

**MOOI-MGENI TRANSFER SCHEME
PHASE TWO: SPRING GROVE DAM
Preliminary Planning of Wetland
Rehabilitation and Biodiversity Offsets**

Authors: David Cox & S Brownlie



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**MOOI-MGENI TRANSFER SCHEME - PHASE TWO (MMTS-2):
SPRING GROVE DAM
Preliminary Planning of Wetland Rehabilitation and Biodiversity
Offsets**

FINAL REPORT

Prepared for



Prepared by David Cox



Institute of Natural
Resources NPC

P.O. Box 100396, Scottsville, 3209

Tel: +27 33 3460 796, Fax: +27 33 3460895, info@inr.org.za

Specialist Input and Review by Susie Brownlie



deVilliers Brownlie Associates

Professional Services in
Environmental Planning and Management

21 Menin Avenue, Claremont 7708, South Africa

Tel: +27 21 6744263, Fax: +27 86 5482678, susie.brownlie@dbass.co.za

MAY 2015

DECLARATION OF INDEPENDENCE

I, David Cox, as duly authorized representative of Institute of Natural Resources (INR) Non Profit Company (NPC), hereby confirm my independence, as well as that of the INR as a specialist and declare that neither I nor the INR have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the INR was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the development of a wetland and biodiversity offset plan for Spring Grove Dam. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in this report.



Full Name: David Cox
Title / Position: Principal Scientist
Qualification(s): M Env Dev
Experience (years/ months): 15 years

DECLARATION OF INDEPENDENCE

I, Susie Brownlie, as duly authorized representative of deVilliers Brownlie Associates, hereby confirm my independence (as well as that of deVilliers Brownlie Associates) as a specialist and declare that neither I nor deVilliers Brownlie Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which I was appointed as an Independent Reviewer/ Advisor to the INR, other than fair remuneration for work performed, specifically in connection with the development of a wetland rehabilitation and biodiversity offset plan for Spring Grove Dam. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as described in this report.



Full Name: Susan Frances Brownlie
Title / Position: Member of, and Principal Partner in, deVilliers Brownlie Associates
Qualification(s): MSc (Env Studies)
Experience (years/ months): 30 years

EXECUTIVE SUMMARY

INTRODUCTION

Conditions (3.2.4.1.1: (l) and (m) of the Record of Decision (RoD) for the Mooi Mgeni Transfer Scheme – Phase two (MMTS-2) required that the loss of wetland function and biodiversity be offset. The Department of Water and Sanitation (DWS - previously Department of Water Affairs) is the holder of the RoD, and delegated responsibility for compliance with the RoD to their implementing agency, the Trans-Caledon Tunnel Authority (TCTA).

TCTA appointed the Institute of Natural Resources NPC (INR) in 2011 to prepare plans to meet the conditions of the RoD that could be submitted to the Department of Environmental Affairs (DEA). The INR defined the scope of work and sequence of steps as follows:

- Phase 1: Determining residual impacts and identifying offset options;
- Phase 2: Detailed investigation of candidate offset sites; and
- Phase 3: Finalising offset site selection and preparing detailed offset plans.

This three-phased approach formed the basis of two Environmental Management Plans (EMPs) that were submitted to DEA to address the wetland rehabilitation and offset conditions respectively. Both EMPs were approved by DEA in August 2012.

The first phase in implementing the EMPs involved documenting the loss of biodiversity and ecosystem function within Spring Grove Dam (SGD) basin, and considering existing draft offset policy¹ in arriving at offset targets. This phase culminated in the report titled “MOOI-MGENI TRANSFER SCHEME PHASE II: SPRING GROVE DAM: Summary of Residual Biodiversity Loss in the Dam Basin and Baseline Offset Targets” dated September 2013. The residual impact and offset targets documented in this report are summarised in the following table.

ECOSYSTEM	EXTENT OF LOSS	OFFSET RATIO	OFFSET TARGET
WETLANDS	462 ha	1:3	1 386 ha
GRASSLANDS	210 ha	1:3	630 ha
RIVER	15.5 km	N/A	15.5 km

For clarity, it should be noted that the functional offset target for wetlands (281 hectare (ha) equivalents) was established during the baseline assessment in line with the approach taken in the Draft National Wetland Offset Guideline that requires setting of functional and biodiversity targets for wetlands.

¹ SANBI 2012. Towards a Best Practice Guideline for Wetland Offsets in South Africa (beta version). D MacFarlane, A von Hase and S Brownlie and Ezemvelo KZN Wildlife (2013) Comprehensive Guideline for Biodiversity Offsets: KwaZulu-Natal Province: Final Draft, February 2012.

The decision taken by authorities was however that “a straight area-based approach be adopted which prescribes a ratio of 3:1 for all wetlands, according to the Ezemvelo KwaZulu Natal Wildlife (EKZNW) Draft Offset Policy”. This decision was based on the:

- Issues encountered in applying the first draft of the National Wetland Offset Guideline, and
- The understanding that rehabilitation of a degraded wetland would be required to restore/enhance the biodiversity value, and in so doing a level of functional value would be restored, albeit not as the primary focus.

There is therefore not a requirement to achieve the wetland functional target².

This initial phase of investigation culminated in a stakeholder workshop which considered the requirements of the conditions of authorisation and offset principles in setting aims, objectives and criteria for achieving the offset targets. These formed the point of reference for the next phase of investigation which is documented in this report.

AIMS AND OBJECTIVES OF THIS STUDY

The current study, documented in this report, constitutes Phase 2 of the offset planning process for which the overall aim was ***“The identification, prioritization and investigation of candidate sites to inform detailed planning”***. The specific tasks required as part of the terms of reference were:

1. *Gather outstanding information/data and resolve outstanding issues through engagement with stakeholders*: this information was required to feed into the prioritisation system.
2. *Develop prioritisation system*: based on agreed aims and principles using the data collected and agreed on in task 1.
3. *Identify and prioritise candidate wetland rehabilitation and biodiversity offset areas*: through application of the prioritization system.
4. *Site investigation to refine the list of priority offset sites*: mapping and classifying the type, condition and conservation value of natural systems on prioritized offset sites. The site investigations also involved mapping and defining rehabilitation actions and high level costs for implementing these.
5. *Determine ‘optimum package’ of offset areas required to fulfil conditions of the RoD desired outcomes*: based on the degree to which the sites meet the offset targets.
6. *Compile a draft offset programme document (this document)*: that summarizes the approach taken, identifies and prioritises potential sites, provides a high-level cost estimate of the costs of offset activities, and proposes possible institutional and governance arrangements for offset implementation.
7. *Hold a Second offsets Working Group Meeting to review the Draft Offsets Programme*: to present the draft offsets framework and high-level plans, based on which they will be finalised.

