

Cultural Ecosystem Services of the Diep River Corridor: Community perceptions

By

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A dissertation submitted in the partial fulfilment of the requirement of the Master's Degree in

Environmental Science

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ACKNOWLEDGEMENTS

The funding for this project was supported by the National Research Foundation (NRF) and I am grateful to be a recipient of this bursary/ scholarship/award. I also feel privileged to be amongst those fortunate enough to pursue a degree in tertiary education.

I would like to thank my supervisor, Dr Pippin Anderson, for the patient guidance, encouragement and advice she has provided throughout my time as a student. I have been extremely lucky and favoured to have a supervisor who cares so much about my work, and who was always available to respond to my questions and queries.

I am thankful to Georgina Avlontis and Jessica Kavonic for providing additional assistance and guidance by providing additional supervision of the work. I am also grateful to the Councillor of Ward 62, Elizabeth Brunette, for connecting me with people involved in my study area and for introducing the study to the local community. A special thank you to Mark Clive Arendse and James Forthsy for walking me along the river corridor, Gavin Lawson who was always available and provided information whenever needed, Jenny Clover for always alerting me of what is happening within the community and Kevin Winter for shedding some light of my study. Lastly, I would like to thank my fellow peer students Fezile Mathenjwa and George Sekonya for their support, feedback, cooperation and of course friendship.

Above all, I thank God for the many blessings that continue to be undeservingly bestowed upon me.

ABSTRACT

The purpose of the study was to examine the cultural ecosystem service and the community perceptions of the Diep River Corridor that connects the Table Mountain National Park, Little Princess Vlei, Zandvlei Estuary, and finally feeds to the sea of the Atlantic Ocean. Constructed interview questions were used to assess the cultural ecosystem activities occurring along the Diep River corridor. The intention of assessing the cultural ecosystem services was to examine the importance of the corridor for the local communities. The corridor was historically important for various activities such as water for human and livestock drinking purposes, agricultural activities, and irrigation of gardens and to a power water mill. The increased number of people relocating and using the Diep River corridor resulted in degradation and transformation of the river. The study thereof acknowledges people as the major cause of transformation of the Diep River corridor. Literature revealed a lot of studies that have been about water quality, vegetation cover and positions people as the cause of environmental crisis such as pollution. This study thereof saw the need to assess the perceptions of people towards their natural environment and see if this could be used to argue for the importance of this green amenity.

Overall, the assessment of community members' perceptions regarding the importance of the river corridor as an available green space was a challenge as individuals had a number of different views. Cultural ecosystem services associated with the Diep River corridor are numerous and variably experienced and enjoyed by the different communities along the river corridor. The outcome of the study revealed different levels of importance and various uses of the corridor by individual and group participants. Important community activities included walking, relaxing, enjoying the peaceful environment, experiencing the beauty of nature, spending time alone or with loved ones, having picnics, sports and kayaking/ boating. The study recognizes that improved management of Diep River corridor for these recreational activities is important and efforts must be made to meet the diverse interest of local community members and residents. The findings will hopefully result in community needs being taken into increased consideration for future recreational management around the Diep River corridor.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
ABSTRACT	3
TABLE OF CONTENTS	4
LIST OF FIGURES	5
CHAPTER 1: INTRODUCTION	6
1.1. What are Cultural Ecosystem Services?	6
1.2. Cultural Ecosystem Services and Rivers in the City	6
1.3. History of the Diep River corridor	7
1.4. Relevance of the study	8
1.5. Aim	9
1.6. Objectives	9
1.7. Thesis outline	9
CHAPTER 2: LITERATURE REVIEW	10
2.1 The role of cultural ecosystem services in the city	10
2.2 The importance of rivers in cities	11
2.3 History on the use of rivers in cities	12
2.4 Case studies on the use of river corridors	13
2.5 Canalisation of rivers	15
a) Cultural landscapes	15
b) Cultural identity	16
c) Sense of place	17
d) Ethnicity	17
e) Recreation	18
CHAPTER 3: METHODOLOGY	20
3.1 Study Area	20
3.2 Sampling	23
3.3 Data Collection	24
a) Meetings attendance	24
b) Key informants	24
c) Field data observation and public interviews	26
d) Participant observation	28
3.4 Data Analysis	28
3.5 Ethical Considerations	29
3.6 Limitations	29

CHAPTER 4: RESULTS AND DISCUSSIONS	31
4.1 Introduction	31
a) The demographics of the study area	31
4.2 Cultural Landscape features and uses	32
a) The upper Diep River corridor	32
b) The lower reaches of the Diep River corridor	35
c) Constructed canals of the Diep River corridor	40
4.3 A space that connects people	42
4.4 Sense of place and belonging	44
4.5 The importance of environmental knowledge and awareness	46
a) The upper Diep River corridor	47
b) The lower Diep River corridor	47
4.6 The importance of maintaining the Diep River corridor	49
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS	53
APPENDIX 1	56
APPENDIX 2	58
REFERENCES.	59

LIST OF FIGURES

Figure 1: Diep River corridor and the nearby estuaries	20
Figure 2: Diep River corridor and the nearby suburbs	21
Figure 3: Google image showing the disconnection of Little Princess Vlei and Princess Vlei	22
Figure 4: Google image showing St Augustine Cricket Club and Princess Vlei Eco Park	27
Figure 5: Constantia Valley Greenbelt walking trails	33
Figure 6: Adults boating at Zandvlei Estuary	37
Figure 7: Community garden at Retreat Suburb	42
Figure 8: St Augustine Cricket Club and Princess Vlei Eco Park	44

CHAPTER 1: INTRODUCTION

1.1. What are Cultural Ecosystem Services?

The term cultural ecosystem services originated in the 1970s with the intent to link environmental science and policy as a way to solve environmental issues, including land degradation, flooding, pollution, resource scarcity and other related environmental issues (Daniel et al, 2012; O'Farrell et al, 2012; Asah et al, 2014). A simple definition of ecosystem services as stated by the Millennium Ecosystem Assessment (2005) include various benefits that people derive for life support and survival and are categorized in terms of provision (such as food and water), regulating (such as climate and air services), supportive (such as soil erosion control) and cultural services (such as recreational activities and aesthetic enjoyment). According to Hernández-Morcillo et al (2013) cultural ecosystem services provide an understanding of the relationship between people and nature which helps reveal a way to care for our natural environment.

Cultural ecosystem services have been variably defined by different authors and encompass a large array of human benefits (Daniel et al, 2012; Milcu et al, 2013; Hernández-Morcillo et al, 2013). These include benefits that are derived through spiritual and religious values, knowledge systems, educational values, inspiration, social relations, sense of place, cultural heritage values, recreation and ecotourism, reflection and aesthetic experiences (Daniel et al, 2012; Holt et al, 2012). Milcu et al (2013) note cultural ecosystem services as life-fulfilling functions, such as amenities services and those that give social-cultural fulfilment.

A broader argument still is that these services are intangible, and not easy to quantify in terms of monetary value (Daniel et al, 2012; Milcu et al, 2013). Despite the importance of cultural ecosystem services being considered intangible and difficult to quantify, several authors (Cloke et al, 2004; Daniel et al, 2012; Milcu et al, 2013; Hernández-Morcillo et al, 2013) discuss these services as a useful tool that can be used for the management and protection of land for both amenity and conservation motives.

1.2. Cultural Ecosystem Services and Rivers in the City

According to the recent literature by Hernández-Morcillo et al (2013) cultural ecosystem services are better understood by assessing people 's perceptions of their interaction with nature. People interact with nature in varied ways, including the need for food, peace and freedom (Cloke et al, 2004; Wilmot, 2014) and therefore tend to settle in flat areas where they can easily grow crops and establish towns or cities (Duranton & Puga, 2000). According to Luger (1998) cities were historically settled on rivers

to address a multitude of purposes, such as water for agricultural, domestic and industrial purposes; economic opportunities such as increased income, better health and social services and other attractions such as parks that were not readily available in rural areas (Bolund & Hunhammar, 1999). Recently rivers also provide cultural services which have become increasingly recognized and sought after by people (Daniel et al, 2012; Milcu et al, 2013). Recreational and outdoor city services such as swimming, fishing, boating or enjoying the space by walking, jogging, spiritual enrichment and so forth play a major role in people's well-being and fulfils the recreational needs of city dwellers (Daniel et al, 2012; Colding,2013; Milcu ,2013)

Cape Town is a coastal city in South Africa and a major destination for immigrants and expatriates (Sonn & Lewis, 2009; Masade, 2007). It is located within the Cape Floristic Region that reflects a collective term of Proteas, Erica, geophytes and Restios and is known as a biodiversity hotspot (Rebelo et al, 2011; O' Farrell, 2012). The Fynbos biome is an integral vegetation type of the Cape Floristic Region and of Cape Town and is known for its diversity and beauty (Rebelo et al, 2011; Holmes et al, 2012). According to Boekstein (2014) the City of Cape Town is a city known for its amenity biodiversity hot spots, heritage sites, and tourism attractions, making it a favourable destination for tourists and potential settlers.

1.3. History of the Diep River corridor

According to Brown and Magoba (2009) the Diep River originates in Table Mountain National Park, confluences with the Sand River, and flows through a series of suburbs, passing through the Constantia Valley Greenbelt and public open spaces, feeds into Little Princess Vlei ,Zandvlei estuary and ultimately into the sea at the at Muizenberg suburb. Once the river flows on from Little Princess Vlei it becomes the Sand River. Besides the varied names of the River, the Diep River corridor¹ has a relatively flat topography which previously made it sought after for farming practices. Despite this flat topography, the Diep River corridor was also deep enough to allow for the sailing of boats during the European Settlement from 1652 (Jackson et al, 2008; Brown & Magoba, 2009). The Diep River supported agricultural activities that date back to Jan van Riebeeck's arrival in 1652 where the demand for fruits and vegetables were high due to an increased number of European settlers in the area and to service passing trade ships (Jackson, 2008; Brown & Magoba, 2009). The river corridor was also used for various activities which included irrigation of gardens, water for human and livestock drinking purposes as well as to power the water mill (Brown & Magoba, 2009). The introduction of agricultural activities and canals to the landscape transformed the corridor as vegetation was cleared for fields

¹The Diep River corridor is one of the river corridors within the City of Cape Town that is known for its fynbos vegetation type (Rebelo et al, 2011)

and the land burned for grazing purposes (Brown & Magoba, 2009). Although much of the river deterioration and transformation were based on the increased urbanization and agricultural activities, there are also observations noted by Shuping (2008) where informal settlements have used the river for the disposal of waste.

To date the Diep River corridor and surrounding suburbs consist of formal and informal areas, industry, farming (vineyards, fruit, and livestock) and forestry (River Health Programme, 2007; Jackson et al, 2008; Shuping, 2008). Despite continued farming activities and urbanization, Viskich et al (2016) discusses the Diep River corridor as naturally rich in biodiversity and a feature that makes a crucial contribution towards the natural heritage of the local city dwellers. The Diep River corridor is argued to be of major importance to various local communities by providing recreational opportunities which support livelihoods and serves to uplift local people's spirits (Jackson et al, 2008; Viskich et al, 2016).

1.4. Relevance of the study

According to recent literature (Bryan et al, 2013; Daniel et al, 2012; Colding, 2013; Milcu et al, 2013; Wolch, 2014; Asah et al, 2015; Wilmot, 2015) the significance and recognition of cultural ecosystem services is taken too lightly and is therefore not sufficiently recognized in South Africa. Cultural ecosystem services are easily ignored due to their intangibility however society values them and strives to protect them from further loss (Daniel et al, 2012; Holt et al, 2012; Milcu et al, 2013; Wilmot, 2015; Handel et al, 2015). According to Daniel et al (2012) cultural ecosystem services need to be constantly and cautiously maintained for both present and future generations to enjoy, particularly in cities where there is less green space for city dwellers to appreciate and benefit from.

In this site selected for this study, cultural ecosystem services have rarely been scrutinized in the past (Pulse et al, 2009, Hart & River, 2015, Brill et al, 2017). Previous studies conducted have related to water quality, vegetation cover, and the various animal species of the Diep River corridor (Jackson et al, 2008; Viskich et al, 2016). Importantly, several studies within the Diep River corridor repeatedly position people as the cause of the current environmental crises such as pollution and over clearing of vegetation (Shuping, 2008; Jackson et al 2008; Ayeni et al, 2010). This current study assessed people's perceptions of the Diep River corridor as a way to understand the attitudes towards and expectations from local users and residents towards their natural environment and thus potentially argue for the importance of cultural ecosystem services to the current area of study.

1.5. Aim

This study aimed to investigate the significance of the cultural ecosystem services to people by assessing their perceptions and use as a way to understand the attitude and expectations that enhance connection with nature within the context of Diep River Corridor.

1.6. Objectives

In order to examine the various uses and perceptions of people about the cultural ecosystem services of the Diep River Corridor, the study sought to:

- Identify the uses and the local users of the Diep River corridor; and,
- Assess the perceptions of the cultural ecosystem services delivered by the Diep River corridor to local users across different neighbourhoods.

