Learning from biodiversity offsets implementation within eThekwini Municipality (Durban), South Africa

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PREFACE AND ACKNOWLEDGMENTS

This research is dedicated to the memory of Kwanele Goodwell ‘Sparks’ Nkosi (22 March 1997 - 26 March 2018), who will forever be in my heart.

My family is appreciated for allowing me the time to undertake this research and for inspiration.

All the respondents in this research are thanked for taking time from their busy schedules to participate and to provide their views.

EThekwini Municipality is thanked for a portion of tuition fees.

Lastly, this has been a long and difficult journey for me. I would not have managed to get over the line without the dedication and encouragement from my supervisor, Professor Francois Retief, whom I always managed to meet alongside conferences and who kept me going; and co-supervisor, Professor Jenny Pope, who contributed enormous international insight in this research. Thank you.

ABSTRACT

The use of biodiversity offsets has expanded internationally over the past four decades. However, amidst the wealth of offsets practice there seems to be limited follow-up empirical research to learn from practice. Therefore, the main question for this research is, "*What can we learn from biodiversity offsets implementation within eThekwini Municipality*?". In order to answer the research question three research objectives were designed namely, i) to evaluate the level of conformance to the eleven best practice offset principles that have been established in the South African context, ii) to understand the factors affecting the level of conformance, and iii) to evaluate the effect of timing on the offset outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets.

The methodology relied on document review and semi-structured interviews with various stakeholders involved in five purposefully selected biodiversity offsets case studies from eThekwini Municipality (EM).

The research results show that the case studies from EM conformed to only three best practice principles and partially conformed to eight principles. The three conformed principles are principle 4: No-net loss; principle 9: Additionality; and principle 11: Offset follows landscape and ecosystem approach. The eight partially conformed principles are principle 1: Conformance to the mitigation hierarchy; principle 2: Proper offset agreement is in place before activity starts; principle 3: Transparency and stakeholder participation; principle 5: Focused on long-term outcome; principle 6: Offset is enforceable; principle 7: Cumulative, direct and indirect impacts are considered; principle 8: Limits to what can be offset; and principle 10: Like for like. Furthermore, the timing of introduction of the offset influenced the overall conformance to the best practice principles. In addition, the timing when the offset was proposed negatively influenced the quality, viability and enforceability of biodiversity offsets when the offset is introduced too late in the EIA process. As a result, implementation is compromised due to the lack of long-term commitment to the offset; the ability to fully offsetting ecosystem services; and effective stakeholder consultation on offsets.

It is concluded that the adoption of a national policy for biodiversity offsets is long overdue and should be implemented as a matter of urgency to guide practice. Furthermore, the research recommends capacity building for biodiversity stakeholders on the best practice principles and for eThekwini Municipality (EM) to determine biodiversity priorities and viable mitigation options.

Keywords: ***biodiversity offsets, timing, effectiveness, conformance, principles.***

ABBREVIATIONS AND ACRONYMS

BA - Basic Assessment

BBOP - Business and Biodiversity Offsets Programme

CBA- Critical Biodiversity Area

CBO - Community Based Organisation

D'MOSS - Durban Metropolitan Open Space System

DAFF - Department of Agriculture, Forestry and Fisheries

DEA - Department of Environmental Affairs

DEADP - Department of Environmental Affairs and Development Planning

DEAT - Department of Environmental Affairs and Tourism

DEDTEA - KZN Department of Economic Development, Tourism and Environmental Affairs

DSEWPAC - Department of Sustainability, Environment, Water, Population and Communities

DWA - Department of Water Affairs

EA - Environmental Authorisation

EIA - Environmental Impact Assessment

EKZNW - Ezemvelo KZN Wildlife

EM - eThekwini Municipality

EMA - eThekwini Municipal Area

EMP - Environmental Management Plan

EMPr - Environmental Management Programme

EPCPD - Environmental Planning and Climate Protection Department

ESA - Ecological Support Area

ha - Hectare

HoP - House of Parliament

IA - Impact Assessment

IAIA - International Association for Impact Assessment

ICMM - International Council on Mining and Metals

IDP - Integrated Development Plan

IFC - International Finance Corporation

IUCN - International Union for Conservation of Nature

I&AP - Interested and Affected Party

km - Kilometre

KZN - KwaZulu-Natal

LAP - Local Area Plan

MoA - Memorandum of Agreement

NBA - National Biodiversity Assessment

NEMA - National Environmental Management Act (Act 107 of 1998 as amended)

NEM: BA - National Environmental Management: Biodiversity Act (Act 10 of 2004 as amended)

NEM: PPA - National Environmental Management: Protected Areas Act (Act 57 of 2003)

NFA - National Forests Act (Act 84 of 1998 as amended)

NGO - Non-Governmental Organisation

NWA - National Water Act (Act 36 of 1998)

NZG - New Zealand Government

OECD - Organisation for Economic Co-Operation and Development

PA - Protected Area

PPP - Public Participation Process

R - Rand

RoD - Record of Decision

R&R - Rehabilitation and Restoration

SA - South Africa

SANBI - South African National Biodiversity Institute

SANParks - South African National Parks

SCA - Systematic Conservation Assessment

SDF - Spatial Development Framework

SDP - Spatial Development Plan

S&EIR - Scoping and Environmental Impact Report

TBC - The Biodiversity Consultancy

UN - United Nations

UNDP - United Nations Development Programme

USA - United States of America

WC - Western Cape

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CHAPTER 1 INTRODUCTION

1.1 Background

Biodiversity offsets have origins in wetland mitigation banking in the United States of America (USA) from the 1970s and have been implemented in Germany and France since that period (Rundkranz and Skarback, 2003, Persson, 2013, Moreno-Mateos, *et al.*, 2015, Maron *et al.*, 2016a; Tucker, 2016). Then over the last four decades, biodiversity offsets have largely been driven by biodiversity losses caused by land use change from human activity (Rockström *et al.*, 2009, Naeem *et al.*, 2012, Steffen *et al.*, 2015, Newbold *et al.*, 2015, Newbold *et al.*, 2016). Therefore, biodiversity offsets have become a common policy tool for conservation (McKenney and Kiesecker, 2010, Vaissière *et al.*, 2016) and environmental sustainability (Hayes and Morrison-Saunders, 2007, Rega, 2013). Hence, a global increase in policy development has been reported together with an increase in peer reviewed publications (Bull *et al.*, 2009, Calvet *et al.*, 2009, The Biodiversity Consultancy (TBC), 2013, Maron *et al.*, 2015, Moreno-Mateos *et al.*, 2015, Gelcich *et al.*, 2016). A publication showed that most of the biodiversity offset publications (108) were from the USA as shown in figure 1 below (Gelcich *et al.*, 2016). Furthermore, the figure also shows the distribution of countries with biodiversity offset enabling policies and frameworks.

In the last, almost, two decades the use of biodiversity offsets has received increasing policy attention since the ten Kate *et al.* (2004) report. The views and experiences from ten Kate *et al.* (2004) were instrumental to the establishment and publication of the Business and Biodiversity Offsets Programme (BBOP, 2012), which in turn formed the basis for policy development internationally. BBOP is considered as an international collaboration of civil society organizations, companies, government agencies, and financial institutions that developed best practice approaches to biodiversity related risks (BBOP, 2012). In that regard the International Finance Corporation (IFC) published performance standard 6 on biodiversity conservation and sustainable management, which has recently been updated, for projects the IFC invests in (IFC, 2019). Similarly, the World Bank has also developed its own guideline (Ledec and Johnson, 2016).

A few countries such as Australia (Middle and Middle, 2010, DSEWPAC, 2012), South Africa for wetlands (Macfarlane *et al.*, 2012), Canada (Poulton, 2014) and New Zealand (NZG, 2014) followed up with their own national policies. Certain European Union (EU) countries also responded to failed conservation commitments through biodiversity offsetting policy (Bark and Crabot, 2016, Moilanen and Kotiaho, 2018) and there have also been clear policy interventions in South America from Brazil, Columbia and Peru (Reid *et al.*, 2015). Whereas in the rest of Africa, according to Chikozho and De Jongh (2014), there was very limited evidence of policy intervention. However, the situation has improved in Africa as shown in figure 1 (Gelcich *et al.,* 2016). Furthermore, several voluntary biodiversity offset case studies from various African countries were

cited in Chikozho and De Jongh (2014) and it was argued then that potential lessons could be drawn from those case studies in Africa.

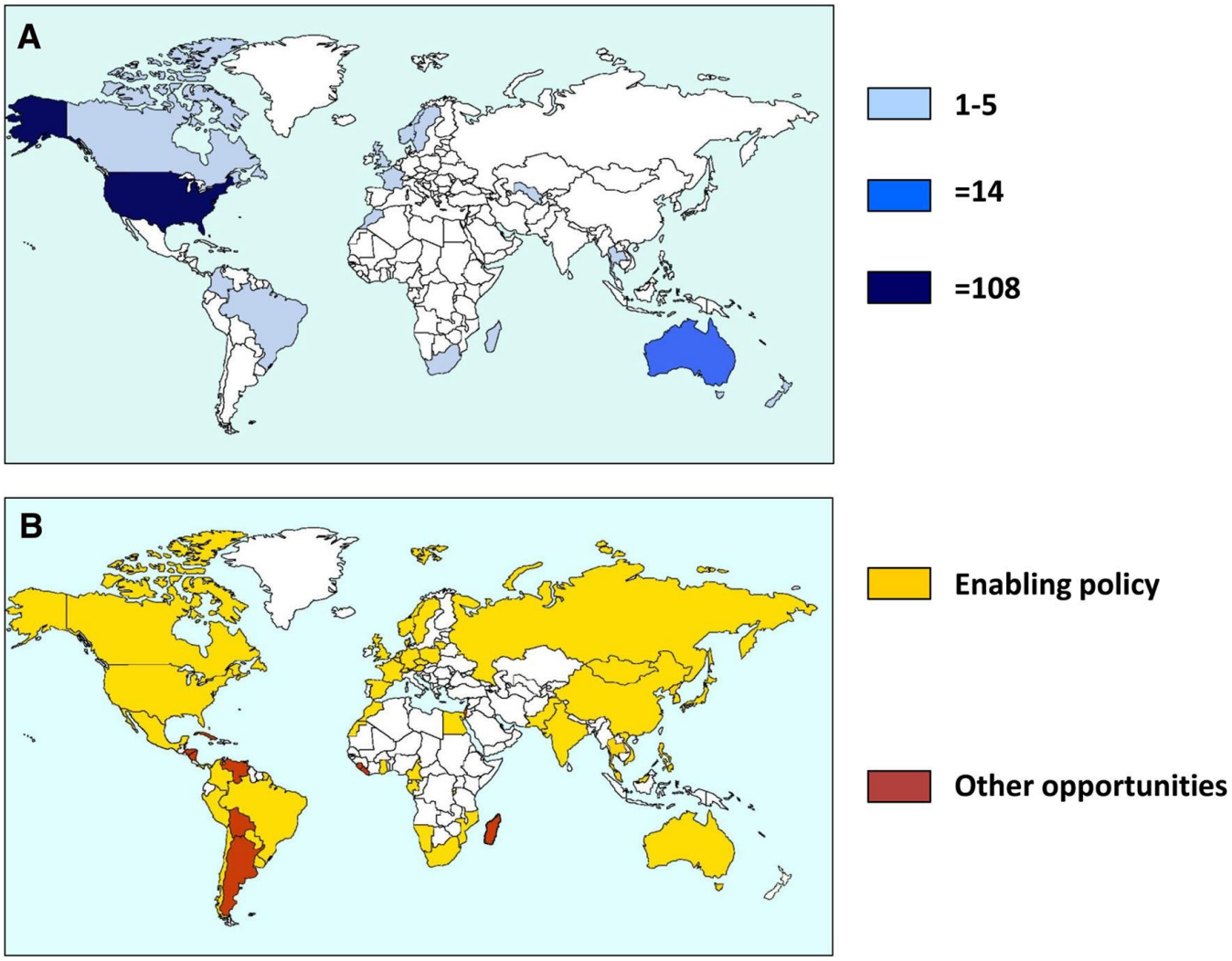

Figure 1A. The number of biodiversity offset publications and the countries where they are focused.

B. Countries with biodiversity offset enabling policies or regulations (yellow), and countries with other tools that may allow biodiversity offsets in EIAs (orange).

Source: Gelcich *et al.*, 2016, Page 3.

The number of countries with biodiversity offset policy, or at least enabling mechanism in Environmental Impact Assessments (EIAs), was reported by The Biodiversity Consultancy (TBC) to be around 40 (TBC, 2013). Environmental Impact Assessment (EIA) is understood as the assessment of environmental consequences of a project before a decision is made or action is taken (IAIA, 1999, DEAT, 2004, DEA, 2017a). Best practice EIA requires the consideration of biodiversity issues (IAIA, 2004, Wale and Yalew, 2010) and in particular the consideration of biodiversity offsets as a mitigation option (Brownlie *et al.*, 2013). In the South African context, the

outcome of an EIA may be an Environmental Authorisation (EA) that may include biodiversity specific conditions such as the implementation of an offset (DEADP, 2011, Brownlie, *et al.*, 2013, EKZNW, 2013). Therefore, the increase of biodiversity offset policies has contributed to the planning, practice and implementation of biodiversity offsets, which has contributed to the increased number of publications globally (TBC, 2013, Maron *et al.*, 2015). In addition, the use of the term 'biodiversity offsets' has also gradually increased in literature since the year 2000 in an analysis that was undertaken, thus research into biodiversity offsets has gained popularity (Maron *et al.,* 2015). Also, in South Africa there has been a growing number of publications on biodiversity offsets practice (such as Brownlie and Botha, 2009, Chikozho and De Jongh, 2014, Brownlie *et al.*, 2017, Lukey *et al.*, 2017, Douwes *et al.*, 2018, de Witt *et al.*, 2019).

South Africa has benefitted from the development of a number of provincial biodiversity offsets policies such as for the Western Cape (WC) (DEADP, 2007 and 2011), KwaZulu-Natal (KZN) (EKZNW, 2010 and 2013), and Gauteng (unpublished / not adopted) (SANBI, 2014). These policies are in addition to the specific policies for offsets related to wetlands (Macfarlane *et al*, 2012) and the forestry sector as prescribed by the National Forests Act (NFA, Act 84 of 1998) (DAFF, 2018). The history of biodiversity offsets policy development and implementation in South Africa are discussed in a number of sources (Chikozho and De Jongh, 2014, de Witt, 2015, Brownlie, *et al.*, 2017, Lukey *et al.*, 2017, de Witt *et al.*, 2019). The practice of biodiversity offsets in South Africa has frequently been criticized for its effectiveness to deliver intended biodiversity outcomes (Brownlie and Botha, 2009, Brownlie *et al.*, 2017). Until 2017 the main criticism has been the absence of a national policy to drive and shape offset implementation (de Witt, 2015, Brownlie *et al.*, 2017, Lukey *et al.*, 2017, de Witt *et al.*, 2019). Although the KZN (EKZNW, 2010 and 2013) and WC (DEADP, 2007, Brownlie and Botha, 2009) provinces in South Africa have their own adopted biodiversity offset policies, these are not aligned in all aspects, and other provinces do not have any guidelines (de Witt, 2015, Brownlie *et al.*, 2017, DEA, 2017b). Furthermore, Brownlie *et al.* (2017) are of the view that there is insufficient capacity to evaluate, design and implement offsets in the environmental management sector and that decision making has been inconsistent between the ten competent authorities in South Africa (one national and nine provincial competent authorities). In order to address the national policy vacuum and coordination at the national level, a draft National Biodiversity offset policy was published in 2017 (DEA, 2017b).

1.2 Importance of offsets

The BBOP (2012: 13) definition of biodiversity offsets has been widely accepted and states that it is *a measure or conservation action for compensating the residual loss, unavoidable impacts on biodiversity and ecosystem services it provides, caused by development project once all steps of the mitigation hierarchy / sequence have been completed in order to ensure a no-net loss biodiversity outcome*. The BBOP definition of biodiversity offsets (BBOP, 2012) has also been

adopted by various policies and in the general offsets literature (see for example DEADP, 2007, DSEWPAC, 2012, Bull *et al.*, 2013, ICMM, 2013, NZG, 2014, Le Coënt and Calvet, 2015, Persson *et al.*, 2015, Reid *et al.*, 2015, Dunne, 2016, Gelcich *et al.*, 2016, Ledec and Johnson, 2016, Maron *et al.*, 2016a, Bennett *et al.*, 2017, DEA, 2017b, Niner *et al.*, 2017, Bidaud *et al.*, 2018, Bezombes *et al.*, 2019, Sonter *et al.*, 2019).

The aim of biodiversity offsets is to achieve a no-net loss outcome. However, biodiversity offsets should preferably produce a net-gain or net conservation outcome (Middle and Middle, 2010, Rajvanshi *et al.*, 2011, Quintero and Mathur, 2011, Brownlie *et al.*, 2013, Bull *et al.*, 2013, Persson, 2013, Rosa *et al.*, 2016, DEA, 2017b). A net-gain outcome means that the biodiversity offsets should have conservation outcomes that would more than compensate for the loss, i.e. a ratio that is greater than one (>1:1). Therefore, the use of biodiversity offsets as a tool has the potential for achieving sustainability and meaningful biodiversity outcomes in a more flexible and cost-effective manner while allowing development with significant residual environmental impacts to proceed (ten Kate *et al.*, 2004, Hayes and Morrison-Saunders, 2007, NZG, 2014, Lukey *et al.*, 2017).

In order for biodiversity offsets to achieve a no-net loss or net gain outcome, the offset should only be considered once all steps of the mitigation hierarchy during the EIA has been completed (Bishop *et al.*, 2008, HoP, 2011, Ledec and Johnson, 2016, DEA, 2017b, Niner *et al.*, 2017, Sonter *et al.*, 2019). The mitigation hierarchy means that significant impacts on the environment should firstly be avoided, and then remedied, compensated, and as a last resort the offset should only be considered where residual deleterious impacts remain (ten Kate *et al.*, 2004, Bishop *et al.*, 2008, BBOP, 2009, Kiesecker *et al.*, 2010, Middle and Middle, 2010, DEADP, 2011, Brownlie and Botha, 2012, OECD, 2014). Figure 2 demonstrates how the mitigation hierarchy should be applied including the aim for a net-gain outcome.

In South Africa, biodiversity offsets and the mitigation hierarchy are included in the National Environmental Management Act (NEMA, Act 107 of 1998 as amended) as a principle under section 2(4) (DEA, 1998, Brownlie *et al.*, 2017, Lukey *et al.*, 2017) and the need to follow the mitigation hierarchy has been prescribed in relevant policy documents (DEADP, 2007 and 2011, Brownlie and Botha, 2012, Macfarlane *et al.*, 2012, EKZNW, 2010, 2013 and 2019, de Witt, 2015, Jenner and Howard, 2015, DEA, 2017b).

Figure 2. Illustration of the mitigation hierarchy and offset outcome of no-net loss and net-gain.

Source: ICMM, 2013, Page 10.