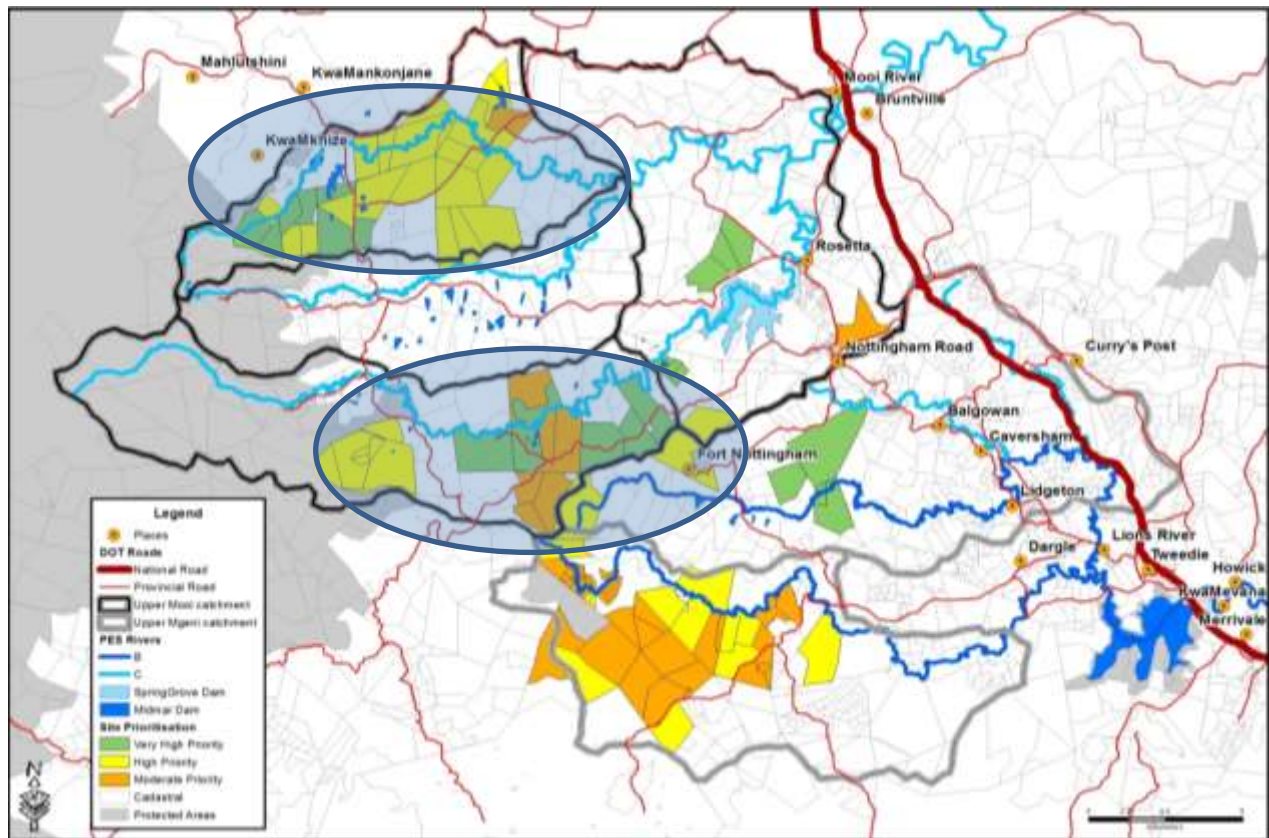
The approach and methods employed in achieving the above are summarized below.

² From an interest point, it was estimated that approximately 560 ha would need to be rehabilitated to restore wetland function, depending on the relative condition of the offset / impact sites. This area is in line with the area identified for rehabilitation in the offset sites investigated in this study i.e. 552.9 ha