A total number of 70 people which comprises of the local residents, local community champions, local conservators, consultants, council and the City of Cape Town representatives were interviewed. A snowballing method which relied of referrals from participants was used to obtain knowledge from extended associations of previous acquaintances. The local users and the way of use of the Diep River corridor was identified though observation, field trips, and surveys.

1.7. Thesis outline

This thesis comprises five chapters. The first chapter is introductory and provides a brief background of cultural ecosystem services, the Diep River corridor, and relevance of the study. The chapter concludes by outlining the aim and objectives of the study. Chapter two presents a review of literature under the following themes: the role of cultural ecosystem services in the city, the importance of rivers in cities, historical use of rivers in cities, case studies on the use of river corridors in cities, canalization of rivers in cities, and people's perception of rivers in cities. Chapter three outlines the study area, methodological approach, ethical considerations and limitations of the study. Chapter four presents the results and discussion of the study, as supported by relevant literature and the interpretation of results found. Finally, chapter five provides the conclusion and future recommendations drawn from the current study.

CHAPTER 2: LITERATURE REVIEW

2.1 The role of cultural ecosystem services in the city

One important fact to take note of is the gradual urbanization of the population. In 2013 the number of people living in cities increased to 50%, and according to Seto et al, (2013) this number is still on the increase. This means that the majority of people reside in cities, and subsequently this environment represents the only “nature” most urbanized people are familiar with (Daniel et al, 2012; Milcu et al, 2013; Wilmot 2015). One negative aspect which can be attributed to the urbanization movement is the increase of stress related to increasingly busy urban lifestyles (Luger, 1998; Handel et al, 2015). One method in which city dwellers cope with these stressors is through engagement in outdoor activities. However, due to the limited green spaces available, it is not always possible for persons to access, and engage in, these activities (Bolund & Hunhammar, 1999; Asakawa et al; 2004). The importance of green spaces such as parks, forests, vacant plots, gardens, streams and rivers are crucial within the urban context as they represent the primary sites for the delivery of cultural ecosystem services (Handel et al, 2014). Cultural ecosystem services thus provide a sphere in which the connection between city dwellers and nature can be enhanced (Milcu et al, 2012; Hernández-Morcillo, 2013). These green spaces are important facets of daily life for people as they provide not only an outlet for stress, but also a place in which one can enjoy outdoor leisure opportunities, revitalize oneself, and appreciate the beauty of nature as well (Milcu et al, 2013).

Numerous studies underline the importance of cultural services as shaping human interaction with nature (Alberti et al, 2008; Daniel et al, 2012; Tengberg et al, 2012; Milcu et al, 2012, Hernández-Morcillo et al, 2013). Daniel et al (2012) hold the viewpoints that cultural ecosystem services are of crucial importance in the process of enhancing public support for ecosystem protection. They support this viewpoint by highlighting the numerous benefits provided by cultural ecosystem services, including: the provision of some religious and spiritual value, a strong sense of place, aesthetic appreciation, social relations, recreational activities and cultural heritage. These include objects which have historical value such as paintings, buildings and sacred land, all of which ultimately contribute to people caring and protecting their landscape to preserve these services (Hernández-Morcillo et al, 2013; Wilmot 2015). Daniel et al (2012) state the intangibility of cultural ecosystem services and argue that the functions and structures of cultural ecosystem services are dependent on human needs and thus quantifiable in that regard. Tengberg et al, (2012) note heritage and cultural identity as the two key factors of cultural ecosystem services followed by the spiritual services, religious services, aesthetic appreciation of nature, recreation and tourism which are not recognized in planning and management of landscapes due to their non-consumptive value. Historic features such as stories,

knowledge systems, traditions such as cultural heritage and identity, and spiritual and recreational values are acknowledged as crucial for the management of landscapes by individuals or groups (Tengberg et al, 2012). Generally, cultural ecosystem services are considered intangible and not easy to quantify or measure, which results in poor appraisal and management of the landscape for a better living environment (Milcu et al, 2013). A further challenge is that not all ecosystem services are enjoyed or engaged in the same way by people (Dickie et al, 2014). This can give rise to conflict where one group may seek peace and quiet in an open space and another may want to hold parties. These differences need to be understood in order to manage open spaces to accommodate different needs.

Cultural ecosystem services are one of the four ecosystem services categories identified in the Millennium Assessment of 2005 (MA, 2005). These services have generated several important debates of social relevance concerning the value of their intangible properties (Daniel et al, 2012; Holt et al, 2012; Tengberg et al, 2012; Hernández-Morcillo et al, 2013; Lopez- Santiago et al, 2014). Many cultural services cannot easily be understood in terms of monetary value due to them being extremely difficult to quantify (Kumar and Welz, 2003). Despite cultural services being considered difficult to quantify, their particular contribution to human wellbeing cannot be replaced by any other source if lost (O'Farrell et al, 2012; Hernández-Morcillo et al, 2013).

2.2 The importance of rivers in cities

Rivers are well known as the green spaces that keep the city functional and desirable through numerous benefits including the provision of food, purification of water, recreation, spiritual fulfilment as well as aesthetic appreciation (Alberti et al, 2008; Frazier, 2010; Daniel et al, 2012; Wilmot et al, 2015). According to Asakawa et al, (2004) and Holt et al, (2012) rivers shape the cultural landscape of cities by providing much needed public green spaces within cities for recreational activities, sporting activities, aesthetically pleasing open spaces, as well as providing an opportunity for people to connect with their landscapes. According to Milcu et al (2012) people share a social interconnection with rivers through not only cultural activities, but also education. Boyd and Banzhaf (2007) contend the connection between people and rivers has existed for centuries based on peoples' dependency on rivers for food and water, and it also provides a space in which to appreciate the aesthetic beauty and other recreational opportunities the river provide. They hold that our current affection for rivers results from this legacy. While the literature on the positive social and cultural contribution of rivers to city dwellers is substantial (Chiesura et al, 2004; Haq, 2011; Francis, 2014; Morcillo et al, 2014), they are not always perceived as positive features in city landscapes. The reason behind this negative view is due to the rivers frequently being used as dumping sites (Suthar et al, 2009), which can create great controversy and points of social conflict (Daniel et al, 2012; Tengberg et

al, 2012). These ecosystem disservices will be addressed in more detail when evaluating the literature on social perceptions.

2.3 History on the use of rivers in cities

Rivers are considered as one of the fundamental sources for human life as they provide water, one of the most necessary elements for flora and fauna to exist (Daniel et al, 2012; Milcu et al, 2013; Wilmot, 2015; Milcu et al, 2013; Daniel et al, 2012). Rivers form the core of numerous habitats as they provide habitats for wildlife, food and water for people, as well as a sphere in which people can enjoy the landscape element thereof (Bolund & Hunhammar, 1999). According to Congress et al., (2006) rivers constitute a significant natural resource, a repository of biodiversity and play a crucial role in human culture.

According to Adams (2014) rivers were historically important for rural development planning due to the value they hold in terms of the increase in crop production they provide. Rivers have played an important role in the existence of humans through providing water to drink, as well as attracting animals for grazing which people could then hunt. Rivers also provide irrigation, a means of disposing of waste, as well as amenity value to building (Arthington et al, 2010). Industries and agriculture were built near rivers due to the core importance of the rivers to these industries (Congress et al, 2006). To date the uses of rivers have increased to the point where they are being utilized for amenity and aesthetic services in the city setting.

Several studies note rivers within cities as being highly used by city dwellers and degraded as a result of agriculture and urbanization (Luger, 1998; Asakawa et al, 2004; Holt et al, 2012). The City of Cape Town view the disturbance of the rivers to arise from urban development, alien vegetation infestation and agriculture activities as argued by Wilmot (2015). Canalization also plays a role in the transformation and degradation of rivers as it disregards variability of the environment and disrupts normal hydrological flows and processes (River Health Programme, 2003).

According to Census (2011), the annual population of Cape Town is estimated at 2.6% growth rate as compared to the result of previous census in 2001 to 2011. This increase in population put a lot of strain on the natural environment in terms of demands for food, shelter and often resulted in environmental degradation (Luger, 1998, Woolsey et al, 2005). Despite the large increase in population within the city of Cape Town, the city still contains rich natural and cultural heritage assets which attract tourists (Avlontis, 2011; Rebelo et al, 2011). Cape Town is further known for its Fynbos biome and the Cape Floristic Region, which comprises Proteas, Ericas geophytes and Restios (Viskich et al, 2016). The Fynbos biome and Cape Floristic Region are well known for their aesthetic features

and unique biodiversity (Avlontis, 2011). Cape Town's economy is supported by this heritage and the natural beauty which stimulates growth in the tourism industry (River Health Programme, 2005) .

The most important attribute of rivers remains the ability to support a multitude of life forms (Luger, 1998; Asakawa et al, 2004; Daniel et al, 2012; Holt et al, 2012). However, it is argued that this is a difficult task to maintain, as rivers are misused by communities residing along the river (Luger, 1998; Asakawa et al, 2004; Wilmot et al, 2015). Over-exploitation of rivers, the dumping of solid waste into rivers, as well as the removal and clearing of vegetation for agricultural and human settlement purposes is further emphasized as some of the major contributors inhibiting the functions of the river, and the benefits it provides to society (Luger, 1998; Woolsey et al, 2005; Wilmot, 2015).

2.4 Case studies on the use of river corridors

Globally, rivers in cities have experienced a more radical decline than their counterparts in rural settlements (Carpenter et al, 1992; Grimm et al, 2008), in support of the argument, two city case studies are used in this study to illustrate radical decline of rivers in the cities. The case studies which clearly demonstrate the importance of social perceptions, course of action which should lead to effective restoration and narratives regarding rivers are presented in this section, this two case studies will assist the study to compare, contrast and analyse people's perceptions beyond the current study site as well as draw viable conclusions that will help the current situations of the study. The first case study centres on Japan and the second on the United Kingdom, where each presents situation related to the topic in the current study. While this current study does not seek to actively restore the Diep River corridor, it does seek to bring to light the different views and perceptions of users and neighbours of the river and this information could, like in the case studies presented below, be useful in informing any socially-relevant restoration activities along the river in the future.

A case study of the Toyohira River in the City of Sapporo in Japan illustrates the use of a city stream corridor that details how people have different viewpoints regarding the uses of this stream, the conflict between users regarding rivers and the disconnection of values and desires. Their study details how the river corridor of the Yamahana, Shojin, Old Nakano, Yusuharu and Shinoro rivers of the city of Sapporo in Japan dried up due to excessive agricultural activities and urbanization. This was the result of people relocating and residing near the river corridor for easy access to water, without considering the risks related to relocating near floodplains. Local residents' perceptions of, and actions towards the transformation of the dried river streams played a major role in turning the marginalized space into a valuable asset to society. The study was informed by multiple perceptions of city river corridors which revealed people's attitudes towards the value of water quality, flood control, good

scenery, trails, and a space for relaxation. This was guided by a survey that focused on the perceptions and attitudes of people towards the use and value of their surrounding river corridors in an attempt to restore the marginalized corridor. The survey included questions about frequencies of river use as well as suggestions on how the river could be maintained. The results of these surveys made it apparent that people placed value on recreational activities such as resting and strolling, as well as on the importance of beauty related to landscapes with trees. As a result of the study the streams were restored and could once again be utilized for cultural activities such as providing an aesthetically pleasing landscape, social and recreational enjoyment and tranquillity. The residents found the space desirable once more, both as a space to live in, a space for their children to play in freely as well as a place with a pleasing view of nature.

A case study from the City of Sheffield in the north of England define issues which tend to arise through the overuse of river corridors through various activities. The study illustrated the historical importance of rivers in the City of Sheffield which included the use of city rivers as a source of power. This was critical to the industrial sector and provided employment to many residents who worked there in the production of steel. The employment opportunities provided led to people relocating closer to their working environment and resulted in urbanization and rapid industrialization. As a result of urbanization, the water bodies of the city became modified due to pollution and environmental degradation, canalization and constriction of weirs which disconnected the river corridors. This also led to a loss of associated green spaces around the corridor. Due to the negative impacts experienced, the city of Sheffield decided to implement a plan in order to restore the vacant land through partnerships with various stakeholders. This led to the formation of a group that could restore the river corridors and reflect on all the activities and uses required by the communities residing along the corridors. Thus, the Sheffield Waterways Strategy Group was formed which comprised representatives from various sectors of government, private, non-government, public, local communities and volunteers. The aim of the group was to ultimately restore the city's river corridors. The group assessed common issues surrounding city waterways through organizing and implementing meeting platforms where information, expertise, ideas, and opinions could be shared regarding ways in which the river corridors could be restored. No outcome was revealed from the meeting platforms, and the only reason why these groups partnered up was due to their shared goal of the restoration of the river corridors. An attempt was made to restore the lost green river corridors through making it a green park, providing recreational benefits such as fishing, kayaking, walking, and bird watching, as well as a cultural heritage site for education. The study's main focus was getting people together for the betterment and restoration of city life through restored green spaces along the river corridor.

