutrients for juvenile fish and protection from marine predators (Turpie and Clark, 2007; Van Niekerk et al. 2013).

Subsistence fishing is considered a key livelihood source mostly for the poor income groups, with fish supplementing dietary needs (Ellender et al. 2009; van Niekerk et al. 2013; Sowman et al. 2014). Interlinked with the provisioning services obtained through activities such as fishing are cultural services. Cultural services are a critical component of ecosystem services and their importance for enhancing human well-being (MA, 2005) and the importance of their inclusion in decision making (Cocks et al. 2008; Turpie et al. 2008; Darvill and Lindo, 2015), have all been documented. Benefits and values from cultural services have led to property development along estuaries in South Africa subsequently leading to an increase in property values and tourism (for example in Knysna), due to their aesthetic beauty (Turpie et al. 2009; Swemmer, 2010).

Consistent with global trends, many ecosystems in South Africa have been lost or modified due to an increased demand for land and water (Lannas and Turpie, 2009; Nel et al. 2015). An ecological study by von der Heyden et al. (2015) identified five key elements as the major cause of degradation, namely flow modification, pollution and exploitation of living resources, land use and development, and manipulation of estuary mouths. Pollution is in the form of both domestic and industrial discharge, with the latter having significant impacts on estuarine ecosystems such as in the Swartkops estuary (Nel et al. 2015). Point and non-point discharge into estuaries have been major factors affecting the ecological setup, especially of urban

situated estuaries (Orr et al. 2008, Van Niekerk et al. 2013; Strydom et al. 2015). Further, exploitation of living resources (such as bait collection and fish) has also been recorded as a major threat to South African estuaries with an estimated 85 % of estuaries providing resources in the form of bait collection (Turpie and Lamberth, 2010).

There are a substantial number of estuaries along the South African coastline, some of which are at the centres of urban development, for example, uMgeni in northern Durban and the Knysna estuary in Knysna in the Western Cape. Although most of these estuaries are considered relatively unpolluted, exceptions include those near industrialised centres like Port Elizabeth and East London (Orr et al. 2008). Urban estuaries are exposed to greater risks due to urbanisation, industrialisation and a growing proportion of the urban poor, who see estuaries as a livelihood source. As a result, greater pressure is exerted on urban estuaries than rural estuaries. To understand the uses and pressures characterising these estuaries, as a first step in designing management strategies, natural resource utilisation must be categorised, including how these resources are valued by the relevant stakeholders.

1.3 Conceptual framing: Resource value and valuation

With a growing understanding of ecosystem services and their related contribution to human well-being, the past few decades have seen an increased body of research into natural resource use and valuation strategies (De Groot et al. 2010; Constanza et al. 2014; Samonte et al. 2016). Relating to this, researchers have tried to design, follow and apply frameworks to understand multiple values of natural resources with respect to the different value streams (Fisher and Turner, 2008), their links to human well-being (Keeler et al. 2012) and estimating resource value from quantitative and qualitative standpoints (Constanza, 1997; De Groot et al. 2002). The point of departure in understanding the value of estuary resources in this study is the Millennium Ecosystem Assessment framework (MA) (Figure 1.1) and the Total Economic Valuation framework (TEV) (Figure 1.2), because these frameworks have informed many previous studies on resource valuation (see De Groot et al. 2010; Constanza et al. 2014; Richardson et al. 2015; Samonte et al. 2016).

1.3.1 Millennium Ecosystem Assessment framework (MA framework)

A bid to improve sustainable management of natural resources, build capacity for further management possibilities and improve the human-environment relationship (Tallis et al. 2008) led to the development of the MA framework (MA, 2005; Carpenter et al. 2009). The framework set out to investigate how changes in ecosystem service use and management affect human well-being (MA, 2005; Daw et al. 2011). Examples of some conventions linked to the Millennium Ecosystem Assessment framework include the Ramsar Convention (Finlayson et al. 2011), the Convention on Biological Diversity (CBD) (Vörösmarty et al. 2010) and the United Nations Convention to Combat Desertification (UNCCD) (Chasek et al. 2011). The MA framework (Figure 1.1) is significant and equally vital as its major goal, the relationship between humans and ecosystems, is well aligned with the goals of the Ramsar Convention which promotes the wise use of wetlands and recognises ecosystem services provided by wetlands to people (MA, 2005; Finlayson et al. 2011). Key to the conception of this framework is the classification of ecosystem services to better understand, assess and monitor them.

1.3.1.1 Classification of ecosystem services

The core of the Millennium Ecosystem Assessment framework was to differentiate ecosystem services and benefits into distinct categories (Figure 1.1) (De Groot et al. 2002; Boyd and Banzhaf, 2007; Constanza et al. 2014). Ecosystem services are defined as the benefits human beings obtain from natural and human modified ecosystems (Constanza et al. 1997; MA, 2005) and are divided into provisioning, regulating, supporting and cultural services (MA, 2005; Chan et al. 2011). In this study, the focus is on two types of ecosystem services, namely provisioning and cultural. According to MA (2005), provisioning ecosystem services are tangible and directly accessible natural resources, contributing to human well-being. In aquatic ecosystems such as estuaries, fish, reeds and freshwater make up the provisioning services (Adeokola and Mitchell, 2011; Enviro-Fish Africa, 2011).

Enhancement of human livelihoods through extraction of provisioning services is well documented (MEA, 2005, Mmopelwa et al. 2009; Adekola and Mitchell, 2011; Shackleton et al. 2013) and several researchers have attributed their extraction to alteration of landscapes (Baral and Heinen, 2007; Maconachie and Hilson, 2011). Across all regions in the world, the highest dependence on provisioning services has been experienced in developing countries, particularly amongst rural households (Shackleton and Shackleton, 2006; Glavovic and Boonzaier, 2007). Valuation of provisioning services has been understood across several

research disciplines mainly because of their ability to be traded easily on markets (Chan et al. 2012; Darvill and Lindo, 2015).

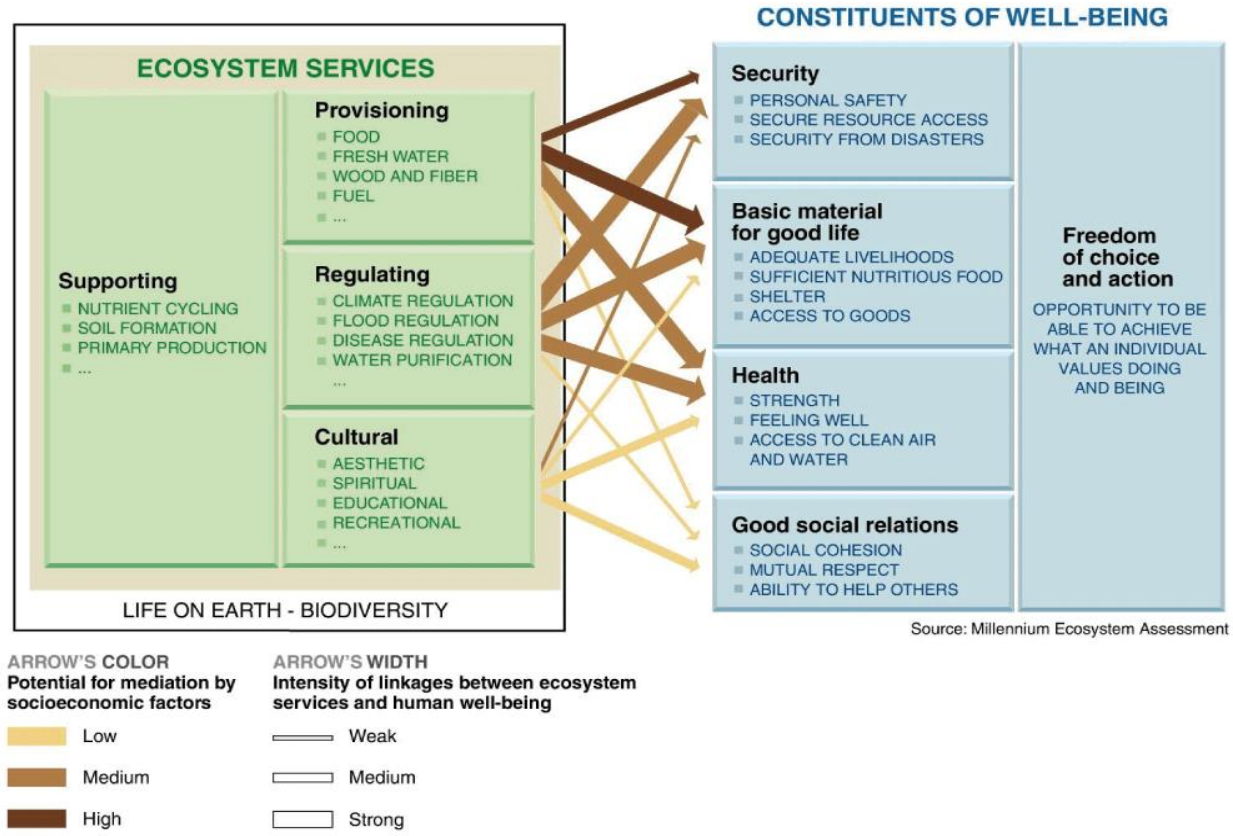

Figure 1.1: Millennium Ecosystem Assessment framework (MA, 2005)

Cultural ecosystem services are defined as non-material benefits obtained through spiritual and religious practices and values, knowledge systems, recreation and aesthetic experience, among others (MA, 2005; Daniel et al. 2012). Understanding their contribution has drawn a multi-disciplinary effort encompassing ecological, economic and a social science understanding (Milcu et al. 2013), attracting a variety of research methods (Kepe, 2008; Chan et al. 2011). A significant amount of research has demonstrated that despite cultural services from ecosystems playing a pivotal role in natural resource use and management, they have been often ignored, and usually sacrificed for economic and ecological interests (De Groot et al. 2002; Chan et al. 2011; Hendee, 2011).

Since cultural services are often intangible and therefore hard to measure, these services are often considered as an afterthought, thereby affecting their valuation as an ecosystem service (Milcu et al. 2013). Further, cultural services are considered under direct non-consumptive use

values, resulting in a negative effect on decision making and inadequate and ineffective natural resource management policies and strategies (Beaumont et al. 2008; De Groot et al. 2010; Gasparatos et al. 2011; Daniel et al. 2012; Thondhlana and Shackleton, 2015). As demonstrated by the Millennium Ecosystem Assessment framework, ecosystem assessments are highly linked to human wellbeing, thus making integration of social constructs influencing cultural ecosystem values crucial to consider in decision making and informing natural resources conservation (Carpenter et al. 2009; Daniel et al. 2012). Further, cultural services have proven to be complex and difficult to value using market indicators, as these services are rarely marketable (Carpenter et al. 2009). Therefore, it remains a challenge to achieve a full valuation of natural resources despite established valuation techniques, which means a gap still exists in the methods applied to understand how and why people value natural resources (Dawson and Martin, 2015).

1.3.2 Natural resource valuation

Valuation of natural resources has been key across many sectors ranging from ecological to social science approaches, used mainly to understand their contribution to livelihoods and human well-being, as a basis for conservation and management of natural resources (MA, 2005; Kepe, 2008; Tallis and Polasky, 2009; Braat and de Groot, 2012). The concept of natural resource valuation has traditionally been characterised by an interchangeable use of terms such as value, value system and valuation (Farber et al. 2002; Gomez-Baggethun et al. 2010) to determine the value or importance of a resource or their contribution. As noted by MA (2005) and Turner et al. (2003), natural resource valuation enables a decision process to determine which service or set of services is valued most highly and how to develop approaches to maintain these services by managing the system sustainably. However, to effectively place a value on natural resources, this needs to be done in a local livelihood context which enhances understanding of how factors like social differentiation help in determining who uses which resource as well as the amount they use (Kepe, 2008).

1.3.2.1. Economic valuation of natural resources

An economic valuation approach has contributed immensely to natural resource conservation through policy development (see Shackleton et al. 2001; Turpie et al. 2008; Juniper, 2011).

Three main value domains characterise the valuation of natural resources, a) ecological, b) socio-cultural and c) economic values (MA, 2005; De Groot et al. 2010). However, economic valuation strategies have been the dominant approach regarding natural resources valuation and categorises value into use and non-use values (Figure 1.2) (Kepe, 2008, Pascual et al. 2010).

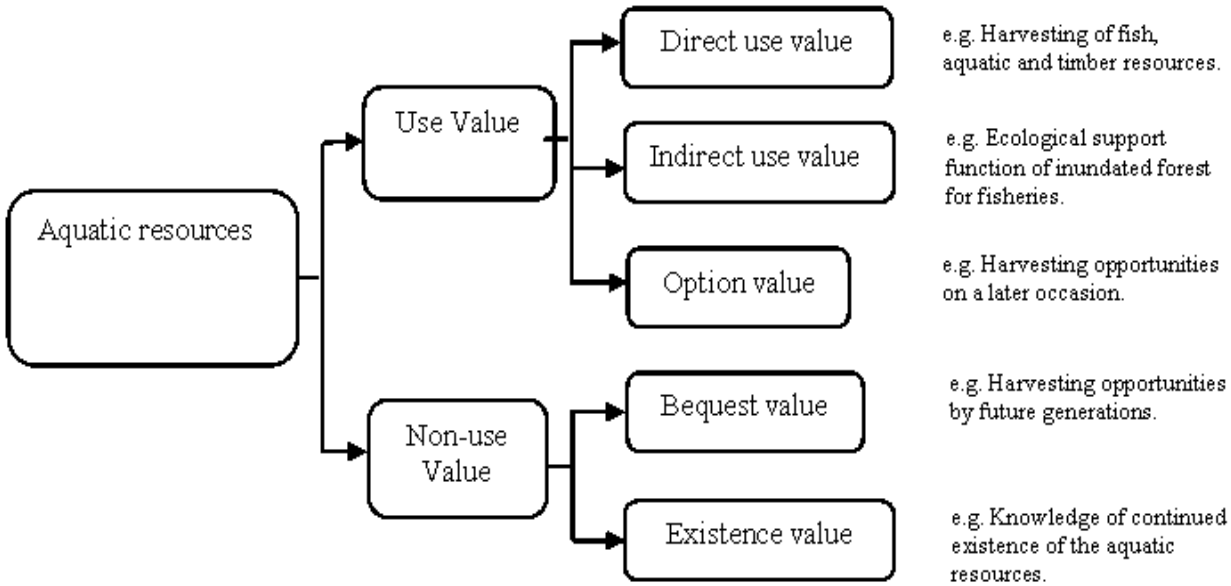

Figure 1.2: Components of the Total Economic Valuation framework (Adapted from FAO, 2004)

Economic valuation uses money as a measure of value (Harvey 1996) cited in (Kepe, 2008). The use of money is understood worldwide and hence is regarded as a universal measure of value. Natural resource valuation arguments have shown how the use of money has the potential to unify complex and multi-dimensional values of natural resources to one stroke of valuation - that is the use of money (Nunes and van den Bergh, 2001; Kepe, 2008; De Groot et al. 2010). Markets have been developed to cater for these ecosystem services and values and thereby provide a basis on which decisions are informed (Turpie et al. 2008; De Groot et al. 2010).

The presence of economic markets globally has made it possible to calculate and estimate natural resource degradation, helping facilitate conservation practices (Kepe, 2008, Juniper, 2011) through policy advocacy (Shackleton et al. 2001). Furthermore, markets provide decision makers in natural resource management with a base for making informed comparisons

of various land use options. Despite these strides, total economic valuation does not fully encompass multi-dimensional natural resource values associated with ecosystems, as some benefits are difficult to characterise and measure (Satz et al. 2013). This can be a result of the absence of markets to cater for other resource values, for example relational values such as a sense of place (Darvill and Lindo, 2015). In addition, economic valuation approaches seem to be self-oriented with markets being key in determining resource value and therefore it is difficult to provide a full value of natural resources since other resources do not have markets to cater for them (Chan et al. 2012).

Kepe (2008) and Lele et al. (2013) outline that using money to measure natural resource value on its own is inadequate, citing its inability to encompass ecosystem services with a notional value such as spiritual values. Harvey (1996) examines where money is used as a single rod or common denominator of measurement. In the findings, he reiterates that money gains strength from various social processes, which in themselves are dynamic and contradictory. Given the dynamic and contradictory nature of social processes, influenced by different people across different scales, the use of money proves to be unreliable (Kepe, 2008).

An economic valuation approach tends to miss out on measuring non-use values attached to dimensions such as culture which are complex, meaning values shown in markets do not reflect the full value of natural resources (MA, 2005). In response to this, it is now increasingly acknowledged that several ways of representing natural resource value, including a ranking of importance of ecosystem services provided as well as qualitative measures, should be considered in resource valuation (MA, 2005; Bateman et al. 2011). These multiple ways of representing the value of natural resources are essential to cater adequately for both values of ecosystem services. Studies highlight that in some circumstances it is unethical to put a monetary value on natural resources such as a sense of place, pointing out the complexity of valuing natural resources for decision making (Pascual et al. 2010; Lele et al. 2013).

Valuation of natural resources, according to Pascual et al. (2013), is heavily dependent on interlinked contexts including social, cultural and economic. This indicates difficulty in effective approaches to natural resource valuation since a single unit of measurement of value that satisfies all parties may not exist (Pascual et al. 2013). Given this complexity, it is important to consider both market and non-market valuation techniques to identify and measure

the full worth of natural resources. Consideration of multiple ways of valuing nature can enable a meaningful representation of the value of nature to different users.

1.4 Aims and objectives of the study

Within this context, the main aim of this study was to explore the direct and indirect use values of the Swartkops estuary and stakeholder perceptions on the estuary's future in Port Elizabeth, South Africa, as the basis for informing management options that can ensure a positive future for the estuary. The key objectives and specific questions are:

a) To identify the uses and contribution of the Swartkops estuary to the livelihoods of the users. Key questions included:
    - What is the direct use value to users of natural resources from the Swartkops estuary?
    - In what ways do natural resources contribute to user household food security?

b) To explore the cultural services gained from the Swartkops estuary by users. Key questions included:
    - What cultural values are attached to the Swartkops estuary by different user groups?
    - What cultural services are considered most important to users?
    - In what ways do cultural services differ by user groups (income status, employment, age etc.)?

c) To establish stakeholders' perceptions of a positive future for the estuary. Key questions included:
    - What are the perceptions held by local communities towards the state of the estuary?
    - What are the future visions for the estuary and support for a possible Ramsar declaration among different social groups and how do they differ?

1.5 Structure of the thesis

The rest of the thesis is structured as follows: Chapter 2 discusses and explains the study area, land use patterns and its biophysical and socio-economic characteristics, drawing on the importance of the Swartkops estuary and the pressures it has been subjected to. A critical reflection of the Convention on Wetlands of International Importance in relation to the Swartkops estuary is provided and implications for estuaries management are discussed. Chapters 3 and 4 are the empirical chapters and are structured as journal articles. Chapter 3 presents the direct and indirect use values of natural resources to multiple users of the Swartkops estuary, including the perceived impact on human well-being and contribution towards food security. Chapter 4 explores the attitudes and perceptions held by the respondents towards the estuary and how that affects the support they have for the declaration of Ramsar. Chapter 5 provides a synthesis of the findings and conclusions of this study.