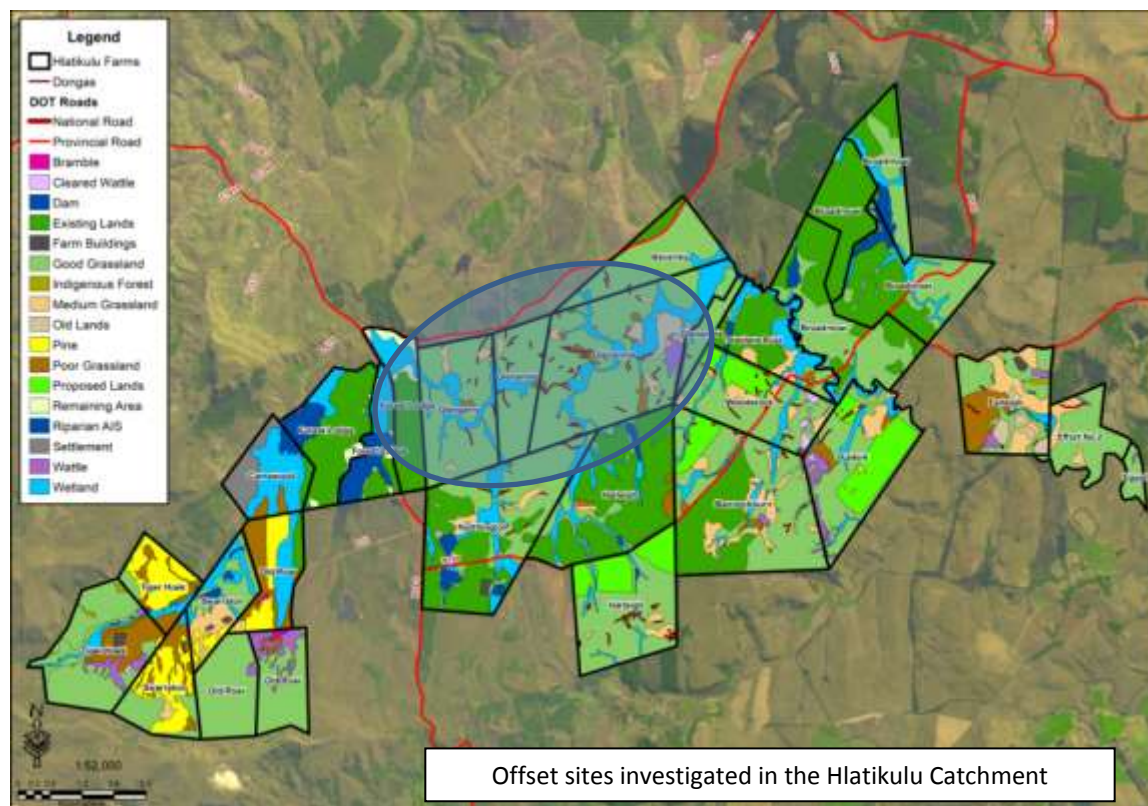
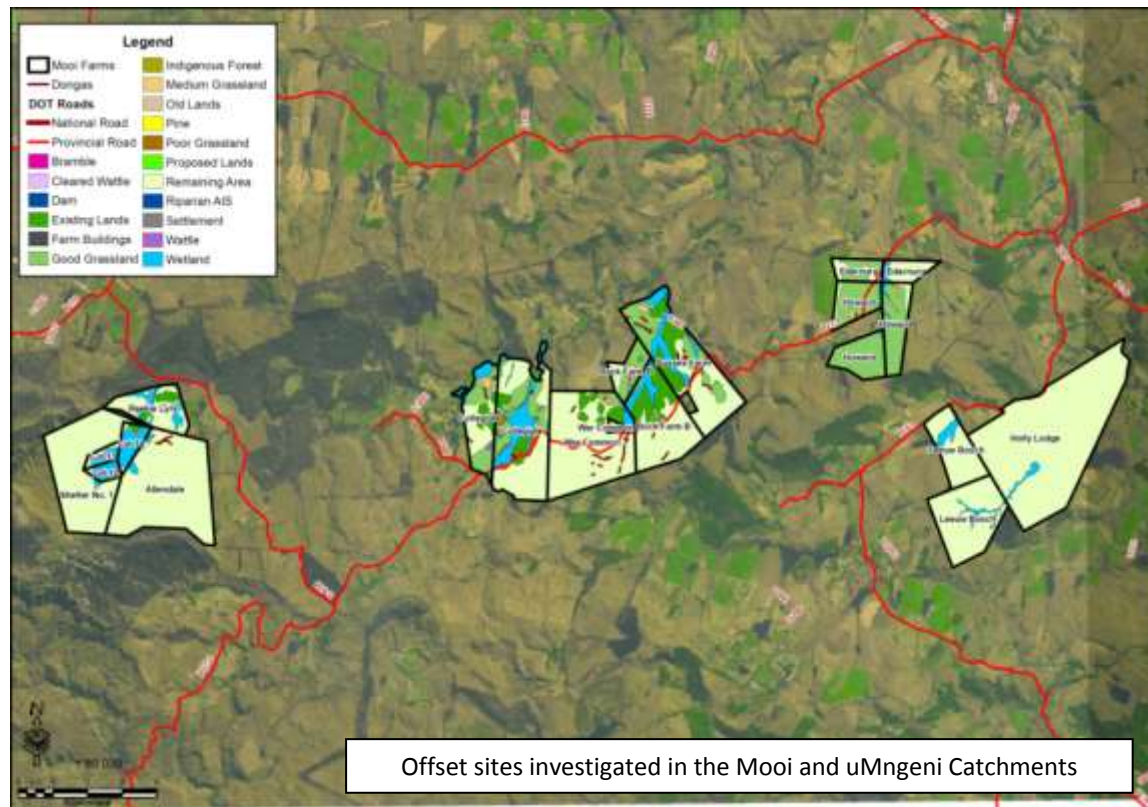
OFFSET SITE PRIORITIZATION & INVESTIGATION

The approach taken was to:

- i. Identify candidate sites based on an existing level of landowner willingness (given the limited time available to engage landowners).
- ii. Develop and apply a prioritization matrix to the initial suite of candidate sites. The matrix included 12 criteria related to those set at the end of phase 1. This resulted in the sites in the Hlatikulu and Mooi River Catchments, circled in the figure below, emerging as priorities.
- iii. Landowners in these priority areas were engaged to explain the offset requirements and what it means for them. Where 'in principle' agreement was established, the offset specialist team investigated each site. This involved:
 - a. Mapping the landcover/use on the property including the extent of natural systems (wetlands, grasslands and rivers) and the potential contribution to the offset targets
 - b. Classifying the type, conservation value and condition of the natural systems
 - c. Identifying impacts within these systems that would require attention to improve the biodiversity and functional value of the systems. Examples of these impacts include alien invasive species, drains in wetlands and erosion in the grasslands
 - d. Establish the nature and scale of interventions required to address the impacts, as well as high level costs for these interventions which include clearing alien invasive species, structures in drains in wetlands.



The investigation identified over 6 000ha of grassland, 66km of river and 1 490ha of wetland on 33 properties owned by 15 landowners from which to meet the offset targets and objectives. The outcomes of the investigation are spatially depicted in the figures below.



Within this suite of options, the investigation identified 19 properties (11 landowners) in the Hlatikulu Catchment as offering the largest area for achieving the offsets with over 4 000ha of good condition grassland, 965 ha of wetland and 42km of river. Within these, the investigation further identified the properties Glennannie and Glengarry (highlighted in the figure above) as the most appropriate in terms of both their area contribution to the offset targets and their suitability in terms of biodiversity value and suitability according to the offset objectives and criteria agreed at the outset.

CONSIDERATION OF THE MPOFANA IRRIGATION PROJECT

Offset planning needs to take cognisance of the socio-economic context within which plans are being developed and the potential 'knock-on' effects of securing sites as offsets. Stakeholder engagement has therefore been an important element of the investigation. Of the stakeholders engaged, the Mpofana Irrigation Project (MIP) is particularly notable. The MIP is a large scale, multi-faceted agricultural project being planned within the Mooi River Catchment. The project involves the development of a combination of large dams, irrigation projects and agricultural training across the beef, dairy and associated sectors. The project is therefore closely related to the MMTS-2 project in terms of the study area, the landowners and stakeholders involved. The MIP and associated organisations, Mooi River Irrigation Board and Farmer's Association, include many landowners on whose properties offsets have been investigated. The MIP project will also require offsets, and there is consequently the potential for synergy, competition and conflict between the two projects regarding the need for, and availability of, sufficient and appropriate offsets for both projects as they are focussed in the same catchments. Given that the SGD Offset planning is more advanced, the risk to the MIP is that optimal/cheaper offset sites are secured for SGD on properties where the landowners are members of the MIP and or other affiliated organisations such as the irrigation board or farmers association. Through the engagement process³ it was agreed that the SGD offset investigation would include a high level consideration of:

- i. The offset requirements for the MIP
- ii. The implications for the SGD prioritization and planning for the MIP in terms of offsets.

Accordingly, high level estimation was therefore made of the offset requirements for the proposed MIP. The investigation established the offset targets for the MIP to be approximately 15.5km of river and 492 ha of wetland, noting that:

- The same offset ratio of 3:1 used in the SGD process was applied.
- This is a 'worst case scenario' estimation given that not all of the dams being investigated are likely to be constructed.
- There is limited impact on grasslands based on the understanding that the irrigation will be of existing dry arable land, and there is limited grassland within the MIP dam sites.