2.5 Canalisation of rivers

According to Wilmot (2015), canalization serves as an example of the control which people may have on nature and not necessarily relate to the relationship between people and nature. Canalization is a method used to deal with issues of degraded river environments and associated flooding, where river bank vegetation is lost (Luger, 1998). Canals are man-made structures that are constructed to control the flow of water to reduce natural erosion and reduce flooding (King et al, 2003; Wilmot, 2015). According to King et al (2003) canalisation involves erecting embankments whereby the river bed and banks are lined with concrete which in return results in loss of ecological biodiversity. Canalisation reduces the aesthetic quality of many river systems as well the recreational opportunities (Brown & Magoba, 2009) and is predicted to result in loss of wetlands caused by the unnatural straightening of the river flow as desired by people (King et al, 2003). Despite the negative impacts, canalisation of rivers was an important advancement for people in terms of development and was done to meet the changing needs of people such as through the control of floods (Woolsey et al, 2005). Many rivers of the City of Cape Town were canalised during the European settlement to avoid flooding and erosion of river banks (Brown & Magoba, 2009).

a) Cultural landscapes

This section provides a brief review on how cultural landscapes are defined. Firstly, the study defines landscape as a concept shaped by communities through various activities such as farming, recreation, and social events, which continually provide an understanding of how people interact with their natural environment (Clope et al, 2004). It is also significant to note that some natural features such as rivers, forests, and grasslands influence the location of communities through better access or a more desired location (Luger, 1998; Barthel et al, 2005). Landscapes reflect a living synthesis of people and their environment and provide a sense of place which differentiates various groups of people or societies (Clope et al, 2004). According to Denier et al (2015) landscapes are visible features of the natural environment, and are often considered in terms of aesthetic appeal, where mountains, forests and rivers are deemed abundant in this appeal. People perceive the landscape as an area in which they interact with nature, and this is separate to the form of interaction (Wilmot, 2015).

There are a number of different definitions regarding cultural landscapes, varying from parks, gardens, green lands, industrial sites, cemeteries, grand estates, heritage corridors, or even historic sites such as sacred or religious places (Haq, 2011; Hernández-Morcillo et al, 2013; Wolch et al, 2014). The UNESCO (1972) defines cultural landscapes as the combined representative works of nature and man,

which is influenced by historic events, aesthetic values and other cultural activities. Daniel et al (2012) states cultural landscapes as long-term interactions between people and nature which constitute the legacy for biophysical features and intangible attributes. These attributes are gained from past generations and maintained by present generations, often associated with specific historic events that communities are exposed to (Cloke et al, 2004; Frazier, 2010; Daniel et al, 2012). According to Frazier (2010), cultural landscapes symbolize the ideas of life, people and their social relations with nature which brings meaning to people's existence through maintained values, beliefs, and attitudes. Cultural landscapes are essentially characterized as places in which people interact with nature in terms of use and value attributed to the space (Barthel et al, 2005). Cultural landscapes reveal the evolving relationships that humans have with the natural environment (Wilmot, 2015). It provides aesthetic, ecological, economic, social, recreational and educational value which is argued to provide crucial links between people and nature (Daniel et al, 2012; Wilmot, 2015).

In this study, which explores green space in a city, cultural landscapes would be seen as those green or natural spaces which provide a crucial sphere for people to connect with nature through recreational activities such as relaxing and walking (Seto et al, 2013). In this study, cultural landscapes were assessed based on how people interacted with their space and communities' preferences towards certain features in a natural landscape over others.

b) Cultural identity

Cultural identity is a complex concept that is related to a person's nationality, ethnicity, religion, social life, generation and space in relation to social groups with distinct cultures (Bottero, 2010). Cultural identity is a sensitive concept that is argued and understood under different terms by different authors, although it mainly relates to a sense of attachment to a place or historical experiences within a space (Tengberg et al, 2012). According to Tengberg et al (2012), cultural identity is an important aspect related to spiritual enhancement, recreation and aesthetic values that people value based upon their historical and cultural importance. The time that people spend together with loved ones relaxing, walking, jogging or enjoying the aesthetic view, enhances cultural identity as people are able to engage in introspection (Asah et al, 2014). Tengberg et al (2012) suggests that the particular use of cultural identity by either an individual or a group relates closely to their roots which can be linked to a sense of attachment to a place, based on historical experiences within the specific space.

Culture is a crucial informant of how human-beings exist and can be understood as comprising the beliefs and values which bring meaning to society's existence. Some examples are common languages, cultural history, traditions, and religions (Frazier, 2010). Daniel et al, (2012) argue that cultural

landscapes contribute to the identities of communities or social groups. These landscapes also explain the value which people place on their historical use of land to retain the legacy of biophysical features and intangible attributes from generation to generation. In this way cultural identity and cultural landscapes become important intertwined ecological and social features.

c) Sense of place

This section reflects the significance of a sense of place between people and their environments as a way to highlight the meaningful reasons why different places are utilized more frequently than others. According to Lopez-Santiago et al (2014), an understanding of the connection between people and their places is important in order to reflect the true value between communities, their place and the value and uses of the place. A sense of place provides a feeling of being at home, and having control of one's own life, and a place therefore becomes meaningful to people's existence (Cloke et al, 2004; Lopez - Santiago et al, 2014).

Sense of place refers to the emotional connections people have with their space (Brown & Raymond, 2007). Cross (2001), notes sense of place is influenced by a custom and a habit of repeatedly doing something for years, which stimulates the feeling of belonging to the place. According to Cross (2001), belonging to a place involves the development of positive perspectives and emotions which lead to cultural belief patterns and practices and eventually link people to their space. Hernández-Morcillo et al, (2014) emphasize the influence of historic events in the attachment to a space. In contrast Cloke et al (2004) argues sense of place as a resource that can be used by people to pursue their own freedom; for example, homeless people using the space for shelter and food as a way to survive poverty and to feel free in their own space.

d) Ethnicity

According to Frazier (2010), ethnicity is a state of belonging to a social group with a common national or cultural tradition. It is a sense of belonging to a group of people who share common languages, cultures, religions, and traditions (Bottero, 2010). Frazier (2010) also notes ethnicity as a term used to connect people to their space and involves a group of people possessing one or more cultural attributes to distinguish them from other groups. In this study the focus of ethnicity is based on shared language and culture that made people belong to a particular group.

The introduction of apartheid in 1948 brought about racial segregation through separate developments based on different racial groups (Turok, 2001; King et al, 2003; Seto et al 2013;). Theoretically, the laws were intended to support equal development and freedom of cultural

expression, however, forcing racial groups to live and develop separately made it impossible to achieve this supposed intended vision (Beinart & Dubow, 1995; Treinman, 2005). The apartheid laws led to increased racism (Turok, 2001), where laws such as the Population Registration Act of 1950 demanded that people be registered according to their race to keep record of groups in terms of ethnicity (Treinman et al, 1996). The Group Areas Act of 1950 brought about physical separation between races in urban and rural areas, where areas were set aside for different ethnic groups, and individuals not of this group were found to be trespassers in the area. To date there has not been much change since the end of the Apartheid era in terms of the spatial arrangement of different race groups in cities (Turok, 2001). The settlements initiated during the apartheid era in response to apartheid policies are still predominantly occupied by the same racial groups in the current context (Treinman et al, 1996). While it would be nice to not have to comment on race, in this study the post-apartheid spatial form of the city is relevant, and respondents interviewed were predominantly coloured or white. These terms are used and deemed relevant where race still relates to socio-economic and spatially informed lived experiences.

The concept of racial foundational environments cannot be ignored in our current context, especially since developments have continually been made according to apartheid policies based on race, culture and ethnicity (Treinman et al 1996; Turok, 2001). Even though race, culture and cultural landscapes complement one another, culture is understood in terms of languages, religion and racial groups, which all form part of a specific landscape and in turn also inform how people respond to a specific landscape (Winker, 2004; Wilmot, 2015).

e) Recreation

Recreation is a leisure activity, often enjoyed in natural or semi-natural outdoor settings (Wolch et al, 2014). Recreation is all about fun and pleasure and involves individual participation which takes place in one's free time (Sibeko, 2007). Outdoor recreational activities normally occur in a green space such as a park (Wolch et al, 2014) and are associated with the need to do something for enjoyment, amusement, fun or pleasure (Veal, 1992; Godbey, 2009). Urban green spaces are commonly used to refer to permeable spaces such as parks, play areas, forests, streams, community gardens, and other green spaces intended for recreational use (Hag, 2011; Wolch et al, 2014). According to Godbey (2010), people need recreation in order to maintain balanced physical and mental health. Access to green vegetated space or parks is associated with better perceived health, reduced stress and depression levels, and increased physical fitness (Lee et al, 2015). Open spaces or green spaces make living in the city attractive and viable through these provided recreational activities and associated ecosystem service benefits (Godbey 2009).

According to Haq (2011) city dwellers prefer to satisfy their recreational needs within the space they live through participating in outdoor leisure activities or through relaxing and enjoying the emotional comfort provided by the green spaces of their city environment. People exposed to the city lifestyle often have high levels of stress and use the green spaces for recreational purposes, aesthetic pleasure, physical exercise, and other activities that contribute to their well-being (Chiesura, 2004; Haq, 2011; Daniel et al, 2012). Milcu et al, (2013) note that these green spaces are being used by city dwellers to walk, (or walk their dogs or children), meet and greet with friends and observe nature; whilst other green spaces are used by families and friends to spend time together, adoring the beauty of nature (Asah et al, 2014).

In conclusion of literature reviewed, nature, and in particular river corridors, are heavily impacted through the process of urbanisation. It is also evident now that people need nature for their physical and mental wellbeing. How people perceive or engage with the cultural ecosystem services provided by river corridors is informed by a complex set of social elements such as culture, ethnicity and emerging sense of place. If a city intends to manage or restore a river corridor to benefit all people, it is important to understand the use and perceptions of users of these green spaces to allow for appropriate restoration and management. This is well demonstrated in the two case studies from Japan and the United Kingdom. It is important that local perceptions are understood however and given the social informants of perceptions and uses of nature these cannot be generalised from other studies.

CHAPTER 3: METHODOLOGY

This chapter provides information of the Diep River corridor as the study area and presents detailed methods carried out for this study including ethical considerations and study limitations.

3.1 Study Area

The Diep River corridor is located within the city of Cape Town in the Western Cape of South Africa (Brown & Magoba, 2009). The Diep River corridor constitutes an upper and the lower corridor and emerges as a result of the river flow from the Table Mountain National Park, feeding into the Little Princess Vlei and Zandvlei estuary and finally feeds to the sea of the Atlantic Ocean (Figure 1) (Jack, 2006; Brown & Magoba, 2009).



Figure 1: Diep River corridor and the nearby estuaries

The upper reaches of the river are still pristine and able to support patches of indigenous vegetation and riparian woodland. The lower part of the river contains more open spaces and wetlands, however it is canalized and constricted by adjacent urban development which has been highly disturbed and currently holds little indigenous riparian vegetation (Jackson et al, 2008; Viskisch et al, 2016). Much of

the river has alien invasive species growing on the banks and at the river margins but large proportions are gradually being rehabilitated and restored to their natural state (River Health Programme, 2007).

The Diep River corridor runs through several high to low income suburbs before merging with the Little Princess Vlei and Zandvlei estuary (Brown & Magoba, 2009). As shown below in Figure 2, the suburbs through which the river runs include Constantia, Tokai, Plumstead, Diep River, Retreat, and Westlake before entering the sea at Muizenberg (Figure 2).



Figure 2: Diep River corridor and the nearby suburbs

While the river runs through a number of suburbs, data was collected in the upper and the lower reaches of the river in the suburbs of Constantia and Diep River, including data from various users of Little Princess Vlei and Zandvlei Estuary.

The river runs through a racially diverse socio-economic gradient that reflects apartheid settlements, with predominantly white and affluent communities in the upper reaches and lower income, poorer, black and coloured neighbourhoods in the lower reaches (Census, 2011). According to the Census (2011), the population of Constantia is predominantly white at 75.3% with a minority coloured population at 9.2%, followed by other racial groups comprising only 15.5%. The suburb is situated at the upper Diep River corridor and constitutes agricultural practices, forestry and affluent residents. The suburb of Constantia has managed to retain a significant portion of green open spaces which is

known as the Constantia Valley Greenbelt (Gaffney, 2012).

The suburb of Diep River is located in the lower reaches of the Diep River near the Little Princess Vlei and named after the Diep River that runs through the area (Viskich et al, 2016). The suburb of Diep River has relatively flat topography which makes it prone to urban development and farming activities (Shuping, 2008). According to the Census (2011) the average population of Diep River is predominantly white at 60.2 % followed by a coloured at 24.8% and other groups at 15%.

Little Princess Vlei feeds into the Diep River corridor (Brown & Magoba, 2009). Little Princess Vlei was once interconnected with Princess Vlei but it is no longer connected due to transformation such as urban developments, farming, and floods events which resulted in canalisation of the river (Figure 3) (Shuping, 2008; Brown & Magoba, 2009). According to Brown and Magoba (2009) the name “Princess” came from the Khoisan people that used to live in the slopes of Constantiaberg, where legend stated that the area was ruled by a princess (Brown & Magoba, 2009).