CHAPTER TWO
DESCRIPTION OF THE STUDY SITE

2.1 Introduction

This chapter aims to give a full account of the study area through the description of the Province and municipality in which the Swartkops estuary is located. This is done through highlighting and describing both physical and socio-economic characteristics of the study area. This study was conducted in the Swartkops estuary, located in the Nelson Mandela Municipality in the Eastern Cape Province, South Africa. This estuary experiences different anthropocentric effects as it is characterised by commercial and residential areas along its banks. Further, it offers different forms of ecosystem services, for example, provisioning services through fishing and collection of other natural resources as well as cultural services through activities like bird watching and boating.

2.2 The Eastern Cape Province

The Eastern Cape Province is home to approximately 12.7% of the South African population and its total land area is estimated to be around 168 966 km^2 or approximately 13.9% of the country (Hamann and Tuinder, 2012). As is the case in many parts of South Africa, the population in the Eastern Cape Province is diverse but dominated by IsiXhosa-speaking people (82.7%), followed by Afrikaans (10.3%) and English-speaking people (3.9%) (Community Survey, 2016). Understanding the socio-economic characteristics is important because of their influence on various uses of the ecosystem by different stakeholders. The Province is characterised by low employment levels, and the Nelson Mandela Bay municipality, where the Swartkops estuary is located is not an exception.

The Eastern Cape Province experiences a bimodal rainfall pattern providing winter rainfall in the Western parts of the Province and summer rainfall in the East (Hamann and Tuinder, 2012). The summer rains encourage production of cattle and sheep due to the abundant grasslands favoring this weather. Most of the southern part of the Province is adjacent to the ocean with a coastline spanning almost 800 km in length.

The Eastern Cape is the only Province in South Africa that is characterised by all biomes and vegetation types except the desert, with the Nama Karoo and the Savanna biomes dominating (Hamann and Tuinder, 2012). This is due to the various weather patterns suitable for different vegetation and biomes. In addition, the Eastern Cape Province is home to the Cape Floristic region and Maputaland-Pondoland-Albany Centre for endemism. One of the major municipalities, Nelson Mandela Bay Municipality, is highly biologically diverse, a result of its location, a convergence zone of nine of South African biomes (Fordyce, 2013).

Because of the long coastline, the Eastern Cape Province boasts a substantial number of estuaries and rivers making up almost half (50 %) of the total number of estuaries on the South African coastline (Van Niekerk and Turpie, 2012). In general, the Province's rivers are regarded to be in a bad state, experiencing high demand for freshwater in the semi-arid parts of the Province (Hamann and Tuinder, 2012). The Province is home to several freshwater and marine endangered and threatened species, which include fish (freshwater and marine), frog and reptile species, with some of these being endemic (Hamann and Tuinder, 2012). In comparison, the estuaries in the Province are generally regarded as healthy (Hamann and Tuinder 2012) except for estuaries around Port Elizabeth in the Nelson Mandela Bay Municipality.

Conservation practices have been put in place, headed by the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) at the provincial level. This branch oversees conservation projects such as the Cape Action for People and the Environment (C.A.P.E), the Succulent Karoo Ecosystem Program (SKEP) and the Subtropical Thicket Ecosystem Planning (STEP) (Hamann and Tuinder, 2012). However, given the past segregation policies that were in place, challenges arise when trying to implement management options which seem to affect people's livelihoods, especially the poor who are still reeling from historical segregations (Makiwane and Chimere-Dan, 2010; Hamann and Tuinder, 2012).

A substantial proportion of the population in the Eastern Cape Province is confined to the former homeland areas, following the settlement and urbanisation patterns drawn by the apartheid regime through the Bantu Authorities Act of 1951 (Makiwane and Chimere-Dan, 2010). However, in recent days, rural to urban migration has been a common phenomenon resulting in increased population densities along coastal and urban areas, a search for employment and better living conditions being the major driver (Hamann and Tuinder, 2012).

Migration of the population from former homelands to centres like East London and Port Elizabeth has been a result of mostly job seeking in industries such as the motor manufacturing and shipping industries (Makiwane and Chimere-Dan, 2010). These two urban centres are highly developed but a significant proportion of their populations live in poverty, like their counterparts in the rural hinterlands which are generally underdeveloped (Makiwane and Chimere-Dan, 2010). A desire for new livelihood opportunities has led to an increase of inhabitants along the coastal cities and towns therefore increasing pressure on natural resources especially wetlands and estuaries (Van Niekerk et al. 2013; Nel et al. 2015). Subsequently, the Nelson Mandela Bay Municipality has not been spared by major threats facing estuaries and wetlands such as urban development, wilting coastal zones, modification of freshwater flow as well as overfishing and exploitation of resources. Addressing contemporary environmental problems and challenges therefore requires research to consider the problems from a local perspective, and to understand the views and perceptions towards given ecosystems.

2.3 The Swartkops estuary

The Swartkops estuary is in the Nelson Mandela Bay Metropolitan area (33º57S; 25º38E), in the Eastern Cape Province of South Africa (Figure 2.1). Predominantly a human landscape, the Swartkops estuary lies approximately 15 km north of the Port Elizabeth central business district. The Swartkops estuary is estimated to cover an area of approximately 682 ha and is about 16 km in length from the mouth to its upper reaches (Enviro-Fish Africa, 2009). This estuary harbors the third largest salt marsh in South Africa along the coastline and is fed by a river which originates approximately 100 km south east of Nelson Mandela Bay. Figure 2.2 is an insert showing an aerial view of the study site.

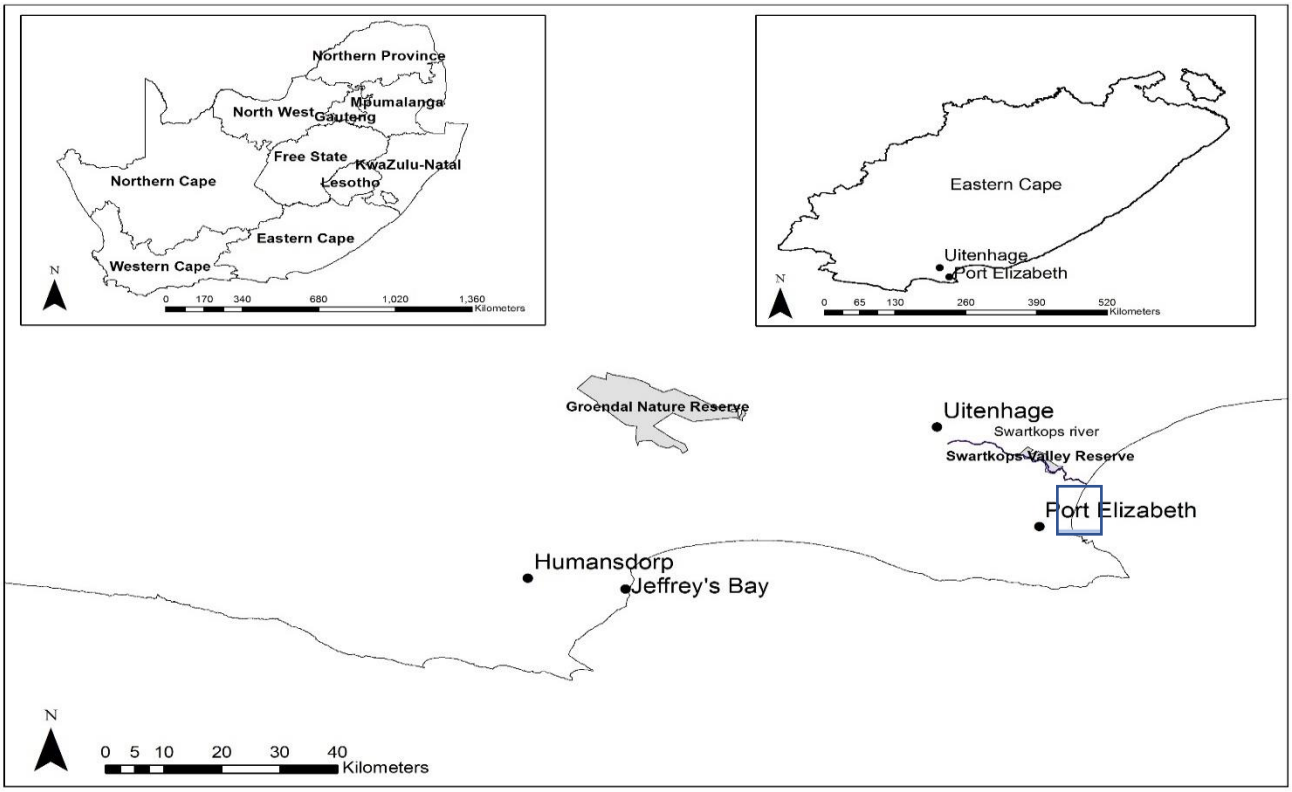

Figure 2.1: Map of the study site showing its position in the Eastern Cape Province and in South Africa as a whole

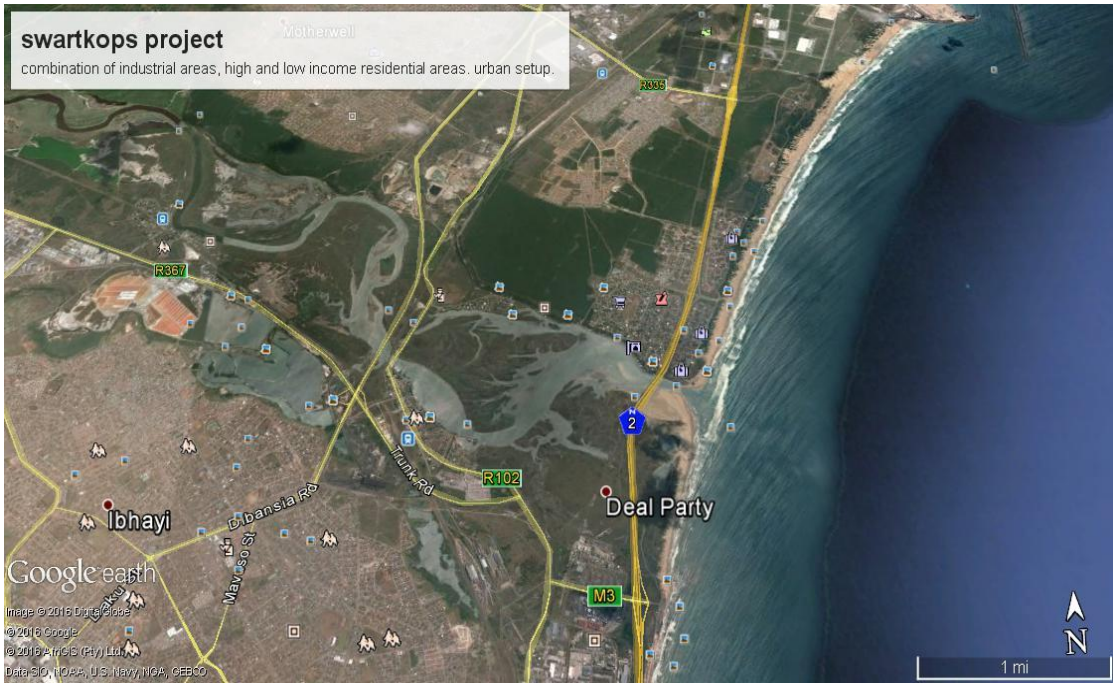

Figure 2.2: Aerial map of the Swartkops estuary (source, Google earth)

The Swartkops estuary is characterised by four primary types of vegetation on either side of the estuary. These include the coastal dune herb lands, floodplain scrubland dominated by

succulent scrub and herbs, grasslands dominated by *Thermeda triandra* and lastly thicket, which is dominated by *Portucalaria afra.* With vast areas of vegetation and abundant food, the estuary and its surroundings attract birds from all over the world hence its status as an International Bird Area (IBA). Surveys dating back to the late 1970s have indicated that the Swartkops estuary has supported an estimated 86 species of fish, with eelgrass beds providing critical nursery areas for juvenile fish species (Enviro-Fish Africa, 2009).

The Swartkops estuary is considered the 11th most important estuary across South Africa because of its diverse and vast amounts of flora and fauna (Enviro-Fish Africa, 2009). Most of this flora and fauna is found in the protected areas adjacent to the Swartkops estuary namely the Swartkops and Aloe Nature reserves as well as the Groendal Wilderness Area. Both the Swartkops and Aloe Nature Reserves have been recognised as areas for biodiversity conservation, therefore forming an integral part of the proposed protected area network in the Nelson Mandela Bay Municipality. The estuary is also characterised by several freshwater ponds with abundant biodiversity. One pond in particular, commonly referred to as pond 6 has received attention from several stakeholders because it is located between industrial and residential areas and is affected by immense pollution.

Land adjacent to the Swartkops estuary comprises residential areas of different income status. Major residential areas include high-income (Bluewater Bay/Amsterdamhoek), parts of Swartkops village as well as low-income areas such as Kwazakhele and Zwide. As a result, people from these residential areas have distinct uses of the estuaries. Furthermore, industrial sites are visible around the Swartkops estuary with activities in the saltpans, sewer treatment plants, brickworks and tanneries. These industries have been reported to be the major contributors of pollution through point and non-point discharge of effluent into the estuary. Despite its high biodiversity, the Swartkops estuary banks have undergone major transformations and have been subjected to several human uses such as the development of industries and residential areas. This has therefore prompted calls to include the Swartkops estuary within the already established protected areas adjacent to it.

2.4 Pressures on the Swartkops estuary

Apart from increased demand for directly consumable resources, the Swartkops estuary is faced with major environmental threats such as habitat alteration, the release of sewage from nearby

residential areas (Hayes, 2015) and industrial pollutants (Pillay, 2015). Habitat alteration has been mostly attributed to various subsistence bait collectors as reports indicate the use of banned equipment such as spades and folks (Enviro-Fish Africa, 2009; 2011). Digging up of estuarine banks with such tools has resulted in a hardening of the estuary bed thereby affecting the entire system.

However, the challenges at the estuary cannot be limited to the small number of these users as it is also surrounded by several factories engaging in different activities (Enviro-Fish Africa 2011), which result in increased deposition of industrial effluent (Van Niekerk et al. 2013). It is claimed that a significant amount of the pollution is coming down the Swartkops River from the nearby towns of Uitenhage and Despatch and into the estuary as it is the exit point to the sea (Van Driel, 2000). The Motherwell and Markman canals have been highlighted as the main channels of deposition into the estuary. This pollution has resulted in studies and articles indicating that it is harmful to eat fish coming out of the estuary as they may cause diseases thus having an immense impact on every stakeholder relying on fish from the estuary as a food and livelihood source (The Herald, 2014; Pillay, 2015; Strydom et al. 2015; Capa, 2018).

Further, reports of illegal dumping have surfaced in recent years which could potentially result in soil and water erosion (Enviro-Fish Africa, 2011; Van Niekerk et al. 2013; Hayes, 2015; Ellis, 2017). Dumping of litter has been massive especially in the surrounding townships, basically the low-income residential areas. Furthermore, unplanned construction of structures such as jetties and slipways has been reported to have affected the flow of water within the estuary. In addition, there has been a rise in the development of informal residential areas around the estuary which has contributed to the loss of natural habitat (land clearing) and increased erosion due to poor land use practices (Enviro-Fish Africa, 2011).

Considering all these pressures on this estuarine ecosystem, the government, through the Eastern Cape Parks and Tourism Authority (ECPTA) and non-governmental organisations as well as other interested stakeholders should raise concerns regarding proper management of this valuable ecosystem. Given that South Africa is a signatory to an international treaty, the Convention on wetlands of international importance commonly known as the Ramsar declaration, deliberations are being made seeking to explore the declaration of the estuary as an alternative management option (Zwartkops Conservancy, n.d). These discussions are against reported heavy usage of the estuary for provisioning and cultural services. According

to a report by Enviro-Fish Africa (2011), various cultural practices are conducted in and around the estuary such as baptisms, cleansing ceremonies as well as harvesting of medicinal plants. However, systematic empirical evidence with regards to the extent of dependence by users is not readily available (Enviro-Fish Africa, 2011).

2.5 Management of estuaries in South Africa

Management of South African estuaries is mainly informed by the National Water Act (Act 36 of 1998). The National Water Act encourages access to water for basic human needs and for purposes of ecological stability, in a way that promote equitable access to water resources for various purposes (Van Niekerk, 2007; Slinger et al. 2014). Despite management of estuaries considered at all spheres of government organisations, from national to local municipalities, it is mostly local organisations that demonstrate more effort towards management of estuaries (Van Nierkerk, 2007). Having these multiple government organs managing estuaries has presented its own challenges, particularly overlaps and fragmentation in implementation of legislature, resulting in conflicting roles and ineffective undertaking of duties (Van Nierkerk, 2007).

According to a report by Enviro-fish Africa (2011), the Swartkops estuary is cooperatively managed by the relevant government authorities and the civil society. The civil society is inclusive of non-governmental conservation agencies (for example, Zwartkops Trust) and a team of honorary fisheries control officers. Inclusivity of different stakeholders in conservation of natural resources promotes sharing of valuable ideas, feedback and methods of effective resource management (Hettiarachchi et al. 2014). Key stakeholders in this setup include the local municipality and government departments such as Department of Water and Sanitation, (tasked with managing water quality and quantity) and the Department of Environmental Affairs and Tourism (DEAT) which is responsible for land use and infrastructure development. In addition, the Zwartkops Trust and the honorary fisheries control officers are also key, given their contribution towards awareness about the importance of the estuary and upholding of the Marine Living Resources Act (MLRA) respectively (Enviro-fish Africa, 2011). The MLRA focuses on regulating collection of natural resources, including how much one can collect and when they can collect it as well as guiding how certain resources should be collected. Therefore, upholding this Act potentially sets different stakeholders on a collision path, resulting from the different uses of the estuary.

2.6 Convention on Wetlands of International Importance (Ramsar Declaration)

According to the South African Estuaries classification (Van Niekerk et al. 2013), the Swartkops estuary is regarded as highly modified because of mostly anthropogenic factors. Accordingly, there are calls for measures to control and reduce wetland and estuarine degradation as per the National Water Act (36 of 1998). In response to this the Eastern Cape Parks and Tourism Agency (ECPTA) is considering conventions such as the Ramsar declaration to enhance conservation of estuarine resources. The declaration was agreed upon in 1971 in Iran and came into effect five years later in 1975 with the focus put on waterfowl and protection of their migratory species (Matthews, 1993; 2013).

With time, the Ramsar declaration took into consideration the links between human beings and their immediate ecosystems, thus upgrading from their initial standpoint focusing solely on waterfowl (Matthews, 2013; Hettiarachchi et al. 2015). Its approaches took a turn from being dominated by a protectionist approach to a preservationist ideology where they seek to involve every relative stakeholder in natural resource management rather than the former approach which saw an exclusion of other relevant stakeholders (Matthews, 2013; Junk et al. 2013; Kleign et al. 2014; Hettiarachchi et al. 2015). Kleign et al. (2014) postulate that despite bird populations increasing in Ramsar protected sites in Morocco, little is known of the extent of benefits brought forth by Ramsar declarations.

Considered as one of the pioneering international treaties for biodiversity management, the Ramsar declaration is widely regarded as the backbone of modern-day wetland management which includes estuaries (Matthews, 2013; Hettiarachchi et al. 2015). The declaration is an inter-governmental treaty which brings with it benefits such as a base for policy formulation at both local and national level and increased opportunities for further research on the wise use of estuaries (Finlayson et al. 2011). However, despite numerous benefits the convention brings, urban wetland management received attention little more than a decade ago (Finlayson et al. 2013). With urban wetland management emerging within the last decade, understanding its interactions with different users is important to inform meaningful policies that do not infringe on people's rights (Hettiarachchi et al. 2014).