Based on this assessment, the high-level process has:

- Established a process, matrix and data for use in prioritizing offsets in this area.
- Established high level offset targets for the MIP.
- Identified surplus length of river that will account for the MIP offset requirements.

³ Meeting between Graham Armstrong (chairperson of the MIP) and David Cox (Offsets planning team leader) held on 12 August 2014 in Nottingham Road. Minutes of the meeting are included in Appendix 1.

- Identified an area of wetlands (approx. 150ha) that is surplus to SGD offset requirements that could contribute to meeting a portion of the MIP requirements.
- Identified alternative sites that could be targeted in the MIP process, that were not investigated in the SGD process.

In summary, the SGD process has provided useful baseline for the MIP. Engagement needs to be maintained with this important role player to sustain the synergies as the MIP planning and authorisation process moves forward in parallel with the next phase of the SGD offset planning.

BUDGETING

High level budgeting was undertaken for the sites that were investigated. A conservative approach was followed to the budgeting which covered the various phases required to achieve the offset, namely, detailed planning, establishment, implementation and long term management and monitoring. It also took account of other costs such as obtaining Environmental Authorisation, included a contingency and escalation of 8% per annum over a 30 year period. The high level budget arrived at, based on using the priority sites (Glenannie, Glengarry and adjoining sites), was approximately R48 million). The finance to implement the offset still needs to be secured. Two options are proposed for DWS to source the necessary funds, these being from Treasury as portion of the annual budget, or via an adjustment to the water tariff. The latter was considered the most appropriate option as it gives effect to the polluter pays principle and the tariff has been structured to meet all other project costs (including all other mitigation measures). Other options may be identified during the detailed planning phase.

GOVERNANCE FRAMEWORK

A governance framework (institutional and financial framework with supporting processes and mechanisms to secure the necessary relationships and the flow of information and finance) is necessary for the implementation of the detailed offset plans. This framework is therefore as important as the plans themselves. It is acknowledged that DWS does not have the skills and capacity to implement the offset (undertakes rehabilitation, monitor and manage offset sites, etc.) and that there are other government agencies, Non-Governmental Organisations (NGOs), etc. that are better placed to do so. A framework is proposed with options provided for different actors to perform different roles, based on a consideration of mandates, capacity and existing relationships and initiatives in the offset planning area. The framework is based on the assumption that DWS, as the holder of the RoD, must provide the finance for implementing the offset; this position was expressed as a requirement of the roleplayers engaged in the offset planning process.

WAY FORWARD

This investigation has focussed on where the offset should be implemented and provided a high level understanding of what needs to be done and by whom, and the costs for doing so. To take the process forward, detailed planning is required in order for the plans to be refined and confirmed, and in so doing also the budget. Detailed planning would broadly involve:

- Detailed discussion and agreements with landowners regarding the areas to be utilized for the offset, the selected mechanism for securing the site in the long term (level of stewardship), whether the entire property or offset areas are secured
- Detailed design and planning of rehabilitation actions
- Detailed fieldwork to inform the preparation of site-specific plans for management, monitoring and evaluation
- Finalising the governance framework, by engaging roleplayers to confirm respective responsibilities for implementation and initial rehabilitation work, ongoing management, monitoring and evaluation, auditing, and compliance checking and enforcement. Binding agreements between roleplayers will need to be drawn up where none exist
- Refining the budgets for offset implementation based on the finalisation of details for all of the above
- Refining and finalising the budgets for all of the above.
- As finance has not been made available for the detailed planning phase this is the first step required to proceed with this process.

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LIST OF ACRONYMS

CCA1	Critical Conservation Area 1
DAFF	Department of Agriculture, Forestry and Fisheries
DARD	Department of Agriculture and Rural Development
DEA	Department of Environmental Affairs
DORA	Division of Revenue
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EI	Ecological Infrastructure
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EKZNW	Ezemvelo KZN Wildlife
EMP	Environmental Management Plan
EWT	Endangered Wildlife Trust
ha	Hectare
HCMA	Hlatikulu Collaborative Management Area
HCMA	Hlatikulu Collaborative Management Association
IHI	Index of Habitat Integrity
INR	Institute of Natural Resources
km	Kilometres
KZN	KwaZulu Natal
M&E	Monitoring and Evaluation
MIP	Mpofana Irrigation Project
MMTS	Mooi Mgeni Transfer Scheme
MP	Management Plan
MoA	Memorandum of Agreement
NEMA	National Environmental Management Act
NEMPA	National Environmental Management Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Governmental Organisation
NPC	Non Profit Company
NRM	Natural Resource Management
PES	Present Ecological State
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SANBI	South African National Biodiversity Institute
SGD	Spring Grove Dam
SI	Sinuosity Index
SOCS	Sites of Conservation Significance
TCTA	Trans-Caledon Tunnel Authority
UEIP	Umgeni Ecological Infrastructure Partnership
UWP	Ukhahlamba-Drakensberg World Heritage Park
WWF	World Wildlife Fund

1. INTRODUCTION

1.1 Project Background and Context

Phase 2 of the Mooi-Mgeni Transfer Scheme (MMTS-2) involved the construction of Spring Grove Dam (SGD), a transfer system (pumping station and pipeline) and associated infrastructure. The SGD dam wall is located on the Mooi River, approximately 2km upstream of the Village of Rosetta. The dam wall is 37.7m high and at full supply the water body will inundate an area of approximately 1 022ha (Figure 1). Inundation commenced in March 2013 and the dam is currently approximately 80% full. The transfer system portion of the project was subject to a separate application for Environmental Authorisation (EA).