The need for using biodiversity offsets relates to the understanding that the rate of biodiversity loss is exceeding the 'safe operating space' for humanity as explained by Rockström *et al.* (2009) in relation to the so-called global planetary boundaries. Land use change with associated development pressures are significant contributors to biodiversity loss at the local scale (Foley *et al.*, 2005, Scholes and Biggs, 2015, Newbold *et al.*, 2016). In addition, the current damages to biodiversity have been linked to the destruction of ecosystem services for human development and consumption (Foley *et al.*, 2005, Bishop *et al.*, 2008). Hence, biodiversity and its ecosystem services are declining at an alarming rate (Newbold *et al.*, 2015) and the situation is especially dire in large cities. The reason is that according to the UN (2014), approximately two-thirds of the world's population will be living in cities by 2050 due to rapid urbanization (Retief *et al.*, 2016). Therefore, how spatial planning and land use is managed in cities will become even more important for biodiversity conservation (Rundkranz and Skarback, 2003, Rega, 2013, Macfarlane *et al.*, 2019).

South Africa is one of the most biodiverse countries in the world (Mucina and Rutherford, 2006, Cadman *et al.*, 2010, DEA, 2017b, Skowno *et al.*, 2019). Figure 3 shows protected areas, critical biodiversity areas (CBA) and ecological support areas (ESA) in South Africa as a demonstration of the richness of biodiversity. Figure 4 shows the rate of biodiversity loss in South Africa between 1990 and 2014 as reported by Skowno *et al.* (2019). Kwazulu-Natal as a province shows a similar trajectory of natural habitat transformation, between 1994 and 2011 as reported by Jewitt *et al.* (2015). Therefore, biodiversity offsets are considered an important policy tool to ensure that the rate of biodiversity loss is reduced or reversed (Hayes and Morrison-Saunders, 2007, Dellas and Pattberg, 2013, DEA, 2017b, Lukey *et al.*, 2017).

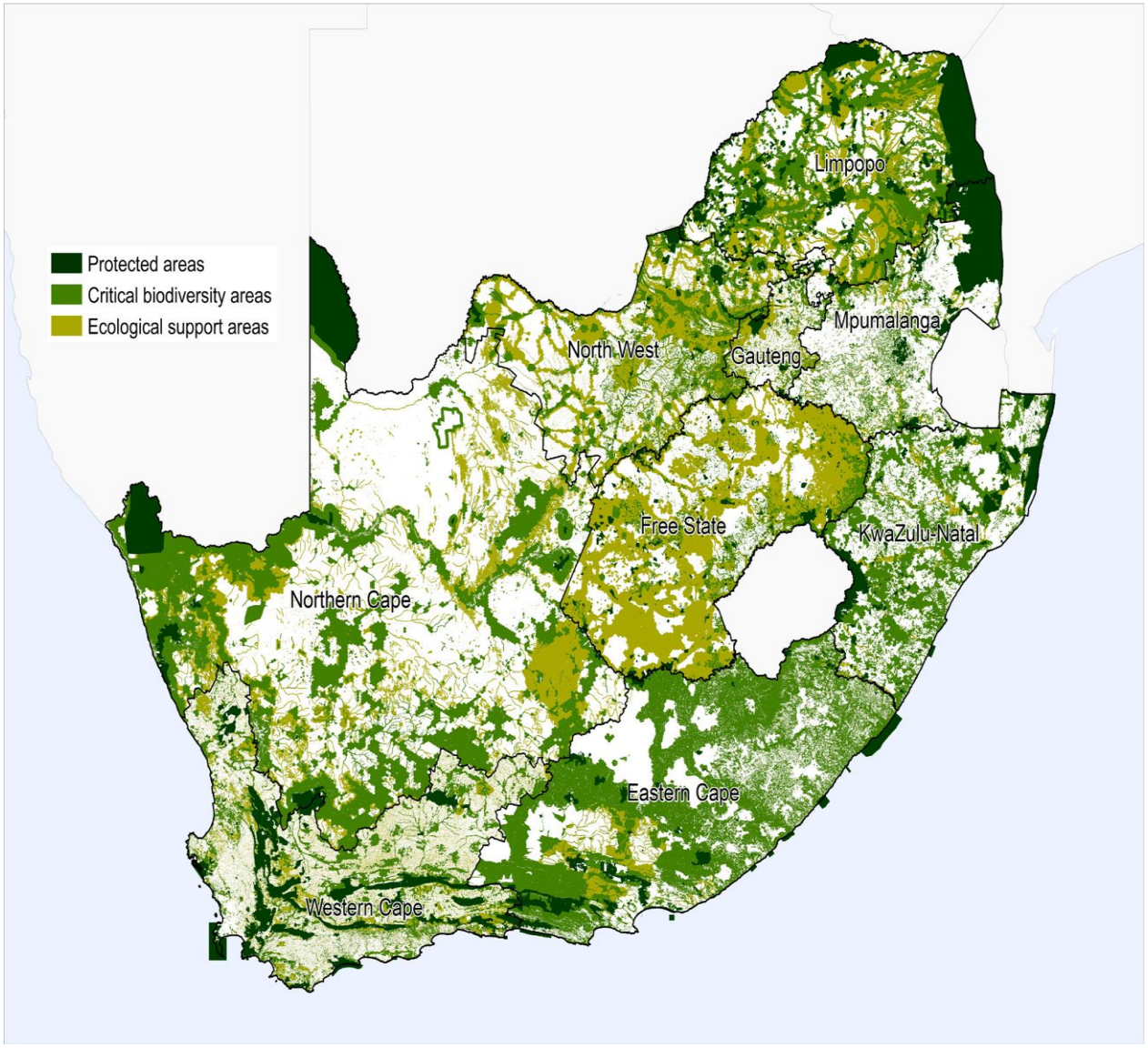

Figure 3. A map of South Africa showing Protected Areas (PAs), Critical Biodiversity Area (CBAs), and Ecological Support Areas (ESAs).

Source: DAFF, 2019, Page 11.

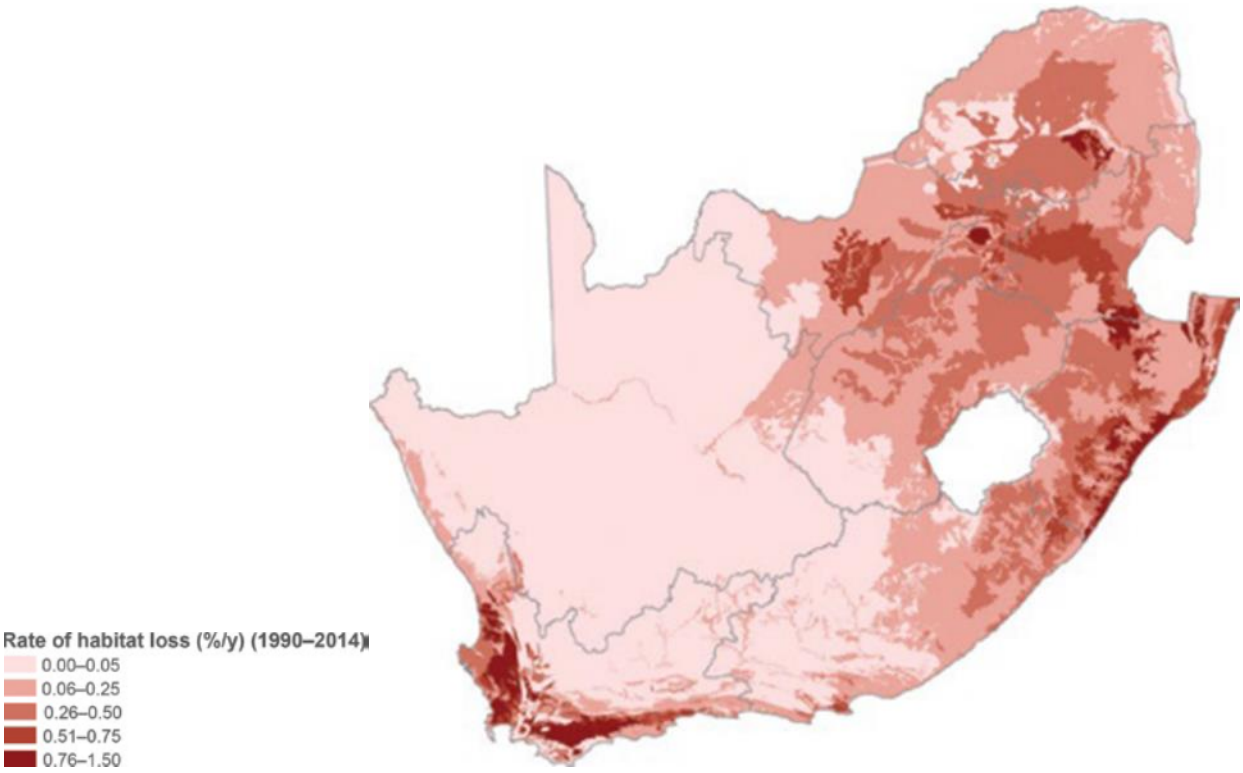

Figure 4. The current rate of biodiversity loss in South Africa.

Source: Skowno *et al.*, 2019, Page 24.

1.3 Implementation of Biodiversity offsets in South Africa

The implementation of biodiversity offsets has been inconsistent, ad-hoc and lacks coordination in certain contexts (Brownlie and Botha, 2009; Hayes and Morrison-Saunders, 2007; Brownlie *et al.*, 2017, DEA; 2017). In South Africa, the use of biodiversity offsets lacks policy coordination at the national level (de Witt, 2015, Brownlie, *et al.*, 2017, DEA, 2017b, Lukey *et al.*, 2017, de Witt *et al.*, 2019). Furthermore, guidance has been limited until recently and biodiversity offsets have been inconsistently applied even though offsets have been included in EIAs for several years (Brownlie *et al.*, 2017, Lukey *et al.*, 2017). Thus, the use of biodiversity offsets through EIAs has often been inadequate to deliver intended biodiversity outcomes (Walker *et al.*, 2009, Quétier *et al.*, 2014, Brownlie *et al.*, 2017). However, now there are best practice principles for biodiversity offsets (de Witt, 2015) and a draft National Biodiversity offset policy (DEA, 2017b) for South Africa. Thus, it is unclear how these adopted best practice principles and draft policy influence biodiversity offsets practice, which is what this research is about.

In South Africa, EIAs are currently conducted under the NEMA EIA Regulations that require EIA under two separate processes, namely the Basic Assessment (BA) and Scoping and Environmental Impact Report (S&EIR) (DEA, 2017a). In essence the BA may be considered as a

shorter process and requires fewer specialist studies whereas the S&EIR could be considered as a more extensive process including an extra step for scoping (DEA, 2017a). Furthermore, there are 10 competent authorities for EIAs (DEA, 2017a), which include the national Department of Environmental Affairs (DEA) and the nine provincial governments that include KZN where the competent authority is the Department of Economic Development, Tourism and Environmental Affairs (DEDTEA).

Biodiversity offsets have been included in EIAs for many years in South Africa (Brownlie *et al.*, 2017). Currently, decision making on biodiversity offsets in the EIA process is acknowledged to be a challenge for various reasons including timing of introduction of the offset (Brownlie and Botha, 2009; Brownlie, *et al.*, 2012; de Witt, 2015, Brownlie *et al.*, 2017; DEA 2017, de Witt *et al.*, 2019). For example, the early consideration of costs for offsets seems to be lacking (de Witt *et al.*, 2019). Therefore, getting the timing right for the introduction of biodiversity offsets in South Africa is important (de Witt *et al.*, 2019) and the mandatory stakeholder consultation process in EIAs (DEA, 1998) could be valuable for determining the need for offsets at an appropriate time so that a sustainable funding mechanism can also be identified. The lack of sustainable funding mechanisms for offsets has been cited as one of the reasons of why offsets fail, if the offset is introduced too late in the EIA process (de Witt, 2015). Hence, EKZNW (2019) has included the need for a sustainable funding mechanism in the minimum requirements for consideration of biodiversity offsets in KZN.

In addition, the timing of introducing the requirement(s) for offsetting was critical, whether it was too early or too late, it had implications for conformance to the best practice principles for biodiversity offsets. Hence, the need for getting the timing right (de Witt, 2015, de Witt *et al.*, 2019). Therefore, if the offset is introduced too early in the EIA process then it raises questions regarding conformance to best practice principles such as adhering to the mitigation hierarchy; whereas if the offset is introduced too late in the EIA process then having the agreement in place prior to start of the activity and ensuring long term protection, linked to sustainable funding, could be a challenge (de Witt, 2015).

In summary, Brownlie *et al.,* (2017) identified particular implementation challenges in South Africa for biodiversity offsets such as:

(a) the absence of national policy to drive and shape offset implementation;

(b) insufficient capacity to evaluate, design and implement offsets;

(c) inconsistent decision making;

(d) problems establishing sustainable financing mechanisms; and

(e) inadequate enforcement and monitoring, linked to poor drafting of licencing conditions and/or insufficient capacity to monitor implementation.

With the above challenges drawn from Brownlie *et al.* (2017) in mind, there is value in having a national adopted offset policy and for better understanding of the eleven best practice principles for offsets from de Witt (2015), which have been explained in section 2.2. The focus of this research would focus on conformance to the best practice principles and the implications of conformance and timing of introduction of the biodiversity offset to the quality, viability and enforceability of offsets.

1.4 The role of eThekwini Municipality in biodiversity offsets

In eThekwini Municipality (City of Durban) (see figure 5), the Environmental Planning and Climate Protection Department (EPCPD) is consulted as an Organ of State and / or Interested and Affected Party (I&AP) during the NEMA EIA process where either DEA or DEDTEA are the competent authority. The EPCPD has a function on biodiversity planning and management within the municipality (EPCPD, 2013b and 2018, Shih and Mabon, 2017) and it provides biodiversity comments on EIAs within eThekwini Municipal Area (EMA) (EPCPD, 2013b). Furthermore, the EPCPD considers spatial and land use / development applications outside of the EIA process to ensure the consideration of environmental issues, including biodiversity (Rundkranz and Skarback, 2003, EPCPD, 2013a and b, Shih and Mabon, 2017, Rega, 2013) since the NEMA principles apply to all decisions that affect the environment (Brownlie *et al.*, 2017). In certain instances the consultation of the EPCPD has resulted in biodiversity offsets as an outcome in EIA and land use planning decisions. However, the focus of this research is on biodiversity offsets that have been considered in terms of the NEMA EIA Regulations.

1.5 The biodiversity of eThekwini Municipality

The EMA is approximately 2297 km² with an estimated population of 3.5 million people and it is located at the centre of the Maputaland-Pondoland-Albany global biodiversity hotspot (EPCPD, 2016). According to Mucina and Rutherford (2006), three of the country's eight terrestrial biomes, eight broad vegetation types and over 2000 plant species occur in the EMA. The EPCPD (2016) has reported that the EMA has approximately 97 kilometres (km) of coastline, 18 river catchments with over 4000 km of river, 16 estuaries (which is approximately a quarter (¼) of KZN's estuaries (Forbes and Demetriades, 2008), and 75000 hectares (ha) of open space as produced through the systematic conservation assessment (SCA).

The approximately 75000 ha of open space is commonly referred to as the Durban Metropolitan Open Space System (D'MOSS), which is a spatial layer representing a series of interconnected open spaces in private, public and traditional authority land (EPCPD, 2016, Shih and Mabon,

2017). D'MOSS then seeks to protect biodiversity and associated ecosystem services in the EMA for current and future generations (EPCPD, 2013b). Furthermore, according to the EPCPD (2016) D'MOSS includes nature reserves that are managed by the municipality and KZN Wildlife (the provincial Conservation Authority), and these reserves are formally protected and managed in terms of the National Environmental Management: Protected Areas Act (NEM: PAA, Act 57 of 2003) and the National Environmental Management: Biodiversity Act (NEM: BA, Act 10 of 2004). The total asset value of natural and semi-natural capital in the EMA was estimated to be in the order of R47.8 billion, thus giving rise to an estimated ecosystem services flows nearly worth R4.2 billion per year (EPCPD, 2016).

Figure 5. Location of eThekwini Municipal Area in the KwaZulu-Natal Province, South Africa.

Source: Douwes *et al.*, 2018, Page 2.

Therefore, D'MOSS informs all levels of planning in the EMA from the broad-scale Integrated Development Plan (IDP) and its spatial representation, the Spatial Development Framework (SDF), to the regional, i.e. Spatial Development Plans (SDP), and local, i.e. Local Area Plans (LAP) and town planning schemes (Shih and Mabon, 2017). However, the environmental assets in the EMA are generally in poor condition and degrading (EPCPD, 2016). The main causes for these findings are considered to be land transformation and fragmentation, invasive alien species, unsustainable use, pollution and climate change (EPCPD, 2016). These causes have resulted in the following statistics (EPCPD, 2016):

- 54% of the EMA's original vegetation was totally transformed and 17% highly degraded
- Wetlands: 25% lost; Remaining wetland habitat: < 10% Good (also in Botes, 2014)
- 8.2% of DMOSS (or 3% of the EMA) is 'protected'
- 0.6% of the EMA is formally proclaimed
- 7.7% of D'MOSS is managed

The implementation of biodiversity offsets in the EMA is important for maximising biodiversity opportunities and addressing certain environmental challenges through EIAs. Therefore, learning from biodiversity offsets in the EMA could be valuable for understanding the effectiveness of EIA mitigation.

1.6 Research question and objectives

Biodiversity offsets have the potential to serve as a conservation tool for achieving sustainable socio-economic development and conservation outcomes through a no-net loss approach to development. However, it is also evident that the rate of biodiversity loss globally, in South Africa and KZN is alarming thereby eroding the range of benefits biodiversity provides for society. In this context, this research seeks to better understand biodiversity offsets implementation within eThekwini Municipality. Therefore, the main research question is, 'W*hat can we learn from biodiversity offsets implementation within eThekwini Municipality*?' In order to answer the above question, the objectives of the research are

1) To evaluate the level of conformance to best practice offset principles,
2) To understand the factors (except timing) affecting the level of conformance, and
3) To evaluate the effect of timing on the offset outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets.

1.7 Dissertation structure

The structure of this dissertation follows on from the introduction chapter to the literature review (chapter 2) where biodiversity offset implementation experiences and current understandings from international and national literature are discussed. Then the methodology (chapter 3) designed to answer the research question and achieve the research objectives is described. Chapter 4 presents the data analysis and research results, which are then discussed. Finally, chapter 5 presents the conclusion and recommendations from the research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to undertake a literature review of peer reviewed publications and policy documents on biodiversity offsets in order to link the research question and objectives with existing knowledge on the topic. This chapter explains the main best practice principles for biodiversity offsets as distilled from recent literature, especially those applicable to the South African context. Then the different types of biodiversity offsets are discussed and lastly, the chapter considers the implementation of biodiversity offsets internationally and locally. The outcome of this chapter provides the basis for the methodological design which relied upon the identification of best practice offsets principles, against which the conformance evaluation could be conducted.