Figure 3: Google image showing the disconnection of Little Princess Vlei and Princess Vlei

Zandvlei is the vlei at the estuary of the Diep River (Harding, 1994; Jack, 2006; McQuaid, 2013; Milliken, 2015). The name Zandvlei was suspected to have originated with Jan Van Riebeeck, one of the first Dutch settlers, during his territory tours in the late 1650's while introducing developments

and upgrading of infrastructure in the area (Brown & Magoba, 2009; McQuaid, 2013). The estuary has been subjected to a long history of physical changes brought by human actions such as the construction of weirs, canalization and hardening of the banks. According to Quick and Harding (1994) the estuary was neglected in the past and was heavily transformed through farming and urban development. However, the original vegetation has been restored and the wetland is now functional, serving as a popular recreational facility (Brown & Magoba, 2009; Viskich et al, 2016).

3.2 Sampling

This study on the perceptions of users and managers of the Diep River sought an informal interview approach to data collection as well as observation of users on the river. Three sites were selected to engage with users based on the nearest located suburbs and estuary of the Diep River corridor and chosen to capture responses across the diversity of users and to include socio-economic and racial diversity along the river corridor. These sites included Constantia suburb, Little Princess Vlei which the nearby suburb was Diep River and Zandvlei estuary which had varied recreational activities that accommodated varied local residents of the study area. The interviews were directed to varied individuals living near the Diep River corridor or using the Diep River corridor, and then key informants such as consultants appointed to do some work in the area, local community champions, local conservators, the Council of the Constantia suburb, Friends of the Constantia Valley Greenbelt, St Augustine Cricket club, Princess Vlei Eco Park, City of Cape Town as the governing municipality, and Cape Town Environmental Education Trust. The Trust is an organization founded by the City of Cape Town in 2001 to provide exposure to nature through camping, hiking, and education across the City of Cape Town's communities. Individual and groups of users interviewed were approached by the researcher on site. Many of the key informants were met at local community meetings of the Zandvlei Catchment Forum. It was felt this would be a useful space in which to meet individuals connected to the Diep River. Many of these individuals then referred the interviewer to other useful informants.

A snowball sampling method was used in this study. The method is based on referrals where primary data sources nominate additional potential secondary data sources to be used in the research (Atkinson & Hammersley, 1994). Primary sources for the study were identified through the local community meetings attended and these individuals then provided referrals and recommendations to secondary or additional sources. This led to chain referral, where the primary source recommended extended acquaintances who met the specific range of skills and knowledge required for this study (the method relies on initial contact and connections between the researcher and the primary source) (Faugier & Sargeant, 1997). The researcher therefore attended three local community meetings which opened several opportunities for engagement with relevant individuals on the ground. This method

was beneficial to this study as diverse participants could be reached through referrals and the use of the community's social networks (Dusek et al, 2015; Atkinson & Hammersley, 1994; Biernacki & Waldorf, 1981; Faugier & Sargeant, 1997). The method provided a means to elucidate the network structure of various individuals, thereby providing a representative view of the larger community's attitudes, use and opinions regarding the Diep River corridor.

3.3 Data Collection

a) Meetings attendance

Three local community meetings of the Zandvlei Catchment Forum were attended as a way to engage and interact with the local community and to obtain information about the use of the river by local residents and the people involved in various activities of the Diep River corridor. The forum was well known by local communities and champions scattered across the Diep River corridor, very active and with meetings occurring three times per annum to address various issues such as pollution of the river, management of the river, education, etc. It was decided that three meetings should be attended to ensure that community members could get to know the researcher, the study intentions and to gather updated information on the study area. The meetings were attended in November 2015, February 2016 and June 2016. The first meeting attended was to introduce the study intentions as well to initiate a relationship and build trust with the community members whilst the last two meetings was just an observation of individuals attending the meeting, relevant data capture and to keep informed on follow-up and progress on matters that were discussed concerning the Diep River corridor. From this meeting various key informants were targeted, and on-on-one interaction was used to gather more information about the study area. This rolled out to various local community champions, local conservators and councillors who accompanied the researcher to various sites for interviews, surveys, observations and field trips.

b) Key informants

The purpose of key informant interviews was to collect data from a diverse group of individuals who have extensive and detailed knowledge about the Diep River corridor. The interview was guided by structured questions that guided the conversation between the researcher and the interviewees, but also allowed for enough open opportunities for the individual to volunteer additional information or insights. The interviews were scheduled for about 30 minutes per individuals to allow enough time for longer conversations. With permission from the interviewee notes were taken. Follow up where more information was needed was made using arranged meetings, emails and telephone calls. Follow up was mainly conducted with local community members such as the local leaders and champions.

Individuals from the City of Cape Town provided clear and valid information for the study as results less follow ups were conducted. A total number of 10 individuals were interviewed using an open-ended interview guide to allow for the free flow of conversations, ideas and information. The aim of the study to assess the local community perception of the Diep River corridor as a way to assess expectations and use of the river was introduced to the interviewees. Interviewees were informed that quotes will be used to validate data and permission was requested to use individuals' names where applicable.

These key informants were comprised of local community and the City of Cape Town individuals. The local community members included local residents of Constantia and Diep River, individuals known as the local community leaders, local community friends groups such as the Constantia Valley Greenbelt. These individuals were found through the Zandvlei Catchment Forum local community meeting representing the interest of local community in terms of green jobs, involvement in events, such as river management through clean ups, education and providing support to community projects. One of the key informant interviewees is one of the local community leaders who were actively involved in supporting communities in their projects such as recycling of plastics for income purpose and cleaning of the river banks for a healthy living environment. Two of the interviewees were from the Cape Town Environmental Education Trust and were also community leaders and representatives working for the Cape Town Environmental Education Trust programme. The programme was well known as it provided local residents and schools with education through camps, recreations, hiking and visiting of various nature reserves across the Western Cape including the Zandvlei Estuary and Princess Vlei. According to the interviews the programme was initiated in 2007 in partnership with the City of Cape Town to upskill individuals with poor education from communities adjacent to nature reserves to enable them to perform duties associated with the management of conservation areas as well as to create an awareness of the uses and benefits of conservation areas to the neighbouring communities. The programme was run by an intern who was a local resident of Diep River and had knowledge of working with local communities for years.

The city of Cape Town individuals included the city's governing municipality which was made of the local councillor, local conservators, and the Cape Town Environmental Education Trust. Notes from the city of Cape Town Environmental Manager while presenting at the Zandvlei Catchment Forum local community meeting about the Diep River corridor was taken and the information provided was about progress of events occurring. The local councillor interviewed was for the ward 62 and she was very active in local community meetings and addressing issues of the community when needed. One of the local residents of the Diep River when interviewed revealed that she constantly contacts the

councillor for issues relating to pollution of the Diep River. The local conservator was also active and engaging the local communities in various ways such as providing basic education of the natural environment which include how to care for the river and not pollute and recreational activities such as boating and kayaking which was done to attract local residents into caring for their precious green spaces which are beneficial to them.

Other individuals interviewed include the consultant conducting an analysis of community interests of river use and activities to inform the transformation of the river activities. One last key informant interviewee was a Zandvlei Catchment Forum Member involved in the rivers across the City of Cape Town and a consultant conducting research on how to connect people with nature to enhance potential events of the Diep River. This was a way of guiding the focus of the study by gathering various views and information from research through on-the-ground people that are actively involved and have knowledge of working with local communities in and along the Diep River corridor. These individuals provided in-depth information for the study as they were well informed about the nature and challenges within the study area.

c) Field data observation and public interviews

The study used ARC 10.1 GIS software and Google maps to locate the flow of the Diep River. Field trips were then conducted to ground truth the study site. Sites were assessed based on the flow of the Diep River Corridor and included both the Constantia and Diep River suburbs, with Little Princess Vlei and Zandvlei Estuary as the nearby estuaries. The sites for interviews with public users were selected as mentioned previously to capture a diversity of views across the socio-economic spread of users in the river corridor and also to make for manageable engagement and interview work load. To work across the entire corridor would have been prohibitive in terms of time available to research and in terms of personal safety where less well used areas of the river corridor could be considered unsafe. A large amount of time was spent at the Constantia and Diep River suburb where people were observed and interviewed. Interviews were carried out in October, November 2016 and January, February 2017 months, between 9h00 am, 13h00 pm and 18h00pm for two days in a week including the weekend. These times were selected based on the busiest time of the corridor activities.

Personal interviews with structured questions were conducted with individuals living nearby the Diep River which included individuals using the Constantia Valley Greenbelt walking trails, St Augustine Cricket Club and Princess Vlei Eco Park that is situated between Princess Vlei and the Little Princess Vlei (Figure 4). These sites were used for various events such as walking and walking dogs, cycling, picnics, relaxing, fishing at Little Princess Vlei and Zandvlei Estuary of the Diep River corridor,

conducting picnics and groups using the Princess Vlei Eco Park for relaxing and St Augustine Cricket Club for sports.



Figure 4: Google image showing St Augustine Cricket Club and Princess Vlei Eco Park

Interviews were structured to address the important role that the river plays to the local communities living nearby the river. Questions were structured to assess the intensity of visits made to the river, access, safety, events or activities, and whether the local communities are actively involved in the more formal events of the Diep River corridor. Individuals and groups were randomly approached while walking along the river corridor, horse riding, having picnics, fishing, while watching their kids playing sports, or just relaxing by the river corridor. Observation was used for various reasons where the researcher did not feel safe to approach an individual, where it was not easy to approach an individual such as the cyclists who were always on the move and not willing to stop and in events such as soccer, boating and kayaking where people are enjoying themselves in a manner that may not allow them to be approached.

d) Participant observation

This is a method widely used in qualitative research to collect cultural and social data wherein the researcher studies the group of people through sharing activities (Atkinson & Hammersley, 1994; Spradley, 2016). The method is known as a learning process through exposure or involvement in day to day or routine people. In this method the researcher becomes part of the group they are studying in order to interact and understand the social phenomenon while collecting data (Spradley, 2016). The intention of a participant observation is to gain clear understanding of groups that are studied and become familiar with their values, beliefs and their way of life. The method is preferred in this study because it allows the researcher to view practices that may not be expressed openly during structured interviews alone and proved rich understanding of social interactions (DeWalt & DeWalt, 2011).

3.4 Data Analysis

Data was analysed through a process of coding, where qualitative data is sorted and arranged into themes for analysis (Glaser & Laudel, 2013). In this study data collected was separated into themes such as riding of horses, walking, cycling, boating and any other activity for analysis. Categories of coding include words, phrases, or sentences that are connected or not connected, but relate to the current study (Hay, 2005). The method allows the researchers to pull out emerging themes and transform data into a format that is easily understandable (Saldana, 2015). The data for this study refers to notes taken from local community meetings, field observations, and interviews with members of the public and key informants. Coding around matters relating to how people value the green space was used to reflect the participants' determined value and use of the Diep River corridor. Quotes from participants were used to validate and support emerging themes. The themes were categorised in terms of landscape feature and use, space that connect people, sense of belonging, importance of the river corridor to local community, and the importance of maintenance of the Diep River corridor. An excel spreadsheet was used to cluster quotes according to themes and the researcher used her own interpretation of data based on clustered quotes and responses from interviewees.

Data collected from the Zandvlei Catchment Forum local community meeting was considered reliable as it was easy to follow up an issue and on progress around a matter by attending the next meeting or arranging personal meetings with relevant parties. These local community meetings were comprised of various attendees and members such the city of Cape Town Manager, the local councillor, local leaders, students from the university of Cape Town conducting research in the area, consultant interested in events of the Diep River, and local community friends groups, Notes and

presentation from the City of Cape Town manager which reflected the potential events of the Diep River corridor and other adjoining rivers were used. Meeting minutes and supporting documents such as presentations and business case study documents were read and interpreted was made by the researcher. Where there was uncertainty of information, a follow up interview was conducted to ensure that the information was accurately captured.

3.5 Ethical Considerations

In every engagement the researcher introduced herself as the main researcher for the study researching the cultural ecosystem services of the Diep River corridor with the Department of Environment and Geographical Science of the University of Cape Town. An informed consent form, drafted on the University of Cape Town's letterhead, was presented to each participant interviewed. The consent form emphasized that the information received would be treated with confidentiality. Individuals were informed of their right to refuse participation and permission was asked before interviews were initiated. It was emphasized that quotes will be used, and names of individuals will only be used where permitted by the interviewees.

It was further emphasized that the outcomes of the study would be communicated to the community through presentations before being published. In this regard the research was presented at the Fynbos Forum conferences where collective students conducting various researches within the Cape Floristic Region and working with the local community were present and had a platform to provide valued input who suggested further key informants for interviews. In this forum the presented findings were well received, and attendees generally agreed with the findings of the study. The research outcome will further be presented at the Zandvlei Catchment Forum where the local community representatives, local champions, councillors and the City of Cape Town managers will be present. A copy of the final research paper will also be available at the local Nature Reserves for easy access by interested local community members. All interviewees were made aware of these likely opportunities for sharing findings.