The Ramsar declaration was created based on three conceptual pillars namely; site designation and management, wise use of wetlands, and international cooperation (Hettiarachchi et al. 2015). Site designation and management was the main basis of the declaration and called for the protection of an ecological state through imposing a protected area status under national law (Hettiarachchi et al. 2015). With time, the wise use of estuaries took centre stage, driven by the motive of understanding how human activities affect wetlands, including estuaries and encouraged national level wetland policies (Bowman, 2002; Matthews, 2013). Wise use of wetlands also targeted improving human well-being through poverty alleviation and improving water and food security. To an extent, the Ramsar declaration encourages an international approach to managing wetland systems in a bid to enable the flow of resources across different nations which will help in managing wetlands of international importance (Hettiarachchi et al. 2015).

Given the wide use of the Swartkops estuary, the implementation of the Ramsar declaration is likely to impact on the local people's socio-economic activities. Since the Swartkops estuary is not a protected area, site designation, which might lead to protected area status, is likely to be the outcome and in the process, may constrain access to ecosystem resources (Adaman et al. 2009). Results from a protected area status might disproportionately impact the poor and marginalised communities who are highly dependent on the estuary for their livelihoods. Furthermore, this will not only affect provisioning services from the estuary such as fishing and bait harvesting but also cultural services which often underpin resource use. Therefore, there is a need to understand the multiplicity of direct and indirect values of estuaries. Studies have indicated that while ecological functions of the estuary are well understood, there is limited understanding or systematic analysis on the contribution of the estuary to local livelihoods, especially those around the Swartkops estuary (see Van Niekerk et al. 2013; Strydom et al. 2015). Therefore, an investigation of the ecosystem services (provisioning and cultural) to the various stakeholders benefitting from the Swartkops estuary is critical for informing conservation strategies for the estuary.

Further, the Ramsar declaration has been criticised for failing to acknowledge existing conservation strategies influenced by various social constructs, indicating an ignorance towards cultural services which are critical in informing management strategies (Hettiarachchi et al. 2015). Building on this understanding might be useful for formulating strategies which are more user-oriented mainly because the Swartkops estuary is characterised by users with

different socio-economic characteristics. As pointed out by Hettiarachchi et al. (2015), social and economic segregation often leads to struggles between responsible authorities and the community members, negatively impacting management practices put in place. Therefore, this calls for increased stakeholder integration and participation to achieve the desired results. The Swartkops estuary is surrounded by communities of different economic status (Enviro-Fish Africa, 2011) which may influence how different stakeholders value and perceive different ecosystem services from the estuary.

Furthermore, it is critical to explore differences between stakeholders towards wetlands and estuarine management strategies as they can be manifested through people's perceptions towards the likely change in the estuary management. Considering stakeholders' perceptions can unlock how people value, interact and relate with the environment as well as understand changes happening within their ecosystem, paving the way for effective management strategies (De Groot et al. 2010; Aswani et al. 2015). Understanding respondents' perceptions of what they perceive as a positive future for the estuary could provide insights into how users of the estuary might be involved in its management.

Despite increasing evidence of the importance of ecosystem services offered by estuarine ecosystems, research focusing on multiple uses of estuaries in urban landscapes is still limited in developing countries (Boyer and Polasky, 2004). Like other ecosystems, estuaries within urban landscapes are characterised by different user groups with different socio-economic opportunities. Therefore, overlaps and trade-offs among estuarine benefits and services should be expected, potentially making it difficult for systems to provide services simultaneously (Dimitrakopoulos et al. 2010; Liu et al. 2010). Understanding these factors resulting from different uses and values attached, as well as how they can be included in environmental management plans, is therefore critical.

CHAPTER THREE
DIRECT USE VALUES OF THE SWARTKOPS ESTUARY

3.1 Introduction

Over the past three decades a substantial amount of work has attempted to quantify and understand ecosystem services, particularly the direct use values of natural resources (Constanza et al. 1997; 2014; Bennet et al. 2009; Fisher et al. 2009; Darvill and Lindo, 2015; Hanna et al. 2018) and the links between these services and human wellbeing (MA, 2005; Bennet 2016; Hossain et al. 2016). Despite the growing literature on the direct use values of natural resources in wetlands, comparatively few studies have focused on the direct use values of urban-based estuaries.

Globally, estimates on the direct use values of natural resources are mainly carried out in rural areas, characterised by higher dependence on natural resources (De Groot et al. 2010; Constanza et al. 2014). Further, researchers have attempted to assess the use values provided by wetlands (Boyer and Polasky, 2004; Mmopelwa et al. 2009) and estuaries. The common motive behind these research efforts is to understand values, both provisioning and cultural, that are derived from these aquatic ecosystems. Mmopelwa et al. (2009) highlighted the value of wetlands in the Okavango Delta, Botswana in trying to understand their contribution to human wellbeing. Direct use values were estimated at US$43.41/ha or US$1 434 per household. This is amongst the few studies that have been carried out in assessing ecosystem services provided by wetlands, especially in Southern Africa. Note that there is very little research done on the socio-economic contribution of estuaries, especially in developing regions (Shackleton et al. 2007), with much focus predominantly the ecological integrity of these systems. However, assessing socio-economic contributions of estuaries will help shed more light on the dependence on direct use values attached to natural resources.

Direct use values can be referred to as an economic or a social value of goods provided by the ecosystem that is used directly. These direct use values provide several functions and benefits such as cash income generation (Shackleton et al. 2007), daily subsistence (Sowman, 2006; Sowman et al. 2014) as well as meeting spiritual and cultural needs for users (Needles et al. 2015). Evidence demonstrates that the poorest (particularly in rural areas) rely more on wild natural resources compared to their wealthier counterparts (Shackleton and Shackleton, 2004;

Shackleton et al. 2007; Thondhlana et al. 2012). Therefore, a widespread notion has been adopted in conservation literature that poor households and beneficiaries of the extractive use of natural resources are highly responsible for their degradation. However, Cavendish (2000) points out that access and utilisation of natural resources differ because of different socio-economic characteristics. This was supported by Shackleton and Shackleton (2006), who note that wealthier households can utilise more natural resources than their poorer counterparts, due to access to a disposable income that they can use to purchase and utilise these resources.

Elevated levels of employment have been shown to reduce the use of and reliance upon provisioning services (Thondhlana et al. 2012), with communities characterised by high employment levels relying less on ecosystem provisioning services (Shackleton and Shackleton, 2006). However, Cocks et al. (2010) postulate employment and wealth can influence natural resource use in a different way whereby wealthier households can consume more natural resources than their poorer counterparts. This could be due to households having more equipment and mechanisms with which to extract natural resources. While there is much appreciation for the role of provisioning services provided by natural resources in enhancing human livelihoods, it should be noted that some of them are characterised by underlying values and are mainly influenced by diverse cultural beliefs (see Thondhlana et al. 2012).

As noted by Milcu et al. (2013), culture is not static and often a major driver of change towards and within ecosystem services management. Therefore, understanding its role towards valuation and utilisation of natural resources is key. Because cultural values are largely based on human interactions with landscapes, the integration in ecosystem services valuation is of great necessity, as they help address trade-offs and reduce bias towards other ecosystems services (Pleininger et al. 2013). Because they are difficult to incorporate in economic assessments of ecosystem services, they have been largely overlooked in decision making (Chan et al. 2012, Milcu et al. 2013).

Differences in the dependence on natural resources by various stakeholders and communities have often resulted in conflicts and remains a challenge in many aspects of decision making (Dietz et al. 2003). Further, different views in the valuation of natural resources often lead to conflicts regarding whose value counts when considering resource management options, including the declaration of protected areas (Davis and Gartside, 2001; Ratner et al. 2013). However, a substantial amount of such work has been carried out in terrestrial ecosystems with

a focus on forest resources (e.g. Cavendish, 2000; Shackleton and Shackleton, 2004; Thondhlana et al. 2012) and to a lesser extent on aquatic ecosystems (e.g. Mmopelwa et al. 2009; Adekola and Mitchell, 2011). As a result, complex aquatic ecosystems such as estuaries, including their ability to satisfy multiple stakeholders particularly in urban landscapes, have been overlooked.

In South Africa, little research has been done on the non-commercial use values of estuaries to users, particularly in urban landscapes. At the Swartkops estuary, most of the research has been focused predominantly on the ecological aspects of the estuary, such as the abundance and richness of fish and vegetation (Strydom et al. 2015). Yet, a fair amount of research has shown that it is difficult to manage natural resources based on the ecological status alone, as this often results in neglect of the human dimensions of natural resource use (Shackleton et al. 2007; Cocks et al. 2008; Kumar and Kumar, 2008; Carpenter et al. 2009), which may breed conflicts between users. There is widespread acknowledgement that there is a dependence on the Swartkops estuary by various groups of users for different uses, but little has been done to assess or establish the extent of this dependence (Enviro-Fish Africa, 2009; 2011). As estuaries are public ecosystems used by various groups, human preferences are a key aspect of their management.

However, preferences may vary between users which may present differences between their demands and hopes regarding access to and use of estuaries. With estuaries increasingly becoming part of urban ecosystem infrastructure, information about the direct use and cultural values of estuary resources to multiple user groups is important for planning around sustainable management of estuaries. Given the multiple benefits provided by estuaries to multiple stakeholders in urban landscapes, it is essential to understand the human-estuary relationships as a basis for natural resource management. This is particularly important in cases of informing management options like implementing the Ramsar declaration which may have disproportionate impacts on users of the estuary.

The valuation of nature from an individual perspective is therefore critical as a means of nuancing the assumptions made when aggregating the perspectives of all members of society, making these valuations superficial (Kumar and Kumar, 2008; Harizaj, 2015). In addition, these individual preferences towards valuation of ecosystem services mostly result from influences by social and cultural practices, an aspect that is important in conceptualising natural

resources valuation (Satz et al. 2013; Fish et al. 2016). Within this context, the main aim of this chapter was to explore the direct use and cultural values of the natural resources to the different stakeholders in the Swartkops estuary, South Africa, as a basis for thinking about the possible livelihood implications of a Ramsar declaration. To achieve this, key research questions included:

a) What is the direct use value to users of natural resources from the Swartkops estuary?
b) In what ways do natural resources contribute to user household food security?
c) What cultural values are attached to the Swartkops estuary by different user groups?
d) What cultural services are considered most important to users?
e) In what ways do cultural services differ by user groups?

3.2 Research Methods

3.2.1 Data collection

A combination of both qualitative and quantitative approaches was adopted in this study to understand and describe how people interact with the Swartkops estuary. The research was conducted in and around the Swartkops estuary between June and August 2016 using questionnaires, key informant interviews and direct observations. A step by step approach for each objective is outlined below.

To answer the first objective, a quantitative approach was taken for this objective. Individuals directly utilising the estuary were initially targeted and in total 47 respondents were interviewed. A similar section of the questionnaire was administered for householders and household respondents were asked if they made direct use of the estuary or not. Questionnaires were administered to them after all ethical considerations were explained. The objective intended to identify and explore the direct use values (mainly extraction of natural resources) of the Swartkops estuary hence the questionnaire focused on gathering information pertaining type of natural resources harvested, quantities harvested, frequency of collection, whether these resources were for sale or household consumption and lastly reported values if the resources were indeed sold. All the prices reported in the survey were based on the South African rand value in 2016. Further, the respondents were asked about their socio-demographic characteristics including age, gender, education level, employment status, place of residence and household size. For this part of the survey, place of residence was critical as it would

provide data on whether local people only utilised the estuary or it attracted users from other places. Data from questionnaires were captured, prepared and organized using Microsoft excel 2013. Descriptive statistics using Microsoft excel were carried out to show distinct socio-demographic characteristics such as household size, age, education levels as well as places of origin. Frequencies of natural resource collection were summarised using graphs and percentages. This was crucial in understanding who relied more on the estuary as well as understanding the natural resources mainly collected. Average income generated from use and trade of natural resources from the estuary were calculated. Monthly direct use values of resources harvested were determined by multiplying the reported values of natural resources harvested for sale by the number of times they were sold monthly (see Shackleton et al. 2007).

The second objective was to examine the cultural values and benefits of the Swartkops estuary to different users. For this objective, a total of 140 respondents (47 direct users and 93 household respondents) were interviewed. Households were randomly selected from neighbouring residential areas as follows, Bluewater Bay/Amsterdamhoek and Redhouse (n=31), Swartkops Village (n=31) and Kwazakhele (n=31). All surveys were done with the head of the household or any senior person should the head of the house be absent at the time of the survey.

Both quantitative and qualitative approaches were taken to answer this objective. The quantitative approach was aimed at exploring information like how many cultural services were enjoyed and individuals would free list these services and benefits as well as how often they enjoyed a service or benefit. Further, a qualitative approach was also essential in addressing this objective. Questions like what the Swartkops estuary meant to them as an individual and how they would feel if it was lost were asked as a basis for understanding how different respondents related with the Swartkops estuary. Similar to objective 1, descriptive statistics were used to analyse cultural values attached to the estuary, which were listed by the survey respondents. Respondents listed multiple responses in answering this key question. This was done to understand the levels of importance of the services by calculating modal responses and frequencies of visits to enjoy the cultural services.

In addition, key informant interviews with at seven key informants representing government, non-government organisations as well as various community members were conducted. Community members participating were a result of referrals and they were either representing their communities pertaining management of the estuary or possessing vast knowledge of, and experience with the Swartkops estuary as fishermen. The researcher understood the likely responses; therefore, a deductive approach was taken. In this instance, key informants were asked to confirm any places of spiritual importance within the estuary, whether these cultural services were being considered in current and future management and conservation practices. Data from the key informant interviews and other open-ended questions answering objective 2 was arranged and organised according to different categories, guided by the objective and key questions. The data was then coded into and analysed by different themes.

3.3 Results

3.3.1 Socio-economic profile of the Swartkops estuary users

Out of 140 respondents, almost half (49%) of the respondents were direct users of the Swartkops estuary at the time of the study and the remaining proportion were household respondents. Amongst the direct users interviewed, two user groups were identified, namely fishermen (80%) and bait collectors (20%). The average household size of the fishermen was 4 ± 0.214 and 5 ± 0.67 people for bait collectors. Both fishing and bait collection was an adult male dominated activity (80% for fishermen and all bait sellers) in the Swartkops estuary. Table 3.1 highlights that all bait collectors were unemployed and less than half of them attained at least a grade 9 in their education.

Table 3.1: Socio-economic characteristics of the different user groups (respondents)

Characteristic	**Category**	**Direct users N=69 (counts)**		**Household respondents N=71 (counts)**	**Total (%) N=140**
		Fishermen n=55 (%)	**Bait traders n=14 (%)**		
Age (%)	18-29	4(7)	4(29)	3(4)	11(8)
	30-39	18(33)	7(50)	11(16)	36(26)
	40-49	10(18)	2(14)	11(16)	22(16)
	50+	23(42)	1(7)	46(65)	70(50)
Education (%)	Primary	4(7)	8(57)	10(14)	22(16)
	Grade 9	6(11)	5(38)	15(21)	27(19)
	Matric	22(40)	1(7)	18(25)	41(29)
	Tertiary	23(42)	0(0)	28(39)	50(36)
Employment (%)	Temporarily	3(6)	0(0)	5(7)	8(6)
	Permanently	26(47)	0(0)	12(17)	38(27)
	Unemployed	9(16)	14(100)	14(20)	36(26)
	Retired	10(18)	0(0)	29(41)	39(28)
	Self employed	7(13)	0(0)	11(16)	18(13)
Gender (%)	Male	49(89)	14(100)	39(55)	102(73)
	Female	6(11)	0(0)	32(45)	38(27)
Origin (%)	<10km	29(53)	13(93)	71(100)	112(80)
	10-20km	21(38)	1(7)	0(0)	22(16)
	>20km	5(9)	0(0)	0(0)	6(4)

The education levels were generally low for the bait collectors. Only 36% of the respondents had matriculated and more than half (57%) had education level of only up to grade 9 (9 years). This was different from the fishermen as they were fairly distributed between those who reached grade 9 and tertiary level, with the highest proportion (44%) for the latter. The level of employment was also high amongst the fishermen with almost half the respondents (47 %) permanently employed and a further (18%) indicating they had retired from formal employment. This was directly opposed to the bait collectors who reported that all of them were not employed in any way and bait collecting was their key livelihood.

Further, the survey questionnaire also revealed that the Swartkops estuary attracts several users travelling various distances to access it. As expected, a larger proportion of the direct users of the estuary came from nearby settlements such as Kwazakhele, Swartkops village and Bluewater bay, areas all under 10 km from the estuary. A smaller proportion (9%) was made up of respondents coming from further places like Uitenhage and Despatch. All respondents travelling the furthest to access the estuary were mainly fishermen. Those travelling from other parts of the metro, further away from the estuary mentioned that the accessibility of the Swartkops as a green space was the main reason for their visit and use of the estuary.

3.3.2 Wild natural resources collected in the Swartkops estuary

Natural resources harvested included fish, oysters, mussels, crabs and bait. Of these resources, fish and bait were the commonly collected natural resource with their collection occurring daily. Fish collected from the Swartkops estuary were mainly for household use (subsistence) while bait was mainly for sale. Figure 3.1 shows the frequency of collection of various natural resources and the proportions of users harvesting them.

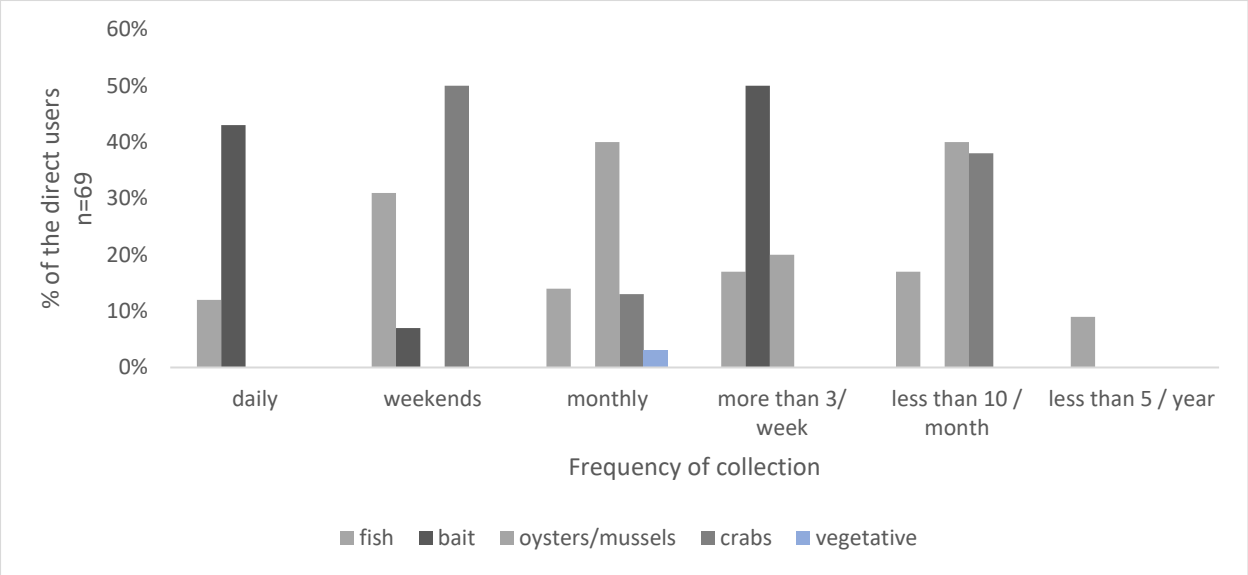

Figure 3.1: Frequency of collection of different natural resources

Fishing activities increased during the weekends with the estuary hosting large proportions of fishermen either taking breaks from work or during the school holidays. About 17% of the users also said they visit the estuary to fish at least three times a week. Half of the bait collectors made use of the estuary at least three times a week, indicating their trade gets busier starting Thursdays until Sundays. Bait was collected daily as all the respondents engaged in this trade

would be providing a service to fishermen visiting the estuary, mostly recreational fishermen. Some natural resources such as crabs were only collected on a part time basis when there was a need from customers, mainly Asian restaurants. Apart from the above-mentioned resources, water hyacinth was also harvested and used in garden composts. A lot of fishing activities recorded were mostly subsistence and there was a consensus among direct users that it was mostly busy during weekends and holidays. Together with reports from the respondents, direct observations confirmed that the spotted grunter (*Pomadasys commersonnii)* was the most sought-after fish species in the estuary (Figure 3.2).