2.2 Biodiversity offsets principles

De Witt (2015) undertook an extensive literature review of biodiversity offsets principles across a range of policies and literature, including EKZNW (2010), DEADP (2011), BBOP (2012), Macfarlane *et al.* (2012) – a policy for wetland offsets in South Africa and IFC (2019 – updated from 2012). The outcome of the literature review produced 11 principles, which are considered as best practice principles for biodiversity offsets. Because these principles were developed with the South African context in mind this research benefitted greatly (de Witt, 2015). Therefore, the following best practice principles on biodiversity offsets formed the basis for this research:

- Principle 1: Conformance to the mitigation hierarchy.
    - A description of this principle is included under section 1.2 and its application has been included in figure 2.
- Principle 2: Proper offset agreement is in place before activity starts.
    - Legal document for ensuring security of the offset area including financial resources for implementation and management (DEADP, 2011, Macfarlane *et al.*, 2012, EKZNW, 2013, IUCN, 2016, DEA, 2017b).
- Principle 3: Transparency and stakeholder participation.
    - The willingness by the proponent to engage with an open mind and to reasonably consider stakeholder views on the offset process (DEADP, 2011, BBOP, 2012, Macfarlane *et al.*, 2012, EKZNW, 2013, NZG, 2014, OECD, 2014, IUCN, 2016, DEA, 2017b).
- Principle 4: No-net loss.

- An explanation of this principle is included under section 1.2 and it implies an offset ratio of > 1:1.

- Principle 5: Focused on long-term outcome.
    - The offset should last as long as residual impact of the proposal (DEADP, 2011, BBOP, 2012, Macfarlane *et al.*, 2012, EKZNW, 2013, ICMM, 2013, NZG, 2014, IUCN, 2016, Ledec and Johnson, 2016, DEA, 2017b).

- Principle 6: Offset is enforceable.
    - The offset has clear conditions for ongoing monitoring of proposed implementation measures and their effectiveness (DEADP, 2011, Macfarlane *et al.*, 2012, EKZNW, 2013, NZG, 2014, OECD, 2014, IUCN, 2016, DEA, 2017b).

- Principle 7: Cumulative, direct and indirect impacts are considered.
    - The offset considers much broader biodiversity issues including past, current and reasonably foreseeable future impacts of an activity (DEADP, 2011, Macfarlane *et al.*, 2012, EKZNW, 2013, NZG, 2014, IUCN, 2016, DEA, 2017b).

- Principle 8: Limits to what can be offset.
    - Where the offsets would not be appropriate for habitat or ecosystem losses or harm to species such as when these are considered critically endangered or are at a 'tipping point' (DEADP, 2011, BBOP, 2012, Macfarlane *et al.*, 2012, EKZNW, 2013, ICMM, 2013, NZG, 2014, IUCN, 2016, Ledec and Johnson, 2016, DEA, 2017b).

- Principle 9: Additionality.
    - The offset results produce a net gain or additional conservation outcome(s) (Macfarlane *et al.*, 2012, EKZNW, 2013, ICMM, 2013, OECD, 2014, IUCN, 2016, Ledec and Johnson, 2016, DEA, 2017b).

- Principle 10: Like for like.
    - The offset has equivalent exchange of habitat / ecosystem / species (Macfarlane *et al.*, 2012, EKZNW, 2013, ICMM, 2013, OECD, 2014, Ledec and Johnson, 2016, DEA, 2017b, IFC, 2019).

- Principle 11: Offset follows landscape and ecosystem approach.

    - The size and location of the offset site and the management activities should consider a much broader biodiversity context (DEADP, 2011, BBOP, 2012, Macfarlane *et al.*, 2012, EKZNW, 2013, NZG, 2014, IUCN, 2016, Ledec and Johnson, 2016, DEA, 2017b, IFFC, 2019).

Most of the above-mentioned principles for biodiversity offsets were also included in other policy documents such as in ICMM (2013) for mining projects, Poulton (2014) for Canada, Ledec and Johnson (2016) for the World Bank policy, DEA (2017b) for South Africa and Bezombes *et al.* (2019) for France.

Furthermore, building on the research by de Witt (2015) a 12th principle has been added as reported in de Witt *et al.* (2019). The 12th principle being the 'precautionary principle' is included in NEMA (DEA, 1998) and the draft national biodiversity offset guideline for South Africa (DEA, 2017b). Unfortunately, this research was started in 2018 and therefore could not benefit from the follow-up De Witt *et al.*, (2019) paper. For that reason, this research only focused on the 11 principles as reported in de Witt (2015).

The establishment of principles for biodiversity offsets is important to ensure the promotion of best practice. Furthermore, conformance to best practice principles for biodiversity offsets would contribute towards meaningful biodiversity and ecosystem services outcomes (Pilgrim and Ekstrom, 2014, de Witt, 2015, DEA, 2017b, Rosa *et al.*, 2016, de Witt *et al.*, 2019). Hence, the contribution of a biodiversity offset could be predicted by the level of conformance to best practice principles (de Witt, 2015). Principles could be applied to different types of biodiversity offsets to compare relative implementation success.

2.3 Types of biodiversity offsets

The origins of biodiversity offsets in the 1970s through mainly wetland mitigation, has been covered under section 1.1. Since the 1970s our understanding of offsets have diversified and the literature now distinguish between the following different types of biodiversity offsets namely:

- Habitat or bio-banking (Wotherspoon and Burgin, 2009, Calvet *et al.*, 2015),

- Monetary offsets (EKZNW, 2013, Niner *et al.*, 2017),

- Risk averse (or averted loss i.e. purchase and protection of habit / ecosystem / species) and restoration offsets (BBOP, 2012, Macfarlane *et al.*, 2012, Bull *et al.*, 2013, EKZNW, 2013, SANBI, 2014, Calvet *et al.*, 2015, de Witt, 2015, Moreno-Mateos *et al.*, 2015, DEA, 2017b),

- Training and development (McKenney and Kiesecker, 2010), and
- Voluntary offsets (Bull *et al.*, 2013, ICMM, 2013, Chikozho and De Jongh, 2014, Gelcich *et al*, 2016),

The different types of biodiversity offsets can further be categorised into two main groups, namely direct and indirect biodiversity offsets (de Witt 2015). Risk averse or protection and restoration biodiversity offsets are considered as direct offsets (McKenney and Kiesecker, 2010, Middle and Middle, 2010, DEADP, 2011, BBOP, 2012, Macfarlane *et al.*, 2012, Brownlie *et al.*, 2013, EKZNW, 2013, ICMM, 2013, SANBI, 2014, UNDP, 2016, DEA, 2017b, DAFF, 2018). Indirect offsets refer to habitat or bio-banking and monetary type of biodiversity offsets (ten Kate *et al.*, 2004, McKenney and Kiesecker, 2010, DEADP, 2011, Quintero and Mathur, 2011, BBOP, 2012, DEA, 2017b). Furthermore, voluntary offsets could either fall within direct or indirect types of offset when implemented (ICMM, 2013, Gelcich *et al.*, 2016).

Direct biodiversity offsets are those that are directly linked to the development impacts and their aim is to create equivalent biodiversity outcomes (Middle and Middle, 2010, BBOP, 2012, de Witt, 2015, Ledec and Johnson, 2016). The comparable ecological outcomes from biodiversity offsets can be achieved through land acquisition for biodiversity protection and management or even through stewardship agreements or donations (DEADP, 2007, EKZNW, 2013, UNDP, 2016, DEA, 2017b). The offset land should usually have the same vegetation type of habitat; a principle of 'like for like' or equivalence must be applied (DEADP, 2007, BBOP, 2012, Macfarlane *et al.*, 2012, EKZNW, 2013, Ledec and Johnson, 2016, DEA, 2017b).

Indirect biodiversity offsets refer to those that may not be accepted as core offset activities or considered as offsets by all stakeholders (BBOP, 2011, DEADP, 2011). Although indirect offsets such as habitat banking, monetary and research can be applied in different contexts, their value lies in the fact that they could be additional activities to direct types of offsets (DEADP, 2011, BBOP, 2012) but their equivalence as biodiversity offsets and valuation are questionable in practice (de Witt, 2015, Vaissière *et al.*, 2016, Bull *et al.*, 2017, Niner *et al.*, 2017). According to research by McKenney and Kiesecker (2010), training and development as a form of an indirect biodiversity offsets were usually not included in legislation and there is no guidance on how monetary offsets are calculated (EKZNW, 2013, Vaissière *et al.*, 2016). Whereas in certain instances the biodiversity offset funding may be unallocated towards biodiversity or conservation (Quintero and Mathur, 2011). Furthermore, habitat banking also requires specific mitigation valuation (Vaissière *et al.*, 2016), it has the potential for ensuring that a more strategic approach to biodiversity offsets can be a solution (DEADP, 2011).

In addition, voluntary offsets may also be considered in practice and these may fall under either the direct or indirect offset category. However, voluntary offsets are usually not included in legislation

but have the potential to contribute positively to conservation (ICMM, 2013), especially in the absence of enabling legislation or policy such as in many parts of Africa (Chikozho and De Jongh, 2014). However, the implementation of both direct and indirect biodiversity offsets through EIA internationally and in South Africa specifically has had varying outcomes and has drawn severe criticism, even though its potential is apparent as a conservation or sustainable development tool through mitigation in the EIA process.

2.4 Implementation of biodiversity offsets

The implementation of biodiversity offsets (either direct and indirect offsets)) through EIA needs to conform to a set of best practice principles (ten Kate *et al.*, 2004, Bishop *et al.*, 2008, BBOP, 2012, EKZNW, 2013, de Witt 2015, UNDP, 2016, de Witt *et al.*, 2019, IUCN, 2019). However, there are various challenges with the implementation of biodiversity offsets that are of concern. For example, their inability to fully compensate for the loss of ecosystem services (Rosa *et al.*, 2016, Sonter *et al.*, 2019). In certain instances the planning for biodiversity offsets has excluded relevant stakeholders from the process (Sonter *et al.*, 2019) such as non-governmental organizations (NGOs), community based organizations (CBOs), Conservancies, and the affected communities, while stakeholder consultation is one of the key principles for biodiversity offsets (Bishop *et al.*, 2009, BBOP, 2009 and 2012, HoP, 2011, de Witt 2015, UNDP, 2016; Bidaud *et al.*, 2017 and 2018). Furthermore, concerns regarding equivalence (Maron *et al.*, 2016b, Bull *et al.*, 2017) and how natural capital could have become a commodity (Walker *et al.*, 2009, Maron *et al.*, 2015, Vaissière *et al.*, 2016, Niner *et al.*, 2017) have been raised.

In South America, mainly in mining projects with impacts on the Amazon forest, Rosa *et al.* (2016) reported that although biodiversity targets may be met through the offset, the delivery of ecosystem services to society are usually not met since it takes time to get these to be realised. These findings were also supported by Brownlie *et al.* (2013 and 2017) and Reid *et al.* (2015), and the lack of suitable baseline data may contribute to this challenge in the first instance since biodiversity and ecosystem services cannot be separated (Soderman, 2005, Wale and Yalew, 2010, Brownlie *et al.*, 2013). Where ecosystem services are not regained through the offset then the offset would be considered as non-conformed to principle 4 for no-net loss and the principle 11 for the offset to following a landscape and ecosystem approach. Furthermore, the calculation of residual loss and finding suitable land within a landscape has been a challenge in Brazil (Bull *et al.*, 2013, Souza and Sánchez, 2018). However, for wetland offsets in South Africa, Macfarlane *et al.* (2012) developed a tool that addresses both habitat and ecosystem services value, which has also been implemented in the north of eThekwini Municipality, with a net-gain approach (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018). There are also concerns with the time lag between the impacts of development and the stage where the offset is delivering the intended outcomes such as ecosystem services targets (Hayes and Morrison-Saunders, 2007).

Stakeholder consultation, principle 3 – transparency and stakeholder participation is an important aspect of this biodiversity offset best practice principle (ten Kate *et al.*, 2004, Bishop *et al.*, 2008, BBOP, 2012, de Witt, 2015, UNDP, 2016, DEA, 2017b, de Witt *et al.*, 2019, IUCN, 2019). However, there are examples internationally where the application of this principle has been ignored and the biodiversity offset has displaced locals due to lack of community consultation (Bidaud *et al.*, 2018). In support of this principle, Rosa *et al.* (2016) have also suggested that the true value of ecosystem services could only be determined through effective stakeholder consultation such as understanding the cultural and recreation value of biodiversity. Hence, principle 3, for transparency and stakeholder consultation, has in practice been misinterpreted. Furthermore, Griffiths *et al.* (2019) underscored the importance of the principle whereby the community involvement in the planning and design of the offset promoted the achievement of a no-net loss biodiversity outcome when the use and cultural values of biodiversity were considered, which is essential in practice.

The valuation of biodiversity has also been criticised and the commoditising of biodiversity (Walker *et al.*, 2009, Vaissière *et al.*, 2016, Souza and Sánchez, 2018), especially in monetary offset (EKZNW, 2013, Vaissière *et al.*, 2016, Niner *et al.*, 2017), which it is argued does not yield equitable biodiversity gains or outcomes. The principle of like for like when it cannot be met lends itself to a scenario where 'trading up' or 'trading down' between ecosystem types may be required as it could be applied through the wetland offset tool calculator in South Africa (Macfarlane *et al.*, 2012). Under this wetland policy (Macfarlane *et al.*, 2012) a more important or critically endangered ecosystem could be offset with a lesser important ecosystem, though with a higher multiplier. However, the success of restoration efforts has also been questionable (Souza and Sánchez, 2018). Furthermore, the use of multipliers and equivalence (i.e. principle 10 - like for like) is in itself a challenge and has been implemented inconsistently (Walker *et al.*, 2009, Maron *et al.*, 2016a, Bull *et al.*, 2017). Lastly, a political context within which a biodiversity offset is implemented may also present varying challenges as it has been reported in Jenner and Howard (2015) and Dunne (2016) where the offset outcomes were influenced. Therefore, questioning if offsets could really, as a minimum, achieve a no-net loss biodiversity outcome (i.e. principle 4 - no-net loss)? In essence, the implementation of biodiversity offset has been inconsistent, ad-hoc and may lack coordination in certain instances (Brownlie and Botha, 2009; Hayes and Morrison-Saunders, 2007; Brownlie *et al.*, 2017, DEA; 2017).

In addition, there were also challenges with establishing sustainable financing mechanisms for biodiversity offsets (Brownlie *et al.*, 2017), since offsets require long term financing and management in line with principle 5 for consideration of long-term outcomes, which included management and protection measures (de Witt, 2015). Where biodiversity offsets have failed, they have been linked with poor financing mechanisms or guarantees, and as most proponents would

claim they are not in the business of managing biodiversity offsets (de Witt, 2015, Brownlie *et al.*, 2017, EKZNW, 2019).

The draft National Biodiversity Offset Policy (DEA, 2017b) includes provision for organs of state to take over the implementation and management of biodiversity offsets where appropriate mechanisms are in place. However, the relevant organs of state that are responsible for conservation functions such as the South African National Parks (SANParks), EKZNW, EM, may not be resourced and structured appropriately for these functions. In addition, the issue of transfer of funds for biodiversity offsets and ring fencing these funds for biodiversity offsets within institutions that have to address other priority issues such as water provision and human settlements is also a challenge in itself. Thus, Pilgrim and Bennun (2014) have argued that funds for offsets should at least supplement government budgets and not substitute the funds if biodiversity offsets are planned in or near protected areas or where management is undertaken by an organ of state. Lastly, organs of state responsible for conservation could add value in the implementation of biodiversity offsets through the monitoring function (Macfarlane *et al.*, 2016) to support principle 6 that requires offsets to be enforceable (de Witt, 2015, de Witt *et al.*, 2019). According to BBOP (2009 and 2012) guidelines, offsets must have a monitoring component so that the efficacy of offsets could be understood, making principle 6 fundamental for ensuring that intended outcomes are delivered by biodiversity offsets. Currently, it has been reported in Brownlie *et al.* (2017) that enforcement and monitoring are inadequate, which are linked to poor drafting of EA conditions and/or insufficient capacity to monitor implementation, including interpretation of monitoring results.

2.5 Conclusion and recommendation on biodiversity offsets

In conclusion, the literature review identified scientific papers and policy documents on biodiversity offsets in order to link the research question with existing knowledge on the topic. Section 2.1 discussed 11 best practice principles for biodiversity offsets drawn from existing literature, especially those that are relevant to the South African context. Section 2.3 also discussed different types of biodiversity offsets. Lastly, this chapter also considered the implementation of biodiversity offsets both internationally and locally, and the associated implementation challenges. Overall the chapter provides a good basis for the methodological design in Chapter 3 as well as the interpretation of the research results in Chapters 4 and 5.

CHAPTER 3 METHODOLOGY

This research is concerned with biodiversity offsets implementation through EIAs within eThekwini Municipality (Durban), South Africa. The research question is, *what can we learn from biodiversity offsets implementation within eThekwini Municipality*? In order to answer the above question, the objectives of the research are (1) to evaluate the level of conformance to best practice offset principles, (2) to understand the factors (except timing) affecting the level of conformance, and (3) to evaluate the effect of timing on the offset outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets. Hence, this chapter describes the research methods used to answer the research question and to achieve the three research objectives, thereby building on the research by de Witt (2015) and de Witt *et al.* (2019).

3.1 Case study approach

As de Witt (2015) has undertaken a critical review of biodiversity offsets in South Africa and established 11 principles that make biodiversity offsets acceptable. A similar methodology for the research was adopted from de Witt (2015) where cases studies from EMA were evaluated through document review and semi-structured interviews (Gill *et al.*, 2009) via a questionnaire for various practitioners who have been involved in biodiversity offsets. A similar approach was used in Hayes and Morrison-Saunders (2007), de Witt (2015) and de Witt *et al.* (2019). The study approach of using case studies is known as a 'focused case comparison' whereby case studies between four and 10 are considered valid (Baxter and Jack, 2008, de Witt, 2015). Hence, Baxter and Jack (2008) have also highlighted the potential value of using a multiple case study approach since the researcher can explore the differences and trends between case studies.

3.1.1 Case study selection

Several biodiversity offset case studies related to EIAs in the EMA were selected for the research to answer the research question. The main criteria for the selection of cases studies were the requirement for a biodiversity offset in the particular EIAs and location, which must be geographically located within the EMA to ensure accessibility of project reports and interviewees by the researcher. This is because such case studies would fall within the review jurisdiction of EM as part of the EIA process. The willingness and availability of participants from a range of stakeholders was important for understanding the implementation of biodiversity offsets. The following stakeholders were involved in each case study evaluated:

- Government, i.e., competent authority who drafted and issued the environmental authorisation for the project.

- Consultant, i.e., the environmental professional who was involved in the drafting of the biodiversity offset proposal or plan.
- Conservation Authority, being EKZNW as the only conservation authority in KZN where EM is located.
- Proponent, i.e., a representative of the developer who was intimately involved in the biodiversity offset process. In certain cases, these were not environmental professionals.
- Municipality, that being EM's EPCPD who had been consulted as an organ of state or Interested and Affected Party (I&AP) and provided comments on the EIA and the biodiversity offset plan or proposal.

In each case study there were five respondents representing the above stakeholder. However, there are instances where certain stakeholders were involved in more than one case study. Therefore, for the purposes of this research there were five case studies, representing different habitat types and locations from the EMA. Furthermore, each of the five case studies had different circumstances on how and when the biodiversity offset was conceived. Therefore, the researcher was satisfied that the five cases studies had sufficient data for analysis in order to further our understanding on the implementation of biodiversity offsets.

3.1.2 Case study description

This section provides the following brief descriptions of the different case studies:

- Case Study A – An airport development and associated infrastructure

The airport development and associated infrastructure projects followed a Scoping and Environmental Impact Report (S&EIR) process. The different EIA processes in South Africa were explained in section 1.4. The major residual impacts were associated with loss of wetland and grassland habitat, and the environmental authorisation was issued by DEA in 2008.