3.6 Limitations

Sampling alone as a woman had limitations for the study and was thereof heavily reliant on the key informants. Majority of the field trips and site visits and field trips were done by the researcher alone and it was not easy to move along the corridor without feeling unsafe, and therefore secluded areas were avoided and specific set sites chosen for interview purposes. Approaching different people along the Diep River corridor was a challenge as people did not want to be bothered while enjoying the space and for this reason there was a bias towards approaching people who seemed friendly. The

researcher found that women were easier to approach compared to men and this may have influenced the representativeness of the results obtained in the study. It was also a challenge to approach cyclists, and therefore observations were used as an alternative data collection tool to reflect how often cyclists use the corridor and how they interact with pedestrians. As the student works full time the periods in which the data could be collected were limited. To this regard the study could have missed out some of the uses of the Diep River corridor because data was collected at certain times.

CHAPTER 4: RESULTS AND DISCUSSIONS

This chapter presents the findings of this study across the Diep River corridor. Data collected through observations, site visits, local community meetings and interviews is detailed according to themes to substantiate the results obtained. Each theme presents the findings of the upper and lower reaches of the Diep River corridor, where the Constantia suburb, Diep River suburb and nearby Little Princess Vlei and Zandvlei Estuary are located. Quotes are used to substantiate the findings throughout each theme. Thereafter, findings are discussed using relevant supporting literature and the researcher's interpretation of the data obtained.

A total number of 70 individuals were interviewed in this study. This comprised of 10 key informants, 20 individuals from the Constantia suburb and 40 individuals from the Diep River suburb. The majority of interviewees were female at 83% and males at 17% ranging from 25 to 70 years of age. The most common language of interviewees was Afrikaans at 80%, and in this study, there were all coloured and located at the lower Diep River reaches; whilst minority of the interviewees at 20% were English and were white people, located at the upper Diep River reaches. Interviews were conducted with individuals in the busiest time of the mornings, afternoons and the weekends were people were out and about enjoying their space through walks, jogging, cycling, horse riding, fishing and picnics.

4.1 Introduction

The Diep River corridor is an important corridor that joins valuable river and wetland areas such as Little Princess Vlei, known for its spiritual and religious use; and Zandvlei Estuary known for its beauty and the environmental education it provides to the community. The Diep River corridor is extensively used by various individuals and groups for a variety of activities. This study broadly sets out to identify the local users of the Diep River corridor and to assess the perceptions of the cultural ecosystem services delivered by the Diep River corridor to local users across different neighbourhoods.

The findings of this study showed the corridor was frequented by diverse groups of individuals, who showed different preferences towards, and feelings about, the space. Interviews, observations and engagements with key informants, stakeholders and local users were intended to gather information from various local users of the Diep River corridor. Findings of the study across the Diep River corridor are categorized according to the themes that repeatedly emerged throughout all stages of data collection.

a) The demographics of the study area

From the 70 participants interviewed in this study, only 12 were male (70 people = 100%). These

participants fell between the ages of 30 and 55. The remaining 58 participants, which formed the majority, were female, and where participants between the ages of 25 and 70. Although the results seem to reflect that the corridor is predominantly used by females (83%), the possibility of bias during participant selection needs to be considered when analysing the results. Observations by the researcher however suggest a closer to 50:50 spread in users, and the skew in interviewee numbers is likely due to researcher bias. Most interview participants (86%) resided along the Diep River corridor, where the remaining 14% of participants were from the nearby areas of the City of Cape Town. The participants predominantly consisted of permanent residents within the area.

4.2 Cultural Landscape features and uses

According to literature landscapes are expressed as diverse areas, such as the park, cemetery, garden, forest, mountains, rivers, grand estates, industrial parks, and so forth (UNESCO 1972; Daniel et al, 2012). In some instances, landscape features are expressed as a way in which people structure their surroundings for their own benefits and it can be through recreation or social events (Cloke et al, 2004; Frazier, 2010). Deneir et al (2015) associate landscape features with aesthetic appeal that allows people to interact with nature. In this study, most of the landscape comprised the river corridor, Princess Vlei Eco Park, St Augustine Cricket club, gardens, canals, walking trails and aesthetic appeal which benefit the community in different ways. These are landscapes used by local residents in their free time for sport activities, playgrounds, picnics, walks, to go jogging, and for relaxing. The results illustrate different landscape features and different uses by various individuals and groups across the Diep River corridor. The results are discussed as per the upper and lower reaches of the Diep River corridor, with Constantia as the representative suburb of the upper reaches and Diep River and Little Princess Vlei as representative of the lower reaches.

a) The upper Diep River corridor

The upper reaches of the corridor are represented here by the suburb of Constantia. These upper reaches have a lot of activities that the local residents enjoy on a daily basis in comparison to the lower Diep River reaches. The upper reaches are characterised by the Constantia Valley Greenbelt which had a lot of activities associated with man-made walking trails which were used for cycling, walking and walking dogs, and relaxing to enjoy the peace and calmness of the space. Horse riding is also an activity that was found to be significantly and singularly enjoyed in the area as well. According to the interviews, these walking trails were revealed to have been developed by the Friends of Constantia Valley Greenbelts in 1996 (as shared by the member) to attract people and improve the experience and use of the corridor as an available green space. A joining fee of about R 100 to the group was

required, and this was used for the maintenance and management of the greenbelt for local residents to enjoy the space. The walking trails continue to be frequented, and community members utilized this space throughout the day for walking, jogging, cycling and horse riding. These numerous constructed and mapped out walking trails each of which each are about 20 to 35 minutes' walk in extent are known as the Alphen trail, Brommesvlei, Diep River trail, Doordrift walk, Grootboschkloof trail, Klassenbosch trail, Silverhurst trail and Spaanschemat river trail (Figure. 5).

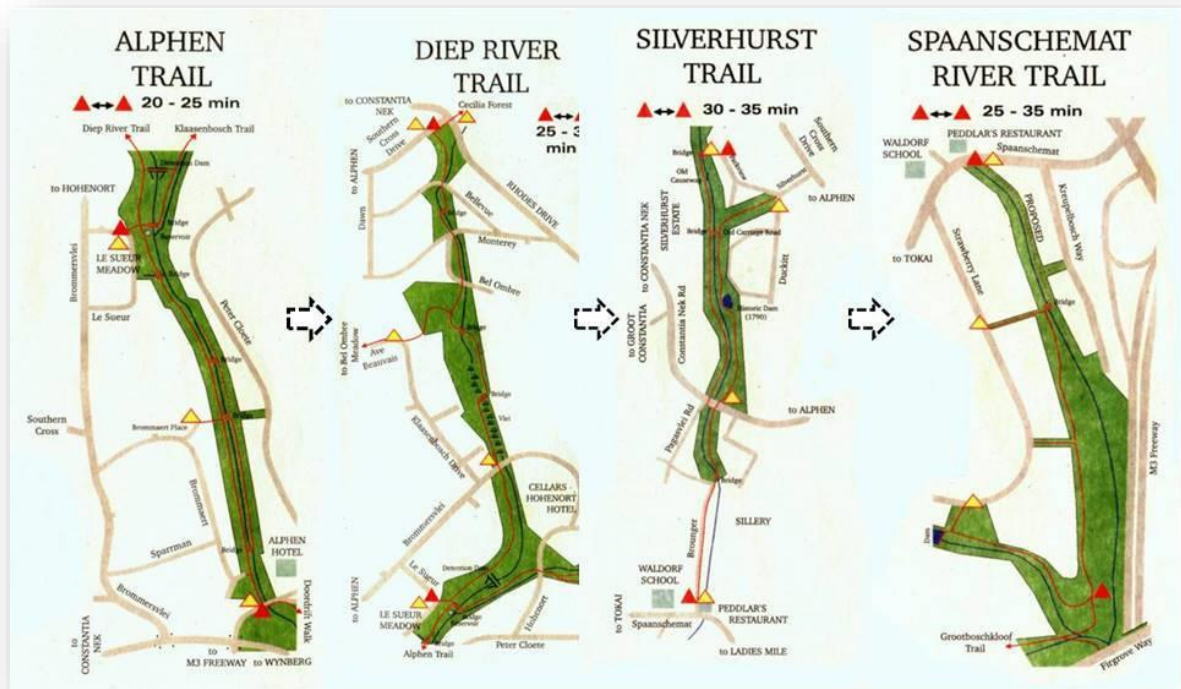


Figure 5: Constantia Valley Greenbelt walking trails

(Slingsby, 2017)

The Alphen trail and the Diep River trails were used the most by both local and non-local residents. Both the Alphen and Diep River trails are bushy with green, leafy, tall trees and some beautiful flowers which made the area attractive and beautiful. According to the interviews, majority of the individuals revealed the beauty of the space as the major attraction. The carefully constructed and well maintained mapped walking trails allow people to walk along the river and this was used on a daily basis by residents residing within a few kilometres of the river. The stretch of the walking trails was long enough to accommodate the cyclers, joggers and those walking or walking their dogs to enjoy the space. However conflicts between cyclists and those walking were observed during site visits and data collection. Interviews with pedestrians revealed concerns of unsafety and that they had to always

be alert of cyclists, which disturb the peace and pleasure of walking. Pedestrians also shared that the cyclists have recently started using the space after fires that were experienced in the Tokai Park were the cyclist initially cycled. Interviews with cyclist was challenging due to difficulties of stopping them while enjoying their ride at high speed. Many of the results reported here are therefore based on observations of cyclists who frequently used the green space for cycling. Based on the concerns of pedestrians one local resident noted: "I think cyclers should not even be here, it is not safe for us (referring to pedestrians) to walk while on the lookout for cyclers, they are just disturbing the peace and quietness of the space. I need to be looking out for birds, and the beauty of this space, not cyclers. I think there should be a trail for cyclers, that way we will all enjoy the space in peace." The presence of cyclists was disturbing to most of the pedestrian participants interviewed for this study, who reported that cyclists disrupted the peaceful nature of the space. The majority of the pedestrians enjoyed jogging and walking as family and friends, and as well as walking their dogs as a daily exercise and reported feeling generally safe apart from the concerns of the disruptive presence of the cyclists.

The horse riders, which were particular to this stretch of the corridor, enjoyed the space without conflicts with other users. Horse riding was one of the most memorable activities that had major historic significance for most of the Constantia residents. This was illustrated by horse riding events being initiated and supported by the local horse riding community members based on the need and value of this historic activity in the area. The reported motive of the community to have horse riding events was to maintain the culture of horse riding in the suburb of Constantia and surrounding areas such as the suburb of Tokai. The local residents initiated the horse riding group known as the Tokai District Riding Association group to provide a platform for horse riders and to promote safe horse riding in the area. According to the Horse Riding Handbook (2014), which is a publication of Tokai District Riding Association group, horses were historically part of recreation in the Tokai and Constantia suburb and were also used to carry wood for construction, boat and furniture building and fuel during colonial settlement times.

The results of the study illustrate riding horses at the suburb of Constantia as an activity associated with the river corridor enjoyed by local residents and visitors of varied age groups, from childhood to adulthood. One older female rider who was interviewed noted: "I have been riding my horse in Constantia during holidays since childhood and I have since then loved the place as it is calm and peaceful to be here. Another respondent noted: "I have lived most of my life in Gauteng Province but I chose to retire in Constantia so I can ride my horse freely"; whilst another respondent added: "I recently moved here (meaning Constantia) as well for retirement but I used to come for holidays with my family to this suburb so I remember how I used to ride my horse with my family. That is why I chose

this area for my retirement. The place is peaceful, and it gives me joy to see horse riding in the area. I believe that these heritage and culture elements need to be protected.” The respondent further shared that: “I feel like horse riding is not much valued in these areas which is why it was easy to compromise the space for riding horses and to prioritize urbanization and farming.” Another respondent concluded that: “riding in this place makes me happy; this is part of the culture that needs to be protected because we need our children to enjoy horse riding as well and I am hoping that this space will not be compromised any further.” The majority of activities enjoyed at the upper reaches of the Diep River corridor formed a major part of the local residents’ lifestyle and was significantly valued.

b) The lower reaches of the Diep River corridor

The lower reaches of the Diep River corridor had more varied recreational activities compared to the upper Diep River corridor. First and foremost, the lower Diep River corridor had no formalised walking trails or horse riding activities. However, the Little Princess Vlei and Zandvlei estuary were actively used for various recreational activities by local residents. The results from observation and interviews illustrated fishing, picnics, education, boating or kayaking, relaxing along the green space for spiritual uplifting, calmness and peace as the major valuable ecosystem services that were evident at the Little Princess Vlei and Zandvlei Estuary.