Figure 3.2: A spotted grunter - *Pomadasys commersonnii* (Field observation 2016)

Out of all the fishermen, almost half (49%) said they used fish caught for subsistence use. A substantial number of these subsistence fishermen came from the Swartkops village. Catch and release accounted for a further 34% of the fishermen (Figure 3.3). Some of the respondents who engaged in non-extractive activities (catch and release) highlighted that it was mainly because the river was either too polluted to consume the fish or simply because fishing was a recreational activity rather than a method of procuring food for their households. In a bid to promote sustainability in South African coastal fishery resources, restrictions have been established on the amount of fish one person can catch. However, a small proportion (6%) of the fishermen said they engaged in illegal fishing practices as a livelihood source which included selling their unlawful catch. It could also be true that some survey respondents might

have not been entirely honest about the way they use their fish catch. This could be attributed to the legal challenges around selling fish from the estuary.

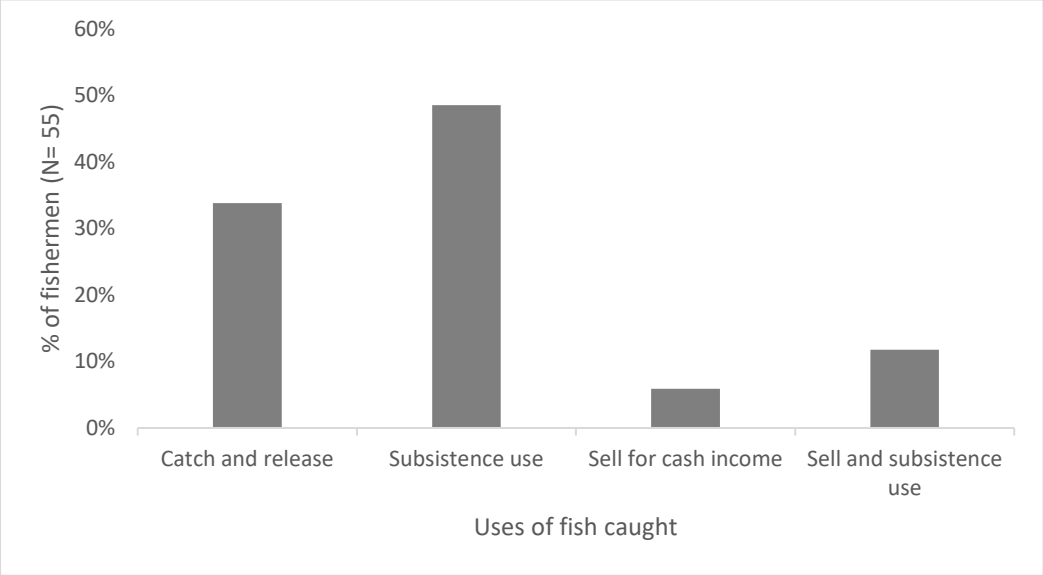

Figure 3.3: Uses of fish caught in the Swartkops estuary

Bait is one of the major resources harvested in the Swartkops estuary by both legal and illegal harvesters. Reports of an increased number of people harvesting and selling bait without permits were evident. Bait collectors and sellers said economic hardships and the lack of alternative options such as employment which has led to the rise of the number of bait collectors. Furthermore, all the bait harvesters interviewed said they sold all the bait harvested, using all the money received to meet their daily needs as well as supplementing the government provided grants. More than half of the bait sellers fell in a youthful age range of between 30-39 years, with very few (7%) in the 50+ age category. All the respondents involved in collection and selling of bait accessed the Swartkops estuary on foot since they reported that they lived in a nearby low-income residential area known as Kwazakhele. Further, as a result of a lack of proper measuring units for the bait collected, the collectors used containers of different shapes and forms (Figure 3.4) as a way to measure and store their harvests.

Figure 3.4: Containers used as measuring units of bait

Mud prawn *(Upogebia africana)* and Pencil bait *(Solen capensis and Solen cylindricus)* were observed and sold as bait to the fishermen. In some instances, respondents indicated prawn would serve as a subsistence food source, therefore contributing towards food security. Bait collectors frequently visited the estuary (at least three times a week), indicating that apart from the social grants they received form the government, bait collection and selling was an important cash income generator. At least one of the bait harvesters interviewed said they only came during weekends, citing an increasing number of fishermen during weekends. Along with fishing, bait harvesting was a major activity amongst the direct users of the estuary. Both licenced and unlicensed bait harvesters accessed the estuary with the hope of selling the harvest to fishermen. These resources were harvested as an alternative means of acquiring food or extra income by either the bait sellers or the fishermen. Despite being a popular food item caught by recreational harvesters, these natural resources were mainly traded on demand from specific customers, especially Asian restaurants because of an increase in demand for sushi menus.

3.3.3 Natural resource income from natural resources collected

Fish and bait were the major traded natural resources despite claims and reports of pollution in the estuary. Despite reports warning against consumption of fish, respondents stated that selling fish among other natural resources such as bait, oysters and crabs remained a key livelihood activity. Fish were traded or sold either per fish or per kilogram, ranging between R 25 to R 35

per kilogram depending on the seller's discretion. For example, if a customer were deemed to have a lot of money, they would be charged more than other customers enjoyed the benefits of being regular customers. Barter trading with small shop owners around the Swartkops shopping centre was highlighted as a form of trade used by the respondents in exchange for daily consumables such as bread, cooking oil and toiletries.

Table 3.2: Monthly average income of total income from natural resources commercialisation by direct users

Natural resource (s)	**Mean values received (± S.E) (ZAR)**	**Proportion of the total value received (%)**
Fish	2 527 ± 287	35
Bait	3 332 ± 480	47
Oysters and mussels	150 ± 38	2
Crabs	1 105 ± 210	16
Total	7 115 ± 015	100

On average, direct users earned about ZAR 7115 per month from natural resource commercialisation (Table 3.2). Out of all the resources traded, fish and bait contributed the highest income. Reported average selling incomes for fish and bait were R2 527 ± 287 and R3 332 ± 857 respectively per user per month. Despite bait being the highest income earner, bait collectors indicated that prices for their product fluctuated depending on the level of business and period of the year with the December-January holidays receiving the most business. Apart from the above-mentioned factors affecting business and prices of the bait, concerns about the growing number of bait harvesters was raised by the respondents, arguing that most of them were unlicensed. Crabs, oysters and mussels were also important income earners, but these were sold on an irregular basis. Despite these resources contributing the least to the monthly income, they were crucial as they satisfied other humans needs, both on a commercial and subsistence basis.

Furthermore, when asked about the uses of money received from natural resources trading, bait collectors indicated they spent it on household groceries (21%) and the rest (79%) said they spent it on anything that needed money in the household. Similarly, almost all fishermen (90%) who engaged in selling fish as a livelihood agreed to use the money they received for all household needs. This was expected given the limited or lack off alternative livelihood

strategies, resulting from high unemployment or limited or lack of education to improve chances of employment.

3.3.4 Cultural values attached to the Swartkops estuary

3.3.4.1 Sense of place

Different components reflecting a sense of place relationship between the Swartkops estuary and survey respondents were mentioned. These included dependence on the Swartkops estuary for provision of natural resources, which enhanced one's livelihood. Further, respondents also mentioned their past experiences from activities such as fishing and swimming in and around the estuary had led them to develop a relationship with the estuary. Disaggregating survey data between direct users and household respondents revealed that 70.2% of the direct users had a relationship with the estuary which invoked (sense of place), compared to the 29.8% who disagreed. Similarly household respondents agreed (70%) to benefitting from the estuary from a deeper connection, with the remaining 30% disagreeing. To further understand some of the relationships between the people and the estuary, they were asked how they would feel should the estuary be lost due to pollution or degradation and some of the respondents' responses are presented below:

"…..basically it will be over for me as this is my only livelihood source….."

.

"We are actually lucky to have such a system around, providing food to many families in and around the Swartkops".

These quotes could indicate a sense of place or dependence on the estuary, albeit putting an emphasis on the economic values attached to the same estuary. However, other respondents had different levels of attachment or a sense of place, as demonstrated below.

'…… I would move away, very bad and sadly that is the only reason I am here….."
Household respondent.

The above responses point out differences in how people relate and possibly assist in predicting how people might be interested in conservation of ecosystem they relate with. Thus, paying

attention to how these different cultural values are shaped by different cultural practices and environmental spaces is critical in resources management strategies and policies (Fish et al.2016; Hausmann et al. 2016).

Further, data pertaining sense of place was further disaggregated by income. Fifty six percent of the low-income survey respondents demonstrated a sense of place, whereas 43.3% disagreed they had a sense of place. Similarly, among high-income survey respondents, those who agreed to have a sense of place (85.9%) were more than who disagreed (14.1%).

3.3.4.2 Recreational activities

Recreational activities comprised of bird watching (46%), jogging and walks (33% and boating activities (10%; cited by 46%, 33% and 10% of the respondents respectively. Bird watching dominated these activities and was pointed out as a key feature of the Swartkops estuary. The Swartkops estuary is regarded as an International bird area and historically held the greatest number of birds between Cape Agulhas and Durban (Enviro-fish Africa, 2011). Because of that, bait collectors and fishermen around the Swartkops estuary indicated that they engaged in bird watching quite often, since they spent most of the day around the estuary.

Disaggregating these survey results by user groups revealed that for bird watching, direct users (32%) and household respondents (68%) took part in this recreational activity. Further low-income respondents (42%) enjoyed bird watching, compared to the 58% who disagreed. On the other hand, high-income respondents were evenly distributed with 50% of the household respondents interviewed either agreeing or disagreeing to taking part in bird watching.

The Swartkops estuary like other estuaries in South Africa afforded multiple users with different recreational activities, which include canoeing and yachting. With this understanding, respondents were asked if they took part in any of the mentioned activities. Disaggregated by income, only 7% of the low-income respondents either took part or enjoyed watching these activities. About, 86% of the high-income respondents also did not take part in these activities, as opposed to the 14% that did. The majority of these respondents might not be taking part in these activities anymore because of pollution which has been reported to be affecting the estuary and subsequently leading to shutting down or a reduction of these activities. Among the direct users, only a single respondent enjoyed any form of boating sports Pertaining

household respondents, 14% agreed they enjoyed any form of boating activity, with some being owners of boats and jetties themselves. However, 86% of these household respondents confirmed this is an activity they did not enjoy, despite others mentioning they used to in the past.

3.3.4.3 Education and Knowledge transfer

Very few respondents acknowledged they used the estuary for educational purposes and they mainly did this through reaching out to primary school pupils from local communities. Only one direct user (2%) interviewed acknowledged the Swartkops estuary was crucial for educational and knowledge transfer benefits compared to the majority of the direct users (98%) interviewed who thought otherwise. Disaggregation of the same results by income groups show that of the lower income group, only 3% agreed to the importance of the education and knowledge transfer, while 97% differed. In a similar manner, 95% of the high-income respondents seem to support their low-income counterparts by not mentioning this non-material benefit as one they enjoyed or benefited from, compared to the respondents who agreed (5%).

3.3.4.4 Cultural and religious ceremonies

Cultural and religious ceremonies such as baptisms were mainly carried out by the Zion Christian Church (ZCC) and according to some respondents, they had specific places they used along the estuary. Other traditional practices carried out were done by the Xhosa people, whereby young men practising an Isixhosa traditional initiation (Abakweta) made use of the estuary surrounds since they offer immediate bushes required for the practice. Disaggregating these responses by user groups, direct users were as follows (agreed=4%; disagreed=96%) and the household respondents were (agreed=10%; disagreed= 90%). The respondents were further disaggregated by income to try and draw a relationship between income and these cultural and religious ceremonies. The survey results showed that only low-income respondents (15%) took part or acknowledged having taken part in these cultural practices in the past. No high-income respondents, reported taking part in any religious and cultural ceremonies in and around the Swartkops estuary.

3.4 Discussion

3.4.1 Users of the estuary

This chapter focused on identifying the uses and contribution of the Swartkops estuary to the livelihoods of the different users. In addition, focus was shifted to the cultural services attached to the estuary and how they differed among different user groups using the Swartkops estuary. As mentioned in the background of this chapter, estimates of use values, tangible or non-tangible have mostly been carried out in rural landscapes, especially in developing countries. Turning to urban landscapes and use of wild natural resources occurring there, this study showed a multiplicity of users and reliance on both provisioning and cultural ecosystem services for daily livelihoods.

The results of this study highlight multiple uses of the Swartkops estuary by different user-groups including subsistence fishermen, bait collectors and sellers as well as other recreational users enjoying non-extractive uses and benefits. Further, direct use values were not restricted to respondents living closest to the estuary alone, as some respondents identified in the estuary travelled for relatively long distances, in some cases up to 50 km to access the estuary. Dominant direct user groups identified were predominantly subsistence and recreational fishermen and bait collectors.

Different people with different socio-economic backgrounds access the estuary, with the goal of enjoying the benefits provided by the estuary. Therefore, in the context of this study, emphasising the maintenance and rehabilitation of the estuary through a potential Ramsar declaration is challenging, given the multiplicity of stakeholders expecting their voices to be heard. Further, being an urban and built up area, a variety of uses of the estuary can be attributed to a lack of, or limited, green spaces for recreational activities such as bird watching or water bodies for fishing or harvesting of bait, activities that are critical, both economically and culturally through provisioning and cultural ecosystem services. However, most direct users of the estuary are residents from close neighbourhoods, with most of them accessing the estuary on foot. These findings were not surprising and confirm those of Ellender et al. (2009), who upon investigation of the users of Lake Gariep, situated along the border between the Free State and Eastern Cape Provinces, noted that the dominant user group, which comprised of subsistence fishermen accessed the fishery on foot, due to their proximity to the lake.

3.4.2 Wild natural resources collected from the Swartkops estuary

The results show that a variety of natural resources are being harvested including fish, bait and crabs. Of the direct consumptive uses identified, fishing and bait selling are dominant with subsistence fishing mainly for food provision. Fish caught was mostly used for domestic consumption, supplementing dietary needs and in some cases surplus fish was sold. This could be attributed to a lack of other income sources needed to purchase basic goods. Ellender et al. (2009) argue that due to unemployment and lack of other livelihood alternatives, subsistence fishing is a key source of income. Unlike in the Knysna estuary (South Africa), fish generated less cash income than bait sales (Napier et al. 2009). The low sales can be attributed to pollution reportedly affecting fish and other living organisms in the estuary. Nonetheless, cash income generated from selling fish is more than the value of government social grants; for example, the child care grant is pegged at R420 and the old age pension is R1780.

Important to note is that bait selling was restricted to mostly low-income and unemployed respondents. Like subsistence fishing, it can be attributed to a lack of alternative livelihoods. In line with Napier et al. (2009), the bait selling is crucial to fishermen, both subsistence and recreational and therefore should be carefully incorporated in proposed conservation plans. Bait collecting proved to be a generous cash income generator. However, this trade is perceived to be under threat from restriction imposed pertaining the amount of resources to be collected per day. Because of the reliance on collecting resources from the estuary, these restrictions can be interpreted as an attack on the livelihoods of some user groups. Thus, capacity building, education and awareness should be part of any proposed conservation plans in the Swartkops estuary. Taken together, direct use values explored in this study suit the narrative proposed by the Millennium Ecosystem Assessment framework. For example, this study has demonstrated that stakeholders can afford basic material for good life, and have secure access to natural resources therefore, enhancing well-being through natural resources utilisation (MA, 2005). Thus, in considering future management plans, they should be cognizant of the vulnerable user groups. This will not only ensure their well-being, but rather set a positive tone for a pro-poor approach to conservation of the Swartkops estuary.

Moreover, natural resource collection was not the only benefit enjoyed or obtained in the Swartkops estuary. Some respondents take part in long-held traditions such as recreational fishing, which at the moment is highly characterised by catching and releasing the fish caught. Results from this study seem to suggest that high-income user groups participated more in these activities. This fishing activity has been documented to provide considerable satisfaction for fishermen regardless of the size and weight of the fish, since they will be released back into the water (Barrella et al. 2016) and in most cases is practiced by the more affluent user groups. Since recreational fishing was practised along with subsistence fishing, overlaps are bound to emerge concerning the direct and the indirect use values. However, fishing for other user groups went beyond just satisfaction, being used in a subsistence manner and for economic gain. Thus, careful considerations of differing natural resources valuation approaches is key in the context of informing conservation initiatives.

3.4.3 Cultural use values attached to the Swartkops estuary

Cultural services are difficult to separate from direct use values; hence there is a need to appreciate these distinct values (Cocks et al. 2008; Thondhlana et al. 2012) in order to improve natural resource management strategies. For example, the respondents in this study indicated that they are at peace when they are fishing implying an indirect value underlining a more direct value (in this case fishing) which can be measured by how much one catches. It is therefore imperative in conservation planning to take note of the overlaps, as these different fishing purposes could generate different perceptions towards conservation.

Derived from human experiences with the physical landscape (Stedman, 2003), a sense of place is highlighted or demonstrated through cultural services and benefits such as recreational fishing, bird watching, walks and other social activities practiced in and around the Swartkops estuary. This adds substance to the idea that ecosystem services are interlinked and can be difficult to manage or appreciate in isolation. The Swartkops estuary is more than a livelihood source for many users as they reported enjoying the calmness of the estuary, the aesthetic nature and the birds that flock the system all year round.

However, despite the respondents pointing out areas mainly used for activities such as baptisms, there was a consensus that any part of the estuary and its river was still usable for their activities. Reports of the use of the estuary for educational and inspirational cases were

few. Respondents mainly from the high-income areas of Bluewater Bay and Redhouse had several uses of the estuary including boat sports and swimming festivals (the Redhouse 1-mile race), among others. However, most of the above-mentioned practices were reported to have been stopped because of the degradation of the estuary. A move towards sustainable management of the Swartkops estuary critically needs to encompass the above cultural services to ensure a holistic approach to natural resource management, limiting chances of a collision course among relevant stakeholders.