However, the environmental authorisation was appealed by certain I&APs and the decision was upheld by the Minister, who then issued an Appeal Decision in 2009 (DEA, 2009). The environmental authorisation and appeal decision included the need for habitat Rehabilitation and Restoration (R&R) as an offset for habitat loss due the project. The R&R plan (SEF, 2015) and its implementation plan were subsequently drafted in 2015 and 2018 respectively. The R&R plan was also approved by DEA in 2015 (DEA, 2015) after a separate Public Participation Process (PPP).

- Case Study B – An integrated human settlements projects including a town centre, business and industrial nodes and associated infrastructure.

The integrated human settlements projects including a town centre, business and industrial nodes and associated infrastructure followed the S&EIR process. The major residual impact was associated with the loss of wetland habitat and the environmental authorisation was granted by the

now Department of Economic Development, Tourism and Environmental Affairs (DEDTEA, 2012 and 2015c) who is the provincial competent authority.

The need for further wetland rehabilitation as an offset for the development impacts was considering during EIA process since there was an early recognition that mitigation would be requiring an offset when approximately a third of the project site was identified as open space. A wetland rehabilitation plan was included in the environmental authorisation as a requirement, and the offset plan was drafted and approved prior to the start of construction (SIVEST, 2015).

- Case Study C – A logistics park and associated infrastructure

The Logistics Park and associated infrastructure project underwent the S&EIR process. There were numerous residual impacts associated with avifaunal species of conservation concern and a mosaic of hygrophilous grassland habitat loss, and the environmental authorisation was issued by DEDTEA (2015a).

However, the need for addressing the residual impacts was only addressed after the final EIR was rejected by DEDTEA and then a revised final EIR was submitted, which informed the environmental authorisation (DEDTEA, 2015a). The environmental authorisation was then appealed by I&APs due to concerns with the project such as loss of open space, but an appeal decision was granted (DEDTEA, 2015b). The environmental authorisation, in response to the appeal decision, required a memorandum of agreement (MoA) between various parties for the planning of the biodiversity offset (DEDTEA, 2015a and 2015b). The MoA was finalised prior to the start of construction, thereby initiating the offset planning process for the wetland habitat component (Edwards and Macfarlane, 2016) since the avifaunal species of conservation concern offset was accepted during the EIA process, and the MoA was considered during Environmental Management Programme (EMPr) approval process after the environmental authorisation. In addition, an ecosystem services offset plan through restoration was also negotiated outside of the EIA process between EM and the proponent. This aspect was included in the MoA as a voluntary offset.

- Case Study D – A logistics and industrial development and associated infrastructure

The logistics and industrial development and associated infrastructure project was subject to the S&EIR process. The key areas of concern were the loss of wetland habitat and functions. For the mitigation it was proposed that these should be through a strategic approach for wetland management (Macfarlane *et al.*, 2016), which was considered an innovative approach for offsetting by Douwes *et al.* (2018). However, the EIA for this project formed part of the strategic wetland management framework, amongst other projects, and the EIA process had to be stopped while the offset approach was investigated between various parties (Macfarlane *et al.*, 2016). The offset plan

was concluded before the final EIR, hence, it was included in the final EIR and it was part of the PPP during the EIA.

The environmental authorisation was granted by DEA (2017c) with a condition for the proponent to follow the strategic wetland management framework for planning and implementation of the biodiversity offset. A MoA was subsequently signed between the relevant parties, the offset plan was drafted and partially approved (DEA, 2019) since the proponent had not secured enough land within the established offset receiving areas (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018).

- Case Study E - An integrated human settlements project including business and industrial nodes and associated infrastructure.

The integrated human settlement project including business and industrial nodes and associated infrastructure was subject to the S&EIR process. Like case study D, the key areas of concern were also the loss of wetland habitat and functions, and the offset also followed the strategic approach for wetland management (Macfarlane *et al.*, 2016), which was considered an innovative approach for offsetting by Douwes *et al.* (2018).

This project also formed part of the strategic wetland management framework, amongst other projects in addition to case study D, and the EIA process also had to be stopped while the offset approach was investigated (Macfarlane *et al.*, 2016). The offset plan was then concluded and also included in the final EIR; hence, it was part of the PPP during the EIA.

The environmental authorisation, this time, was granted by DEDTEA (2017) with a condition for the proponent to follow the strategic wetland management framework for planning and implementation of the biodiversity offset. A draft MoA, at the time of this dissertation, is still in process between the relevant parties and the EIA for the offset implementation has not been initiated. However, the intentions are also to locate the biodiversity offset within the established offset receiving areas (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018).

3.1.3 Context for when the biodiversity offset was introduced

It is important to highlight the context of each case study in order to understand the outcome on the consultation of various stakeholders regarding the implementation of biodiversity offsets within EM. In case study B, the offset requirement was evident at the final scoping report stage when it was accepted by DEDTEA. The wetland losses from the project could not all be avoided or minimised or remedied totally, since there was a development framework plan that informed the development layout on land approximately 1000 ha in size. The offset remained as a notion during the EIR stage with no further details. However, it was only after the environmental authorisation was granted that the finalization of the wetland offset rehabilitation and management plan was developed (Sivest, 2015) and approved by DEDTEA.

In case studies A, D and E the offset plan, although conceptual or draft at that stage, was included in the final EIR after comments from the draft EIR were considered. The offset requirement was then endorsed in the environmental authorisation (DEA, 2009 and 2017c, DEDTEA 2015a) and further offset planning continued thereafter.

Lastly, in case study C the final EIR was rejected by DEDTEA due to limited and incorrect baseline data, which meant that several aspects of the EIA needed to be reconsidered prior to resubmission. In this instance the wetland study, delineation and functionality assessment, needed to be redone and other faunal specialists needed to undertake surveys for critically endangered species on the project site. However, the offset was introduced at the amended final EIR stage (DEDTEA, 2015a) and then offset planning commenced (Edwards and Macfarlane, 2016) after the environmental authorisation was granted by DEDTEA (2015a).

3.2 Data collection and analysis

3.2.1 Document review

Data collection was initially through analysing available reports ranging from the EIRs, biodiversity offset plans (including rehabilitation plans) and environmental authorisations (including appeal decision) on the five (5) EM cases studies described above in 3.3.1. The purpose for undertaking document review was to understand the background information on the case studies, and the reason(s) why the biodiversity offsets were recommended, and how the biodiversity offset was included in the environmental authorisation.

3.2.2 Interviews

In addition to document review, interviews were arranged to gain an in depth understanding of the context for each biodiversity offset case study as it was done in Hayes and Morrison-Saunders (2007) and de Witt (2015). In order to answer the research question for the EM case studies a questionnaire that was developed by de Witt (2015) and used in de Witt *et al.* (2019) paper, was adapted for this research. The questionnaire has been included in this dissertation as annexure 1. Each stakeholder was requested to furnish their opinion on the level of conformance against each best practice principle to meet research objective (1). Furthermore, the stakeholder was asked to consider the positive and negative factors (except timing) that may have contributed to the level of conformance in order to address research objective (2). The question to the stakeholders was, w*hat was the biggest challenge to conformance to these best practice principles AND/OR what was the biggest positive influence which helped you conform to the principles?* Then, during the interviews, the stakeholders were requested for their views on the extent to which timing of the offset influenced the outcomes, to address research objective (3). In this context outcomes means conformance to best practice principles (part I) and the quality, viability and enforceability of

biodiversity offsets (part II). Therefore, the following questions (as part I and II) were asked in order to further understand the implementation of biodiversity offsets in EM:

I) *In your opinion, did the timing of when the offset was introduced, influence the offset's conformance to the above-listed best-practice principles?*
II) *In your opinion, did the way in which and timing when the offset was proposed influence the quality, viability and enforceability thereof?*

The interviews were used to record perception by interviewees representing different role players on conformance to best practice principles and to gain a better perspective on aspects that informed the biodiversity offset in each case study. When interviews are used in combination with document review it assists the researcher with obtaining a better and deeper understanding (Gill *et al.*, 2008). A similar approach was also successfully used in Hayes and Morrison-Saunders (2007). However, a likert scale, with numbers, was not used in this research and instead the researcher evaluated each response broadly on whether the case conformed, partially conformed or non-conformed. This is due to the complexity of the responses for each principle from the different role players, which asks for a broader and more open-ended approach. A similar type of evaluation has been used in Rosa *et al.* (2016). Therefore, the results in the research relate to the subjective perceptions of interviewees. In total 25 respondents were recorded in this research with five responses for each case study. However, certain interviewees were involved in more than one cases study and therefore effectively making it 14 individual participants for all the case studies.

3.2.3 Data analysis

The data were collected through a qualitative methodology (Druckman, 2005, Baxter and Jack, 2008) and the data were descriptive in nature similar to other acceptable qualitative research methods (Silverman, 2004, Baxter and Jack, 2008, Hennink *et al.*, 2011). The data analysis was thus through deductive methods since the data would be evaluated against best practice principles.

The responses from the interviews were consolidated for each case study and based on the response from data, as either conformed or partially conformed or non-conformed, was entered into annexure 2. The data were captured for each best practice principle from each respondent. The horizontal analysis of the data in annexure 2 was scored as a percentage for each principle per case study and for all combined case studies, in order to understand the stakeholder's perception on the overall conformance to the best practice principle. However, where a respondent believed a principle is not applicable (N/A) then the percentage scoring was estimated based on the remaining responses. A final percentage score of two-thirds or great determined the final level of conformance for each principle as either conformed or non-conformed, while partially conformed was as a result a combination of inclusive percentage scores.

Annexure 3, as a vertical analysis, was used for evaluating the data to determine overall conformance for a case study. The measure of conformance for each case study was evaluated separately using all 11 principles. The evaluation was simply by majority of responses as conformed or partially conformed or non-conformed. These results would assist with a summation on the level of conformance for each case study in order to make a justified result on the level of conformance to all the best practice principles combined. Furthermore, the evaluation would further the understanding of why the level of conformance was achieved and to identify possible lessons learnt. This analysis approach was more complex, due to the higher number of possible combinations of responses.

3.3 Limitation(s) and challenges for the case study approach

Initially, the approach was to get the respondents to fill-in the questionnaire (annexure 1) and to return to the researcher. However, there were delays with getting the majority of the responses even after numerous email and telephonic follow-up. Therefore, the approach was changed to rather focus on setting up meetings in order to conduct the interviews face to face in person, although two of the role players were not based in Durban hence there was a need to arrange telephonic interviews. Hence, the above limitations and challenges of the case study approach were successfully resolved. The researcher is satisfied that the interviewees are representative of the different stakeholders in each case studies.

The respondents that participated in the interviews were all intimately involved in either the biodiversity offset initiation, planning and/or implementation. Hence, the data that has been collected through the case studies are considered trustworthy, which is a requirement that has been highlighted by Baxter and Jack (2008) for this type of research. The respondents were also considered to have good knowledge of the EIA process and had relevant experience with biodiversity offsets. Overall this improved the depth of the discussions and the overall reliability of the results, which are presented in chapter 4.

CHAPTER 4 RESULTS AND DISCUSSION

The purpose of this chapter is to present and discuss the research results. In the discussion the results are linked to the research question and objectives. In the methodology, it was explained that all data from the interviews was captured in annexure 2. Then annexure 3 (vertical analysis) were used for analysis of conformance to best practice as perceived by the stakeholders. In annexure 2, there is also the horizontal analysis on the level of conformance to the best practice and is expressed as percentage for each principle in each case study and overall case studies.

4.1 Conformance to biodiversity offset best practice principles

Overall, the research results show that two case studies (A and D) conformed to the best practice principles in terms of the determined criteria for vertical analysis (annexure 3). Then three case studies (B, C, and E) partially conformed to the best practice principles and no case study non-conformed. The overall analysis is at a crude level of aggregation and therefore a more refined analysis is required to distil more detailed results. This was achieved by analysing the data across cases as well as across stakeholder groups.

The vertical analysis (annexure 3 – stakeholders' perception) of the data in annexure 2 where the results from each stakeholder group (i.e. government, consultant, conservation authority, proponent, and municipality) were analysed and are summarised in figure 6. Figure 6 shows that government (1) considered two case studies (A and D) to be conformed and three case studies to be partially conformed (B, C, and E) and no case studies were non-conformed to the best practice principles.

The results from government, two, were comparable to those from the consultant group, where two case studies (D and E) conformed, three case studies partially conformed (A, B, and C) and no case studies non-conformed to the best practice principles. Notably, it was only in case studies D and E where the consultant that undertook the biodiversity specialist assessment in the EIA that informed the offset plan was the same biodiversity specialist that prepared the offset plan. Whereas in case studies A, B, and C, the biodiversity specialist in the EIA and that who prepared the offset plan were different professionals. The consultants further added that the offset in case study A showed *how offsets should not be approached* since there was generally no conformance to principles 1 and 2 in that case study, and a similar observation was made in several case studies. The other criticism from consultants that needs to be highlighted, which links more specifically to principle 1, was that *development planning went too far ahead with limited environmental consideration,* which limited opportunity for adhering to the mitigation hierarchy. Furthermore, by that time a development cost benefits analysis had been completed and limited funds are usually remaining for implementation of the offset (Brownlie *et al.*, 2012, de Witt, 2015).

The results from the provincial conservation authority (3) showed that two case studies (A and D) conformed, two case studies partially conformed (C and E) and one case study (B) non-conformed to the best practice principles. According to a respondent from the conservation authority stated that *case study A provided many lessons on how to best approach offsets* since it was one of the earlier offsets completed at a time when there was limited policy guidance available in the province. The approach that was used in case study D should be *the approach considered throughout the municipal area since it was a good approach* according to some respondents. However, the main concern for the provincial conservation authority was on case study B, which non-conformed since there was the *significant loss of wetland habitat* that has not been adequately offset. The main basis for the case study B results are non-conformance to five principles (1, 2, 3, 5, and 9) whereas no best practice principles are considered as conformed to by the conservation authority.

The proponents (4) considered all case studies to have conformed to the best practice principles, mainly due to acceptance of the offset and agreement to implement the offset. The above results from proponents were achieved despite where the offset in certain cases was *the first for the organization* (case study C) and in case study A, *the offset experience has helped the organization to draft and adopt an environmental policy*; therefore, the offset experience has now *informed an approach to development planning within the company* in case study B).

Lastly, the results from the municipality (5) are that one case study (D) conformed, four cases studies (A, B, D, and E) partially conformed and no case study non-conformed. It should be considered that the Municipality as the local government, which is a government sphere closest to implementation (compared to national and provincial) and for that reason should be more active in monitoring offset implementation. Furthermore, the municipality's respondent is of the view that *offsets should be considered in a strategic way and included in spatial planning* to ensure that the intended biodiversity outcomes are achieved. The strategic approach to offsets has been considered in case studies D and E.

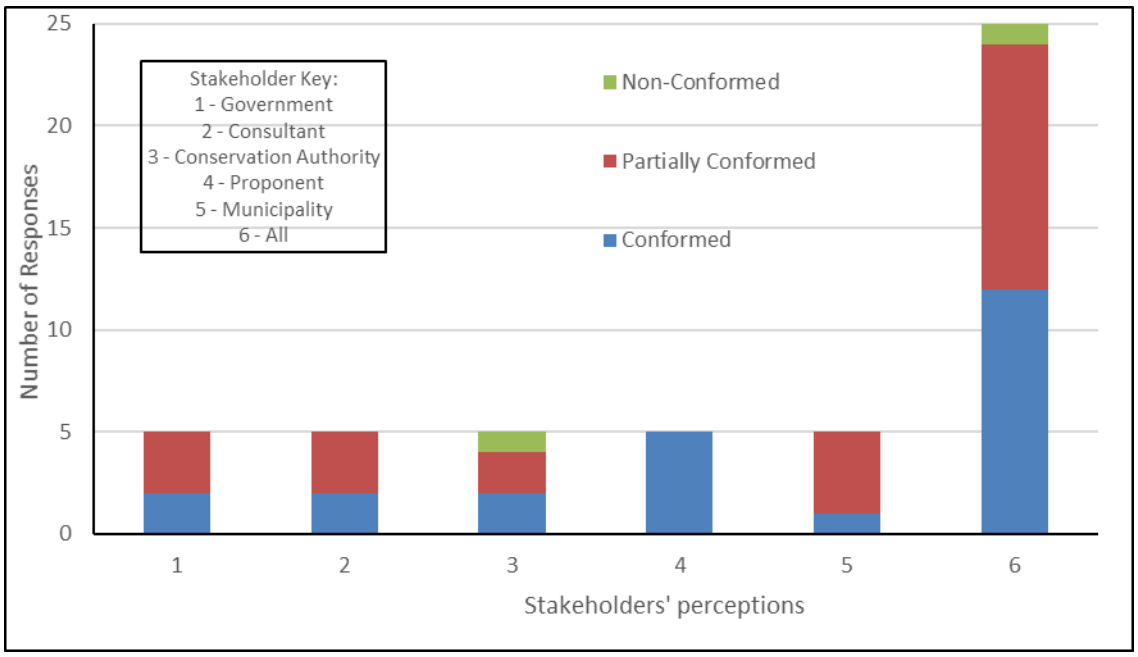

Figure 6. Stakeholders' perception on conformance for case studies.

The summary of the horizontal analysis on the level of conformance to the best practice principle has been reported in figure 7. Figure 7 shows all the stakeholders' perceptions (maximum of 25 responses), combined, and the results are that there was overall 57% conformance, 30% partially conformance, and 13% non-conformance to the best practice principles.

Furthermore, based on the horizontal analysis on the conformance to the best practice principles using the percentage scoring (see annexure 2), the summary of the results using the determined methodology showed that biodiversity offsets case studies from EM conformed to only three best practice principles, partially conformed to eight best practice principles and there were no best principles that were considered to be non-conformed (see table 1).

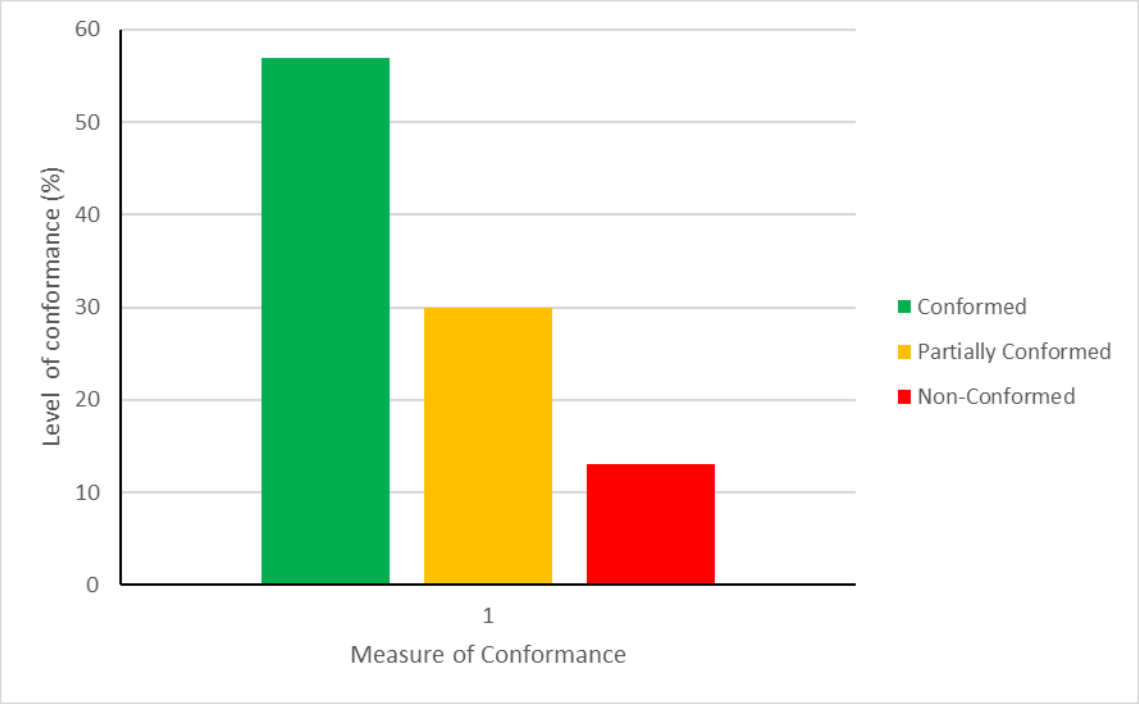

Figure 7. Overall level of conformance to the best practice principles.