Recreational activities such as boating and kayaking were the activities most enjoyed by local residents living nearby and to some extent those living away from the estuaries of the Diep River corridor. The activities were mainly communicated by the well-respected local conservator to nearby schools and local residents interested were allowed to enjoy the activity as well. These boating and kayaking activities were initiated at the Little Princess Vlei and Zandvlei Estuary. These activities were conducted by the local conservator together with the City of Cape Town Sports and Recreation Facility Officer (who provided boats and kayaks) as an attempt to connect people with nature. When interviewed, the local conservator explained that the activities are used to educate local residents about the importance of caring for the natural environment by using them not just for fun but also to clean the corridor from waste. To this regard the local conservator communicates with local schools and the programme allows school-aged children to be picked-up at their homes to come boating while gaining knowledge and enjoying the estuary. Most of the recreational activities were set based on calendar events such as Father’s Day, Mother’s day, World Wetland day and school holidays in order to include more members of the community.

According to the local conservator the school holidays were the busiest time of year for Little Princess

Vlei and Zandvlei Estuary. He further revealed that people from various areas would come for boating and kayaking (Figure 6) as well as general recreation such as picnicking. Youth from church known as Grace Bible Church visited the Zandvlei Estuary for their team building event and picnic. These youths was of age from 25 to 35 with mainly females and only two males from the group. The local conservator provided environmental education to the group with regards to the need to care and maintain the precious natural environment for both the present and future generations. When interviewed the group shared varied responses and levels of interest towards the Estuary and one noted that: "It is my first time visiting this place and I really enjoyed every minute I spent, I would like to visit this place more often. I thought I am coming for boating and to my surprise I am leaving with knowledge on the importance of birds and had an opportunity to see the Kingfisher bird. These birds are so beautiful to look at." Another respondent goes on to say: "I thought that I would only be enjoying boating activity however the education provided by the local conservator made me realise that I need to learn more about nature, start to care and be involved, not just through the activities that the estuary offers but by helping other visitors like me, so I am willing to volunteer my time." Another respondent concluded that: "the way I enjoyed this estuary, I am definitely visiting again. The estuary was beautiful and now I understand why people love nature so much, I have experienced the calm and peaceful moments since I got here".



Figure 6: Adults boating at Zandvlei Estuary

Photo taken by Mark Clive Andresen

Despite all the communication and education provided to local communities, some of the local neighbours were not aware that the Diep River corridor is a public space. A neighbour living right next to the Zandvlei Estuary was observed to be watching the ongoing activities. At that moment the City of Cape Town Sport and Recreation officer approached the neighbour to extend an invitation to her to join in, only to find out that the neighbour was not aware that the Zandvlei Estuary and the Diep River corridor is in fact available for public use. The woman shared that: “I always see people coming and doing all these fun activities however I never thought I am also allowed to come”.

According to the local conservator, the recreational activity of boating and kayaking was a way to connect the people with nature since people had long histories of deprivation and a common response is one of not feeling entitled to use the green space. The activities were a stepping stone to attract the local residents and other people from various areas to take part in and enjoy the benefit provided by the estuary. As much as the boats and kayakers were enjoyed by various local residents, they are also used for clearing and cleaning the Diep River corridor at these lower reaches where a lot of waste

pollution is evident. The local conservator explained that environmental education also played a major role in getting people to volunteer in helping with the clearing and cleaning of the Diep River corridor. He then personally shared that: “I am hoping to have local community caring and maintenance of our natural environment, this way we will have less dumping into the corridor; however, I am well aware that it will take time, more education is needed to reach out to many local communities. Once people have knowledge of why we need to care for our beautiful green spaces we will have more volunteers to help cleaning and clearing the Diep River corridor”.

Despite the Diep River corridor being a public space that can be used by all local communities, the concern from the recreational officer working for the City of Cape Town Sport and Recreation when interviewed was that the space is not big or clean enough to accommodate everyone. He shared that: “We as the City of Cape Town would like to see everyone using the space however the space is not big enough to accommodate everyone and not clean due to constant pollution. What we need to strive for is to enhance more care by the local communities and neighbouring residents and reduce the amount of pollution into the Diep River corridor. I therefore think working with schools is the best way to work toward reducing pollution in this space”.

Cape Town Environmental Education Trust is another organization that provides education to local residents using local schools and camping activities with children from grades six to grade nine. This is an attempt to change the local residents’ mind-set ideally towards reducing pollution into the river. According to the findings of the study recreational activities such as boating, and kayaking were observed at the lower Diep River of the Little Princess Vlei and Zandvlei estuary. The upper reaches of the Diep River which constitutes the Constantia Valley greenbelt was observed not deep enough for the local community to have the pleasure to enjoy boating and kayaking at their doorstep.

According to the literature, cultural landscapes play a role in connecting people and nature by providing recreational activities, aesthetic appeal and green spaces needed by people (Cloke et al, 2004; Frazier, 2010; Daniel et al, 2012; Wilmot, 2015). Literature further reveals cultural landscape as how people structure their surrounding and can be through parks, gardens, green lands etc. which in turn enhances public support for ecosystem protection (Daniell et al, 2012, Alberti et al, 2013; Hernández-Morcillo et al 2013). It is evident in this study that landscapes play an important role of connecting people and nature through various activities such as the cultural services and green spaces. It is further evident in this study that people structure their surrounding depending on what they perceived as important for them and this can be beneficial for the protection of the natural environment. Constantia Valley Greenbelt is an example of a man-made structure that speaks to what people perceive as an important element to facilitate nature related activity this needs to be in places

for the green space to play an important role of connecting people and their nature through the recreational activities provided.

The two case studies by Asakawa et al, (2004) and Holt et al, (2012) were chosen to draw the current study into a globally reflective space. They are both closely aligned and while of course there are numerous such studies these two were felt most appropriate to show– case. The study of Toyohira River in the city of Sapporo in Japan is one case study that reveals the important of perceptions towards restoration of degraded rivers for the social benefits of people in terms of recreational activities (Asakawa et al, 2004). The study argues the importance of landscapes in terms of the green space and cultural services provided such as the space to play and the beauty of the landscape. According to Wilmot (2015) the features of cultural landscapes are underpinned by the identity, sense of place, ethnicity and recreation. In this study the major feature was recreation and sense of belonging to a place. Individuals felt belonging to the place due to varied activities that made the place welcoming and enjoyable, activities recalled from childhood, and activities that are considered fun. Recreational activities across the Diep river corridor were the driving feature that drove people to have sense of caring and using the corridor for their own benefit.

In this study the focus was on the perceptions that enhance people’s connection to their space, and interaction with, nature. The results showed that people perceive and use the landscape differently depending on the needs and desires of the community members. The perceptions expressed are mainly linked with the aesthetic beauty, recreation and relaxation. There is evidence of the socio-economic differences across the study site where in the upper reaches recreation relates to sports which require cost inputs such as cycling and horse riding while in the lower reaches sporting pursuits tend to be those offered for free through community and City-based initiatives. Respondents from both the upper and lower reaches of the Diep River corridor expressed varied use in accordance with community wants and needs, history, economic potential, and also what the river allowed (where for example boating in the shallow upper reaches is simply not possible). As a landscape reflects a living space that connects people with nature, people tend to create memories that will leave a legacy for future generations. In this study, horse riding was found to be one activity that was memorable to residents, and therefore still actively engaged in. Users express a desire to secure the green space for this cultural activity into the future. Senses of exclusion generally in the lower reaches reflect social histories of exclusion and in this area some users are still new to the green space and the cultural ecosystem services on offer.

c) Constructed canals of the Diep River corridor

Canalisation involves erection embankments of river bed and banks that are made of concrete (King et al, 2003). Canalisation is argued to reduce the aesthetic beauty of the landscape through loss of ecological biodiversity, wetlands and recreational opportunities (Woolsey et al, 2005; Brown & Magoba, 2009). As argued by Brown and Magoba (2009) that majority of the rivers of Cape Town are canalised it was evident in this study that the Diep River corridor is one of the rivers in the City of Cape Town that are canalised. Based on observations and site visits of the Diep River corridor it was observed that the lower reaches of the river are canalised. According to literature the canals of the corridor were introduced during the European settlement to reduce erosion of river banks. This was a major change of development that benefited people by reducing flooding problems and protecting river banks from being eroded once vegetation was removed (Brown & Magoba, 2009). However, according to the results of this study, the present residents along the river corridor viewed the canals as a disturbance to the aesthetic beauty of the river, and felt it was affecting the natural functions of the river. According to the interviews the local wetlands that used to feed into the Diep River corridor were described by local residents as disturbed and dry. According to the residents the canals affected the natural flow of the river corridor. When interviewed the residents noted changes along the Diep River corridor, from a bushy setting with diverse plant- and bird life, to what is now a polluted and an unattractive space. One resident notes: "I have lived in Diep River suburb, right next to the Little Princess Vlei, for 30 years and have enjoyed living here. However, from my knowledge the corridor used to provide valuable services, the canals introduced in this space has damaged a lot about the space, some of the wetlands that the water would flow from are no longer in existence it is only traces that the wetland used to exist. Introductions of the canals was not a good idea, everything should have been left as is; for nature to take its course".

Questions posed to the participants around what has changed in the Diep River revealed concerns. The concerns shared were not only about the current state of the Diep River corridor which has been argued to have changed since the introduction of the canals. There were also concerns about pollution by the local residents and people visiting the corridor for picnics. The local residents also felt that the City of Cape Town should constantly collect waste dumped to ensure that their green space is clean and can be enjoyed. The response from one woman living along the corridor expresses these wide-ranging concerns as she says that: "I stay right next to the vlei and my problem is people who come here for picnics and leave their waste behind and worst is that some people come here to dump their waste at night which then gets blown to my yard as a result my yard is never clean". She further noted that it seems: "the City of Cape Town does not clean the area as often as it used to do, some part of

the vlei are cleaned but it never reaches to my side (referring to the lower side of the river that is Little Princess Vlei). She further added that: "I think they should consider cleaning the wetland more often, so we can enjoy the space." These kinds of conflicts are recorded in the literature where ecosystem services are not always appreciated and enjoyed in the same way by all users and conflicts over use can easily arise (Dickie et al 2014). This demonstrates the importance of understanding different perceptions around use to better inform management.

Despite the concerns of the majority of the local residents, the canals were used by communities residing along the corridor for social networking. These included a meet and greet spot for friends, family and neighbours. Various uses within this space were observed, including the construction of gardens for medicinal purposes (Figure 7). When interviewed the local communities responsible for the maintenance and management of the garden shared that they saw the need to have medicinal gardens for their own health purposes, such as planted aloe being used for stomach aches and other ailments. The use of city gardens by the urban poor in Africa for the construction of medicinal gardens is reported elsewhere in the literature and this finding here further supports this fact, that the poor in cities use gardens to meet their medicinal needs (Cilliers et al, 2013). It was also revealed through interviews that the garden was established along the canals for easy access to water for irrigation purposes.



Figure 7: Community garden at Retreat Suburb

Picture taken by Boitshekwane Kgantsi

According to the results of this study, local residents are aware of the functions and services that the rivers are able to provide, and this is why residents raised concern regarding the introduction of canals. The local residents believe that the aesthetic value and recreational services of the lower Diep River corridor has been reduced as a result of canalisation. Most of the perceptions are associated with concerns and thus influences the attitudes and behaviours of people toward their own green space. Residents of these spaces may therefore pollute the area, because they see no need to try and maintain an area that they can see is already evidently damaged and degraded (Luger, 1998; King et al, 2003).

4.3 A space that connects people

Literature describes rivers as shaping and connecting people with nature through the provision of various benefits and activities such as walking, camping and education (Boulund & Hanhammar, 1998; Asah et al, 2014). Furthermore, Wilmot et al (2015) echoed this noting river as green spaces for people to relax in and enjoy the aesthetics. According to the data from this study, local residents settling along river corridors find rivers very important for recreational purposes such as fishing, kayaking, a spot to relax, view nature and walking along the river banks for physical fitness. According to literature the

connection of people with their green space is influenced by unique historic memories of shared resources (Hernández-Morcillo et al, 2014). Similarities amongst groups sharing the same resource were evident in the study. It was observed that people with the same interests, language and needs preferred to network together. Social networks were also influenced by language, meaning people speaking the same language preferred to network with each other and were observed to enjoy mingling with one another. It is possible that these reaches, and spaces associated with the river have become something akin to cultural landscapes appreciated and enjoyed by different groups (Daniel et al, 2012). This is complicated in the case of South Africa where planning history informs the spatial use of spaces according to race. The study had people with common languages such as Afrikaans and English, common cultural ecosystem services use such as fishing, boating, walking and picnics, and common social networks and spaces such as the Constantia Valley Greenbelt, St Augustine Cricket Club, Princess Vlei Eco Park, Little Princess Vlei and Zandvei estuary evidently using the green space in local and socially informed ways. The local communities of this study comprised English speaking people and Afrikaans speaking people, which contributed to both the groups seeing themselves as segregated due to different language and activities. The historical apartheid spatial form is evident in the racial groupings along the corridor with white, English-speaking users in the upper reaches and white and coloured, Afrikaans-speaking users in the lower reaches. The river serves as a meeting ground for connecting with other people, but the local demographics dictate the social engagements which tend to be local and not transgress these historic racially informed boundaries.