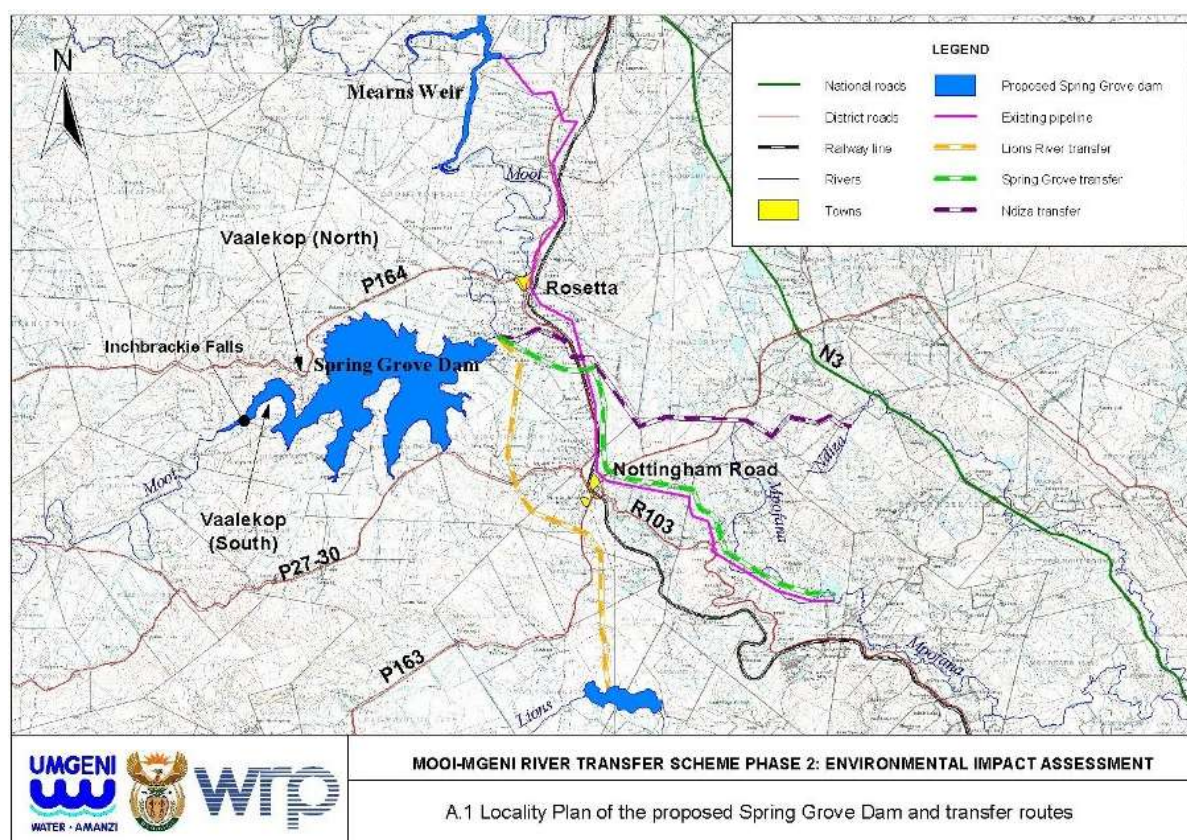


FIGURE 1 Location of extent MMTS-2 elements

Feasibility studies on the proposed MMTS-2 project started in 2000 culminating in the biophysical impact assessment⁴. The specialist studies during this phase of investigation identified the loss of wetlands as a significant issue warranting mitigation through off-site rehabilitation of wetlands. This recommendation prompted a bridging study in 2004 to identify wetland sites for rehabilitation⁵ and associated rehabilitation planning.

⁴ Biophysical Impact Assessment by WRP Consulting Engineers, including specialist botanical, wetland, fish, small mammal, amphibian, reptile, invertebrate and bird surveys carried out in 2002.

⁵ Cox D, D Kotze and W Russell (2004) report entitled Identification of Wetland Rehabilitation as a Mitigation Measure for the Wetlands Submerged in the Spring Grove Dam.

The project came back on line in the late 2000s, when the application for EA was submitted. The final Environmental Impact Report (EIR) was dated January 2009 and the Record of Decision (RoD) was issued on 15 June 2009. The need to compensate for residual negative impacts on biodiversity was expanded from a wetland focus only to include the loss of all biodiversity, as defined in the following two conditions of environmental authorisation issued by the Department of Environmental Affairs (DEA):

“3.2.4.1.1:

(l) A detailed plan for the rehabilitation of off-site wetlands in the Mooi and Mgeni catchments to mitigate the loss of wetland function and habitat (including base monitoring). Separate plans must be submitted for each individual wetland to ensure site specific issues are included. It is recommended that the Applicant work with The Working for Wetlands programme overseen by the South African National Biodiversity Institute (SANBI) since rehabilitation activities may trigger activities listed in terms of the regulations, 2006; and which will then require an environmental assessment.

(m) A detailed plan of action to establish offset areas to compensate for the loss of biodiversity and habitat, and for their management during the operational phase of the MMTS-2.

The Department of Water and Sanitation (DWS - previously Department Water Affairs) is the holder of the RoD. The former Minister of Water Affairs and Forestry directed the Trans-Caledon Tunnel Authority (TCTA) to implement and fund the MMTS-2 project.

1.2 Phasing of Work Required to Meet Conditions of Environmental Authorisation

Two Environmental Management Plans (EMPs) were submitted to DEA to address the wetland rehabilitation and offset conditions respectively. These plans comprised of three distinct phases for meeting the requirements of the conditions, namely:

- Phase 1: Determining residual impacts and identifying offset options;
- Phase 2: Detailed investigation of candidate offset sites; and
- Phase 3: Finalising offset site selection and preparing detailed offset plans.

The phased approach allows for high levels of consultation and continued refinements as the process unfolds, recognising that the outcomes of each of the phases may result in a modification to the following step to reach the required output i.e. detailed offset plans for consideration by the authorities. It also allows for a higher level of confidence in detailed planning if there is initial prioritization. This avoids expensive detailed assessment of a large number of sites.

Both EMPs were accepted by DEA in August 2012 on condition that programmes incorporating the detailed plans referred to in the conditions were submitted for approval. It was acknowledged in both EMPs that, while they addressed wetland rehabilitation and biodiversity offsets separately due to the separate requirements from DEA in the environmental authorisation, both conditions ultimately relate to and constitute ‘biodiversity offsets’. For this reason, wetland rehabilitation and biodiversity offsets are dealt with in an integrated manner.

SUMMARY OF THE OFFSET PLANNING PROCESS

- **Phase 1** of the work has been completed, as described in the next section.
- **The current study constitutes Phase 2**, to inform the final phase of offset work. It identifies and prioritises potential sites, provides a high-level estimate of the costs of offset activities, and recommends *possible* institutional and governance arrangements for offset implementation.
- The future **Phase 3** of the work comprises finalising site selection, negotiating with landowners and obtaining commitment regarding suitable legal, financial and stewardship arrangements for offsets, preparing detailed plans for offset work at each of the selected sites, and finalizing the costing. These activities would essentially be undertaken in parallel.