The principles that are considered conformed are the following:

- Principle 4: No-net loss
- Principle 9: Additionality
- Principle 11: Offset follows landscape and ecosystem approach

Then the principles that are considered partially conformed are the following:

- Principle 1: Conformance to the mitigation hierarchy
- Principle 2: Proper offset agreement is in place before activity starts
- Principle 3: Transparency and stakeholder participation
- Principle 5: Focused on long-term outcome
- Principle 6: Offset is enforceable
- Principle 7: Cumulative, direct and indirect impacts are considered
- Principle 8: Limits to what can be offset
- Principle 10: Like for like

The results presented in figure 7 show the overall percentage outcome from evaluating each best practice principle across all stakeholders for all the case studies (i.e. horizontal analysis). The percentage scores were then used to determine the level of conformance for each principle based on the determined criteria, which is two-thirds or great for a conformed or non-conformed

outcome(s) as shown in annexure 2. The reasons for these results are further discussed in more detail for understanding the outcomes in this section of the research. Furthermore, the level of conformance to each best practice principles is then discussed individually in greater detail and in certain instances quotations in italics from the interviews are included.

The research results in relation to each best practice principle is discussed below:

4.1.1 Principle 1: Conformance to the mitigation hierarchy

Principle 1 requires conformance to the mitigation hierarchy and there are two main reasons that the principle was considered as partially conformed. The reasons were the selection of site location for the projects without environmental due diligence and using incomplete or incorrect base line data during the EIA. Both of these were very apparent for case studies A and C where the project site was identified in the 1970s and where the site was purchased without consideration of all environmental constraints respectively. In case study A, the offset consultant stated that *not all effort was made in this respect since the site had since the 1970s used and earmarked for the development*. The view in case study A was also supported by the proponent who stated that *there was no other feasible location for the development to minimise the impacts*.

In case study C, the stakeholder from the municipality stated *no, the offset was identified too late in the process. The layout was based on incorrect information and it was too late to change it* when asked about conformance to this principle. However, the proponent had a different view when asked about conformance to the mitigation hierarchy, from their perspective that, y*es and it was done as part of the development planning process. The development planning process was long and hence, the need to offset to make the project feasible*. Therefore, in both case studies there was no opportunity for investigating site alternatives and designs to make the projects viable once land purchases had been made. Secondly, basing investment decisions and development layout on incorrect base line data contributed to the inadvertent skipping of the steps of the mitigation hierarchy (i.e. avoidance, minimise, remedy / rehabilitate) once all the environmental constraints or sensitivities were apparent. The steps of the mitigation hierarchy were not clear when the EIR was finalised, a view that was shared by government, the consultant (responsible for the biodiversity offset), conservation authority and the municipality. For these reasons, the offset may have also been considered too late in the process, which was either at final EIR stage for case study A and at the amended final EIR stage after the final EIR had been rejected by DEDTEA in case study C.

Furthermore, it was interesting to note that in certain cases the representative from government, proponent and consultant, when interviewed would not likely bring into question their involvement in the project where there was non-conformance (for consultants if they undertook the assessment). Whereas the conservation authority and the Municipality were most likely to be the

ones who would raise concerns with conformance to this principle, especially in the absence or limited participation of non-governmental organizations (NGOs) in the offset process.

4.1.2 Principle 2: Proper offset agreement is in place before activity starts

Principle 2 requires that a proper offset agreement is in place before the activity starts. An agreement was in place for case study C when the municipality would not sign-off on the EMPr without the offset agreement when the proponent had planned to start construction. Hence, all the stakeholders had to agree or accept conformance to this principle. Therefore, the stakeholder from the provincial conservation authority stated that *there was a MoA prior to the start of construction*. In case studies D and E, the process of getting the agreements in place were initiated when their land use applications (i.e. for rezoning and subdivision) to the municipality were deferred. The proponent added that the agreement *was necessitated by the environmental authorisation.* However, at the time of writing this report case study D had the MoA in place and the MoA had not yet been signed for case study E.

The principle was, however, non-conformed in both case study A and B since the developments have been completed or at least in the construction phase, and in both cases the rehabilitation and restoration measures at the offset sites have not commenced in 5 or more years. Similar findings were also report in de Witt *et al.* (2019) whereby the timing of introducing the offset had negative influence on conformance with the principle. In case study A, the government stakeholder conceded that, *there was initially no acceptance of the offset, which has caused a delay with implementation* and the consultant also acknowledged that *the offset process was only initiated 4 years after the development was complete hence there was no agreement that was in place*. Several of the respondents also added that offset practice was still at its infancy when case study A and B were in the EIA process, and for that reason there was never a requirement for an offset agreement. However, with the current understanding on offset principles and practice some of the case studies may have been approached differently, which could have resulted in better biodiversity outcomes. For example, the stakeholders could have insisted on the offset agreement to be in place prior to the start of the activity in order to potentially limit the time lag for initiating the offset in case studies A and B.

Furthermore, it was the proponents in the majority of the case studies (B, C, D, and E) that were of the view that offset agreements were in place prior to the commencement of the activity. However, based on document review there were no agreement for case study A and B, hence implementation on both these case studies has been delayed by over five years. The government stakeholder in case study B however conceded that *it is important to have a clear agreement in place prior to construction* when the lack of implementation became apparent. In case studies C, D and E, the proponent was forced to have the agreements in place by the Municipality who would

not consider any land use application (i.e. rezoning and / or subdivision) on the projects to enable sale or lease on development land.

4.1.3 Principle 3: Transparency and stakeholder participation

Principle 3 requires the biodiversity offset process (i.e. planning, design and implementation) to be transparent and have stakeholder participation. However, the offset design was undertaken by a few role players from government and the proponent with the consultants in case studies A, B and C appointed outside the EIA process. Therefore, I&APs who could have added valuable input to the offset design and how certain ecosystem services could be prioritized were excluded. However, in case study A once the offset plan was finalised it was followed by a PPP process, although this happened more than five years later. The offset for case study C ended up about 100 km outside the municipal area and later a voluntary offset for restoration of various ecosystem services was initiated to compensate for the loss of amenities in the project area. Although the offset design was included in the EIA for case studies D and E, it was fortuitously in the final EIR stage since there were a few years invested in finding offset solutions when these EIAs were placed on hold by the proponents (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018). The proponent in case study E added that *the offset was developed collaboratively in conjunction with the local authority. Furthermore, the approach was extensively explained in workshops with all the authorities including EKZNW, and DEA*.

Therefore, in case studies A, B, and C, the proponents mainly conformed to the requirement from the competent authority on the stakeholders that were to be consulted on the offset planning, design and implementation. However, the conformance in case studies B and C did not enable NGOs, CBOs and the communities to be involved in the biodiversity offsets. For an example in case study C the consultant acknowledged that *the opportunity for some local restoration of ecosystem service could have been raised much earlier in the offset process with support of the local community*. The implications for not involving all relevant stakeholders, especially the community, has been demonstrated in Bidaud *et al.* (2018) where the community was displaced and excluded from the offset area in Madagascar. In case study C, the community where the offset was established was not consulted and there were challenges of land invasion and overgrazing on the offset site, which has resulted in the fencing off of the property. Therefore, the importance of adhering to this principle cannot be overstated (BBOP, 2012, Rosa *et al.*, 2016, UNDP, 2016, Griffiths *et al.*, 2019). Furthermore, the implications for not adhering to this principle were evident in Brazil whereby ecosystems services provided by biodiversity, and which the local communities rely on for livelihoods were negatively affected (Rosa *et al.*, 2016) and similar findings were also evident in case study C.

Case study A followed a formal PPP once the offset plan and design had been completed, again because this was a requirement of the competent authority. Furthermore, in case study A the proponent added that *there were other focused groups that were involved on aspects such as noise monitoring, avi-fauna and regional wetlands* as a justification on a smaller group of I&APs that worked on the offset plan before the PPP.

In addition, the context of case study D and E was unique since the EIAs were placed on hold while mitigation options were developed for both projects (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018). Thus, the placing on hold of the EIA projects allowed for all I&APs to review the offset plan as part of the EIA process, though late during the final EIR. De Witt *et al.* (2019) stated the inclusion of the offset plan in the EIA, as it was done in case studies D and E, enabled other I&APs to potentially raise certain issues that government may have missed or would not necessarily raise during the offset planning phase. Therefore, the outcomes in case study C, where the offset was located outside the EMA boundary, would likely have been different as there was a clear loss of amenities and ecosystem services delivery in the project area.

4.1.4 Principle 4: No-net loss

The principle of a biodiversity offset achieving a no-net loss outcome was largely embraced based on the conformance percentage scoring of 84%. However, there were some concerns raised by the Municipality in case studies A and C, and by the provincial conservation authority in case study B. For example, the stakeholder from the municipality emphatically responded, *never, since the final proposal was not like for like habitat and there was a loss of a Critically Endangered habitat*, when asked about conformance to the principle. The provincial authority stakeholder in case study A stated that *the concept of no-net loss was not part of the thinking at the time*, whereas, in case study B another stakeholder from the provincial conservation authority acknowledged that *there was no clear offset target*, hence the case study had partially conformed to the principle. The concern in case studies A, B and C from the stakeholders were mainly due to wetland habitat loss, inadequate buffers and at certain instances inappropriate allocation of undevelopable land as open space where it is not linked with other conservation worthy open spaces to be considered as part of the offset.

Furthermore, in case studies D and E, the approach to the offset was to achieve a net-gain biodiversity outcome in line with Macfarlane *et al.* (2016) and Douwes *et al.* (2018) in this context where a partnership was established between the municipality and proponents who owned large portions of land to the north of the EM. On this principle, the proponent in case study D concluded that *the offset design exceeded the no-net loss approach through following the strategic wetland management framework. The framework was drafted over three years with various stakeholders and the draft offset plan was included in the EIA for I&APs*.

4.1.5 Principle 5: Focused on long-term outcome

The principle for biodiversity offsets being focused on long-term outcomes was considered as partially conformed in the overall percentage scoring of the case studies. In case study A, the proponent stated that *protection of the offset was included in the implementation plan and that provides assurance for consideration of long-term effects* while the municipality also added that *the intentions are for a Conservation Zone or Nature Reserve status*. Similarly, in case study C the proponent stated that *the offset site will be protected in perpetuity and declared as a nature reserve*, a view that was shared by the provincial conservation authority. The main contributors were the provincial conservation authority and the municipality, and the competent authority, either DEA or DEDTEA, for ensuring conformance to the principle in case studies C and D.

In case studies B and E, the findings showed partially conformance the principle, whereby the proponent had been hesitant to implement this requirement. The consultant in case study B indicated that *no long-term mechanism had been provided and therefore long-term management may be problematic since the applicant plans to sell off the land*. Furthermore, the proponent in case study E stated that *the benefits for a proponent are once off at the point of land sale and it is unfair to then expect a developer to continue with the long-term protection for the offset*. Interestingly case studies B and E were undertaken by the same proponent, which argued during the interviews that it is not in the business of managing offsets and their business approach is based on selling portions of the development site to third party developers.

4.1.6 Principle 6: Offset is enforceable

In most of the case studies, A, C and D, the principle was partially conformed since the percentage scoring did not meet the criteria for conformance. However, some stakeholders believed the biodiversity offset is enforceable, meaning that the environmental authorisation and / or environmental management plan (EMP) or programme (EMPr) and / or offset plan had clear intervention requirements, indicators, location and timelines. In case study C the proponent stated that, *yes, the offset is enforceable and there is a clear implementation plan with timelines*. Furthermore, the provincial conservation authority was complimentary of case study c by stating that *it was one of the better offsets out of 15 in the province and the applicant was also very willing in the process to meet the offset obligations*.

In de Witt *et al.* (2019) there was a concern with the enforceability of the offset in two case studies whereby the offset was introduced too late in the EIA process and the offset conditions were not specific in the environmental authorisation. However, the lack of specific conditions in the environmental authorisation has been observed in all five cases studies and the stakeholders had to rely on the MoA, EMP or EMPr, and approved offset plans to find the specific offset requirements in each case study. Hence, these issues, *insufficient capacity to evaluate, design and*

implement offsets and *inadequate enforcement and monitoring, linked to poor drafting of licencing conditions and/or insufficient capacity to monitor implementation*, were raised in Brownlie *et al.* (2017). The municipality stated that *the R&R plan is clear and there is a supporting implementation plan* in case study A, but these are not in the environmental authorisation. Therefore, it is recommended that the environmental authorisation should contain specific offset conditions to ensure that the offset is enforceable (DEADP, 2011, DEA, 2017a), and in that context stakeholders would not have to rely on documents that are considered as an extension to the environmental authorisation such as the MoA, EMPr or offset plan for compliance and implementation.

Furthermore, monitoring could be valuable to ensuring enforceability of the offset once the stakeholders have gone through the environmental authorisation, EMPr and offset plans. In case study B, the proponent stated that *the issue would be on the capacity and expertise of the enforcement agents* and the municipality also stated that *enforcement is now required* on the same case study. The importance of monitoring biodiversity offsets has been clearly set out in BBOP (2012), Macfarlane *et al.* (2016), UNDP (2016) and Brownlie *et al.* (2017). Hence, the concept of EIA follow-up could potentially bridge the shortcomings of compliance monitoring in practice. The lack of enforcement is evident when the environmental authorisation conditions are not specific (Brownlie *et al.*, 2017) and the lack of enforcement has been considered as one of the major contributors to the delay with physical implementation of the biodiversity offset, especially in case studies A and B as it was confirmed by some respondents. Although, the responses from the stakeholders in the research shows conformance to this principle, the true level of enforceability would only be determined after years of monitoring, enforcement where required and possibly EIA follow-up.

4.1.7 Principle 7: Cumulative, direct and indirect impacts are considered

The principle that cumulative, direct and indirect impacts are considered was partially conformed when the cases studies were evaluated together. The findings in case study B and C showed that certain indirect impacts such as on ecosystem services in the area of impact were not fully addressed and there was limited consultation with the local communities. There was an attempt to reduce impacts on the downstream estuarine habitat that was associated with case study B. Government in this case study stated that *the focus was on the protection of large wetland systems and impacts on the downstream estuary were also considered*. However, the lack of implementation to date would have compromised the expected offset outcomes, which is supported with the comments from the provincial conservation authority that the *implementation is still a challenge*.

The challenge with conformance to principle 7 could be linked with the perceived weakness of the EIA process, to fully assess cumulative and at times indirect (or unintended) impacts of the project

(IAIA, 1999). Hence, offsets in case studies A, B and C are isolated and could be negatively affected by other developments in the area. However, case study D and E considered offsets within a broader strategic wetland management framework (Macfarlane *et al.*, 2016 and Douwes *et al.*, 2018) hence cumulative and indirect impacts of the development and offsets were considered to a greater extent. This understanding was also shared by the proponent who stated that *cumulative impacts were considered, and a net gain approach was followed for the offset* and the provincial conservation authority added that *the wetland management framework was important for conformance to this principle*.

4.1.8 Principle 8: Limits to what can be offset

Principle 8 requires for there to be limits to what can be offset, several respondents were of the view that the offset should not have been considered especially in case study B due to significant loss of wetland habitat, however, the wetlands functionality levels were low since the wetland systems were farmed with sugarcane. In case study C, the concern was raised due the loss of a hygrophilous grassland with the last known location of a critically endangered plant species (*Knifophia pauciflora*, the Red-Hot Poker). In case study C, the municipality stated that this *principle needs policy certainty, and this was a classic case of where the offset should not have been considered or accepted but it was done too late*.

The state of wetlands in EM was reported in Botes (2014) and therefore, any further loss or degradation of wetlands is significant in this context, hence, the rating in case study B. Government even acknowledged that *wetland habitat losses should be limited as there could a constant reduction in overall wetland habitat*. Case study C had unique habitat, flora and fauna that have since been displaced from the EMA, therefore, the majority of respondents were of the view that the offset should not have been considered. However, the project was generally supported by other stakeholders due to its perceived economic benefits for the citizens. Furthermore, the offset consultant added that, *technically the wetland habitat lost is irreplaceable*. Whereas, in the same case study, government acknowledged that *impacts on biodiversity were highly significant, but the development would address social needs* and the proponent's view was *there had to be some impact for the development to go ahead*.

In addition, the offset implementation in case study B has not been realised and for that reason the potential environmental improvements are delayed. In case studies D and E, though significant wetland habitat would be lost to development, the respondents understood that the habitat functionally, i.e., provision of ecosystem services, was low and the site had limited biodiversity since the land was previously used for sugarcane farming. The offset consultant in case studies D and E stated that *the wetland impacts were associated with highly transformed wetlands, of low conservation value*. Therefore, following an approach for a net-gain outcome (Macfarlane *et al.*,

2016) in that landscape was appropriate. Thus, the principle was considered not applicable in two case studies.

4.1.9 Principle 9: Additionality

In all case studies the results conformed to principle 9, for Additionality with an overall scoring of 84% for conformance, which means that the offsets are thought to potentially yield additional conservation outcomes or interventions that would ordinarily not be implemented in the absence of the offset. Case study A required the restoration and rehabilitation of a coastal grassland that no longer existed in the EMA due to urban development and agriculture, and the grassland reference sites including seed sourcing were located in a protected area over 100 km from Durban central. In case studies B, D, and E, the impact sites were under sugarcane farming but the wetland systems on each case study were still persistent to a degree. The proponent in case study B contributed by stating that *the offset would improve the current situation that is taking place on site and on the external receiving environments through the rehabilitation since the land will not be farmed with sugarcane anymore*. Therefore, the offset in these case studies also required ceasing of sugarcane farming within wetlands and to establish suitable buffers to the watercourses in addition to structural interventions and re-planting with suitable plants.

In case study C, although the offset site was 100 km outside the EMA, it certainly contributed towards the provincial conservation target and protected areas expansion strategy since the site had been identified by the provincial conservation authority. The consultant was of the view that *the offset targets calculated were very onerous when you consider the impacts on a critically endangered vegetation for the development*. Therefore, the offset in case study C also conformed to the principle, and the offset also included contribution towards the wattled crane initiative in the KZN Midlands since the development also displaced birds from the project site. In addition, a voluntary wetland recreation project for ecosystem services in the EMA was also initiated though outside the EIA process. Furthermore, the proponent in case study E agreed that conformance to the principle *would be met through a net gain approach and environmentally improved corridors. Furthermore, the onsite wetlands will be rehabilitated even though they do not contribute towards the offset target / outcomes*.