3.5 Conclusion

This study examined the direct use and cultural values of the Swartkops estuary, and their contribution to both direct and indirect users. Based on the results of the study, it can be concluded first, that multiple user groups make use of the Swartkops estuary in extractive and non-extractive ways. In considering any future developments affecting this estuary, it would be essential to effectively integrate the views, needs and aspirations of these users in a way that minimises potential conflicts, possibly through a thorough stakeholder engagement process. Second, in some cases, direct benefits from the estuary were underlain by cultural values, satisfying both extractive and non-extractive activities. Thus, it can be said that to fully understand interactions between people and immediate ecosystems, particularly regarding a possible change in management of the natural resources (for example after a Ramsar declaration), a local level approach is likely to give more insight into the possible intended successes or possible failures of the initiative.

This is mainly because of factors such as diverse cultural and social contexts which play a pivotal role in the management and use of natural resources. Past research work (Reed et al. 2008; Ellender et al. 2009; Hossain et al. 2016) into natural resource use and their management highlight and acknowledge that public participation in natural resource management is increasing, paving the way for enhanced understanding and integration of cultural values and benefits. Lastly, given the levels of reliance on natural resources highlighted by this study, conservation options like the proposed declaration of a Ramsar site should carefully weigh the consequences for local communities should their access to the estuary be limited. Equality for the poor people directly living off the estuary should be a key consideration in any propositions of natural resource management in the Swartkops estuary.

CHAPTER 4
STAKEHOLDER PERCEPTIONS ON THE USE AND MANAGEMENT OF THE SWARTKOPS ESTUARY

4.1 Introduction

Estuaries are among the most productive and dynamic ecosystems on earth, and within urban systems are increasingly used by multiple actors for direct and indirect livelihood needs (Barbier et al. 2011; Pinto et al. 2014; Aheto et al. 2016; Feka, 2015; Jean-Hude et al. 2016). In urban settings, satisfaction with life is linked to the use of ecosystems (Lyytimaki et al. 2008) and ecosystem resources such as estuaries (Vemuri et al. 2011). Yet to sustain this satisfaction, natural resources need protection from degradation and over-exploitation by humans (Pretty and Smith, 2004) to maintain the productivity and functionality of ecosystems (Lotze et al. 2006; Hoegh-Guldberg and Bruno, 2010; Barbier et al. 2011; Sheaves et al. 2014). To achieve the goal of ecosystem protection, designation of protected areas and zones worldwide has been a dominant approach in natural resource conservation practices (Pretty and Smith, 2004; Chuenpagdee et al. 2013) and has often led to conflicts between actors in certain instances (Bavinck, 2005; Stepanova and Bruckmeir, 2013; Thondhlana and Cundill, 2017).

Therefore, it is becoming increasingly important for urban planning to consider urban residents' perceptions of and needs from, natural areas such as estuaries as a basis for promoting the satisfaction of urban residents, and for understanding the implications of various management options (Feka, 2015; Aheto et al.2016). Perceptions can be defined as the way in which one understands or interprets an object of interest, but they can be different from reality (Bennett, 2016). Both positive or negative perceptions towards conservation and management of natural resources are influenced by benefits and services from ecosystems (Martín-López et al. 2012; Chan et al. 2012; Chan et al. 2016) as well as ecosystem disservices (Lyytimaki et al. 2008; Belaire et al. 2015).

However, ecosystem disservices have received comparatively less attention in the ecosystems service literature with some notable exceptions (Lyytimaki et al. 2008; Shackleton et al. 2016). Ecosystem disservices comprise of any ecosystem related characteristic or effect that could be harmful to human well-being (Shackleton et al. 2016). Resulting from the negative impacts of ecosystems, people have often developed a negative perception towards the conservation of

certain ecosystems as they see no use for them (Lyytimaki et al. 2008). Therefore, recognising local social constructs which affect perceptions on the use and management of natural resources is key to identifying management options that will receive social support (Imram et al. 2014; Bennett, 2016).

For example, conflicts have occurred between local communities and protected area management authorities (Thondhlana et al. 2011; Lopes et al. 2017; Thondhlana and Cundill, 2017). Some of these conflicts have been fuelled by alienation or isolation of local communities, for example through failure to recognise existing resource management mechanisms (traditional systems) or a failure to align local livelihoods in desired conservation strategies (Torri, 2011). In Scotland, conflicts between Salmon fishermen and parties interested in conserving harbour seals (*Phoca vitulina)* have been reported because harbour seals were regarded by fishermen as a threat to their livelihoods (Redpath et al. 2013). This conflict of interest jeopardized conservation efforts.

Similarly, the government of China saw tensions rise as a result of the establishment of a world heritage site (Liu et al. 2017). This was attributed to grazing restrictions introduced in the Bodga community, subsequently affecting the community's livelihood strategy. Lopes et al. (2017) also noted conflicts emerging from increased tourism activities and natural resource collection in the Fernando de Noronha marine protected area in Brazil, which saw a rise in demand for fisheries in adjacent communities. Evidence from these examples have shown a need to incorporate important social aspects such as culture, livelihoods, and lived experiences (Kideghesho et al. 2007; Mutanga et al. 2015; Bennett, 2016). These socio-economic factors are critical in influencing stakeholders' perceptions and willingness to participate in the defined conservation strategies (Aswani et al. 2015; Thondhlana and Cundill, 2017).

Thus, documentation and analysis of local communities' perceptions on resource use and management can provide insights and critical evidence that is fundamental in discussing future interventions in resource management (Aswani et al. 2015; Bennett, 2016). It is imperative to understand these future visions, especially at a local scale as they are pivotal in predicting changes, whether in use or management of ecosystems (Kass et al. 2011; Thompson et al. 2012). Amongst several conservation mechanisms, exploring perceptions may aid in the understanding of potential or perceived social, ecological and economic impacts of proposed

conservation methods, ultimately influencing the level of support of proposed management plans (like the Ramsar declaration), as is the case in this study.

As a pathway to conserving the Swartkops estuary amid high anthropogenic activity, a Ramsar declaration has been proposed (Section 2.5, Chapter 2). Like other conservation strategies, the declaration will likely be characterised by changes in local livelihoods through restrictions to natural resource harvesting. Within this context, this chapter seeks to explore the perceptions held by stakeholders regarding the future of the Swartkops estuary, in Port Elizabeth in the Eastern Cape Province of South Africa. Key research questions included:

a) What are the local stakeholders' perceptions towards the state and management of the estuary?
b) What is the level of support for a Ramsar declaration among user groups and how does this vary?
c) What are the visions of a positive future for the Swartkops estuary among different user groups?
d) What are the implications of the above findings on future estuary management in terms of support for a possible Ramsar declaration?

4.2 Data collection and analysis

A mixed methods approach using a questionnaire and key informant interviews was used to gauge stakeholders' perceptions towards the state of the Swartkops estuary and potential level of support for a Ramsar declaration. An explorative pilot study was first conducted in June 2016 to pre-test the questionnaire. Data collection was undertaken between July and September 2016 and the survey targeted both direct and non-direct users of the Swartkops estuary. For direct users, activities such as recreational fishing and bait selling in the estuary were used as a proxy of the income status as they generally indicate different income categories (Chapter 3), and for household respondents, residential areas were used as a proxy. Participant households were randomly selected from a range of different residential areas, broadly representing low- and high-income areas. Low-income areas are Kwazakhele, Zwide, Swartkops village, and Data Street while Bluewater Bay and Redhouse are high income areas. This ensured representation of respondents with an interest in the estuary, both in terms of location relative to the estuary and uses of the estuary. During household interviews, household heads were

targeted and in instances of absent household heads, the most adult person at the time of the interview was chosen.

A total of 140 people (direct users and household respondents) participated in the questionnaire survey; 69 direct users (14 bait collectors and 55 fishermen) and 71 indirect users. The first part of the questionnaire had questions designed to capture socio-demographic information of the respondents and their households (age, gender, income, education levels and employment status, among others). The second and main part of the questionnaire included questions about perceptions on ecosystem services from, and threats to, the Swatkops estuary. The services were specified as the benefits from the estuary, including extractive and non-extractive uses, while threats related to activities that undermined the quality of the estuary and their potential to provide and sustain the livelihoods of different people. With regards to perceived threats, the respondents were asked to rate their perceptions of threats to the estuary on a given list, with responses ranging from Not a problem (1) to Very serious problem (4).

Further, survey respondents were asked if there were any perceived and experienced disservices (negative impacts) associated with the Swartkops estuary that influenced the way they interact with the ecosystem. The respondents were also asked to indicate if they thought everyone had the same understanding of the estuary, what the overall loss of access to the estuary would mean to them, who they thought was responsible for management of the estuary and their overall satisfaction with its management. Direct users, household respondents and key informants were also asked to explain, considering the perceived benefits and threats associated with the estuary, what they deemed a positive future for the Swartkops estuary. Further, they were also asked if they thought protecting the estuary using a Ramsar declaration was an ideal alternative to managing the estuary and its surrounds.

Seven key informants were engaged in in-depth interviews and they represented different constituencies within the estuary (Government officials, NGOs and Community representatives). A referral approach was used to select the key informants given their positions and knowledge of the ecosystem. Both tape recordings, with the permission of the interviewee and note-taking, were employed in documenting the data that were provided by the key informants. The interviews were conducted in a manner that helped improve flexibility, allowing adjustments to the interview guideline in accordance with the responses (Boyce and Neale, 2006; Creswell et al. 2007; Newing et al. 2011). Following an interview guide, questions

asked included an inquiry on the uses and users of the estuary, conservation practices in place and what management options were envisioned (including the Ramsar proposition), and what possible impacts this ensued. Data from these interviews were transcribed and coded into separate themes as per questions (Vaugn and Turner, 2016; Newing et al. 2011).

For the data analysis, the questionnaire survey data was first captured on an Excel spreadsheet. Descriptive statistics (frequencies and percentages) were employed to express respondents' thoughts on major benefits, uses, disservices and the perceived threats to the estuary. Differences in perceptions between estuary users were shown as percentages. With regards to qualitative data, categorical analysis was employed to identify and formulate different themes on the value of the estuary and visions of estuary management, the interpretation of which is presented in this chapter.

Consistent with ethical practices, the purpose and content of the study were explained to the respondents before every interview, both in the pilot and the main study. The respondents were informed and made aware of the anonymity of their responses (privacy), confidentiality, the voluntary nature of their participation and their right to withdraw from the study at any time without any repercussions for doing so.

4.3 Results

4.3.1 Characteristics of respondents

Fifty percent of the respondents were aged 50 years and above, and those between 30-39 years and 40-49 years made up (26%) and (16%) respondents respectively. Only 8% of the respondents were aged between 18-29 years, making the survey population less youthful. With regards to education, almost two-thirds (65%) of the respondents either achieved matric (highest education level before entry into tertiary education) or tertiary education, 19% had reached grade 9 (the first exit point in the South African schooling system) while 16% had only primary education. Concerning employment status, about 27% of the respondents were permanently employed, 26% unemployed and 28% were retired. Furthermore, an additional 6% of respondents were temporarily employed along with 13% respondents who said they were self-employed.

4.3.2 Perceived benefits and services from the estuary

All the interviewed survey respondents either strongly agreed (83%) or agreed (17%) that the Swartkops estuary is indeed a very important ecosystem and that it needs to be sustainably managed. An abundance of flora and fauna, mostly birds and fish could have been the major reason the Swatkops estuary was highly valued. The respondents stated that flora and fauna enabled different uses of the Swartkops estuary. For instance, collection of natural resources (fish and bait), an important livelihood strategy for low-income users (Chapter 3) was perceived to be one of the key benefits provided by the estuary. On the other hand, residents, mostly from high-income residential areas like Bluewater Bay and Redhouse, mentioned that the aesthetic nature of the estuary helped protect and maintain property values of their residential area. Various users travelling from relatively longer distances, for example in excess of 40 km to and from were also perceived as an indicator of the benefits and services offered by the Swartkops estuary.

All key informants agreed with the widely held perception that the Swartkops estuary provided numerous benefits and services, which have the potential to spur socio-economic growth for the local communities, the city and Province, mainly through tourism. One key informant said: "not many places you find around Port Elizabeth that you can enjoy the pleasures of fishing and bird watching at once". Another key informant emphasized the importance of properly managing these benefits and services into different tourism activities with a vision to help integrate the local communities' cultural practices, chiefly the Xhosa people. Asked if people had similar perceptions towards the estuary, all key informants did not agree. For instance, in some cases people viewed the estuary as their workplace, harvesting and selling bait while others found it to be a place they could come and relax, satisfying their human well-being. In addition, all key informants further acknowledged that residents valued the estuary more and are more concerned about the well-being of the estuary than those from areas away from the estuary. Common among their answers was the issue of the estuary having a different meaning to all who use it since people benefit in different ways from it.

4.3.3 Perceived threats to the estuary

Sewer and industrial effluent (68%) as well as the dumping of litter (66%) were cited as the major threats to the Swartkops estuary by more than two-thirds of all the survey respondents.

Table 4.1 shows these perceptions disintegrated by income groups and high-income respondents (32%) were slightly lower than lower income respondents (36%) regarding perceived sewer and industrial effluent threats. With reference to ponds adjacent to the low-income residential areas, sewerage has been reported to be entering the ponds because of obsolete infrastructure (sewer pipes) and illegal settlements, despite efforts made to remove some of the illegal settlements. Survey respondents who perceived industrial effluent to be a threat further reported that industrial effluent from a canal (Markman) (Figure 4.1) passes through a small settlement and was responsible for domesticated animal deaths, such as dogs, at the time of the interview.

Figure 4.1: Images showing industrial effluent coming through from Markman industries. Top image shows the canal in which effluent is channelled towards the estuary and the bottom image, industrial effluent is discharged into the Swartkops (Source, Glen Vembo).

In addition, disaggregation of user groups by income shows that of the 66% proportion of survey respondents concerned by litter, low-income users accounted for a higher proportion (41%) compared to high-income users (25%) (Table 4.1). This could have emanated from the issue that pollution concerns were both in the forms of litter, mainly in the low-income residential areas and industrial effluent, affecting the entire estuary. Litter was mainly associated with the low-income areas where dumping of plastic, tyres and dead animals was reported. Lack of proper waste removal facilities such as bins in the low-income areas was highlighted as the major reason residents dumped their garbage and litter in the nearby ponds.

Table 4.1: Perceived threats to the Swartkops estuary by user groups

Threat	*% in agreement according to user groups*		*Perception on the magnitude of the threats*					
			Very serious		*Serious*		*Less serious*	
	High-income	*Low-income*	*High-income*	*Low-income*	*High-income*	*Low-income*	*High-income*	*Low-income*
Sewer/industrial effluent	32	36	22	20	18	15	7	19
Dumping of litter	25	41	17	28	8	17	13	17
Bait collection methods	29	24	24	17	15	4	20	20
Fishing methods	19	14	28	19	28	13	9	13
Siltation and flooding	10	4	40	0	20	5	15	20

Slightly more than half (54%) of the survey respondents perceived that bait harvesting was practiced in an unsustainable way, and this group was made up of high-income users (29%) and their low-income counterparts (24%) (Table 4.1). This included the unlawful use of tools such as spades and forks and the overharvesting of bait. Further, among the survey respondents who perceived that natural resource harvesting practices were a threat, 59% were direct users compared to the non-direct users. Amounts of natural resources collected through direct activities like bait harvesting were a source of concern amongst relevant stakeholders. For example, some bait collectors (mostly without licences) were perceived to collect excessive amounts only to throw away the unsold bait around the estuary, an issue not only affecting responsible authorities, but other direct users like fishermen.

Further, all bait collectors perceived that an increase in the number of unlicensed bait collectors led to uncontrolled extraction of bait. In contrast, some 46% of the survey respondents had a different perception, suggesting that bait collection had not reached alarming levels. Bait collectors reiterated that their bait collecting practices were being exaggerated and blamed for damaging the estuary. About a third of the survey respondents (33%) agreed that the fishing methods used were a danger to the estuary, for example, use of nets to catch fish especially when large schools of fish have been spotted. Further, bait collectors acknowledged that in some instances they make use of banned tools such as spades, which resulted from either lack of alternative tools regarded as environmentally friendly and often, pumps provided to harvest bait are not effective for the activity at hand.

Apart from a few incidents of abalone poaching reported, illegal fishing practices such as gill netting were perceived to be on the rise and this was mainly to satisfy a growing need in the fast food outlets for Asian dishes (for example, Sushi). Respondents who perceived fishing methods to be detrimental to the estuary claimed that this leads to harvesting of fish species regardless of their sizes, including those below the stipulated sizes for harvesting purposes. However, most of our survey respondents (77%) disagreed with the statement that the fishing methods implemented were a threat to the estuary. A majority of the respondents who disagreed fell within the low-income group (61%) compared to the high-income respondents (39%).

Furthermore, a smaller proportion (14%) of the survey respondents living next to the estuary pointed out flooding and siltation as the other threats faced by the estuary. Construction of a bridge along the national highway and harbours close to the mouth of the estuary were cited as key reasons behind high levels of siltation in the estuary. Lack of dredging, which one key informant indicated had been stopped for a long period, was also another cause of siltation in the estuary, viewed as a threat by some and in some instances mentioned to be causing more damage than bait harvesting.

Key informants' perceptions on threats to the estuary were aligned with the survey respondents' perceptions. However, one key informant argued that over-harvesting of resources should not be considered a threat until alternatives are provided to the stakeholders involved, saying "our government is letting people harvest resources as they please because it does not have a solution to their problem since these people have no other option to fend for their families". His sentiments supported some of the key informants' concerns regarding the use of the estuary, highlighting that to some extent, high levels of unemployment have led to some of these estuary uses.

4.3.4 Perceived disservices of the estuary

Perceived disservices related to the estuary (Table 4.2), included drowning of people and breeding of mosquitos, particularly in the ponds around the low-income areas. More than one-third of the survey respondents (34%), further disaggregated by high-income users (11%) and low-income users (23%), said the Swartkops estuary had become a spot for criminal activities over the years (Table 4.2). In a similar fashion, some low-income respondents reported cases of murder victims being dumped in ponds close to their neighbourhoods, insisting these ponds

had become hideouts for criminals. However, most of the respondents (66%) perceived the Swartkops estuary to be peaceful and free of crime.

Table 4.2 A summary of the perceived disservices associated with the Swartkops estuary

Disservice	*% in agreement according to user groups*		*Perception on the threats and disservices*					
			Very serious Problem		*Serious problem*		*Problem*	
	High-income	*Low-income*	*High-income*	*Low-income*	*High-income*	*Low-income*	*High-income*	*Low-income*
Drowning	8	20	3	10	5	13	23	48
Crime hotspot	11	23	4	10	8	15	29	48
Breeding of mosquitos	5	29	6	33	6	31	2	21
Other disservices	1	1	0	33	0	0	68	0

With the perceived rise in the number of unregistered bait harvesters, it is possible the survey respondents felt that crime was on the rise around the estuary. In the low-income areas, cases of crime were reported to have dropped in and around the ponds. In contrast, some respondents said they were aware of reports of rising criminal activities in the neighbourhoods closest to the estuary, like the Swartkops Village. This was blamed on illegal bait harvesters who were reported to be increasing. Negative perceptions were reflected in the following statement by a key informant who said: “failure to consider management of the ponds seemingly deeming them less important than the estuary itself has led to immediate communities having a strong negative perception towards these water bodies despite their potential to provide numerous services, particularly recreational”. Further, other key informants weighed in, saying neglected ponds were now responsible for breeding of mosquitos, despite sporadic efforts which sees the government spraying and treating the ponds. Concerning crime, all key informants interviewed acknowledged separate incidents, which some concluded was not cause of concern yet.