1.3 Outcomes of Phase 1: Residual Impacts and Offset Targets

Following acceptance of the EMPs, the first phase in implementing them involved documenting the loss of biodiversity and ecosystem function within SGD, and considering existing offset policy in arriving at offset targets. This phase culminated in the report titled “MOOI-MGENI TRANSFER SCHEME PHASE II: SPRING GROVE DAM: Summary of Residual Biodiversity Loss in the Dam Basin and Baseline Offset Targets” dated September 2013. The conclusions of that report are summarized as follows:

1.3.1 Summary of Residual Impact

*A large proportion of the dam basin is classified as a Critical Conservation Area 1 (CCA1), i.e. these areas are **irreplaceable** if provincial conservation targets are to be met. The conservation status of biodiversity that will be residually impacted is significant at a number of levels, contributing the CCA1 status of the areas, and is described below.*

– **Ecosystems**

*Areas of two wetland and two grassland types will be lost; **all four ecosystem types are listed as Vulnerable in terms of provincial conservation targets.***

– **Species**

*There is a **high concentration of South African and regional endemic species**, as well as a **number of species with high threat status** (ranging from Vulnerable to Critically Endangered) **across all taxa** (mammals, birds, amphibians, reptiles and plants) within the dam basin.*

– **Unique Habitats**

*The **habitat provided by the Inchbrakie Falls is considered unique** and supports a community of plants with high conservation value. The loss of this irreplaceable habitat **cannot be offset.***

– **Ecological Processes**

Spring Grove Dam (SGD) will establish a significant barrier to the use of the Mooi River valley as a corridor for the movement of terrestrial species from west to east. Given the extent and ‘absolute nature’ of the barrier presented by SGD, it can be assumed that it will impact the movement of terrestrial species at some level⁶.

– **Ecosystem Function**

An assessment of the loss of ecosystem services value across the various systems concluded that:

- i. There is no loss of services that will result in specific users being disadvantaged to a degree that warrants additional activities in terms of offsets activities or compensation.
- ii. The critical services that are affected are across users and scale at a societal level and relate to water services, these being: water supply, water regulation, flood attenuation and waste water treatment.
- iii. The delivery of these services was also considered with the dam in place. In the case of several of these services, the dam provides either a different or better level of service. For example, in the case of water regulation, the ability of the dam to regulate water supply to meet the significant demand downstream by distant users i.e. Durban and Pietermaritzburg is increased (assuming authorised releases to downstream users in the Mooi River are maintained). Similarly, the dam provides a significant capacity to attenuate.
- iv. Maintaining the capacity of the dam to provide good quality water increases the importance of managing its catchment. The proposed offset measures i.e. wetland and grassland rehabilitation and protection will result in the improvement of the key services (water regulation and quality) in the catchment.

Figure 2 and photos 1, 2 and 3 provide a visual representation of the extent, nature and location of the natural systems lost within SGD Basin.

⁶ This issue was not identified or assessed in any detail in the EIA process.

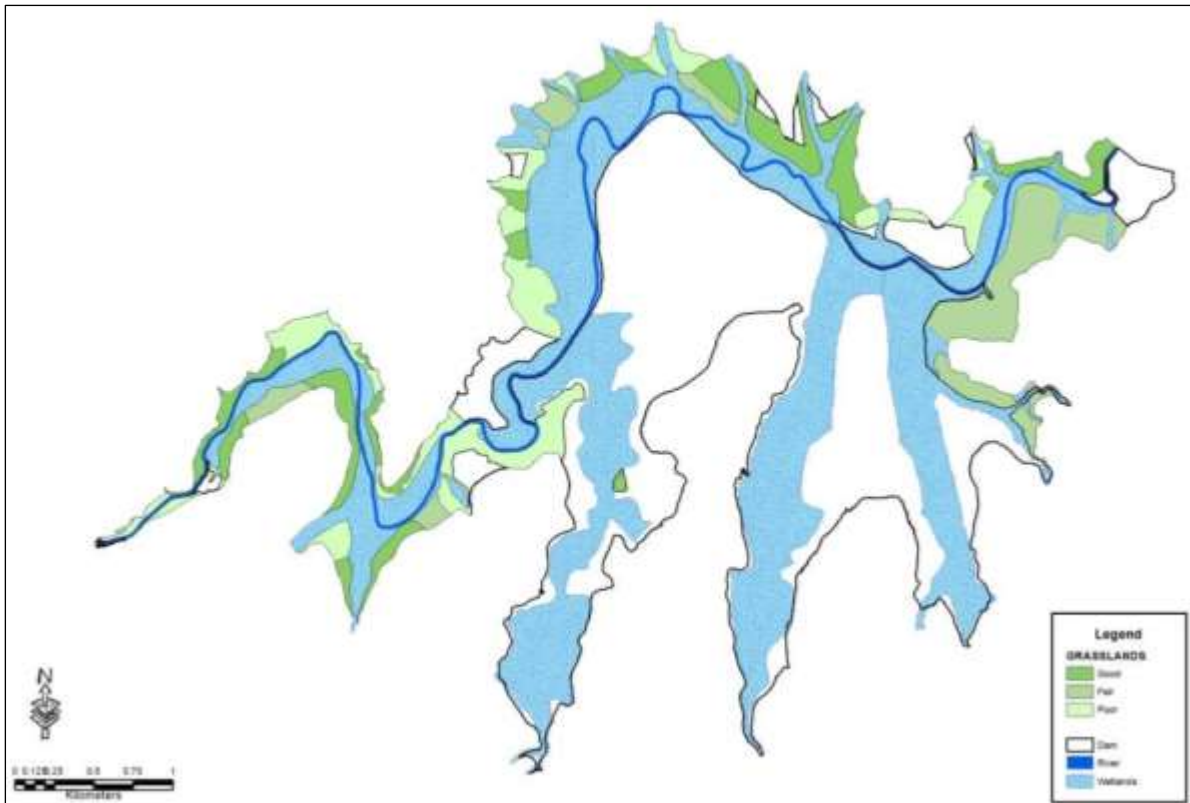


FIGURE 2 Spatial extent and location of natural systems within Spring Grove Dam Basin



PHOTO 1. Example of grasslands in good condition which cover approximately 73ha of the total SGD basin area.



PHOTO 2. Natural wetland vegetation within a channelled valley bottom wetland (this area of this wetland is approximately 70ha in extent).



PHOTO 3. Inchbrakie Falls provides unique habitat for rare fynbos plant species.

1.3.2 Offset Targets

Available draft policy guidelines listed below were applied to the residual loss of biodiversity in determining the offset targets⁷:

- i. The Draft National Guideline for Wetland Offsets (SANBI 2012) in its 'beta' or 'trial' version prior to refinement, referred to as 'the Draft National Guideline'.
- ii. Ezemvelo KZN Wildlife (2013) Comprehensive Guideline for Biodiversity Offsets: KwaZulu-Natal Province: Final Draft, February 2013, referred to as 'the Draft EKZNW Guideline'.

A summary of the residual loss per system (area/distance/type and condition), the offset targets proposed in the phase 1 report, along with the policy document applied in determining these targets, is provided in Table 1.

TABLE 1 Summary of the residual impact and offset targets.