4.1.10 Principle 10: Like for like

Principle 10: like for like was partially conformed with an overall percentage score of 64% for conformance (whereas 66% was the minimum required score for conformance). The major contributing cases to this scoring were case studies A, D, and E. The offset in case study A comprised mainly of grassland and wetland habitat, and these were available in the landscape. The proponent confirmed that *the offset included ecosystem and species that were negatively impacted by the development*. In case studies B, D, and E, the main habitat that was part of the

offset was wetland habitat and the wetland systems were abundant along the coast in the EMA due to the undulating terrain in the lower catchment.

In case study C, the options for like for like where not available and the offset planning was considered too late in the EIA process, when the environmental authorisation was issued. Like for like (suitable) habitat could not be found in the EMA and the offset had to be located 100 km outside the EMA in case study C where another grassland type similar to the project site was located. The proponent's view on the principle was that *there was no opportunity for conformance to this principle due to limited habitat options and suitable offset sites in proximity to the project site*. However, the development in case study C has resulted in significant biodiversity losses locally. This finding was evident in the response from the municipality that *it was impossible to achieve conformance to the principle. Although, technically the wetland offset calculator shows that the offset target could be met through trading down, in reality there was significantly high biodiversity loss*. The stakeholders were then forced to make the offset work by eventually accepting a like for unlike habitat through a method of 'trading down' in the wetland offset calculator. The method of 'trading' had to be accepted by the stakeholders that were involved in the offset planning and the expected offset ratio had to be increased.

4.1.11 Principle 11: Offset follows landscape and ecosystem approach

The overall percentage score for conformance was 92% for this principle and the minimum scoring target was exceeded in four of the five case studies whereby the offset follows a landscape and ecosystem approach. The locations of the offsets were in the same catchment for four case studies (A, B, D, and E). However, it was a challenge in Brazil for offsets to follow a landscape and ecosystem approach due to limited land for offsets (Bull *et al.*, 2013, Souza and Sanchez, 2018). In case study C, it was however a challenge for the offset to follow a landscape approach, but the offset was strategically located to be linked and located near a protected area.

Furthermore, the vegetation types that were negatively impacted and their associated ecosystem services were to be offset in all case studies. In case study A, the offset provided a cross catchment link and it was an opportunity to recreate a coastal grassland that no longer existed in the EMA. In case study B, the offset focused on large wetland systems that were linked to the 1:100 flood plain on one of the major rivers at the estuary mouth. Case study C, from a provincial perspective, addressed the principle although there were concerns from the municipality due to the loss of biodiversity features locally. This was supported by the provincial conservation authority in case study C stated that *the principle was followed by the consultant in the site identification process, which helped with ensuring successful outcomes*.

Then in case studies D and E, the approach to the offset was to achieve a net-gain biodiversity outcome in line with Macfarlane *et al.* (2016) and Douwes *et al.* (2018). In this context, the offset

receiving areas were determined in partnership between the Municipality and proponents who owned large tracts of land to the north of the EM. The proponent added that *the offset is within a composite offset site and it has linkages with other offsets so there should be better environmental outcomes*. The offset, therefore, was located within the offset receiving area hence a landscape and ecosystem approach in these case studies conformed to this principle.

4.2 Factors influencing conformance to best practice principles

Furthermore, it was important to understand the factors (except timing) affecting the level of conformance to the best practice principles. During the interviews the stakeholders were asked a question, w*hat was the biggest challenge to conformance to these best practice principles AND/OR what was the biggest positive influence which helped you conform to the principles?* A number of issues were raised by the respondents regarding the challenges and positive influences. The main issues that were raised are included in table 1 and the case study where the issues were raised are indicated in brackets.

The challenges and positive influences on the level of conformance to best practice principles for each case study were recorded. The main challenges to the results were the lack of site alternatives for the projects (case studies A, C and D). The project site for case study A *was identified in the 1970s for the project* and in case study C *the project site was purchased at a significantly higher price for the development* while there was limited understanding of environmental constraints on the site. Therefore, the development on site had to be maximised, and in both these case studies there was *limited scope to fully apply the mitigation hierarchy* (principle 1).

Conformance to principle 1 was also negatively influenced by the poor baseline data and lack of like for like offset sites (case study C) thereby contributed to the lack of fully applying the mitigation hierarchy and better consideration of environmental constraints on the project site.

There was a limited group for stakeholder consultation in the offset design (case studies A, B, C), and principle 3 requires transparency and stakeholder consultation. Therefore, consideration of ecosystem services in the project area where there are affected communities were not fully considered hence there was a *need for an additional restoration project for ecosystems services* that was not part of the offset in case study C. Furthermore, *there was no PPP for the offset plan* in this case study, including both the affected community and offset receiving community. In addition, in case study C, government conceded that *the introduction of the offset was too late in the EIA process* and the provincial conservation authority cited the *lack of offset receiving area in close proximity to the impact site* as a challenge to conformance to best practice principles. However, for case study A, the only cultural values that were considered were those that were linked to specific tree species, such as on a tree where ash remains from a certain family were scattered, and

therefore not all cultural aspects were considered such the need for communal cattle grazing land, which only emerged when the offset plan was finalised and approved.

There has been limited offset monitoring during construction and lack of enforcement (case studies A and B), which is one the challenges with offsets practice in South Africa offsets. Principle 4 requires the offset to be enforceable and the limited monitoring and enforcement of the offsets could be linked to the drafting of offset conditions and timing of introduction of the offset, which will be discussed in great detail in the next section.

Then the lack of commitment to long term management and protection (case studies B and D) lead to challenges with principle 5 that offsets should consider long term effects in terms of protection and management. The *lack of commitment to long term protection* was raised by the municipality as a concern for offset practice. In addition, for case study B, government stated that *the size and complexity of the development as a challenge for assessment*.

However, there were positive influences on the conformance to the best practice principles in figure 7. The factors (i.e., positive influence) were effective stakeholder participation with only the selected groups (case studies A, B, C, D, and E). For example, in case studies A and C the selected stakeholder, although they were few, were valuable in assisting the proponents with finalising the offset plan. In case study C, the proponent was *grateful for the amount of local knowledge and site options that the stakeholders raised for consideration of the offset*. Furthermore, the offsets in case studies D and E were co-developed in a partnership between two landowners and the municipality outside the EIA, which was then included in the EIA (final EIR) during the PPP.

The offsets were an opportunity to link the offsets with other sensitive environments (case studies A, B, C, D, E), thereby supporting site selection in line with principle 11 that requires the offset to follow a landscape and ecosystem approach. In case study C, the offset site was part of the protected area expansion network and in case study A, the offset was an opportunity for a cross catchment link along the urban coastal area in the EMA. Then in case study B, D and E, the offsets were located along major rivers and near estuarine habitat thereby also intending to improve water quality in addition to addressing biodiversity and habitat issues.

The preparation of a draft or conceptual offset plan (case studies C, D, E), for stakeholders to consider if these would be acceptable for the offset prior to the commencement of construction was positive and it ensured that the proponents attend to the task. A memorandum of agreement (MoA) for the offset plan was a requirement prior to construction in case study C and the MoA included timeframes for the offset planning process hence performance on the MoA clauses could be monitored. In cases studies D and E, the offset was facilitated through the strategic wetland management framework contributed to transparency and stakeholder engagement in case study D

and E, since the offset conceptual plan was included in the EIA (final EIR) for consideration by I&APs. Several stakeholders such as the proponent, municipality, consultant, and conservation authority were complementary of the approach that was followed in case studies D and E. In case study A, the consultant stated that *having the relevant conservation authorities present at every step of the drafting the offset plan was assuring since the project was difficult*. In the case study government added that the selected *stakeholders had many agreements*; a view that was supported by the municipality that *there were many agreements between the stakeholders, and they were committed to finalising the process*. Based on this experience in case study A, the proponent developed its own environmental policy based of this project experience. Lastly, the use of the BBOP (2012) and EKZNW (2010 and 2013) guidelines during the offset planning (case studies A, C), and a willing proponent (case study C) contributed positively.

In conclusion, the main challenges and positive influences that affected conformance to the best practice principles have been summarised in table 1.

Table 1. The main challenges and positive influences on conformance to best practice principles.

Challenges	**Positive Influences**
No site alternative for the project (A, C, D)	*New environmental policy for organisation (A)*
Limited stakeholder group for offset design (A, B, C)	Effective Stakeholder participation with the selected / focused group(s) (A, B, C, D, E)
Lack of long-term offset management and protection (A, B, E)	Willing proponent(s) to secure the offset (C, D)
Delayed offset implementation (A, B)	Opportunity to link with other sensitive environments (A, B, C, D, E)
Poor or incorrect baseline data (C)	Draft or conceptual offset plan for consideration by stakeholders (C, D, E)
Offsets were an emerging practice with limited local examples (A, B)	Existing BBOP and EKZNW guidelines were good reference (A)
No like for like habitat for the offset (C)	-
No enforcement (A, B)	-

Note: In italics are factors that are not based on best practice principle and the non-italic factors are based on best practice principle.

The outcomes, based on the results, of objective (1) in this research on the level of conformance to best practice principles and objective (2) on the factors (except timing) affecting the level of conformance when compared with other similar research, such as de Witt (2015) and de Witt *et al.* (2019). The findings were that principle 1, adherence to the mitigation hierarchy, was partially conformed in this research. These results are considered similar for adherence to the mitigation hierarchy, which scored low in three out of five cases studies in other research (de Witt, 2015, de Witt *et al.*, 2019). The application of the mitigation hierarchy was also 'partially performed' (i.e. partially conformed) (Rosa *et al.*, 2016); these findings are similar to the findings in this research. Furthermore, in Western Australia, Hayes and Morrison-Saunders (2007) found that the responses of practitioners on offsets were in the majority neutral for conformance with principle 1, which also suggests challenges in practice as it has been demonstrated in this research. The challenges in this research that have negative influences on the level of conformance to principle 1 are lack of project site alternatives and using limited or incorrect baseline data.

Then principle 2, having a proper offset agreement in place before the activity starts, in the research was partially conformed. This principle had also scored lower in two out of five case studies that were considered in de Witt (2015) and de Witt *et al.* (2019). The implications of not having a proper agreement in place before the activity starts has potentially led to a delay with physical implementation of the biodiversity offset hence a delay in ecosystem services delivery, which was a concern raised by the Municipality during the interviews for case study A and B. A similar concern has also been raised by practitioners in Western Australia (Hayes and Morrison-Saunders, 2007) and in Brazil by Rosa *et al.* (2016) on the compensation of ecosystem services. It is however wondered whether the degree with which lack of clear conditions in environmental authorisation(s) and lack of enforcement also contributes to conformance to this principle when you consider the challenges, *(b) insufficient capacity to evaluate, design and implement offsets* and *(e) inadequate enforcement and monitoring, linked to poor drafting of licencing conditions and/or insufficient capacity to monitor implementation*, that were raised for the South African context (Brownlie *et al.*, 2017).

The implications of poor stakeholder consultation and lack of transparency were evident in Madagascar when the community where the offset had been located became excluded from the offset land thus affecting their social and cultural needs (Bidaud, *et al.*, 2017). Similarly, in South America the principle for the offset design process to be transparent and engagement of stakeholders was never performed (Rosa *et al.* (2016). The exclusion of certain stakeholders in the offset design and planning process could cause implementation challenges and reduced biodiversity outcomes as in case study C. Hence, the overall outcomes in this research showed partial conformance to principle 3, which requires offset design process to be transparent and for the stakeholders to be engaged. Three of the five case studies suffered from the undertaking of the

offset plan after the environmental authorisation had been issued and where only certain stakeholders were consulted.

The other low scoring principle in de Witt (2015) was principle 6, that the offset is enforceable, which was also partially conformed in this research. In case study A and B, the concerns on the lack of enforcement was specifically raised by some respondents.

Lastly, De Witt *et al.* (2019) also reported challenges on the conformance to principle 1 and 2. These concerns were in addition to concerns on the transparency and effective stakeholder engagement (principle 3) and enforceability (principle 6) when the offset was only introduced in the environmental authorisation for two case studies, thereby raising credibility of biodiversity offsets in practice. Therefore, the implications of these results, where five best practice principles for offsets in EM were partially conformed, has the potential to contribute to further criticism for using biodiversity offsets as a sustainable development tool in EIAs (Brownlie and Botha, 2009, Bull *et al.*, 2013, Maron *et al.*, 2015 and 2016b, Rosa *et al.*, 2016, Brownlie *et al.*, 2017, Bull *et al.*, 2017, Bidaud *et al.*, 2018). Furthermore, when there is certain partially conformance to best practice principles for biodiversity offsets then the risk offset failure or ineffectiveness for no-net loss could be higher as it has been observed to varying degrees in case studies (A, B, C, E) in this research. Therefore, the intended outcomes for biodiversity offsets is likely not be met in such a context within the EMA and the practice of biodiversity offsets would be ineffective to stop, or at least reduce, the rate of biodiversity loss.

4.3 Timing of Biodiversity Offsets

Objective 3 of the research is to evaluate the extent to which the timing of the introduction of the offset influence outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets. These outcomes include conformance to best practice principles as well as the quality, viability and enforceability of the biodiversity offset. The approach to this objective was twofold as reflected in the methodology whereby I) the timing influenced the level of conformance to the best practice principles (objective 3, part I), and II) the timing influenced the quality, viability and enforceability of the offset (objective 3, part II).

4.3.1Timing affecting conformance to best practice principles

The results of the influence of timing of introducing the offset on conformance to best practice principles have been included in figure 8 below. The results of the research when all the case studies are combined has revealed that the timing of when the offset was introduce resulted in 57% of conformance, 30% partial conformance, and 13% non-conformance to the best practice

principles. However, each case study was also analysed individually and the timing for introducing the offset was considered on the level of conformance to the best practice principles.

In case study A, the offset was introduced at the final EIR stage of the EIA process, which could be considered too late. The influence of timing in this case study resulted a level of 57% conformance, 29% partial conformance, and 14% non-conformance. Then the offset was confirmed through the environmental authorisation and when the offset planning commenced it was only with a selected group of stakeholders that registered as Interested and Affected Parties (I&APs) in the EIA. Although, having a selected group of I&APs to finalise the offset plan worked well through what was called an advisory forum, there were other stakeholders that could have provided valuable input to the process (principle 3 – transparency and stakeholder engagement). At least case study A did follow a PPP after a draft offset plan was finalised, even though it was an additional cost to the proponent and its delayed implementation; the additional PPP may have contributed to the current scoring where conformance to the principle was not of concern. There are however, still challenges of cattle grazing in the offset receive area, which should have been addressed. However, the level of conformance for principle 1 – conformance to the mitigation hierarchy (60%) and principle 2 – having a proper agreement in place prior to the activity (100%) were very concerning in this case study. The major contributor on the level of conformance for principle 1 is that there was no alternative project site that were considered in the EIA.

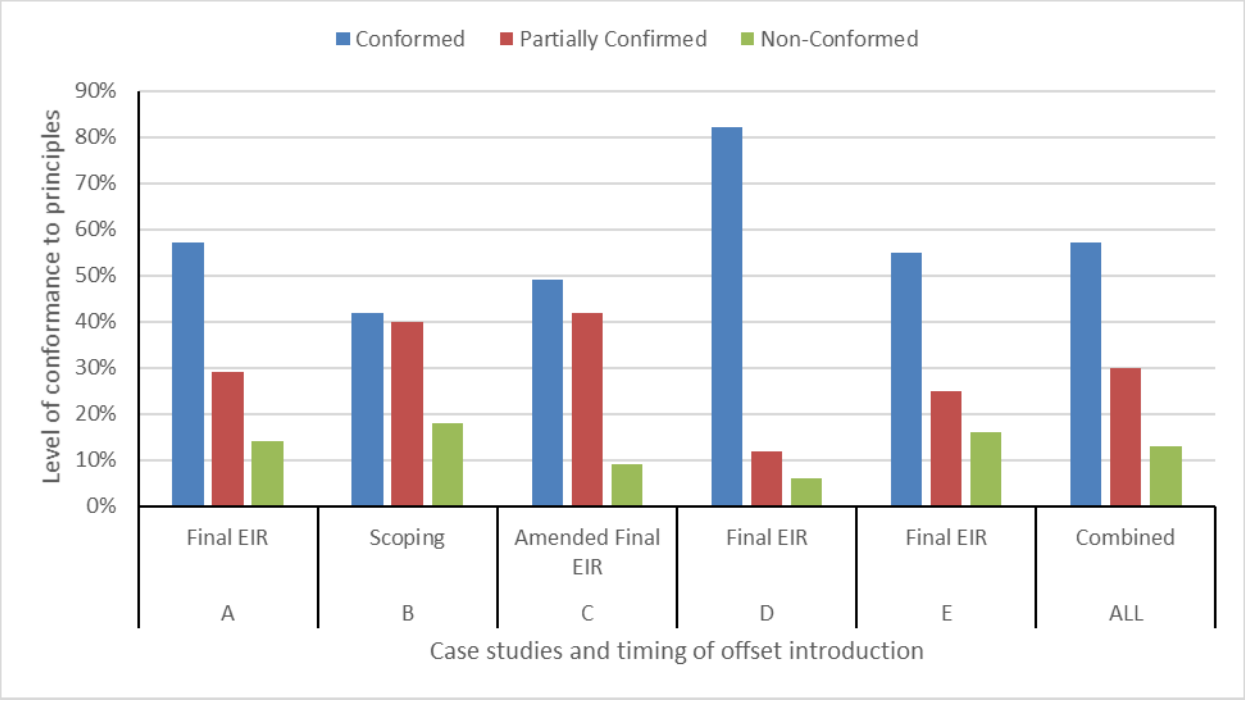

Figure 8. The influence of timing of offset introduction to the level of conformance to best practice principles.

In case study B, the offset was introduced at the scoping stage of the EIA. Although, this timing could be considered the appropriate stage for introducing an offset, the results showed the level of conformance to the best practice principles as 42% conformance, 39% partial conformance, and 18% non-conformed. These results are rather surprising and the proponent's perceived attitude towards offsets could be a major contributing factor to this outcome. In this case study there is no offset agreement (principle 2) and this principle was scored at 80% non-conformance; hence, there has been evidence of implementation on the ground to date. In addition to the level of conformance on principle 2, the enforceability (principle 6) of the offset could be weaker and this may be leading to the delays with the physical implementation of the offset. Therefore, delaying delivery of ecosystem services to society and potentially could alter outcomes on conformance to principle 4 (i.e. principle 4 – designed for no-net loss) in future. The time lag of offset implementation was one the concerns raised by practitioners in Western Australia (Hayes and Morrison-Saunders, 2007) and Rosa *et al.* (2016) raised issues on the compensation of ecosystem services. Both the time lag and ecosystem services delivery are a concern in case study B. The factors for such an outcome are linked to the lack commitment by the proponent to long term offset management and protection (principle 5).