4.3.5 Management of the Swartkops estuary

To gauge the involvement of different stakeholders in the management of the estuary, the respondents were asked if they were aware of any estuary management meetings and awareness campaigns on its importance within their areas. About 36% of the survey respondents said they knew of meetings and some had attended them. The remaining proportion (mostly low-income

respondents) said they either did not know of any meetings (42%) or such meetings were not publicised for all to attend (22%) (Figure 4.2). This concern was supported by other key informants, who reiterated that if there were any meetings, people would not care to attend as everyone would be busy with their livelihood activities, with some people not directly affected by the well-being of the Swartkops estuary. Another key informant added that the Zwartkops Conservancy did coordinate these meetings despite lack of support and resources from other government departments.

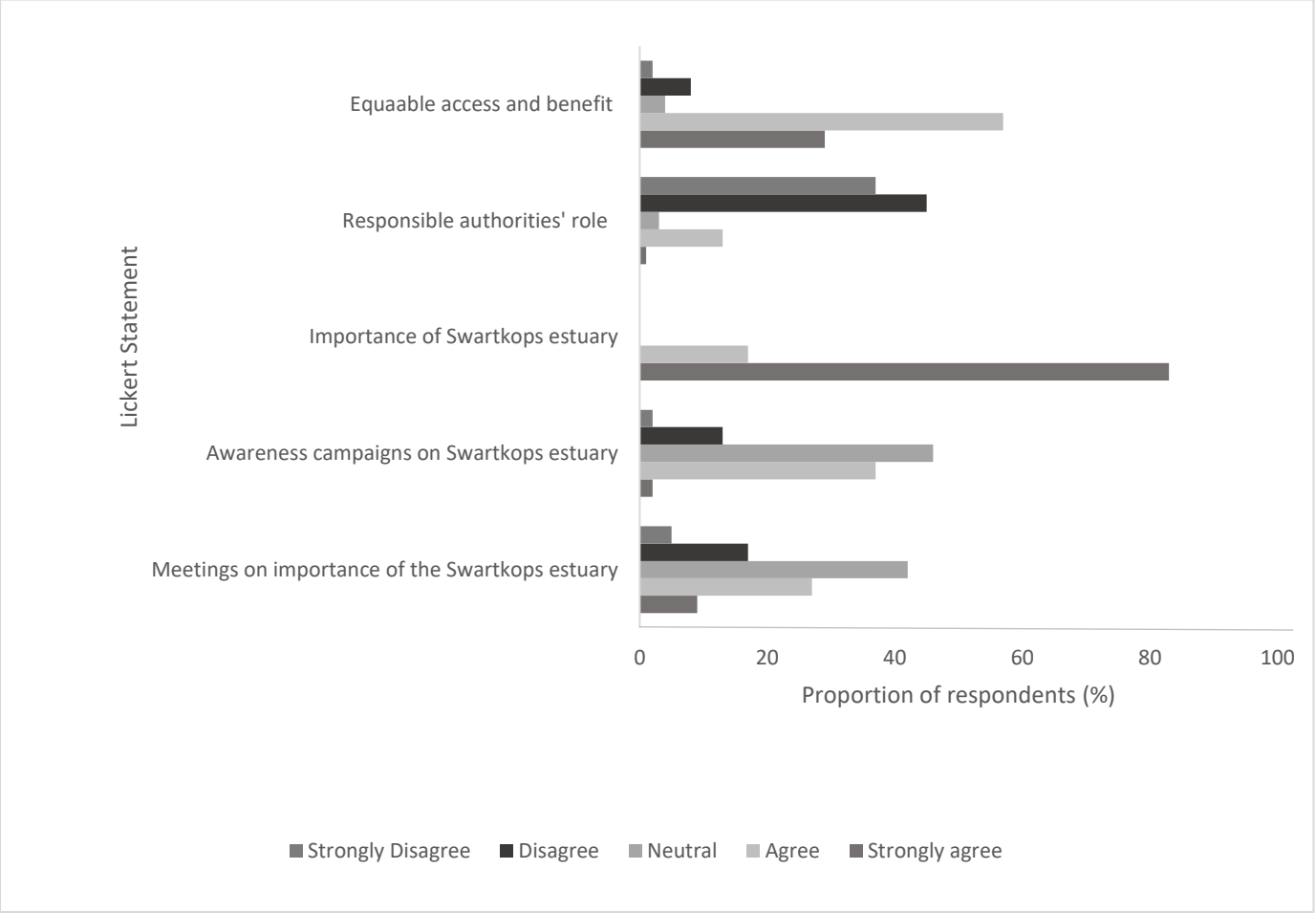

Figure 4.2: Respondents' perceptions on the status of the Swartkops estuary management

Most of the respondents (86%) agreed with the statement there was equal access to the Swartkops estuary, stating that if one had a permit to harvest selected resources, they were able to access any part of the estuary (Figure 4.2). Further, respondents mainly from high-income households, mentioned that personal behaviour in and around the Swartkops estuary would influence and, in some cases, determine people's access to the estuary. Failure to abide by set rules (for example failure to follow bait harvesting rules) was deemed a cause for concern and one could be restricted from using the estuary. Issues raised among the small proportion of

respondents (mainly bait collectors) who felt there was no equal access to the Swartkops estuary, included lack of and closure of parking spaces and private jetties on the high-income residential areas, which ultimately reduced accessibility to some parts of the Swartkops estuary.

To try and gauge respondents' perceptions on whom they thought was responsible for managing the estuary, they were prompted to give as many options as they could, without any order. Of the 173 responses, 42% indicated that it was the duty and responsibility of the local Nelson Mandela Bay Municipality (NMBM), since it is already responsible for managing the residential areas around the estuary (Figure 4.3). About 9% of the responses pointed towards other government entities or departments which included the Flora and Fauna Agency and Coastal and Fisheries Management as the ones responsible for managing the estuary. Further, a couple of responses (5%) highlighted that the Metro police was responsible for managing the estuary since they had offices and equipment very close to the estuary. Figure 4.3 shows a summary of the respondents' perceptions of whom they thought was responsible for managing the estuary.

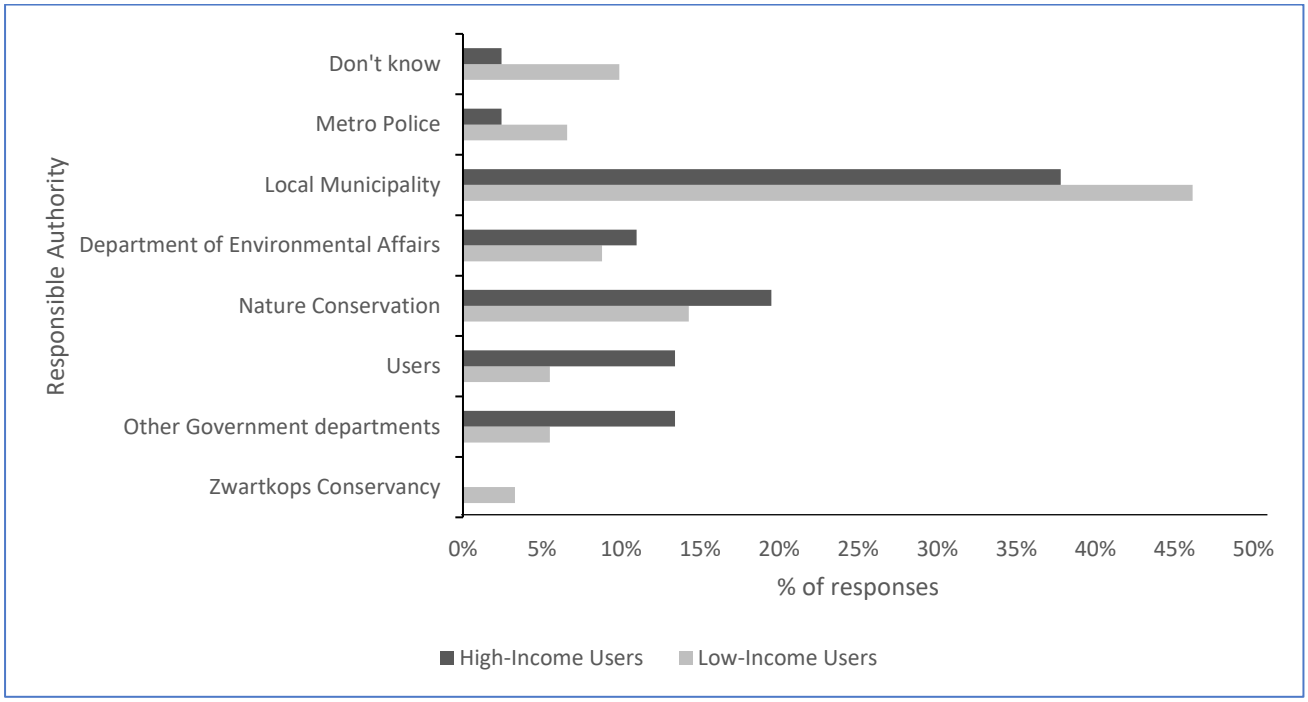

Figure 4.3: Respondents' perceptions on Swartkops estuary management responsibility

Other respondents reported that the responsibility of managing the estuary lay with the Department of Environment Affairs (DEA), with (10%) of the responses, whilst the Zwartkops Conservancy (an NGO championing the protection and sustainable use of the estuary) gained 2% of the responses. However, some respondents had no idea who was responsible for managing the estuary, indicated by 6% of the responses. Further, the department of Nature Conservation was also mentioned to be a responsible party, backed by 17% of the survey responses. Apart from both government and non-governmental organisations mentioned and tasked with managing the estuary, 9% of the responses indicated that all the users of the estuary had a duty to take care and manage the estuary (Figure 4.3).

82% of the respondents felt the authority was not doing a satisfactory job in managing the estuary and its surrounds (Figure 4.2). Major reasons cited included estuary pollution resulting from industry and domestic effluent and litter, especially in the low-income side of the estuary which was common and had become unsightly. Moreover, respondents also highlighted that failing and obsolete infrastructure were signs of failure from the responsible authorities. Also, a lack of proper education on the importance of the estuary, as well as awareness campaigns involving all relevant stakeholders, showed some of the weaknesses of management's approach. Another issue raised by survey respondents was the routine inspection of natural resource harvesting permits by patrol units, seen as both inadequate and often targeted at low-income users of the estuary. Further, there was a demand from other respondents of a review of the limits stipulated on permits as to the amount of resources one can harvest at a time. Despite agreeing there was equal access to the estuary for all, there was a perception that practices like permit checking were partial and selectively applied, often towards the low-income respondents.

4.3.7 Future visions for the positive future of the Swartkops estuary

The survey respondents were asked to indicate their preferred future visions for the estuary considering its threats, uses and current management. More than two-thirds of the respondents (69%) concurred they wanted to see improved management in the Swartkops estuary. Out of this, 43% high-income estuary users and 57% of the low-income users mentioned this as the most important issue they would like to see change. Minimal, or lack of, effective patrolling in and around the estuary influenced calls for effective monitoring and allocation of the permits guiding use and collection of natural resources from the estuary. Further, direct users of the

estuary, particularly bait collectors, raised issues indicating that their permits had been severely reduced, concerning bag limits of how much an individual can collect, negatively affecting their livelihoods. Another issue raised was a vision aimed at assisting the people reliant on the estuary through the creation of organised fishing and bait harvesting groups, something they said could be monitored and which would give them some form of employment security.

In addition, 36% of the survey respondents said they would like to see an improvement in the infrastructure around the estuary. Analysis of results by user groups showed that the low-income group had a bigger proportion in support of improved infrastructural development (61%), compared to the high-income group (39%). Provision of ablution blocks was the most desired type of infrastructure, seen as a measure to improve sanitary conditions around the area for both bait collectors and other users of the estuary. In addition, unavailability of freshwater taps was of great concern specially to bait collectors that spent almost their entire day in the estuary. Obsolete sewer pipes were blamed for leaking sewage into the ponds surrounding the low-income residential areas and some parts of the Swartkops residential area.
Further, bait collectors voiced their challenges concerning a lack of on-site storage facilities for their equipment, thereby forcing them to carry some of this equipment home. According to the bait collectors, the government used to provide them with shipping containers which they used to store their equipment and to establish selling spots for their bait. However, due to perceived illegal activities in the estuary, the container was removed and as part of their future visions of the estuary, bait collectors would like infrastructure improvement to include storage facilities.

About 15% of the surveyed respondents mentioned that getting the Swartkops estuary and adjacent ponds to become an effective tourism destination was their desire for a positive future of the Swartkops estuary. For these respondents, transformation of the Swartkops estuary into a friendlier tourism hotspot was a means of increasing job opportunities, mainly for the unemployed youth population, especially in the low-income areas. Lack of livelihood options may be the main reason why 62% of low-income users, as opposed to 38% of high-income users, see the creation of these options in and around the estuary as contributing to a positive future vision. Another future vision shared by about 10% of the respondents was creation of employment opportunities. Respondents said it would be possible to create these opportunities if there was infrastructure development and improved management of the estuary. Of these respondents, unemployed respondents made the largest proportion (73%), while other

employment categories (retired, temporarily employed and permanently employed) had proportions of 9% each. This trend showed the need to diversify the opportunities hoped for, should any arise to cater for the different sets of skills likely to be possessed by the respondents.

Recreation and tourism had an overlap with improved infrastructure, with respondents mentioning that adjustments and upgrades should be made first for the Swartkops estuary to be regarded as a recreational destination. Planting trees and fences around ponds adjacent to the estuary (low-income residential areas) was the common intervention upgrade mentioned. Other respondents hoped for a return of activities practised in the past. For example, The Redhouse one-mile race, a swimming competition which attracted visitors and several boating and fishing competitions. This was explained as a way of bringing back visitors to the estuary. Interestingly, these proposals came from both user groups in the study.

Furthermore, increased security in and around the estuary was also raised by at least 12% of the respondents as one of the future visions they would consider. Out of this proportion, counts of responses from the low-income group was greater (54%) than in the high-income group (38%). An increase in security measures was a main concern raised by the relatively elderly (50+ years) more than any other age category. Several factors contributed to this issue including failing streetlights and individuals mainly identified as illegal bait collectors. An increase in failures and vandalism of streetlights particularly in the Swartkops village was highlighted as a great concern, with some respondents explaining that the streetlights were a hazard to local residents due to exposed live electricity wires. Thus, fixing the issue of streetlights would be essential as this would help with patrols and make it relatively safer to engage in other important night activities such as jogging and walks.

4.3.8 Support for the Ramsar declaration

Out of all the survey respondents who answered the question regarding support for the Ramsar declaration and future visions (n=108), more than half (60%) welcomed the proposition and were in support of it. Those supporting the Ramsar declaration were composed mainly of low-income users (54%), compared to 46% of high-income users. The main reason for supporting the declaration among the low-income users was the belief that it would bring improved livelihood options. A Ramsar declaration was believed to have the ability to increase recreational activities within the estuary. Another reason for supporting the declaration, shared

across both stakeholder groups, was enhanced conservation of the Swartkops estuary, which was referred to as a 'treasure for Port Elizabeth' by one key informant.

Additional reasons of support given were possible opportunities for job creation through improved recreational capacity and bringing all relevant stakeholders to account for their deeds through proper monitoring structures. Moreover, with the Swartkops estuary recognised as an International Bird Area (IBA), respondents, mainly from the high-income Bluewater Bay residential areas, hoped a Ramsar declaration would bring back the estuary to its previous status. This status included increased water quality, recovery of salt marshes and controlled natural resource collection (mainly bait). Some of the survey respondents hoped for improved management of the estuary through the Ramsar declaration, with one respondent from a high-income residential area declaring:

> "……with a Ramsar declaration, priorities could be put into awareness and education on the importance of conserving the estuary, at the same time clarifying what are the problems and therefore making it easier to tackle them……" (Backpackers Operator, Redhouse Village).

In contrast, (40%) disagreed with the idea of a possible Ramsar declaration. One of the major reasons cited was that the management practices already in existence needed to be effectively adhered to. This was raised as a quick and realistic way to realise change in the way natural resources are being used and managed within the estuary. Moreover, the respondents also explained that the people in management structures should be held accountable, as the estuary is facing challenges such as pollution and misuse and overharvesting of natural resources under their custody. Further, the respondents felt a Ramsar declaration was a measure of denying access for certain users, as narrated by one fisherman:

> "……we have enough management structures as it is, the responsible authorities should ensure their tasks and duties are effectively carried out. Should that be the case, there will not be a need for a protected areas status or the Ramsar declaration" (direct user, Swartkops estuary).

Other respondents opposed to a proposed Ramsar declaration, perceived that a Ramsar declaration will equitable access to natural resources provided by the Swartkops estuary. . It was argued that majority of the estuary users from low-income areas around the Swartkops estuary were unemployed and their livelihoods were dependent on the estuary in various ways (fishing and bait collection). Therefore, potential restriction of equitable access to natural resources should the estuary receive a protected area status, would subsequently result in an increase in crime and conflict as reflected in the following statement by one respondent:

> "……. This river and everything it has is given free of charge and available for everyone, it would not be fair if it is protected from use when other people depend on it for food and daily income, whilst others want it protected because they have everything they need" (Household respondent, Swartkops Village).

Further, respondents opposed to the proposal of a Ramsar declaration perceived that bringing in or implementing other management plans in the Swartkops estuary would mainly affect the low-income direct users living off the estuary. Another respondent, a direct user of the estuary for recreational fishing also asserted that certain groups of people (especially the low-income direct users) depended on the Swartkops estuary for all their income. The respondent went on to explain how recreational fishermen were helping, through purchasing of bait and at times employing local people to guard their cars, saying:

> "…….. You cannot take away the estuary from the community, it will not be the same again and if there is any change in access which will restrict people, a lot of people will starve to death because of lost livelihood means".

This was supported by another direct user, a fisherman from the Swartkops village, who expressed displeasure at the way things were unfolding. The respondent questioned decisions that were already being taken with regards to how people use the Swartkops estuary, including the closing down of jetties that they used to access the river with their canoes, saying:

> "….. People living in Bluewater Bay, especially Amsterdamhoek Drive think they own the Swartkops estuary. They were influential in making sure our jetties are closed

whilst they get to keep theirs for access at any time they pleased…." (Fisherman, Swartkops Village).

4.4 Discussion

4.4.1 Benefits, threats and disservices associated with the Swartkops estuary

This study examined perceptions towards the state of the Swartkops estuary, the positive future visions for the estuary and to try to establish the potential support for a possible Ramsar declaration. As expected, lower income users, depending more on natural resources harvested from the estuary, suggested there was nothing wrong with their harvesting practices. However, contrary to expectations, a considerable number of lower income users supported the idea of a declaration. To establish a relationship between the respondents and the Swartkops estuary, the perceptions towards the benefits, threats and disservices associated with the estuary were investigated. Results from the study indicate an agreement between high- and low-income users of the estuary regarding the benefits they obtained from it. The high number of respondents acknowledging the importance of the Swartkops estuary are in line with findings elsewhere (Nascimento et al. 2017; Turpie et al. 2017) and these benefits often positively influence perceptions towards conservation.

Pollution and unsustainable natural resource harvesting were highlighted as the key threats to the estuary and these threats could have motivated the majority support for a Ramsar declaration. An understanding that continued generation of benefits and services from the estuary can only be guaranteed if the system remains integrated could have spurred a positive perception towards its conservation. However, since pollution was mostly associated with low-income residential areas, lack of will and poor service delivery from the responsible authorities might have been responsible for the shift in support for the Ramsar declaration. This is understandable given that there could be a belief that if the authorities did their part, there would be no need for a Ramsar declaration.