ECOSYSTEM	CLASSIFICATION & CONDITION	TOTAL EXTENT	POLICY & RATIO	OFFSET TARGET
WETLANDS (Functional) Target	National Wetland Classification (Sub-Escarpment Grassland Group 5) Eight Wetlands were inundated within SGD 1. Floodplain (Health – C, Area 166 ha) 2. Channelled valley bottom 1 (Health D, Area 70 ha)	462 ha	Draft National Guide Ver1 (Area*Health)	281 ha equivalents ⁸
WETLANDS (Biodiversity) Target	3. Channelled valley bottom 2 (Health D, Area 92 ha) 4. Channelled valley bottom 3 (Health D, Area 88 ha) 5. Channelled valley bottom 4 (Health C, Area 18 ha) 6. Unchannelled Valley bottom 1 (Health C, Area 8 ha) 7. Hillslope seep 1 (Health B, Area 11 ha) 8. Hillslope seep 2 (Health C, Area 9 ha)	462 ha	Draft EKZNW guideline (Ratio 1:3)	1 386 ha
GRASSLANDS (Biodiversity) Target	Mooi River Highland Grassland (MRHG) ▪ Good 73ha ▪ Medium 44ha ▪ Poor 75ha Drakensberg Foothill Moist Grassland (DFMG) ▪ Medium 23ha	210 ha	Draft EKZNW guideline (Ratio 1:3)	630 ha
RIVER (Biodiversity) Target	Provincial River Type 5901 ▪ Sinuosity Index 1.78 ⁹ ▪ Present Ecological State – Category B) ▪ Lost contribution to provincial river type ² – 6.25%	15.5 km	NA	15.5 km

⁷ Note: Although the key findings of that report are reproduced here, the detailed explanation of the policy setting and motivation for arriving at wetland rehabilitation and biodiversity offset requirements are not repeated in this document. This report must be read in conjunction with the 'Summary of Residual Biodiversity Loss in the Dam Basin and Baseline Offset Targets' report for Spring Grove Dam (September 2013) and the supporting specialist reports.

⁸ The required area of wetland to achieve this target depends on the scope for wetland restoration/ rehabilitation, and thus the 'gains' in condition that could be achieved: the greater the gains the less the wetland area required. It is estimated that 560 ha would need to be rehabilitated, depending on the relative condition of the offset/impact sites).

⁹ Based on a river actual path length of 15.7km and a shortest path length of 8.8km.

It is important to note that:

- In the case of wetlands, the Draft National Guideline requires the setting of a ‘Functional Target’ (which focuses on maintaining the water-related ecological processes and services, and which is established by multiplying the area impacted by the dam by the condition of the system), and a Biodiversity Target (which focuses on fully compensating the loss of the intrinsic value of the affected wetlands as ecosystems and in providing habitat for species).
- The ratio against which the offset target for wetlands and grasslands (to compensate for biodiversity loss) is set, is informed by the conservation status of the impacted system and biodiversity targets for those systems as defined by the EKZNW Draft Offset Policy.
- There is no existing policy that defines offset ratios for rivers. In the absence of such guidance, a ratio of 1:1 was applied as a minimum.
- The condition or quality of impacted wetland, grassland and/or riverine habitat was taken into account, to be used in determining a final offset requirement.

Upon review of the proposed targets, the authorities decided that, a straight area-based approach be adopted which prescribes a ratio of 3:1 for all wetlands, as per the EKZNW Draft Offset Policy. This decision was based on the;

- Issues encountered in applying the first draft of the National Wetland Offset Guideline, and
- The understanding that rehabilitation of degraded wetland would be required to restore/enhance the biodiversity value, and in so doing, a level of functional value would be restored, albeit not as the primary focus.

There is therefore not a requirement to achieve the wetland functional target¹⁰. The final targets agreed by the authorities were as follows:

ECOSYSTEM	EXTENT OF LOSS	OFFSET RATIO	OFFSET TARGET
WETLANDS	462 ha	1:3	1 386 ha
GRASSLANDS	210 ha	1:3	630 ha
RIVER	15.5 km	NA	15.5 km

Having established offset targets, the “what, where, how, when and by whom” of achieving the offsets needed to be defined according to the context within which they are being planned and implemented. This requires establishing clear aims and objectives for the offsets, as described in the following section.

1.3.3 Setting Offset Aims and Objectives

A core principle of biodiversity offsets is that the process must involve stakeholders in defining the aims, objectives and criteria which will define where, how and by whom the offset targets will best be achieved. Adhering to this principle is particularly relevant given the range of existing

¹⁰ From an interest point, of it was estimated that approximately 560ha would need to be rehabilitated to compensate for loss of wetland function, depending on the relative condition of the offset/impact sites. This area is in line with the area identified for rehabilitation in the offset sites investigated in this study i.e. 552.9ha.

conservation and natural resource management initiatives in the Mooi and uMngeni River Catchments. Important examples include:

- ***Conservation Initiative***

The KwaZulu Natal (KZN) Stewardship programme, the Midlands Conservancies forum, and various NGO-driven conservation programmes like the Endangered Wildlife Trust Crane and Oribi Working Programmes.

- ***Natural Resources Management Programmes***

The Umgeni Ecological Infrastructure Partnership (UEIP) has recently been established. This partnership is focussed on investing in Ecological Infrastructure (EI) through rehabilitation and protection of EI in the Mooi and uMngeni River catchments, and involves a cross section of government, NGO and civil society organisations. There are also several of the National DEA: Natural Resource Management (NRM) programmes that operate within the region; they include 'Working on Wetlands', 'Working for Water', 'Working on Land', 'Working on Fire' etc. There are additional NRM programmes run through other national and provincial government agencies, e.g. LandCare, run by the National Department of Agriculture, Forestry and Fisheries (DAFF). The Department of Agriculture and Rural Development (DARD) also operates a provincial LandCare Programme.

- ***Landowners***

The potential offset area is dominated by land under private tenure. The co-operation of landowners is therefore an essential requirement if the offsets are to be realised. There are several forums and organisations representing landowners with different interests. They include farmer associations and the Mooi River Irrigation Board. Landowners are also involved in organisations concerned with conserving biodiversity on their land. Conservancies are the traditional structure for such collaboration.

- ***Other Large-Scale Development***

There are a number of large-scale developments being considered in the potential offset area, such as the MIP and developments driven by Local Government in fulfilling their Economic Development and service provision mandates.

There is both potential for synergy and/or conflict between these various initiatives and the SGD offset planning process. Furthermore, several of the role-players mentioned above may assist with or play a role in the offset process. An 'Offsets Working Group' was therefore established in Phase 1 of the offset planning process with the purpose of involving role-players in the offset design and implementation process. The scope of the consultation process has involved engagement with a broad range of stakeholders including both individual and landowner associations, conservation NGOs and consultants working with the landowners, and a range of government authorities whose mandates require their involvement in the process. Appendix 1 provides a summary of the stakeholder consultation that has taken place during this phase of the offset planning process.