In this study the green spaces of the Diep River corridor were found to play an important role in bringing people together through walks along the river banks and canals, sport and picnics. It was observed in both the upper reaches and the lower reaches of the river that local residents would meet each other while walking and spending time with family and friends through picnics, and whilst fishing. The river was observed and reported to be a great sport for recreation activities and for friends and family to spend time together.

Available green spaces such as the crickets Augustine Cricket Club and Princess Vlei Eco Club (Figure 8) provided spaces where people could socialize and have picnics, braais and enjoy sports such as soccer. The interviewees noted the space is beautiful, calm and provided the quietness needed away from the home and work spaces. One interviewee noted that: "I enjoy coming here to relax with my family because it is very quiet and peaceful. I spend most of my time working during the week, so on weekends I come here to enjoy time with my family and friends. Watching my son playing soccer at this field gives me joy." Another interviewee noted: "I enjoy doing picnics here; it is a quiet space and provides the calmness after a long day of work. I come here for my picnics with family and I would

really appreciate braai facilities in this space even if I need to contribute money to make that happen.” Another interviewee concluded “this place relieves stress associated with busy city life and busy homes where we worry about cooking and watching television. My family is into television and phones, so this place provides a platform for us to connect and talk like a normal family without distractions of a phone or a television”. The Diep River corridor clearly serves to connect local residents to nature through the delivery of valued cultural ecosystem services (Alberti et al, 2008; Daniel et al, 2012; Tengberg et al, 2012; Milcu et al, 2012, Hernández-Morcillo et al, 2013).



Figure 8: St Augustine Cricket Club and Princess Vlei Eco Park

Picture taken by Boitshekwane Kgantsi

According to the study results both the upper and the lower reach of the Diep River corridor are used as spaces that connect people in various ways. From the observations and interviews conducted it is evident that the Diep River corridor green space provides significant cultural services to people and this enhances the interaction and connection of residents with nature.

4.4 Sense of place and belonging

Sense of place is normally linked with aspects that people value, such as an ocean view or proximity to a river. Accordingly, people tend to settle in areas that offer scenic views, recreational activities and potentially a nearby park or green space in cities (Daniel et al, 2012; Wilmot, 2014). Sense of belonging is influenced by emotions, beliefs and practices that attract people to a place or space (Cross, 2001; Brown & Raymond, 2007; Hernández-Morcillo et al, 2014). People play a major role in giving meaning

to a place and find it easy to feel attached to a place once they find it meaningful.

In this study, the majority of people interviewed felt a sense of belonging to the area through various activities they regularly did in the river corridor such as fishing, family picnics, cycling and walking. For some respondents this was enhanced through local community groups where concerns about the corridor could be shared and discussed. Various local community friends groups were active in the area and these included the Friends of Constantia Valley Greenbelt, Zandvlei Trust and the Princess Vlei Forum. Respondents' sense of belonging related to activities such as walking dogs and meeting neighbours, being part of the local community groups where their voices were heard and feeling the presence and value of local conservators who ensure that activities of the green space can be enjoyed. The role of public space for growing a sense of community is evident in the Diep River corridor, and in turn a community groups allow easier access to the space (Francis et al, 2012). The results of this study found a diverse sense of belonging, both as an individual and a group user of the corridor space. Concerns regarding safety were raised during the interviews; however local community members generally addressed this by engaging in group activities. One resident noted: "I don't feel safe at all to walk alone passing here, so we normally wait for our transport to home in groups after work. The reason is that there are homeless people living here and one cannot know what they are capable of."

Despite recreational activities and services that the Diep River corridor provides, it is also considered a resource by the homeless people for whom it evidently provides shelter, water for drinking and washing, food through fishing opportunities, and income opportunities by selling the corridor's flowers. Local gardeners also shared their benefit of income opportunities from selling flowers from the river corridor. One gardener, when interviewed, shared that the income they received was insufficient and therefore selling flowers helped to provide for the family as well. The ecosystem services available in the Diep River corridor are variable and used differently by different groups of people. The uses are not always compatible as demonstrated with the walkers and cyclists, and again here where the presence of homeless people makes others feel unsafe. This kind of conflict or difference in appreciation is debated in relation to ecosystem services in the literature and while the issues are not resolved there is an argument that by at least understanding multiple perspectives managers can be better placed to manage to meet the diversity of needs (Asah et al, 2014).

According to Cloke et al (2004), space can be used for various reasons; it can be for free will of living in your own space and extraction of resources. In this study various activities connected people with their space, including walking trails which made it easy to walk, jog and cycle along the river corridor and aesthetic aspects which provide tranquillity to the majority of local residents. To some residents, homeless persons and workers the area provided income opportunities, where they could harvest and

sell flowers for survival. The homeless were observed to have freedom to survive within this space through fishing. Moreover, due to people feeling attached to the space, there was an increased feeling of care about the Diep River corridor where several communities saw the need to come together, clean and maintain the clean space for their own use and benefit. The river corridor produces multiple ecosystem services, and these are variably used and enjoyed by the different users.

Although maintenance activities were evident, there was also a feeling that the space belongs to the residents and is not over regulated, and thus provides them the freedom to engage in negative activities such as dumping waste along the canals of the river and leaving waste after picnics. The general assumptions were that the City of Cape Town is responsible for cleaning the area. Only a handful of community members felt a responsibility towards cleaning the waste within the corridor. This reflects a difference regarding residents' sense of belonging to the space and caring for the space, where the majority of residents assumed councillors and the municipality were responsible for the upkeep of the area.

It is evident that people tend to have an emotional bond with a space based on individual preference, feelings, memories, and interpretation of the landscape. From this study, it was found that a beautiful place with various recreational activities tended to be preferred and cared for more than that of less appealing areas, for example in this case the canalised areas. It was also evident that once people feel a sense of place they tend to participate more readily in activities to conserve, maintain and care for the areas that benefit them. At the same time residents that do not feel as attached to a space are less likely to care about a space. As a result, behaviours and the attitudes towards a space may change perceptions and increase the chances of pollution amongst community members.

4.5 The importance of environmental knowledge and awareness

Local residents across the Diep River corridor use the space for various activities. Most of the activities practiced and supported within the area demonstrate how much the community value and appreciate this nearby green space. This was made possible through the friends groups of Constantia Valley Greenbelt which brought the community together to care for the green space to the benefit of local residents. Through observations and interviews used in this study, it was evident that the majority of the local community residents had knowledge of the Diep River corridor. However, the study also demonstrated varying degrees of environmental knowledge, concerns, attitudes and environmental awareness at both the upper and the lower reaches of the river corridor.

a) The upper Diep River corridor

Along the upper reaches of the Diep River corridor (in the suburb of Constantia), local residents were found to be more aware of, and appreciative towards, the green space and cultural ecosystem services that the river corridor provides. This was evident through interviews where one resident of Constantia noted that the maintenance of the space was made possible by numerous contributions from the local residents to ensure continuous care and management of the space. According to the interviews, local residents of the corridor worked together to care and maintain the green space. Constantia Valley Greenbelt friends group was the local community initiative which contributed to ensuring that the space is well maintained, cleaned and that needed activities are introduced to attract more users. The focus of these initiatives was to increase local residents' access to, and use of, the corridor as a result walking trails were introduced.

The upper reaches of the corridor comprise of a mostly affluent population who are more involved in the environment and have the financial means to engage in cultural activities they value. In light of this, the corridor is still intact and not as modified or canalised as can be seen in the lower reaches of the Diep River corridor. Pollution was not a significant problem within the upper reaches as was found in the lower reaches of the corridor. The provision of river trails provides a great platform for users to enjoy the services that the river provides and serves to grow the sense of place and belonging which in turn promotes care and involvement (Cross, 2001; Cloke et al, 2004). It is easy here to walk around the river and enjoy the beauty of the green space. Engagements here promote access to nature with the provision of infrastructure.

b) The lower Diep River corridor

Residents of the lower reaches of the Diep River corridor demonstrated environmental awareness and knowledge of cultural services. It is argued that this is due to the residents' active participation and engagement in clean-up and recycling activities in the area. Awareness was targeted and supported through constant education and activities provided by the City of Cape Town such as boating, camps, environmental clean ups, recycling of plastic bottles by some of the local communities and education to local schools. Engagement in the lower reaches is more informed by group involvement in environmental awareness programmes. Local residents also shared memories of cultural activities that the corridor used to provide before it was transformed such as wetlands that used to exist in the area and had plants and birds that are no longer of existence and used to offer aesthetic value to the area. There is a strong sense here that the river corridor has declined in environmental value.

The lower reaches were found to be not as suitable for walking, jogging or cycling as compared to the upper reaches of the corridor. However, there are varied activities that the local residents enjoy within the lower reaches, including provisioning and cultural ecosystem services such as fishing for food and recreation. Volunteering is the main method used within the lower reaches to preserve the cultural services the river provides. In contrast, the upper reaches rely on various organisations to ensure that their green space is enjoyed, maintained and beneficial to the local community. The difference in economic status is evident in the kinds of engagements but all are still towards accessing the cultural ecosystem services benefits from the river corridor.

Site visits and observations showed that large sections of the lower Diep River corridor are canalised, while the shorter sections are degraded. Through observation and interviews canalisation of the river corridor was found to be a problem to the majority of local residents. The results demonstrated concerns regarding the change in quality of the space and associated use of the space over time. Through interviews one of the residents noted a change of landscape where wetlands used to exist but have disappeared over time. Other participants reported a change in the aesthetics and accompanying uses of the space over time. The majority of respondents raised concerns regarding the damage and current state of the corridor as a result of canalization, where local residents felt like the river would have been in a better state had it not been canalized. Residents note and are aware of the significant environmental degradation associated with canalization suggesting environmental awareness. They also note how it reduces access to the river in some places.

Even though residents were aware of, and actively used, the cultural services of their green space, pollution along the river banks of the canals was a problem to many local residents. According to the interviews pollution was a key issue and needed to be urgently addressed by various stakeholders. In this regard, the City of Cape Town, counsellors and the local conservators of the Diep River corridor have evidently played a major role to ensure that the local communities are aware of and connected to their valuable green space. This has been achieved through collaboration and partnership with educational programs such as Zandvlei Trust and Cape Town Environmental Education Trust to provide education to schools, local churches and residents. The programs hosted various activities such as environmental camps, clean-ups, eco-schools and wetland talks to local residents and schools such as Levana and Lavender Hill Primary schools. When interviewed the program leader of the Zandvlei Trust noted; “the recreational activities we provide has played a major role even though not all local community members know of the Zandvlei Estuary as a public space, we are striving to ensure that they know and use it”. The program leader of the Cape Town Environmental Education Trust who recently relocated to the Diep River suburb for work purposes stressed attitudes and concerns as the

main driver of ignorance to maintain and care for the corridor and noted: “the problem in the lower Diep river is lack of knowledge, I have been involved with the local community through eco schools particularly youth, I have realized that people do value this space however their living condition contribute a lot to jeopardizing the only space they have. From my experience working with the local community, the local resident of the Diep River corridor care about the space but values it differently. If they don’t benefit from the corridor they develop an ‘I don’t care’ attitude towards the space, to this regard I think poverty plays a major role. Most local residence of the lower Diep river corridor from Diep River uses the river or the wetland for survival, so they fish so they can have food for the day. There is less element of using the corridor for inspirational purposes that is why there is a need for environmental awareness and education to enhance and inspire the community to see the needs to protect and care for their green space.”

According to this study, there is a consensus that increased environmental awareness may enhance participation of residents in the management of environmental problems. Asakawa et al (2004) and Holt et al (2012) demonstrate participation and inclusion of local residents in restoration of river corridors as most effective. It was evident in this study that people may develop ways to maintain things that are important and beneficial to them, as was seen with the upper reaches of the river where people created a friends group as a way to protect their green space. From the data obtained, it was found that the intentions of environmental awareness are mainly to improve possible solutions to problems and to help people develop a positive attitude and value towards their green space. Environmental awareness serves as a tool for people to firstly understand the need to take ownership of their own environment and educate people regarding the impact of human activities such as pollution on the environment. How people then engage is informed by other factors such as their personal wealth, history, and available time.

4.6 The importance of maintaining the Diep River corridor

Maintenance of the Diep River corridor is driven by local residents, various stakeholders and representatives from organizations such as the City of Cape Town, Zandvlei Trust, Cape Town Environmental Trust, Friends Groups, Source to Sea project, the Environmental Resource Management, and the Wildlife and Environmental Society of South Africa. These groups play various roles in ensuring the Diep River corridor provides a much-needed green space for the community through engaging people in various educational and recreational activities.