Further, negative perceptions or support for a Ramsar declaration could have been motivated by disservices from the estuary and ponds around it. For instance, Lyytimaki et al. (2008) presented that street trees can be of great aesthetic value when well maintained, but they can also present a safety concern should there be failing basic infrastructure like street lights. A

possible explanation for this could be the increased time they spend in the Swartkops estuary either fishing or selling bait, thus increasing their chances of being victims of crime or in some instance involved in criminal activities. Furthermore, low-income user groups were the most affected by these disservices, for example stagnant water in ponds which bred mosquitos and, in some cases, acting as refuse dumping areas. Failure to restore and maintain some of the infrastructure enhancing some of these disservices associated with the estuary could have a greater impact in decision making concerning conservation of the Swartkops estuary.

4.4.2 Perceptions of the current state and management of the Swartkops estuary

Management of the Swartkops estuary involves several organisations, including the Department of Agriculture, Forestry and Fisheries (DAFF), which is mainly responsible for control of natural resource extraction, and the local municipality. However, the responsible authorities' capabilities in managing the estuary were questioned by respondents. Many survey respondents either disagreed or were unsure if there were any meetings or awareness campaigns aimed at improving stakeholder involvement in the management of the estuary. Despite the survey respondents' perceptions varying from the key informant revelations that meetings and campaigns were held, they can be useful in explaining why other respondents chose not to support the proposed Ramsar declaration. Toteng (2001) notes that governments often fail in managing natural resources because of power inconsistencies in decision making. This is supported by Lockwood et al. (2010), who argue that often, governments' natural resources governance is limited and poorly aligned to sustainable resources management principles particularly in developing countries. Considering these examples together, an argument can be made that policy processes between government and non-governmental actors in natural resources management could be formed on an unstable platform, to achieve meaningful success.

Further, a possible explanation for some of the users' exclusion from awareness meetings and campaigns could be their proximity to the estuary. For instance, despite mostly low-income users depending on the estuary for natural resource extraction, their voices could be overlooked because they are deemed to be from distant residential areas and therefore perceived to care less about the estuary. Inconsistencies in the way conservation meetings and awareness campaigns were conducted could also lead to a lack of trust among stakeholders and a possible sense of injustice or inequity, therefore negatively influencing the marginalised communities

and respondents alike (Tole, 2010; Young et al. 2013; Pascual et al. 2014; Thondhlana et al. 2016). Alternatively, some respondents might feel less inclined to engage more in estuary management, given that they live further from the estuary. Should this be the case, respondents' perceptions should be integrated in management of the estuary, in a bid to enlighten the responsibilities of various stakeholders and hopefully develop a relationship where complaints and suggestions can be lodged and acted upon.

Moreover, despite reports of pollution in the Swartkops estuary (Nel et al. 2015), unsustainable natural resource extraction continues to be perceived as a threat, especially bait organisms. However, some survey respondents disagreed, possibly suggesting that the notion of over-extraction of natural resources in the Swartkops estuary was underlain by hidden social agendas. Further, one possible implication of these agendas was to reduce usage of the estuary, especially by the low-income people. Disagreements by some respondents could probably be supported by an investigation by Enviro-Fish Africa (2011), which reported that the amount of bait collected was a small fraction and unlikely to have any serious impact on the estuary. This could also indicate issues of social equity and injustice where some voices are not heard within conservation strategies, a situation not only confined to the Swartkops estuary but consistent with global trends (Turner et al. 2016; Musavengane and Simatele, 2017). However, other respondents perceived that pollution reports are being used as an excuse to push through newer conservation strategies. It is therefore critical for conservation and management officials to come up with strategies which are realistic, transparent and ensure all stakeholders are well informed, to enhance the strategies acceptability to achieve meaningful success. .

4.4.3 Future Visions for the Swartkops estuary

Improved management headlined the future visions held by the respondents and possibly linked all the other future visions mentioned. This trend suggests respondents, regardless of income, identified with a need for change, which would improve the estuary resulting from a change in management approaches. A possible explanation for this vision could be lack of administrative resources or will to effectively carry out designated tasks among management officials. This has been documented to impede on policy implementation to achieve conservation and management objectives across all levels of management (Chidumayo and Gumbo, 2013; Shackleton et al. 2014). Moreover, the results could also suggest lack of consultation and involvement of affected actors in policy formulation regarding use and management of the

Swartkops estuary (Carvalho and Fidélis, 2013; Muhumuza and Balkwill, 2013; Dahal et al. 2014). This could possibly affect stakeholders' trust towards conservation agents and government departments responsible for managing the estuary. Bennett and Dearden (2014) argue in their findings that success of conservation strategies can be based on intensified fairness and equity within conservation efforts.

Further, a possible explanation for respondents highlighting a need for improvement in the manner the estuary is managed could be the need for aspects like recreational activities and parks, and basic infrastructure such as working streetlights, fresh water supply and ablution facilities. People can develop a negative perception towards the estuary because of lack of infrastructure like streetlights that can ensure safety at night or fresh water and ablution facilities in instances where they want to spend more time at the estuary. McCormack et al. (2010) argue that lack of basic facilities may negatively influence local communities' perceptions towards natural spaces. This could potentially impede on positive future visions including attracting more tourists to the estuary.

Enhancement of tourism and recreation through creation of leisure parks and development of infrastructure around the estuary and ponds surrounding it, would not only provide employment but also a place where people would go and spend time relaxing, giving out social benefits and improving human well-being (MEA, 2005). Therefore, improvement of basic infrastructure could improve the state and user-friendliness of the Swartkops estuary, potentially influencing perceptions towards the estuary and its conservation in a positive manner. However, while there were calls for an improvement in management of the estuary and to improve infrastructure in a bid to improve tourism potential, there were surprisingly few calls to increase education and awareness campaigns, despite the importance of conservation.

Education and awareness on the importance of the estuary were not mentioned often despite their role in implementation of conservation strategies. Fien et al. (2001) argue that education is critical in bringing social change and understanding of conservation goals and benefits within communities. However, this low support for education and awareness could result from the numerous ways the respondents perceive their interaction with and management of, natural resources in the estuary. Increased environmental education and awareness could impact some livelihood activities negatively, for instance people might be encouraged to desist from harvesting resources in ways that are harmful to the estuary. As a result, some respondents

might become fearful of losing their sole livelihood sources especially without being provided with alternative strategies to secure these livelihoods. Therefore, improving education and awareness on environmental management systems can help fight negative perceptions towards use of the estuary through equipping stakeholders with knowledge and the engagement needed to efficiently manage and improve the quality of the ecosystem (Morar and Peterlicean, 2012).

4.4.4 Support for a proposed Ramsar declaration

The Ramsar convention has had some success in management and restoration of wetlands across the world, for example, clearing a path for power sharing and effective management of the Waikato River in New Zealand (Oviedo and Kenza Ali, 2018). This study found more respondents in support of a possible Ramsar declaration and varied reasons were given. For example, employment creation (Andam et al. 2010; Clements et al. 2014) through potential tourism and recreation was one of the major highlights among supporters for a Ramsar declaration. Further, there was also hope for improved stakeholder intervention and transparency, possibly through more inclusive participatory meetings concerning management of the Swartkops and to an extent securing rights to valuable natural resources (Maekawa et al. 2013). The situation was different with low-income respondents who supported the proposal for a Ramsar declaration. For this group, this initiative could have represented two main things. Firstly, there was strengthened hope for employment creation through tourism and recreation potential and secondly, hope that polluted ponds surrounding their residential areas would be properly managed or eradicated to deal with the effects of pollution.

Tourism and recreation would also require infrastructure development and personnel that would be employed as guides and guards around the estuary and its surrounds. According to Melita and Mendlinger (2013), conservation based tourism has yielded some positive results elsewhere, for example in the Ngorongoro conservation park, Tanzania. This conservation area employed a multiple use strategy to conservation, which enabled local people to be employed and the proceeds from this initiative to be shared among stakeholders (Melita and Mendlinger, 2013). Therefore, support for a Ramsar declaration could improve livelihood strategies and aid poverty reduction, should a pro-poor conservation approach be implemented (Leisher et al. 2007; Gurney et al. 2014). The idea of communities supporting proposed conservation is not unusual, Thondhlana and Cundill (2017) noted that promises of community development through infrastructure and job provision has been key in soliciting support for conservation.

However, not all expectations are realised. For instance, Cundill et al. (2013) warn that promises should be made upon quantifiable information on whether or not the expected benefits can be fulfilled.

Further, another indication from the responses was that a Ramsar declaration would help eradicate or rehabilitate ponds adjacent to the Swartkops estuary, which were a nuisance, attracting mosquitos and litter and garbage dumping. Transformation of these ponds could also provide healthier green spaces in urban spaces, particularly in the low-income urban residential areas which are usually overcrowded and lacking the mentioned facilities. In addition, support for Ramsar as a conservation approach from the poor and marginalised participants could also be an indication of their willingness to be involved in the affairs of the Swartkops estuary, its management, as well as benefit sharing from the natural resources it provides. In a study by Stringer et al. (2007), local pastoral communities embraced conservation approaches by non-governmental organisations designed to combat rangeland degradation. In doing so, these communities were empowered to monitor and manage the rangelands using both modern and traditional strategies to manage the rangelands. Further, support and participation in new conservation approaches have also been documented to strengthen a sense of ownership over the natural resources and outcomes of the conservation approach (Reed, 2008).

Our findings are in-line with findings elsewhere (see Brockington and Wilkie, 2015), regarding concerns about the exclusion of the poor and marginalised communities from using natural resources. This is a key perception in informing equitable conservation strategies, noting that some of the survey respondents greatly depend on the estuary for their daily needs, including food supplies. As noted by Brockington and Wilkie (2015), restriction or displacement of people when paving the way for a protected area can be either physical or economic displacement and often leads to a lack of, or unjust compensation, of their respective losses. Should restricted access become a reality in the Swartkops estuary, alternative livelihood sources should be availed to avert the risk of people dependant on the estuary breaking any set conservation rules and guidelines (for example Redpath et al. 2013; Bennett and Dearden, 2014) and possibly setting up conflicts in the estuary.

4.4.5 Conclusion

To achieve positive results and support for a Ramsar declaration in the Swartkops estuary, will require policy and decision makers to engage all relevant stakeholders, especially low income user groups. This includes everyone, directly or indirectly using the ecosystem, therefore creating an inclusive platform for all stakeholders. To achieve this, there is a need to incorporate respondents' future visions and consider their perceptions towards the state of the estuary. A major vision shared by almost all respondents, and key in this study, was an improvement in the management of the Swartkops estuary. Realisation of this vision is likely to have positive implications on other visions mentioned, which include infrastructure development and increased education and awareness of the importance of the estuary. In addition to incorporating these visions, objectives that are transparent, attainable and beneficial to all relevant stakeholders should be implemented. In this way, negative perceptions towards natural resource conservation can be eased if a sense of community involvement is availed by the decision makers. In addition, equity and fairness should be a cornerstone benefit sharing, arising from the conservation mechanism implemented.

Further, there are multiple stakeholders in the Swartkops estuary, thus resulting in various opinions and perceptions regarding the state of the estuary and its management. Different people value the estuary differently, with some appreciating the livelihood options it provides through natural resource extraction, while those more indirectly dependent might have different views. Therefore, these varying factors should be factored in conservation planning and future management of the estuary. Further, invoking these visions is likely to increase community engagement and stakeholder participation, which is crucial to achieve both ecological conservation success, as well as sustaining socio-economic benefits enjoyed by the local communities. In addition, addressing underlying social problems such as service delivery, security and safety in and around the estuary may help overcome negative perceptions surrounding mostly the low-income groups. Conservation planners also need to move away from the common negative perception that poor communities are responsible for overharvesting of natural resources and usually oppose most forms of conservation.

Finally, consistent with suggestions by Bennett and Dearden (2014), responsible authorities and decision makers must ensure increased participation in meetings and awareness programs concerning management of the Swartkops estuary, ensuring all stakeholders are equally

engaged. In doing so, they should also ensure that education and awareness is not selective of any social class, thus enhancing community participation and ultimately wise use of the Swartkops estuary as prescribed in the Ramsar principles. Gathering ideas about the management of the Swartkops estuary proved that a reasonable proportion of respondents, both direct and indirect users, are not convinced by the current practices in managing the estuary, in a way suggesting alternative management approaches in the estuary. Addressing issues such as lack of transparency in the management affairs of the Swartkops estuary also motivates relative stakeholders into considering co-management of their ecosystem, a feat encouraged by several pro-poor conservation strategies. Further, with a fair and transparent conservation approach in the Swartkops estuary, communication is enhanced among communities and all interested stakeholders.

CHAPTER 5

NATURAL RESOURCES, PERCERPTIONS AND FUTURE VISIONS FOR THE SWARTKOPS ESTUARY: SYNTHESIS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Wetlands including estuaries worldwide have been altered in pursuit of ecosystem services and benefits which are critical for human well-being, thus putting these ecosystems under severe pressure, both human induced and natural (Van Niekerk et al. 2013; La Colla et al. 2018; Whitfield et al. 2018) (see Chapter 1). This has led to destruction of habit for flora and fauna globally, and in the context of urbanisation, particularly in developing regions, an increase in freshwater demand which can add to pressure on wetlands including estuaries. Therefore, the main aim of this study was to explore the direct and indirect use values of the Swartkops estuary and stakeholder perceptions on the estuary's future, as basis for informing management options that can ensure a positive future for the estuary. Ensuring successful conservation of wild natural resources significantly includes integration of local stakeholder perceptions concerning current management options and what is hoped for in the future. Perceptions have been used to inform conservation strategies across Africa, for example, assessing attitudes towards wildlife conservation in Namibia (Störmer et al. 2019), determining implications for developing a sustainable land use management in Ethiopia (Tesfahunegn, 2019). However, to paint a clearer picture concerning conservation, frameworks guiding conservation propositions were identified and reviewed, in order to integrate these perceptions.

Both the Millennium Ecosystem Assessment framework and the Total Economic Valuation framework were used in this study. The Millennium Ecosystem Assessment framework informed the classification of ecosystem services and benefits enjoyed from the Swartkops estuary. The MA framework was useful in disentangling the usefulness of wild natural resources in improving human well-being. This is a relevant aspect in the context of my study which thrives to advocate for a pro-poor approach to conservation of natural resources provided by the estuary, to ensure higher chances of conservation success (Grabowski et al. 2012; Pinto et al. 2014; Lamsal et al. 2015). Putting values to some services for example fish and bait collecting was largely guided by the Total Economic Valuation framework. Although some monetary values were attached in this study, research gaps still exist concerning overlaps

among other services with multiple values and in some instances, difficulty and failure to attach monetary values to intangible ecosystem services such as sense of place.

A number of research methodologies were used in gathering data during this research and these included questionnaire surveys, key informant interviews and direct observations. The research aim and objectives were key in designing the questionnaire and the key informant interview guideline. Open-ended questions were critical in collecting and generating insight into complex issues, for example, cultural ecosystem values which might have a deeper meaning.

As expected, differences in socio-economic statuses of both direct users and household respondents were evident. These differences, for example household income, education and employment largely influenced natural resources use and how they are valued (Chapter 3). Unemployment, mostly among the direct users emerged as a major driver among natural resource use. For example, unemployment meant other survey respondents had limited options to sustain livelihoods and also more time to spend in the Swartkops estuary, trading natural resources. Fish and bait were the major natural resources harvested and commercialised in the Swartkops estuary (see Chapter 3) as different user groups enhanced their livelihoods. Further, cultural values and benefits attached to the Swartkops estuary varied. Evidence from this study suggested that sense of place and recreational activities such as bird watching and taking walks were the most important cultural ecosystem services (Chapter 3; Table 3:3).

In addition, a combination of both the provisioning and cultural ecosystem services contribute to different perceptions held pertaining the state of the Swartkops estuary. Similar to Clarke (2012), survey respondents indicated they are looking towards the government and responsible authorities to implement a natural resources management strategy for the Swartkops estuary, which will not only focus on the ecological aspect of the system, but one that will also uplift different livelihoods. This was further supported by a greater call concerning future visions for the estuary, whereby a majority of the respondents suggested they would like to see a change in the way the Swartkops is managed and this included dealing with pollution, ensuring a consistent and considerable representation of various stakeholders in management of the estuary.

5.2 Use values of the Swartkops estuary

5.2.1 Use of natural resources harvested

There is growing literature on how natural resources through ecosystem services provide households with a variety of goods and services which enhance various livelihoods (MEA,2005), thus helping in poverty alleviation and improving human well-being (Constanza et al. 1997; Daw et al. 2011; Fisher et al. 2014). Results from this study demonstrate a widely held view that urban poor also depend on natural resources, as they sometimes lack other livelihood alternatives such as agriculture and livestock rearing, as compared to their rural counterparts (Paumgarten and Shackleton, 2011) but also urban landscapes. Similar to Clarke (2012), some natural resources harvested boosted dietary requirements, thereby improving food security in predominantly poor households. For example, subsistence fishermen indicated they would trade fish caught with other household grocery requirements, thus improving their food sources (Chapter 3; Figure 3.3).

Taking these contributions into account, a positive influence on the perceived importance of the Swartkops estuary to livelihood provision can be established. This could entail that consideration of direct use values alone is insufficient in developing natural resources management plans, but rather, coupling them with perceptions held by stakeholders can give a clearer idea of best conservation can be practiced. Already limited livelihood options as shown in this study should be strongly addressed in any proposed conservation plans, to ensure that natural resources indeed are being channelled towards improving human well-being, as advocated by the Millennium Ecosystem Assessment framework (MEA, 2005). However, subsistence use of the fish caught was an interesting finding, given there have been reports discouraging people from consuming fish from the Swartkops, citing pollution. With limited livelihood options experienced by some of direct users of the estuary, there is need for a more nuanced perspective in addressing some of these challenges, for example, urgent policies that aim at combating pollution affecting the estuary.

5.2.2 Cultural services

Importance of sense of place in conservation decision making has been described as an important tool in encouraging public support for conservation initiatives chiefly in complex socio-cultural setups, like urban landscapes (Hausmann et al. 2016). Further, this study also

revealed that high-income households were more interested in non- consumptive livelihood activities like recreational fishing (catch and release), jogging and bird watching, unlike their low-income counterparts. This confirms that interests and natural resources valuations likely differ among user groups despite being provided by the same ecosystem, in this context, the Swartkops estuary (Chan et al. 2012; Bateman et al. 2013; Hausmann et al. 2016). With the findings presented, further research will be essential in the integration of these different valuations in conservation plans, to ensure all stakeholders are adequately represented. Further, there is a possibility that when deciding how to conserve the estuary, different valuations of the estuary will be contested and careful considerations should be taken, to cater for inherent trade-offs or overlaps from attempting to manage multiple ecosystem services (Needles et al. 2015). Further, these current findings add to the growing literature on integration of cultural ecosystem services in decision making (see De Groot et al. 2010; Chan et al. 2012; Darvill and Lindo, 2015; Hausmann et al. 2016).