In case study C, the offset was only introduced after the final EIR was rejected by the competent authority, hence, the offset was only introduced at the amended EIR stage. The level of conformance to best practice principles as influenced by the timing was 49% conformance, 42% partial conformance, and 9% non-conformance. One of the issues in this case study was the lack of suitable offset receiving areas and de Witt (2015) also highlighted the lack of suitable land for biodiversity offsets as a challenge in South Africa; hence, the lack of suitable offset land could have had implications on the perceptions on the overall level of conformance in case study C. The timing of the offset in case study C negatively affected the level of conformance to principle 1 on conformance to the mitigation hierarchy, which scored 60% non-conformance and principle 7 (cumulative, direct and indirect impacts), which scored 100% partial conformance, due to loss of the last remaining open space for the project area. Principle 8 (limits to what can be offset) had a partial conformance score of 60% since critically endangered habitat and species were displaced and principle 10 (like for like) scored 100% partial conformance since the offset habitat that was selected had to be 'traded-down' to a lesser important habitat. Similar to case study A, the offset in case study C was only confirmed through the environmental authorisation and when the offset planning commenced it was also only with a selected group of stakeholders that registered as I&APs in the EIA. Finalising the offset plan with a selected group of I&APs also worked well in this case study as in case study A. However, there was no PPP once the offset plan was finalised and for that reason some contributions to the offset plan were not considered. The implications were that the loss of ecosystem services in the project area could never be offset in the project area / catchment (principle 4 – designed for no-net loss). Thereby impacting on the level of conformance

to the principle for transparency and stakeholder engagement, which scored 100% partial conformance. In addition, it has been demonstrated that the offset has a potential to exclude communities from ecosystem services and cultural values when all stakeholders, I&APs, are not part of the offset design (Bidaud *et al.*, 2017 and 2018, Griffiths *et al.*, 2019). Furthermore, there are also challenges of cattle grazing as in case study A and harvesting of medical plants by community members in the offset receive area that has necessitated the fencing off of the offset site and delaying proclamation of the property as a conservation area in terms of relevant legislation. In addition, for this case study as it was in case study A, there were no alternative project sites that were considered in the EIA, hence affecting level of conformance to the mitigation hierarchy principle, which scored 40% partial conformance and 60% non-conformance.

In Case study D, the level of conformance to the best practice principles was 82% conformance, 12% partial conformance, and only 6% non-conformance; thereby, case study D could be considered as one of the better performing EIAs in the EMA. The timing of when the offset was introduced in case studies D was positive. Then in case study E, the level of conformance to best practice principles as influenced by the timing of introducing the offset showed 55% conformance, 30% partial conformance, and 16% non-conformance. In both case study D and E, the offset was introduced at final EIR stage. However, in both these case studies, the EIAs were placed on hold while mitigation options where investigated and the establishment of a strategic wetland management framework with a composite offset receiving area was concluded (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018). The strategic wetland management framework specified the level of rehabilitation and potential environmental outcomes, and management requirements (Macfarlane *et al.*, 2016). The composite offset receiving area has the potential, based on an assessment, to accommodate several offsets together, thereby according to Macfarlane *et al.* (2016) improving economies of scale and making ongoing management costs cheaper and to potentially ‘bank’ offset credits for future developments. The draft offset plan for both these case studies was then included in the EIA, although at final EIR stage, it at least allowed for greater transparency and stakeholder engagement on the offset plan (principle 3 – transparency and stakeholder engagement) and ensured that the offset design yielded a net-gain outcome (principle 4) whereby both scored 100% conformance. Therefore, as much details as possible on the offset plan was provided for consideration by I&APs during the last stage of the EIA. Although the offset plan details were included in the final EIR the condition in the environmental authorisation may be too simplistic (DEA, 2017c and DEDTEA, 2017) for effective implementation and enforceability without referring to the offset plan.

4.3.2 Timing affecting quality, viability and enforceability of offsets

The research results show that the timing when the offset was introduced influences the quality, viability and enforceability of the biodiversity offsets. The summary of these results are shown in

figure 8, where case study A and B, suggest a strong negative outcome, whereas case studies C and E shows a slightly weaker but still negative result. Timing does not seem to have had an impact on case study D.

Based on these results, case study D may have benefited from the strategic wetland management framework (Macfarlane *et al.*, 2016) and the draft offset plan included in the final EIR for consideration by all I&APs. In addition, the proponent had been amenable to long term management and protection of the offset, perhaps since the proponent was a provincial corporation. The commitment to long term management and protection of the offset contributed to the quality and viability of the offset.

Secondly, there are, however, challenges identified for case study E, where the proponent is a private sector company, for committing to long term management and protection of the offset, which puts the viability of the offset at risk. The main reason for not committing to long term management and protection may be due to the business approach whereby the company needs to 'exit' at a certain place along the development process when a land sale of serviced platforms to end users has been done. The proponent in case study E underscored the point that as *a proponent they need to exit from the development once all land sales are complete*. The implications are that the environmental obligations could get eroded in that process, therefore, chances of offset failure are high under these circumstances where the offset intended outcomes would not be achieved.

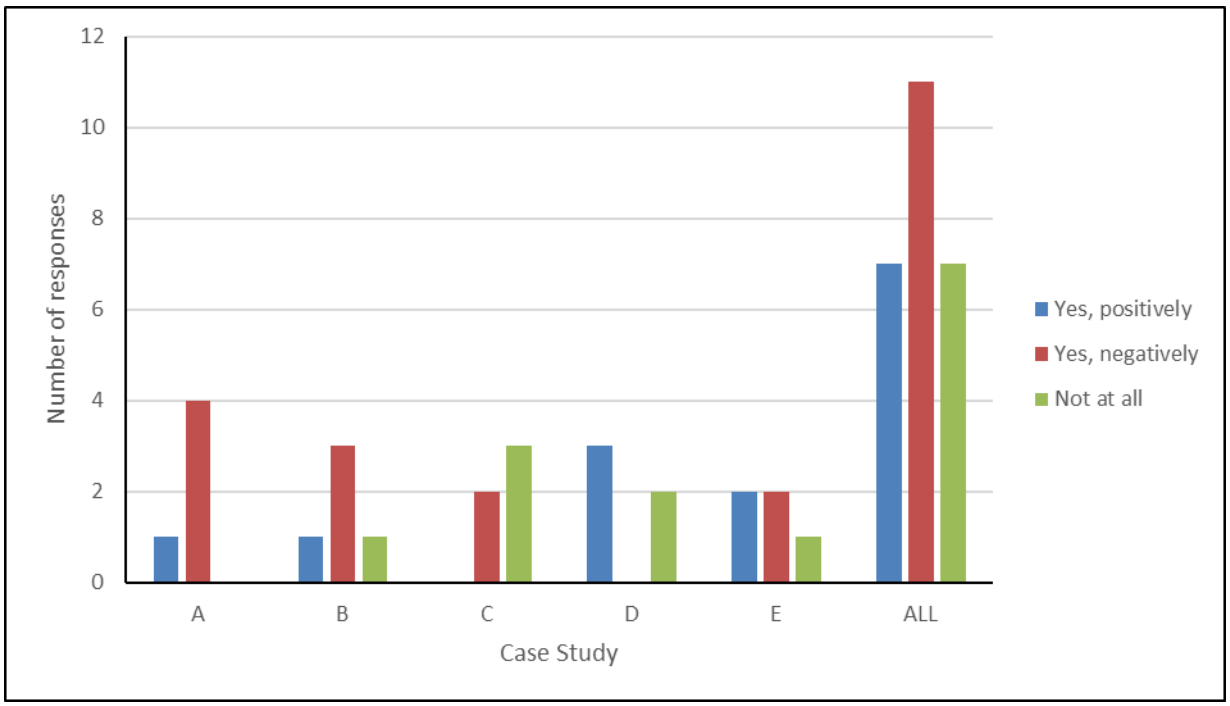

Figure 9. The way in which and timing of when the offset was proposed influence the quality, viability and enforceability.

Thirdly, in case study C the timing of when the offset was introduced had negatively influenced the quality and viability of the offset, which needs to be understood so that these issues could be prevented in future. Case study C was contentious due to the use of poor baseline data in the EIA, which lead to the eventual rejection of the EIA and appeals by civil society group(s). Hence, the quality of the offset was at risk from the start and once the correct baseline data was available there were no further opportunities to apply the mitigation hierarchy (principle 1) as there were no site or layout alternatives. Therefore, the project resulted in the loss of a unique hygrophilous grassland and one of the last remaining wild patches for an endangered plant species. For that reason, certain stakeholders in the research responded that the offset should not have been considered (principle 8). The consultant was of the opinion that at least *an interim offset plan should have been included in the EIA, prior to granting a positive EA, so that all stakeholders can consider the offset, and the applicant could also do more feasibility of the proposal if an offset is then required*.

Furthermore, the views that the offset should not have been considered in case study C were affirmed by the findings that there are no like for like habitat in KZN for the offset (principle 10). Therefore, the stakeholders had to contend with the difficulty of 'trading-down' on an offset site more than 100 km away from the impact site and outside EM (Edwards and Macfarlane, 2016). These issues needed to be resolved, even outside the EIA process, in order to ensure viability of the offset. Therefore, the proponent, a company listed in the Johannesburg Stock Exchange, was determined to ensure the viability of the offset in order to manage a business risk in a similar way how certain banks may consider biodiversity issues and manage risk (Mulder and Koellner, 2011, Potdar *et al.*, 2016). Furthermore, the proponent committed to an additional voluntary offset for ecosystem services within the EMA when these issues were presented in case study C.

Then fourthly in case study A and B the timing of the offset had a clear negative influence on the offset quality, viability and enforceability. In both case studies there are delays with the implementation of the biodiversity offsets, hence an even longer time lag for delivery of intended outcomes (Hayes and Morrison-Saunders, 2007, Rosa *et al.*, 2016). Furthermore, successful habitat restoration is a challenge in these case studies, which is likely to compound the viability of these offsets further (Souza and Sánchez, 2018). In addition, the lack of enforcement (principle 6) further perpetuates the situation as certain respondents had pointed out during the interviews. The consultant in case study A, pointed *enforcement is a challenge*. Therefore, the need for guaranteeing the offset prior to the start of activity is very important as it was reported in de Witt *et al.* (2019) and having the offset agreement (principle 2) prior to construction could also assist with implementation and enforcement.

In addition, in both cases studies there are challenges with commitment to long term management and protection, which would improve viability of the offsets. Similar findings were not found in

literature at this stage and further research on the topic would be valuable. The proponent is a private sector company (case study B) and the other was a state company (case study A), which has since then adopted its own environmental policy that has facilitated for recent environmental support internally.

Lastly, based on the discussions, the cost of offsets tends to be secondary and are never internalised by proponents due to either the late introduction of the offset (in the final EIR – case studies A, C, D, E) and / or when a detailed offset plan with costs and timelines is available (case studies A, B, C). The cost of implementing an offset can be a barrier to the quality and viability of the offset if not considered early in the development planning process, hence, could lead to offset failure. In summary, therefore, the way in which and timing of when the biodiversity offset is introduced negatively influences the quality, viability and enforceability of the offset in EM and similar findings were also reported in de Witt (2015).

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

The question posed for this research is, *what we can learn from biodiversity offsets implementation within eThekwini Municipality (EM)*? In order to answer the research question three research objectives were designed namely (1) to evaluate the level of conformance to best practice offset principles, (2) to understand the factors (except timing) affecting the level of conformance, and (3) to evaluate the extent that timing of the introduction of the offset influence outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets.

There are four main findings from the research, which are discussed here in more detail. Firstly, there were two case studies (A and D) that were considered to be conformed and three case studies (B, C, and E) were partially conformed to the best practice principles when evaluated on their own through the vertical analysis of responses from the interviews.

Secondly, based on the horizontal analysis using all the stakeholders' perceptions, combined, the research findings were that there was an overall 57% conformance, 30% partially conformance, and 13% non-conformance to the best practice principles. This then led to the conclusion that biodiversity offset case studies from EM conformed to three best practice principles and eight principles were partially conformed to the best practice principles based on the set criteria. Both the vertical and horizontal analysis were responding to research objective 1.

There were challenges and positive influences, except timing, on conformance to best practice principle were listed for the research, see table 1 for these factors, which was part of objective 2.

The third finding is that the level of conformance to best practice principles is influenced by the timing of introducing the offset since the results in this research showed the level of conformance for all cases studies as 57% of conformance, 30% partial conformance, and 13% non-conformance (research objective 3, part I).

The fourth and last main finding of the research is that the timing of when the offset is introduced has negatively influenced the quality, viability and enforceability of biodiversity offsets in EM (research objective 3, part II).

5.1 Conformance to biodiversity offset best practice principles

The first of objective of the research was to evaluate the level of conformance to best practice offset principles. The evaluation was undertaken through an analysis of performance within and across cases against the views from different stakeholder groups – see annexure 2.

The summary of the evaluation, through a vertical analysis, for stakeholders' perception on conformance of case studies in EM showed that two case studies conformed, and three case studies partially conformed and no case study non-conformed to the best practice principles. Furthermore, the summary of responses (25) by stakeholders' perceptions shows that there was an overall 57% conformance, 30% partially conformance, and 13% non-conformance to the best practice principles across all the case studies. In addition, the level of conformance, through a horizontal analysis, to best practice offset principles for cases studies in EM showed that biodiversity offsets conformed to three best practice principles and eight practice principles were partially conformed. The three conformed principles are the following:

- Principle 4: No-net loss
- Principle 9: Additionality
- Principle 11: Offset follows landscape and ecosystem approach

The remaining eight principles were partially conformed and therefore, no principles were non-conformed across all the cases. The partially conformed principles are the following:

- Principle 1: Conformance to the mitigation hierarchy
- Principle 2: Proper offset agreement is in place before activity starts
- Principle 3: Transparency and stakeholder participation
- Principle 5: Focused on long-term outcome
- Principle 6: Offset is enforceable
- Principle 7: Cumulative, direct and indirect impacts are considered
- Principle 8: Limits to what can be offset
- Principle 10: Like for like

For the first objective of the research, it is recommended that the offset should only be considered once the mitigation hierarchy (principle 1) has been applied and / or demonstrated in the EIA. The offset should be informed by correct and suitable baseline data (Brownlie *et al.*, 2017), and the offset plan be considered in the EIA, to ensure transparency and stakeholder participation (principle 3). Then the environmental authorisation should be based on a detailed offset plan so that there are clear conditions for monitoring and enforcement of the implementation (principle 6) biodiversity offsets. The current EIA regulations in South Africa (DEA, 2017a) requires the EIA process to be completed prior to lodging the EIA application, which should assist to resolve the issue where the EIA is considered without some details on the offset plan. Therefore, the offset should no longer be a surprise inclusion at the end of the EIA and when there is urgency to commence with construction of the activity.

The offset agreement needs to be in place prior to the commencement of the activity (principle 2). However, for the Municipality the land use planning process (i.e., rezoning and subdivision applications) could provide an additional step for ensuring implementation of biodiversity offsets has been considered at the local government level. This has also been recommended by Rega (2013) through guarantees prior to the start of construction (i.e., principle 2).

Transparency and stakeholder participation (principle 3) is important for both affected stakeholders and offset receiving communities. A sharp focus on this aspect in the research was on case study B whereby the community where the development was located (i.e. where biodiversity, ecosystem services and open space were lost) did not take part in the offset planning process and therefore, the communities voice was never heard when offsets were considered. However, the local restoration project for ecosystem services that the Municipality required, although after the EIA process, sought to address the loss of local amenities. Similarly, the offset receiving community in case study C were not consulted hence there were initially land invasion, uncontrolled grazing and harvesting in the offset area until there was buy-in from the community on the offset plans. In case study A, it was reported that access to grazing land was required and this issue had to be managed long after agreements of the offsets were in place. Therefore, conformance to principle 3 would ensure that affected communities are not excluded from the offsets as it was reported in case study from Madagascar (Bidaud *et al.*, 2018).

In addition, for case study C, limits to what can be offset (principle 8), if there was conformance to the principle then the last patch of the hygrophilous grassland with the last population known in the wild with *K. pauciflora* (Red Hot Poker) should not have been lost from eThekwini Municipal Area (EMA). Thus, the offset for an 'unlike' vegetation type was secured almost 100 km north of the EMA due to lack of like-for-like habitat. The draft national offset policy has a notion that offsets should not be considered for significant loss of critically endangered vegetation types (DEA, 2017b) and when the policy is adopted then stakeholders would be able better placed to ensure conformance.

Furthermore, it is also recommended that long term management and protection of biodiversity offsets (principle 5) is also clarified in the EIA so that the potential costs could also be considered by proponents. One of the challenges with biodiversity offsets implementation in South Africa has been *problems establishing sustainable financing mechanisms* (Brownlie *et al.*, 2017), and the lack of funding was a challenge that has also been raised in another research in South Africa (de Witt, 2015, de Witt *et al.*, 2019).

The second objective of the research needed to understand the factors affecting the level of conformance. In the research the results suggest that there are both challenges and positive influences on the level of conformance to best practice principles. However, stakeholders need to

be aware of the challenges that were found in the research, see table 1, for reference and consider how best to ensure that there is conformance to the 11 best practice principles. It is expected that conformance to the 11 best practice principles would potentially ensure that intended biodiversity outcomes are achievable. Furthermore, conformance to best practice principles that are established biodiversity offsets in South Africa (de Witt, 2015, de Witt *et al.*, 2019), should be linked to capacity building, training and awareness for all stakeholders (Brownlie *et al.*, 2017); a significant step would be the gazetting of a national biodiversity offset policy (de Witt, 2015, Brownlie *et al.*, 2017, Lukey *et al.*, 2017, de Witt *et al.*, 2019).

There were other factors, than timing, which influenced the level of conformance to best practice principles. However, it recommended that stakeholders need to ensure conformance to all 11 best practice principles when considering biodiversity offsets in EIAs and this is critical for ensuring that biodiversity offsets achieve the intended outcome. In addition to the proper application and demonstration of the mitigation hierarchy (principle 1) in the EIA, there is a need for all stakeholders, i.e. I&APs, to be consulted (principle 3) in offset process (initiation, acceptance, designs, planning, implementation, and monitoring). Hence, the biodiversity offset plan must be included in the EIA.

5.2 Timing of Biodiversity Offsets

The third objective of the research was to evaluate the extent that timing of the introduction of the offset influence outcomes. In this context outcomes means conformance to best practice principles and the quality, viability and enforceability of biodiversity offsets.

For objective 3, part I), the research findings were that the level of conformance to best practice principles is influenced by the timing of introducing the offset since the results in this research showed the level of conformance for all cases studies as 57% of conformance, 30% partial conformance, and 13% non-conformance (research objective 3, part I). In case study A, the offset was introduced at the final EIR stage of the EIA process and the influence of timing in this case study resulted a level of 57% conformance, 29% partial conformance, and 14% non-conformance. The worst performing case study was case study B, which had the offset introduced at the scoping stage of the EIA. However, the level of conformance to the best practice principles as 42% conformance, 39% partial conformance, and 18% non-conformed. Then case study C, the offset was only introduced after the final EIR was rejected by the competent authority, hence, the offset was only introduced at the amended EIR stage. The level of conformance to best practice principles as influenced by the timing was 49% conformance, 42% partial conformance, and 9% non-conformance. Then the best performing case study was case study D where the level of conformance to the best practice principles was 82% conformance, 12% partial conformance, and only 6% non-conformance. Lastly, for case study E the level of conformance to best practice

principles as influenced by the timing of introducing the offset showed 55% conformance, 30% partial conformance, and 16% non-conformance.