The Zandvlei Catchment Forum was the central meeting platform of discussion around the issues and concerns of the Diep River corridor. From this meeting Diep River was disclosed as a priority river

where an extension of the walking trails were suggested as necessary further down into the lower reaches of the of the Diep River corridor as an attempt to enhance the benefits of recreational activities across the corridor. The plan of the introduction of the walking trails at the lower reaches was to accommodate the desires of the majority of the nearby local residents to walk and jog just as they do in the upper reaches in the Constantia Valley Greenbelt. Discussions around collaborating with schools to include environmental education into the curriculum were held and are still ongoing as no conclusion around implementation of this concept has been reached. In addition to improved facilitation to recreation opportunities across the Diep River, a City of Cape Town Environmental Manager noted at the Forum that the river is also of ecological and social restorative interest to the local community. A potential plan was brought forward to maximise urban recreational space, link corridors with recreational multi-use trails, develop eco-heritage, and improve educational and tourism opportunities. From these discussions a consultant was appointed by the Source to Sea project to highlight priority actions for the river to enhance the activities occurring at the Diep River corridor. The consultant conducted an assessment which included site visits and walks along the Diep River corridor and engagement with schools along the river corridor in an attempt for the schools to take on conservation activities as part of their curriculum in the river corridor itself.

Management of the Diep River corridor evidently varied in the upper and the lower reaches. According to the interviews there was active engagement and attempts to clean and care for the river corridor at the upper Diep River corridor through the Friend Group that is Constantia Valley Greenbelt as compared to the lower reaches where there was no evidence of Friends Groups and little community-driven action. However, the lower reaches were also not just left for no care, the City of Cape Town through local conservators provided programs to clean educate and raise awareness about the importance of the river corridor. Socially, rivers play an important life-sustaining role to people, evident in the establishment of cities close to, or along, river banks (Luger, 1998). It is clear that rivers are popular destinations for recreation, and the lack of these green spaces may cause an imbalance in the wellbeing of city-dwellers. Certainly, in this study the river corridor provides an important place for social and recreational activities that are highly valued by the users. It is therefore evident that rivers shape and bring life to the city, supporting a healthy functioning environment where people can benefit from cultural, spiritual, provisional and regulation services (Daniel et al, 2012; Milcu et al, 2013, Wilmot et al, 2015).

In this study, there was an overall consensus that river corridors are valuable to different users in different ways. Local residents use the Diep River corridor to de-stress from the city life, to relax, and to spend time with loved ones. The space is regarded as a getaway from the busy life of the city.

However, it was found that individuals had various perceptions towards how the river is valuable and of benefit to them. Well maintained rivers provide various benefits such as recreation, social cohesion, aesthetic, education and culture (Wilmot et al, 2015), increasing the use and connection with nature through various activities, events and sports. It offers free open space, accessible and safe recreation for people and fitness as well in terms of walks, jogs and cycling. Rivers enhances social interaction and can bring people together in positive action to look after their space, through outdoor activities. The beauty of the green space encourages and connects people with nature as it draws interest of people relocating to the space. Constantia suburb is an example that shows how easily people get attracted to a space due to the beauty and well managed nature of that space. Rivers have always been part of human culture with people settling adjacent to rivers for fishing, farming, recreational and, at least to some extent, religious and spiritual support.

According to literature rivers are argued as available green spaces within cities that connect people with their natural landscapes (Alberti et al, 2003; Boyd & Banzhaf, 2007; Milcu et al, 2012). For centuries people preferred to live near rivers for varied reasons such as easy access of water for drinking and irrigation purposes, beauty of living close to the bushy and leafy green space (Bolund & Hunhammar, 1999; Congress et al, 2006, Arthington et al, 2010). Today the need for rivers has changed considerably to the use and value in terms of recreational activities such picnics, walks, jogging, cycling and aesthetic appreciation. That said there is still evidence of some use for provisioning purposes in this study with the river used by homeless people, also still fished for livelihood purposes.

The case study by Asakawa et al (2004) about the Toyohira River in the city of Sapporo, Japan demonstrates the importance of the social perception of rivers with regards to use and value. Asakawa et al (2004) argues the agricultural activities and urbanisation as the cause of river degradation however regards an understanding of people's perception as a way forward to restoration of rivers to what people use and value. It is evident in this study that an understating of people's perceptions reveals the use and value which contribute to restoration of rivers to the state of what people desire for their own cultural benefits. Cultural services benefits across the Diep River corridor shows the greatest use to be recreational. Some rehabilitation of the Diep River corridor from agricultural activities and urbanisation in the past proves to have provided recreational activities that the local residents enjoy, use and value such as walking along the river banks.

The study by Holt et al (2012) about the City of Sheffield river corridors in the north of England assess perceptions of people based on the job creation of urban development such as industries and recreational activities. In their study urbanisation and industrialisation caused river degradation of the

city's river corridors. According to Holt et al (2012) rehabilitation of the river corridors was a success based on engagement of people. Their study demonstrates the important role of local community groups in initiating river rehabilitation. In this study the Diep River corridor shows similar potential for local community group initiatives such as evident in the local community meetings such as the Zandvlei Catchment Forum and friends group such as the Constantia Valley Greenbelt platforms as community initiatives for a way forward for river restoration to improve cultural services that people clearly perceive as important to their life styles. These platforms play a significant role for understanding various opinions and desires of local community residents.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

The Diep River corridor is extensively used and valued by different individuals and groups within the local community for diverse activities. This study found that the majority of the users of the Diep River corridor were the local communities residing along the corridor. Outdoor leisure was the most popular activity and clearly most valued by the local community members. The space was actively utilized, where local residents were always out and about, walking, cycling, relaxing, fishing for food and recreation, and meeting with family and friends. This study also revealed the use of horses, boats and kayaks by people across the Diep River corridor and the importance of infrastructure and facilities to aid access to the river or river banks for the associated activities of riding and boating. Homeless people also found the Diep River corridor space suitable to use for shelter and this presents something of a potential conflict where some people feel threatened by the presence of homeless people. There was also some apparent conflict between walkers and cyclists in the upper reaches. Part of the importance in drawing out perceptions is in exposing conflicts in green space use, so management can engage the different parties to find agreeable solutions.

In the context of this study the role that rivers play in providing cultural ecosystem services to local communities has been addressed. According to literature, it is clear that cultural ecosystems services are not easy to quantify in terms of monetary value and therefore the respective value of these services is often underestimated (Blolund & Hunhammar, 1999; Bryan et al, 2013; Daniel et al, 2012; Milcu et al, 2013; Wilmot et al 2015). Besides the challenges of quantifying cultural ecosystem services, the assessment of perceptions by people towards the rivers and green spaces has shown the need and importance of the Diep River corridor within these populations. People were indeed found to use the Diep river corridor for various and unique activities that were underpinned by many factors such as ethnicity, a sense of place, aesthetic value and identity, where participants expressed joy around different activities

The similarities and differences of people's perceptions towards the use and value of the Diep River corridor showed diverse interests towards the same green space by individuals and groups across the corridor. However, activities such as walking, relaxing along the river bank parks, picnics, cycling, horse riding, fishing, boating and kayaking addressed some of the more popular activities. The Diep River corridor (particularly the upper corridor) is a green space that was green, bushy and leafy enough to influence constant walks, cycling and picnics whilst the lower Diep River corridor was deep enough to allow boating and kayaking. Some sites within the Diep River corridor had playground facilities which accommodated members who were interested in physical health and exercise. Parks adjacent to the river played a major role in offering a space to relax while spending time with family and friends. The

corridor accommodated various local residents to use and enjoy the space through variety of these activities. The nature of a river corridor varies through space with steeper sections in the upper reaches and a shallow stream, and wider flatter banks in the lower reaches with deeper water. These physical geographic features must also be considered in deciding on the kinds of interventions in management along the corridor.

There were few imperative factors that influenced people's perceptions to use and value the Diep River corridor such as the landscape aesthetic which attracted people to use the corridor for various activities such picnics and relaxing along the river banks and sense of belonging to the place which was enhanced by the historic events and childhood memories of living along the corridor. Cross (2001) emphasizes that when people use and values something for years it stimulates a sense of an attachment and belonging, and this was evident in the interviews with local users. Perceptions are also influenced by the ethnicity of the individuals using the space. In this study, there were different groups of people with different language and social networks and because of this structure, people of same language and networks were engaging in the same activity which resulted in segregation amongst groups. Certain groups felt that they belong only to certain social groups and networks and that limited their willingness to explore activities across the full extent of the Diep River corridor. Certain groups did not feel they would be welcome in other areas of the corridor. This will have in part to do with apartheid planning where local users having been historically confined to certain areas have a greater affinity to these areas and feel they belong in these spaces and do not belong in others. Perceptions towards the value of different spaces by different individuals do not affect the value of the space itself. For example, this study showed that the Diep River corridor had different groups of users. Some groups preferred to use the corridor as a quiet space to relax while others preferred picnics with loud music.

The underlying outcome of the study illustrates use and value being influence by various events and memories. People emphasized their preference to stay along the corridor due to the memories they had as visitors to the place and as childhood residents particularly in the upper Diep River corridor. To this regard local residents thrived to keep what they value and use to keep the legacy that has been extended from generation to generation. For an example, those who were exposed to riding horses as visitors at the Diep River corridor found joy in this activity and therefore decided to settle where they could continue with this. The lower Diep River area illustrates events such as soccer, picnics and braai spots as favourite activities among users. The youth were found to perceive the corridor as an important space for education, where activities were encouraging young people to connect with nature in their free time. While there seems to be a longer history of use and positive association in

the upper reaches it is hoped that current engagements and activities in the lower reaches will result in similar outcomes in the future, where these youths will continue to foster and care for the river into the future based on their childhood experiences and memories.

Although the community benefits greatly from the cultural ecosystem services, there are challenges within this area. Damages, disturbance to the corridor and other related issues may jeopardize the corridor environment, and therefore it is important to educate the community in the management of the space. As challenging as it is to assess community perceptions as individual differences are challenging to quantify, it needs to be understood that the underlying cause of problems within the natural environment is driven by how people react and behave toward their valued space. While there will be a number of factors informing this behaviour, assessing perceptions can be a great first-cut tool to reveal certain characteristics about people's preferences which can help to improve the management and support of environmental initiatives. The two case studies of the City of Sheffield in the north of England and the city of Sapporo in Japan demonstrate the integration of all stakeholders including local communities to improve damaged and transformed spaces as a way to improvements in a community green space.

In this study it has been very evident that people can take part to protect what is of value and beneficial to them in many ways, both financially and through giving of their time. This study suggests an understanding of behaviours and attitudes may aid in finding solutions to environmental challenges, whilst still addressing the needs of the community within these spaces. It is evident that people require nature as it enhances quality of life in a variety of different ways, yet little has been done to manage nature sustainably. People need to be educated around the need to care, protect, maintain and manage green spaces they value. As populations increase, increased demands are placed on the natural environment; and therefore, a focus towards sustainable management is of paramount importance. Cultural ecosystem services fill an important gap in the health and wellbeing of people. The recreational activities provided by cultural services provided by urban rivers offer individuals a retreat from often busy daily schedules, allowing them to maintain a more balanced lifestyle in the modern age.

APPENDIX 1



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The purpose of the study was to examine the significance of cultural ecosystem services to people by assessing their perception and use of the Diep River corridor as an attempt to understand the attitude and expectations that enhances connection between people and nature. Participants Interviews were guided by two questions:

1. To identify the uses and users of the Diep River corridor
2. To assess the perceptions of the cultural ecosystem services delivered by the Diep River corridor to local users across different neighbourhoods

PARTICIPANT'S INTERVIEWS (CLOSED QUESTIONS)

<p>1. How often do you visit the River? Monthly <input type="checkbox"/> Weekly <input type="checkbox"/> Daily <input type="checkbox"/> Never <input type="checkbox"/></p> <p>2. If you visit and have access to the river, what is it that you use the river for?</p>
<p>3. If you don't visit the river what stops, you?</p>
<p>4. How safe do you feel to visit the river? Safe <input type="checkbox"/> Less safe <input type="checkbox"/> Very safe <input type="checkbox"/> Not safe at all <input type="checkbox"/></p> <p>5. Please specify if you don't feel safe, why?</p>
<p>6. How safe do you feel to visit the river? Safe <input type="checkbox"/> Less safe <input type="checkbox"/> Very safe <input type="checkbox"/> Not safe at all <input type="checkbox"/></p> <p>7. Please specify if you don't feel safe, why?</p>

8. Are you aware of the activities that are happening in the river?

9. What activities are those activities that are happening in the river?

10. Are you interested or involved in the activities mentioned? (if any)

11. If you could, what change would you make to your time use for these activities?

Less Time More time No time at all Which activity?

12. What would you say have changed about the river corridor?

APPENDIX 2



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KEY INFORMANTS INTERVIEWS (open ended questions)

These interviews were scheduled for not more than 30 minutes per individual. Follow up was made through emails, phone calls and meetings with some individuals for more information or clarity to points that may have been missed.

1. Do you know of the Diep River corridor?

Yes No

2. If yes, what is it that you think the river is used for?

- Recreational activities (boating, walking, hiking, cycling, picnic)
- Education
- Other

3. What is your engagement with local communities?

.....
...

4. What is your opinion of local communities about rivers?

.....

5. How actively involved do you think local communities are to local meeting or events?
(local meeting, recreational activity, cleaning of the river, etc)

.....

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