5.3 Perceived state of the Swartkops estuary

Perceptions are pivotal in natural resource management approaches as they help provide insight, speculate or inform the potential support from local participants (Bennett, 2016). More so, understanding various perceptions held by stakeholders is important for conservation planning as it may assist in establishing different interactions with the ecosystem and understanding how local stakeholders value their immediate environment to avoid overstating or understating ecosystem services for conservation purposes. Findings from this study seem to suggest that the Swartkops estuary was not only perceived to be important for consumptive use values only, for example, many users highlighted their non-consumptive uses such as bird watching, walks along the estuary which amounted to generating a sense of place and to an extent crucial for tourism within the region.

An investigation of the perceptions towards the state of the estuary and its importance revealed that all participants acknowledged the critical role played by the estuary in the provision of ecosystem services, in enhancing people's livelihoods. However, these benefits and services could be under immense pressure and threat, as suggested by findings in Chapter 4 (Table 4.1). A considerably higher proportion of the survey respondents perceived the Swartkops estuary to be under threat from pollution, from both industrial effluent and litter lying around lower-income residential areas. The situation is exacerbated by the issue that management of the

estuary is perceived to be poor (Chapter 4, Figure 4.2) and that respondents not fully aware who was responsible for managing the estuary (Chapter 4, Figure 4.3). Interestingly, apart from the industrial effluent and discharge, natural resources harvesting was also a key threat identified in this study.

In general, an implication of these findings is a possibility of lawlessness when governing use of the estuary, highlighted by the lack of a clear channel of communication with the responsible authority. Therefore, positive perceptions towards the estuary's ability to support various livelihoods might have been the reason for a majority call on the responsible authorities to improve the way they are managing the estuary. These threats have a major bearing on the poor and marginalised communities compared to high-income communities. Further, these threats could be summing up lack of a robust local level management structure and effort to combat some of these threats. Further, our findings gave an insight into how benefits like cash income from natural resources trade were key in support for or against the proposed conservation mechanism (Ramsar declaration), characterised with fear and negative perception towards conservation should there be no alternatives provided to these livelihood practices.

In addition, different perceptions from respondents characterised by different socio-economic classes influenced future visions and support for a potential Ramsar declaration. For example, many stakeholders perceived that a change in management of the estuary would ensure continued provision of ecosystem services. With this understanding, this research provides an important opportunity to further the understanding that lack of or limited green spaces particularly in urban landscapes may lead to converging interests and values on similar geographic spaces, thus providing challenges when considering conservation practices.

5.4 Future visions for the Swartkops estuary

The study suggests that failure to implement a major future vision held concerning improvement of management in the Swartkops estuary, will likely reduce any future conservation plans. This is likely because of inconsistencies in the communication of estuary related issues, such as education and awareness meetings, inconsistent checking of permits and failure to address failing infrastructure like ablution facilities (Chapter 4). Lack of robust management options has seen careless extraction of natural resources and continued polluting of the estuary. This therefore calls for the alignment of national and regional policies with local

institutions and social networks particularly those supported by private organisations such as the Zwartkops Conservancy (Van Nierkerk, 2007). As noted by Karabo and Chadzingwa (2016), social networks are key mechanisms in fostering change in management of natural resources. Empowering these social networks will not only support national plans such as the South African Water Act of 1998 but will improve stakeholder responsibility towards sustainable and wise use of the estuary. However, to ensure solid social networks, there is need to consider and embrace of cultural ecosystem services in decision making, as they largely influence social cohesion in communities (MA, 2005, De Groot et al. 2010; Chan et al. 2012). Furthermore, to realise improved management in the estuary, proposed conservation plans should look to revamp capacity building through education and awareness programs.

Surprisingly, few respondents indicated a desire to see an improvement in education and awareness, despite an earlier suggestion that the management official are not providing enough education and awareness platforms. Similar to Waeber et al. (2017) a considerable proportion of the respondents in this study acknowledged the existence and importance but few were keen to participate in education and awareness programs that will assist in sustainable use and management of the estuary. Engaging stakeholders in a nuanced approach in conservation of the Swartkops is therefore critical, to transform their knowledge into practice, thus, making them key contributors in chatting a path to an inclusive conservation approach. Furthermore, direct user of the estuary seemed to be more aware of education and awareness programs regarding the Swartkops estuary. However, it takes more than just the direct users to boost chances of conservation plans succeeding, chiefly because this particular estuary is characterised by a multiplicity of users, similar to the Kynsna estuary (Napier et al. 2009). With multiple users visiting and making use of the estuary, robust strategies to cater for various expected benefits from future conservations plans, equitable resource access measures should be promoted significantly.

Differences in expected benefits from these visions and support for a potential Ramsar declaration included security issues and employment opportunities. Most of these expected benefits complemented each other. For example, the need to improve tourism and recreation in the Swartkops estuary would mean infrastructure development, which has the potential to create employment. Perceptions towards the importance of the Swartkops estuary because of its ecosystem services, both provisioning and cultural were strengthened by beliefs that tourism and recreation would succeed. Security was a major concern in and around the estuary leading

some respondents (mainly from the high-income residential areas) to develop negative perceptions towards the estuary and its surrounds.

5.5 Support for a possible Ramsar declaration from a local perspective

Support for natural resources conservation initiatives globally have been examined and arguments have been developed regarding how best they can work and be supported to achieve their objectives. For example, some authors have argued that community participation highly determines success of conservation, especially around protected areas (Berkes, 2007; Chitakira et al. 2012; Bennett and Dearden, 2014) and in wetlands (Chowdhury et al. 2014; Hettiarachchi et al. 2015). There is growing literature supporting adoption of stakeholders' perceptions and input in conservation of natural resources (Abecasis et al. 2013; Bennett, 2016; Oldekop et al. 2016). This research enables conservation officials to tackle some complex conservation issues, such as trade-offs and overlaps in natural resources valuation among stakeholders. Some conservation mechanisms and treaties have in some cases highlighted to have excluded marginalised communities in their decision making. In some instances, this has led to knowledge gaps, deserving further research because of the commonly accepted notion that the poor and marginalised communities depend more on natural resources and often times enhance their degradation (Barbier, 2010). Findings from this study seem to confirm this notion, evidenced by low-income users extracting more natural resources from the Swartkops estuary. This was an expected finding, given lack of varied livelihood options, not only around the Swartkops estuary but rather a characteristic that besets several developing regions.

As mentioned earlier, differences among communities gave a platform for varied perceptions towards several aspects of the estuary to be expressed, as demonstrated by this study. Contrary to previous research, for example Klein et al. (2007) who highlighted a consideration by conservation agencies that communities are homogeneous, this study revealed the opposite. This implies that the several perceptions provided regarding the state of the estuary and its management can be used as an indicator for conservation support among different income group respondents. For instance, our respondents differed considerably when it came to pollution around the estuary, management of the estuary as well as resource harvesting. This could imply that for proposed conservation plans to have a better chance at success, these perceptions would have to be considered accordingly (Cinner and Pollnac, 2004; Bennett, 2016).

Taken together, the findings of this study point to the importance of considering heterogeneity in natural resource management from an urban setting. Similar to Cinner and Pollnac (2004), differences between the high-income and low-income users were evident and these were reflected through uses of the estuary and how each community perceived the ecosystem and support for conservation plans. Be that as it may, poor communities lack access to critical aspects of empowerment which include education and are often disempowered both politically and economically (Bene, 2003; 2009). Because of this exclusion, poor communities are often marginalised, and their socio-economic statuses not considered when drafting conservation policy (Musavengane and Leonard, 2019) and the Swartkops estuary is no exception.

This is largely because social equity is critical in determining stakeholders' participation in conservation initiatives. Against a background of exclusionary development approaches, this could be interpreted as a perpetuation of apartheid era goals of excluding marginalised communities (Musavengane and Leonard, 2019). Therefore, conservation policy propositions in the Swartkops estuary should aim to offer equitable platforms for all stakeholders despite different social backgrounds. This can be done by prescribing intensive capacity building and education of stakeholders, consistent with goals of pro-poor conservation approaches and the Millennium Ecosystem Assessment goals (MA, 2005). This will not only help stakeholders understand conservation propositions but rather allow them to be competitive economically, thus improving their livelihood options.

Although the current study is based on a small sample of participants, the findings suggest that the Ramsar declaration should display equity among all user groups, to fulfil the Millennium Ecosystem Assessment and the Ramsar Convention goals (MEA, 2005; Matthews, 2013; Hettiarachchi et al. 2015). Complaints by other survey respondents, particularly with regards to pollution and potential restrictions that might be imposed by newer conservation strategies will have an enhanced opportunity to be addressed should equity be displayed. Further, the results of this study indicate that the poor highly depend on the estuary for economic purposes thus making them key stakeholders whenever conservation of the Swartkops estuary is concerned. Therefore, when coming up with conservation plans, it is essential to ensure that these plans are inclusive, especially of the marginalised people's needs because they have limited livelihood options. Not only will this improve these people's livelihoods, but it gives

an enhanced chance of success in any proposed conservation plan proposed or implemented (Bennett, 2016; McKinley et al 2017).

Therefore, in the context of this study it is imperative that stakeholders are educated and made aware of any natural resources' management options proposed, and have their perceptions considered in conservation planning. This will not only help calm people's perceptions but also improve chances of their willingness to be engaged in the process of conserving their perceived prized asset, the Swartkops estuary. However, focusing on local participants' perceptions alone regarding the state and management of the Swartkops estuary alone can prove to be inadequate. For example, possibly due to limited or pressure on green spaces, the Swartkops estuary accommodates users from further places, expecting to equally benefit from the estuary. Therefore, to help avert potential conflicts within users of the estuary, there is need to incorporate more than the local communities, since users from further afield may have their own needs and expectations may differ concerning the use and management of the Swartkops estuary.

5.6 Conclusion

This study contributes substantially to the growing literature and debates on natural resources management and use in urban landscapes. With increased urbanisation, human pressure is threatening green spaces in urban areas, hence this study helps to understand resource use dynamics and also explore possible overlaps and points of conflicts, thus giving a basis for designing conservation initiatives that are inclusive of all stakeholder concerns. Further, despite the Swartkops estuary being a very important and significant environmental asset, it is not spared from the human pressure threatening its existence. Therefore, the main aim of this study was to provide empirical evidence pertaining use values of the Swartkops estuary, perceived state of the estuary and its management as well as future visions held. This would provide conservation practitioners, policy makers and fellow researchers with a better understanding of not only the contribution of the natural resources, but also the state in which the ecosystem providing these services is perceived.

Results from this study suggest that respondents, including the marginalized are keen to support the Ramsar declaration, seeing it as a way that will incorporate them in some form of custodian roles to contribute in the management of the estuary. Despite mixed conservation outcomes and benefits as a result of any association formed, all kinds of support to the conservation initiative such as monitoring progress of management and community awareness campaigns can be critical in realising conservation goals and objectives.

5.7 Policy implications and recommendations

Taking the broader objective into account of trying to understand the likely livelihood implications of a potential Ramsar declaration interactions between local communities and their immediate environment should be further researched. A more in-depth understanding of how different cultural practices interact with environmental spaces to give them a meaning and ultimately a produce cultural values should be the main focus. It is also critical that complexities arising from the different user groups' needs and benefits in the estuary are accounted for in designing conservation mechanisms. Some of these stakeholders may not necessarily be from the local communities directly affected by the conservation initiatives implemented.

Further, management approaches should be adopted at a local level scale as this would allow addressing conservations issues specific to that area, in this case the Swartkops estuary. There is need for enhanced communication between local government and local communities (Clarke, 2012). These engagements can aid local governments to identify any human or financial capacities that need to be boosted, in order to equip stakeholders with adequate resources to adapt and sustainably manage the Swartkops estuary. If stakeholders are educated on the importance of conserving and sustainable utilisation of natural resources, they are likely to understand conservation objectives and policies presented to them and likely to increase the chances of conservation success. It is however critical that they are always made aware of the progress of any conservation approaches that would have been implemented to sustainably manage the Swartkops estuary. This could ensure estuary governance practice integrates current data, findings and advances made in scientific research to develop appropriate interventions to resource use challenges in the estuary.

More so, given the perceptions and future visions presented in this research, it is imperative that there is a clear distinction of roles and duties among government departments and officials. This will not only assist in improving efficiency of carrying out tasks due to clarity of tasks but also, local communities can be made aware of which offices or officials to visit regarding use and management of the Swartkops estuary. Van Niekerk (2007) suggests that this lack of clarity among management officials reduces chances of success of any policy or strategy put in place to manage natural resources. Further, with clarity of roles and duties, priorities and management objectives of the Swartkops estuary can be clearly communicated.

5.8 Research limitations

This study potentially had some limitations. For example, during the surveys, respondents free listed cultural services they enjoyed or valued, that were provided by the Swartkops estuary, without ranking them according to their importance. As a result, only the different cultural ecosystem services were recorded and analysed. Although these results were in aligned to the proposed objectives, ranking these cultural services would have given a more meaningful assessment of the different valuations and importance of these services for conservation purposes. Furthermore, some respondents might have been insecure concerning some questions administered in the questionnaire, particularly for the directly collected natural resources. Therefore, some inaccuracies might be expected given that some of these survey respondents could have answered some questions incorrectly.

5.9 Directions for future research

This study has opened a promising avenue for future research in coming up with different management options for the Swartkops estuary. A similar study and approach should be transferred to other urban estuaries, to confirm the accuracy of these results. Dependence on natural resources has mostly been studied in the rural areas of South Africa or in and around protected areas such as National parks. Therefore, results from this study concerning future management alternatives for the Swartkops estuary can influence objectives for further research in the management of estuaries, especially towards improvement of poor and limited livelihoods within urban landscapes.

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APPENDICES

SURVEY QUESTIONNAIRE

QUESTIONNAIRE NO: _____ Name of respondent: _____

Date of interview: _____Location_____ Activity_____

SECTION A: RESOURCE UTILISATION

This study seeks to understand the type of resources utilised, either harvested, bought or sold and will also look at the frequency of collection as well as the amounts collected.

1. What type of resources do you harvest from the Swartkops estuary?

Natural resource	**Frequency of collection?**	**Quantity/per collection trip (use local measures)?**	**Preferred season of harvest?**	**How do you use harvested resources?**	**Approx how much do you receive from sales/month**
Fish					
Bait (prawns, worms)					
Shellfish (oysters and mussels)					
Crabs					
Others, specify_____ _____					

2. If harvested resources are for sale,
   a) Who do you sell to?

      _____

   b) Where do you sell?

      _____

   c) How often do you sell the harvested resources?

Everyday [ ] Once/week [ ] once/2 weeks [ ] once/month, other times_____

d) What do you normally use the money for?
School fees [ ] Utility bills [ ] Groceries [ ] Other uses_____

3. Do you buy any natural resources in the table below harvested from the Swartkops estuary?

Natural resource	**How often do you buy these resources?**	**Quantity bought per trip (use local measures)?**	**Who do you buy from?**	**Approx how much do you pay for the resources?**
Fish				
Bait (prawns)				
Shellfish (oysters and mussels)				
Crabs, lobsters				
Others, specify_____ _____ ___				

4. a) Are there any differences between resources from the estuary and the ones offered in the markets? Yes [ ] No [ ]
If yes, please explain?
_____.

b) How far do you travel to harvest resources from the Swartkops estuary?
0-4 km [ ] 5-9 km [ ] 10+ [ ] other, specify_____

c) What mode of transport do you use when visiting the estuary?
Foot [ ] Cycle [ ] Motorcar [ ] other, please specify_____

d) How long (how many hours in a day) do you normally take harvesting resources?
_____

SECTION B. CULTURAL SERVICES OBTAINED FROM THE ESTUARY.

5a.) Other than the uses already mentioned, do you currently make use of the estuary in any other way? Yes [ ] No [ ]

b) If yes, please indicate the uses as well as the importance of each use.

Item	**Frequency of visit**	**Level of importance**		
		Very Important	Important	Less important
Bird watching				
Jogging, swimming, dog walks				
Boat sports				
Education and knowledge				
Baptisms or traditional ceremonies.				
Sense of peace and tranquillity				

6. Do you have any memories attached to the Swartkops estuary from the past?
   Yes [ ] No [ ]
   Please
   explain_____
7. Are the any resources harvested from the estuary that are used for any traditional ceremonies?
   Yes [ ] No [ ]
   Please
   explain_____
8. Do you get any inspiration from the Swartkops estuary which you can express through art, folklores or any other forms?

Yes [ ] No [ ]

Please

explain_____

9. Are there any places within the estuary that are of cultural significance? Maybe places were ceremonies are held?

_____

SECTION C. ATTITUDES AND PERCEPTIONS

10. When you hear about the Swartkops estuary, what do you think about?

_____

11. Estuaries all over the world are faced with problems including pollution, unsustainable harvesting methods of resources. In your view, do you think the following are threats to the estuary?

If yes, how serious is the threat?

Threat	Yes/No	Problem	Serious problem	Very serious problem
Sewage disposal				
Dumping site				
Unsustainable fishing				
Bait harvesting				
Other(s)				

12. In your view, what are the major disservices from the estuary?

If yes, how serious are the disservices?

Disservices	Yes/No	Problem	Serious problem	Very serious problem
Drowning				
Crime hotspot				
Breeding ground for mosquitos				

Other(s), please list.				

13. Do you feel that everyone around has the same understanding of the value of and threats to the estuary? Yes [ ] No [ ]

    If yes, please explain_____

14. How would you feel if the Swartkops estuary was lost completely?

    _____

15. Public meetings and seminars on Swartkops estuary management are open to everyone.

    Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree [ ] Don't know [ ]

    Why? _____

16. Everyone has equal right to access and benefit from the Swartkops estuary.

    Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree [ ] Don't know [ ]

    Why? _____

17. There are public awareness campaigns done on the importance of the Swartkops estuary.

    Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree [ ] Don't know [ ]

    Why? _____

18. The swartkops estuary is an important asset to the environment hence it should be managed properly.

    Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree [ ] Don't know [ ]

    Why? _____

19. Who do you think is responsible for the Swartkops estuary management?

    Users [ ] DEAT [ ] Zwartkops conservancy [ ] Metro police [ ] Don't know [ ]

    Local municipality [ ] Other(s), please specify

    _____

20. The responsible authorities are doing a good job of managing the estuary?

    Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree [ ] Don't know [ ]

    Why? _____

SECTION D: CATEGORISATION OF RESPONDENT

21. Gender of respondent.

    Male [ ] Female [ ]

22. Race/Ethnicity

    Black [ ] white [ ] Coloured [ ] Indian [ ]

23. Age (years)

    18-29 [ ] 30- 39 [ ] 40-49 [ ] 50+ [ ]

24. Marital status

    Single [ ] Married [ ] Divorced/widowed/separated [ ]

25. Education

    None [ ] Primary Education [ ] Matric [ ] University [ ]

26. Employment status

    Temporarily [ ] permanently employed [ ] Unemployed [ ] Retired [ ]

27. How many members make up your household?_____

28. Place of residence? _____

    Permanent resident [ ] Temporary/ holiday resident [ ] Visitor [ ]

SECTION E. HOUSEHOLD INCOME

29. What is your gross household income per month?

    R0- R1000 [ ] R1000- R3000 [ ] R3000-R6000 [ ] R6000-R12000 [ ] R12000+

30. Are there any other benefits you receive other than your salary?

    Yes [ ] No [ ], please specify_____

31. Does any of your household members earn any type of grant listed below?

Grant type	**No of grants**	**R/ Month**
Old age		
Disability		

Child support		
Care dependency		
Foster care		
Government pension		
Other grants, specify_____		

32. Do you have anything you want to add, that you feel has not been included in this questionnaire? Yes/No

    If yes, Please

    explain_____

THANK YOU.