In summary, the offsets were introduced at the final scoping stage (case study B) and final EIR stage (case study A, C, D, and E), although it was the amended final EIR in (case study C) after the final EIR was rejected by the competent authority. Therefore, the results in the research are that the timing had different effects to the level of conformance to best practice principles in all he vase studies. Furthermore, when offsets are considered there needs to be commitment for long term protection and management (principle 5). However, the introduction of the offset at final EIR is too late in the EIA process (de Witt, 2015) and could potentially lead to implementation challenges as has been observed in this research in case study A, B, C, and E in certain respects. However, if the offset requirements are confirmed at final scoping stage (considered as an appropriate stage) then the offset should be informed by specialist studies and there should potentially be a better opportunity for ensuring conformance to all 11 best practice principles.

Then objective 3, part II) the findings of the research were that the way in which and timing when the offsets were proposed negatively influenced the quality, viability and enforceability of biodiversity offsets in EM. When considering offset there should be correct and suitable baseline data. Therefore, when the offset is considered at an appropriate stage in the EIA process then the opportunity is better for ensuring conformance to all 11 best practice principles. The best practice principles should be part of legislation or regulations and / or be within an adopted policy for offsets, which has been requested by environmental practitioners (de Witt, 2015, Brownlie *et al.*, 2017, de Witt *et al.*, 2019). In South Africa, there are currently five biodiversity offset guidelines for specific contexts (DEADP, 2011, Macfarlane at al., 2012 – a policy for wetland offsets, EKZNW, 2013, SANBI, 2014, DEA, 2017b) and there are still those that are not formally adopted in this list (SANBI, 2014, DEA, 2017b). Therefore, there is a desperate need for an adopted national policy for better coordination and consistency in practice for biodiversity offsets (de Witt, 2015, Brownlie *et al.*, 2017, de Witt *et al.*, 2019).

Furthermore, the offset must be guaranteed prior to the start of the activity or construction through an agreement (principle 2), which should include both financial and implementation timelines for biodiversity offsets to improve the likelihood of success. Then government and other stakeholders with a mandate for monitoring and enforcement should take the necessary steps to ensuring that biodiversity offset are implemented as planned and agreed with all stakeholders. Lastly, capacity building on best practice principles for biodiversity offsets stakeholders (de Witt, 2015, Brownlie *et al.*, 2017), determining biodiversity priorities (EPCPD, 2016) and investigating mitigation options for developments (Macfarlane *et al.*, 2016, Douwes *et al.*, 2018) should be some of the interventions that are considered by EM so that future biodiversity offsets conform to best practice principles and these are framed within a municipal offset framework, which will form part of D'MOSS.

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ANNEXURE

Annexure 1 - The questionnaire that was used for interviews (Source: de Witt, 2015).

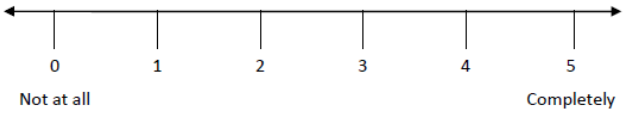
How many offsets have you been involved in?

**If you have been involved in more than one offset, please answer the below questionnaire for as many case studies as you can/are willing to*

BACKGROUND QUESTIONS: single case study		
What sector was the offset for? (i.e. mining, construction, municipal, property development, logistics, infrastructure, etc.)		
What project was it for? **This is only for me to know the context if different parties were involved in the same project – the name of the project and your name will not be included in the report*		
At what stage in the EIA process was the offset proposed?		
By whom was the offset proposed?		
Which role did you play in this offset? (please tick)	*Government*	
	Consultant	
	NGO/environmental organisation	
	Private sector / Project proponent	
	Other (please specify)	

Please score the extent to which you feel that the offset you worked on conforms to the question.

0 = the offset does not conform to the principle at all, 5 = the offset completely conforms.



QUESTION 1 **To what extent do you feel the offset you were involved in conforms to the following general, best-practice principles?** **These principles were identified through an analysis of various guidelines (local and international) as the ones present in most guidelines and are therefore assumed to be overarching and used widely.*		
PRINCIPLE	**SCORE (0-5)**	**COMMENTS** **Comments can be made for relevant points/as a whole/for all*
1. Mitigation hierarchy is adhered to Offset only recommended after all efforts have been made avoid, minimise and mitigate impacts.		
2. Proper offset agreement is in place before activity starts Offset should be secured before development commences through explicit conditions		
3. Offset design process was transparent and stakeholders were engaged Stakeholders should be engaged in a timely manner; offset should be designed and implemented in a transparent manner with engagement with relevant parties		

4. Designed for no net loss Offset should be designed to have no residual loss		
5. Long-term effects considered The offset should be designed to be enduring – preferably in perpetuity but at least for project duration		
6. Offset is enforceable Must have clear, enforceable conditions		
7. Cumulative, direct and indirect impacts were considered Offset should consider regional importance of the biodiversity - endemism, the use and cultural biodiversity values held by local people, irreplaceability		
8. Limits to what can be offset Impacts on biodiversity of 'very high' significance may not be able to be remedied or offset		
9. Additionality The offsets should achieve gains above and beyond measures that are already required by law or would have occurred had the offset not taken place		
10. Like for Like The offsets should preferably comprise or benefit the same ecosystems and combination of biodiversity features that would be negatively affected		
11. Offset follows landscape and ecosystem approach Offsets should contribute to conservation in a landscape context, supporting an ecosystem approach, taking into consideration corridors and connectivity		

What was the biggest challenge to conform to these best-practice principles AND/OR what was the biggest positive influence which helped you conform to the principles?

_____

_____

_____

NOTES

QUESTION 2			
QUESTION	**Yes, positively**	**Yes, negatively**	**Not at all**
I your opinion, did the timing of when the offset was introduced, influence the offset's conformance to the above-listed best-practice principles?			

COMMENTS: How, and which principles?

QUESTION 3			
FOR PROJECT PROPONENT:			
QUESTION	**Yes, positively**	**Yes, negatively**	**Not at all**
In your opinion, did the way in which and timing when the offset was proposed influence the viability* of your project?			
COMMENTS: What impact did it have?			
FOR GOVERNMENT:			
QUESTION	**Yes, positively**	**Yes, negatively**	**Not at all**
In your opinion, did the way in which and timing when the offset was proposed influence the quality, viability and enforceability thereof?			
COMMENTS: What impact did it have?			
FOR CONSULTANT:			
QUESTION	**Yes, positively**	**Yes, negatively**	**Not at all**
In your opinion, did the way in which and timing when the offset was proposed influence the viability of the offset?			
COMMENTS: What impact did it have?			

**viability refers to the probability that an offset can be designed that will be implementable and achieve the desired effects in the long-term*

FOR OTHERS:			
QUESTION	**Yes, positively**	**Yes, negatively**	**Not at all**
In your opinion, did the way in which and timing when the offset was proposed influence the viability of the offset?			
COMMENTS: What impact did it have?			

NOTES

Annexure 2 - The outcome of the data evaluation from interviews and percentage scores for the horizontal analysis.

Best Practice Principle	Case Study 1						Case Study 2						Case Study 3					
	Case Study A						Case Study B						Case Study C					
	Government	Consultant	Conservation Authority	Proponent	Municipality	Summary per Principle	Government	Consultant	Conservation Authority	Proponent	Municipality	Summary per Principle	Government	Consultant	Conservation Authority	Proponent	Municipality	Summary per Principle
1. Mitigation hierarchy is adhered to	Conformed	Non-Conformed	Partially Conformed	Non-Conformed	Non-Conformed	20% 20% 60%	Partially Conformed	Conformed	Non-Conformed	Conformed	Conformed	60% 20% 20%	Non-Conformed	Non-Conformed	Partially Conformed	Partially Conformed	Non-Conformed	0% 40% 60%
2. Proper offset agreement is in place before activity starts	Non-Conformed	Non-Conformed	Non-Conformed	Non-Conformed	Non-Conformed	0% 0% 100%	Non-Conformed	Non-Conformed	Non-Conformed	Conformed	Non-Conformed	20% 0% 80%	Partially Conformed	Conformed	Conformed	Conformed	Partially Conformed	60% 40% 0%
3. Offset design process was transparent and stakeholders were engaged	Partially Conformed	Partially Conformed	Partially Conformed	Conformed	Partially Conformed	20% 80% 0%	Partially Conformed	Partially Conformed	Non-Conformed	Conformed	Partially Conformed	20% 60% 20%	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	0% 100% 0%
4. Designed for no net loss	Conformed	Partially Conformed	Conformed	Conformed	Partially Conformed	60% 40% 0%	Conformed	Conformed	Partially Conformed	Conformed	Conformed	80% 20% 0%	Conformed	Conformed	Conformed	Conformed	Non-Conformed	80% 0% 20%
5. Long-term effects considered	Conformed	Partially Conformed	Conformed	Conformed	Partially Conformed	60% 40% 0%	Partially Conformed	Partially Conformed	Non-Conformed	Partially Conformed	Partially Conformed	0% 80% 20%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%
6. Offset is enforceable	Partially Conformed	Partially Conformed	Conformed	Conformed	Conformed	60% 40% 0%	Conformed	Non-Conformed	Partially Conformed	Conformed	Partially Conformed	40% 40% 20%	Conformed	Conformed	Conformed	Conformed	Partially Conformed	80% 20% 0%
7. Cumulative, direct and indirect impacts were considered	Conformed	Partially Conformed	Conformed	Conformed	Conformed	80% 20% 0%	Conformed	Non-Conformed	Partially Conformed	Partially Conformed	Conformed	40% 40% 20%	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	0% 100% 0%
8. Limits to what can be offset	Conformed	Partially Conformed	Conformed	Conformed	Conformed	80% 20% 0%	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	0% 100% 0%	Partially Conformed	Partially Conformed	Partially Conformed	Conformed	Non-Conformed	20% 60% 20%
9. Additionality	Conformed	Partially Conformed	Partially Conformed	Conformed	Conformed	60% 40% 0%	Conformed	Conformed	Non-Conformed	Conformed	Conformed	80% 0% 20%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%
10. Like for Like	Conformed	Partially Conformed	Conformed	Conformed	Conformed	80% 20% 0%	Conformed	Conformed	Partially Conformed	Partially Conformed	Conformed	60% 40% 0%	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	0% 100% 0%
11. Offset follows landscape and ecosystem approach	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Conformed	Partially Conformed	Partially Conformed	Conformed	Conformed	60% 40% 0%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%
Summary per Stakeholder	**Conformed**	**Partially Conformed**	**Conformed**	**Conformed**	**Partially Conformed**	**57% 29% 14%**	**Partially Conformed**	**Partially Conformed**	**Non-Conformed**	**Conformed**	**Partially Conformed**	**42% 40% 18%**	**Partially Conformed**	**Partially Conformed**	**Partially Conformed**	**Conformed**	**Partially Conformed**	**49% 42% 9%**

Key:
Conformed
Partially Conformed
Non-Conformed
N/A

Case Study D						Case Study 5							
						Case Study E							
Government	Consultant	Conservation Authority	Proponent	Municipality	Summary per Principle	Government	Consultant	Conservation Authority	Proponent	Municipality	Summary per Principle	*Average Score*	
Conformed	Partially Conformed	Partially Conformed	Conformed	Non-Conformed	40% 40% 20%	Partially Conformed	Partially Conformed	Partially Conformed	Partially Conformed	Non-Conformed	0% 80% 20%	24% 40% 36%	Partially Conformed
Non-Conformed	Partially Conformed	Conformed	Conformed	Partially Conformed	40% 40% 20%	Non-Conformed	Partially Conformed	Partially Conformed	Conformed	Partially Conformed	20% 60% 20%	28% 28% 44%	Partially Conformed
Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	48% 48% 4%	Partially Conformed
Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	84% 12% 4%	Conformed
Conformed	Conformed	Partially Conformed	Conformed	Conformed	80% 20% 0%	Non-Conformed	Partially Conformed	Partially Conformed	N/A	Non-Conformed	0% 50% 50%	48% 38% 14%	Partially Conformed
Conformed	Conformed	Partially Conformed	Conformed	Conformed	80% 20% 0%	Partially Conformed	Partially Conformed	Non-Conformed	Conformed	Non-Conformed	20% 40% 40%	56% 32% 12%	Partially Conformed
Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Partially Conformed	Conformed	Conformed	Conformed	Conformed	80% 20% 0%	60% 36% 4%	Partially Conformed
N/A	N/A	N/A	N/A	N/A N/A N/A	N/A N/A N/A	Non-Conformed	Conformed	N/A	N/A	N/A	50% 0% 50%	38% 45% 18%	Partially Conformed
Non-Conformed	Conformed	Conformed	Conformed	Conformed	80% 0% 20%	Conformed	Conformed	Conformed	Conformed	Conformed	59% 0% 0%	84% 8% 8%	Conformed
Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Partially Conformed	Conformed	Conformed	Conformed	Conformed	80% 20% 0%	64% 36% 0%	Partially Conformed
Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	Conformed	Conformed	Conformed	Conformed	Conformed	100% 0% 0%	92% 8% 0%	Conformed
Conformed	**Conformed**	**Conformed**	**Conformed**	**Conformed**	**82%** **12%** **6%**	**Partially Conformed**	**Conformed**	**Partially Conformed**	**Conformed**	**Partially Conformed**	**55%** **25%** **16%**	**57%** **30%** **13%**	

Annexure 3 - Evaluation criteria for stakeholder perception on conformance per case study.

Scoring	Meaning
11*Conformed	Conformed
10*Conformed+1*Partially Conformed	Conformed
10*Conformed+1*Non-Conformed	Conformed
9*Conformed+2*Partially Conformed	Conformed
9*Conformed+1*Partially Conformed+1*Non-Conformed	Conformed
9*Conformed+2*Non-Conformed	Conformed
8*Conformed+3*Partially Conformed	Conformed
8*Conformed+2*Partially Conformed+1*Non-Conformed	Conformed
8*Conformed+1*Partially Conformed+2*Non-Conformed	Conformed
8*Conformed+3*Non-Conformed	Conformed
7*Conformed+4*Partially Conformed	Conformed
7*Conformed+3*Partially Conformed+1*Non-Conformed	Conformed
7*Conformed+2*Partially Conformed+2*Non-Conformed	Conformed
7*Conformed+1*Partially Conformed+3*Non-Conformed	Conformed
7*Conformed+4*Non-Conformed	Conformed
6*Conformed+5*Partially Conformed	Partially Conformed
6*Conformed+4*Partially Conformed+1*Non-Conformed	Partially Conformed
6*Conformed+3*Partially Conformed+2*Non-Conformed	Partially Conformed
6*Conformed+2*Partially Conformed+3*Non-Conformed	Partially Conformed
6*Conformed+1*Partially Conformed+4*Non-Conformed	Partially Conformed

6*Conformed+5*Non-Conformed	Partially Conformed
5*Conformed+6*Partially Conformed	Partially Conformed
5*Conformed+5*Partially Conformed+1*Non-Conformed	Partially Conformed
5*Conformed+4*Partially Conformed+2*Non-Conformed	Partially Conformed
5*Conformed+3*Partially Conformed+3*Non-Conformed	Partially Conformed
5*Conformed+2*Partially Conformed+4*Non-Conformed	Partially Conformed
5*Conformed+1*Partially Conformed+5*Non-Conformed	Partially Conformed
5*Conformed+6*Non-Conformed	Partially Conformed
4*Conformed+7*Partially Conformed	Partially Conformed
4*Conformed+6*Partially Conformed+1*Non-Conformed	Partially Conformed
4*Conformed+5*Partially Conformed+2*Non-Conformed	Partially Conformed
4*Conformed+4*Partially Conformed+3*Non-Conformed	Partially Conformed
4*Conformed+3*Partially Conformed+4*Non-Conformed	Partially Conformed
4*Conformed+2*Partially Conformed+5*Non-Conformed	Partially Conformed
4*Conformed+1*Partially Conformed+6*Non-Conformed	Partially Conformed
4*Conformed+7*Non-Conformed	Non-Conformed
3*Conformed+8*Partially Conformed	Partially Conformed
3*Conformed+7*Partially Conformed+1*Non-Conformed	Partially Conformed
3*Conformed+6*Partially Conformed+2*Non-Conformed	Partially Conformed
3*Conformed+5*Partially Conformed+3*Non-Conformed	Partially Conformed
3*Conformed+4*Partially Conformed+4*Non-Conformed	Partially Conformed
3*Conformed+3*Partially Conformed+5*Non-Conformed	Non-Conformed
3*Conformed+2*Partially Conformed+6*Non-Conformed	Non-Conformed

3*Conformed+1*Partially Conformed+7*Non-Conformed	Non-Conformed
3*Conformed+8*Non-Conformed	Non-Conformed
2*Conformed+9*Partially Conformed	Partially Conformed
2*Conformed+8*Partially Conformed+1*Non-Conformed	Partially Conformed
2*Conformed+7*Partially Conformed+2*Non-Conformed	Partially Conformed
2*Conformed+6*Partially Conformed+3*Non-Conformed	Partially Conformed
2*Conformed+5*Partially Conformed+4*Non-Conformed	Partially Conformed
2*Conformed+4*Partially Conformed+5*Non-Conformed	Non-Conformed
2*Conformed+3*Partially Conformed+6*Non-Conformed	Non-Conformed
2*Conformed+2*Partially Conformed+7*Non-Conformed	Non-Conformed
2*Conformed+1*Partially Conformed+8*Non-Conformed	Non-Conformed
2*Conformed+9*Non-Conformed	Non-Conformed
1*Conformed+10*Partially Conformed	Partially Conformed
1*Conformed+9*Partially Conformed+1*Non-Conformed	Partially Conformed
1*Conformed+8*Partially Conformed+2*Non-Conformed	Partially Conformed
1*Conformed+7*Partially Conformed+3*Non-Conformed	Partially Conformed
1*Conformed+6*Partially Conformed+4*Non-Conformed	Partially Conformed
1*Conformed+5*Partially Conformed+5*Non-Conformed	Partially Conformed
1*Conformed+4*Partially Conformed+6*Non-Conformed	Non-Conformed
1*Conformed+3*Partially Conformed+7*Non-Conformed	Non-Conformed
1*Conformed+2*Partially Conformed+8*Non-Conformed	Non-Conformed
1*Conformed+1*Partially Conformed+9*Non-Conformed	Non-Conformed
1*Partially Conformed+10*Non-Conformed	Non-Conformed

11*Partially Conformed	Partially Conformed
10*Partially Conformed+1*Non-Conformed	Partially Conformed
9*Partially Conformed+2*Non-Conformed	Partially Conformed
8*Partially Conformed+3*Non-Conformed	Partially Conformed
7*Partially Conformed+4*Non-Conformed	Non-Conformed
6*Partially Conformed+5*Non-Conformed	Non-Conformed
5*Partially Conformed+6*Non-Conformed	Non-Conformed
4*Partially Conformed+7*Non-Conformed	Non-Conformed
3*Partially Conformed+8*Non-Conformed	Non-Conformed
2*Partially Conformed+9*Non-Conformed	Non-Conformed
1*Partially Conformed+10*Non-Conformed	Non-Conformed
11*Non-Conformed	Non-Conformed