The first engagement of the Offset Working Group was a workshop held on 22 August 2013. The purpose of the workshop was to: ***“Establish offset objectives and options for meeting these through***

optimizing synergies with aligned programmes within the Mooi and Mgeni catchments”, and had the following objectives:

- i. Provide an understanding of the biodiversity loss within the SGD basin.
- ii. Present and agree on the offset targets.
- iii. Establish aims and objectives for the SGD Offsets.
- iv. Establish an understanding of the aims, objectives, programme and spatial focus of aligned initiatives.
- v. Identify how the SGD offsets programme can add value to other initiatives and *vice versa*.
- vi. Establish a process and mechanisms for taking forward the synergies identified in the workshop.

The primary purpose was to establish the guiding aims and objectives for achieving the offset. The two key inputs considered in establishing aims and objectives were i) offset principles, and ii) the requirements of the conditions of authorisation. These guiding requirements and the agreed way in which they will be met are summarized in Table 2 below.

The aim of the offset was agreed to be defined in the relevant conditions of the RoD and summarised as: ***“To offset the loss of wetland function and biodiversity resulting from the inundation of Spring Grove Dam Basin”***.

TABLE 2 Alignment of the Offset Objectives with requirements of the RoD and Offset Principles

REQUIREMENT	RESPONDING OBJECTIVE
Requirements of the Conditions of Authorisation	
i. The required output are ‘Detailed plans of action/ planning’ involving ‘separate plans’ for each offset site	<i>Recommend detailed offset framework and specific plans per offset site including amongst others:</i> detailed designs for offset activities, detailed quantities and associated costs for constructing/undertaking offset activities including labour, materials professional services, signed agreements with all relevant role-players, financial instruments and arrangements and signed agreements formalising the institutional arrangements and individual responsibilities of role-players.
ii. Mitigate the loss of wetland function.	<ul style="list-style-type: none"> – <i>Select sites located above the MMTS impoundments</i> in the selected catchments, namely Mearns, Spring Grove and Midmar Dams. The benefits of water-related ecosystem services (improved flow and quality) will accrue within these impoundments. – <i>Consider water quality issues in selecting offset sites</i> i.e. point sources of pollution and areas of poor water quality. – Strive to <i>compensate for loss of wetland function by rehabilitating degraded wetlands and protecting intact wetlands</i> from likely transformation and degradation.
iii. The offset plans need to compensate for the “loss of biodiversity and habitat” .	<ul style="list-style-type: none"> – <i>Use biodiversity prioritization layers</i> in offset site prioritization i.e. EKZNW Minset, National Freshwater Ecosystem Priority Areas (NFEPA). – <i>Consider biodiversity at an ecosystem level</i>, and at a species level using Cranes (Wattled and Blue Species) as an indicator for other grassland and wetland species – utilise Endangered Wildlife Trust (EWT) crane data. – Establish and <i>consider the condition of the habitat at the offset site</i> in the prioritization process.

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iv. The RoD condition requires that the offsets be managed for the “ operational phase of the dam ”.	A minimum of 30 years must be built into the mechanism selected for securing the offset and the associated management agreement. ¹¹ Budgeting has also provided for management costs over this period.
v. The offsets should be identified in the Mooi and Mgeni Catchments ”.	The offset study area is defined as the upper Mooi (including the Little Mooi and Hlatikulu Rivers), and the upper Umgeni River catchments .
vi. In the case of wetland offsets, the applicant “ works with the SANBI Working for Wetlands programme since rehabilitation activities may trigger activities listed in terms of the regulations”.	The Working for Wetlands and range of other ‘Working for’ programmes’ will be engaged in the planning process given: <ul style="list-style-type: none"> – The potential for them to act as offset implementers, and – The potential for them to assist in obtaining any EAs required for offset activities through the standing agreements and procedures they have in place with the DEA.
Offset Principles	
vii. Offset “like for like” i.e. the offset should be of the same biodiversity type that is lost.	Apply data sets to confirm ‘like for like’. Use data sets confirming wetland, grassland and river types as per provincial classification, and higher definition data.
viii. Offset as close to the site of impact as possible.	Prioritize sites within the Mooi-River Catchment and adjacent Spring Grove Dam basin (see ii and iv).
ix. Secure the offset in ‘perpetuity’.	Only consider options that secure the offset in the long term: <ul style="list-style-type: none"> – Nature reserve, protected environment or biodiversity agreement (for at minimum 30 years) under the Stewardship options. – Conservation servitude. (Also see iv. above).
x. Optimize efficiency of offset sites.	<ul style="list-style-type: none"> – Prioritize sites that include all three systems – river, wetland and grassland - and that support affected and indicator species. – The larger the site or proportion of the target achieved by that site, the higher the priority.
xi. Consider features that cannot be offset.	It is acknowledged that the Inchbrakie Falls are unique and cannot be replaced. The selection of offset river sections including waterfalls with similar habitat should however be prioritized.
xii. Ensure additional conservation outcomes	Only consider options that represent new measures to avoid probable loss of biodiversity through protection and/ or to rehabilitate/ restore degraded habitat.

The aims, objectives and associated criteria for identifying and prioritizing offset sites formed the point of departure and guiding framework for proceeding with the preliminary planning documented in this report.

1.4 Report Purpose and Structure

This purpose of this report is to: “**Document the process followed and outcomes of the offset identification, prioritization and preliminary planning phase**”. It does so in separate sections by:

- Summarizing the approach for identifying an initial set of possible offset sites and prioritizing them for further investigation (Section 2).
- Investigating and planning those offset sites that emerged as having most potential from the prioritization exercise (Section 3).

¹¹The operational life of the dam is reported to be 50 years. A 30 year period is however considered to be reasonable as a minimum as it relates to a ‘generation’ of a particular land owner, and is the period used in stewardship agreements which will form the likely mechanism used to secure offset sites.

- Determining a preliminary budget for implementing biodiversity offsets and proposing a potential institutional/governance framework for the implementation of the offsets (Section 4).
- Analysing the most appropriate sites within the options to meet the conditions of the RoD, and the costs for focussing on these sites (Section 5).
- Proposing a governance framework for the further phase of offset planning and implementation (Section 6).
- Summarizing key steps to be undertaken in the way forward (Section 7).

1.5 Assumptions and Limitations

The following assumptions and limitations need to be considered when reviewing the document.

- i. Ideally an offset should be planned and implemented prior to the impacts taking effect. However, in this case, the process of offset planning has been left late in the overall project process. This timing, as well as the relatively short period in which to plan offsets, has restricted the depth of landowner engagement and limited consideration of some possible options for financing the offsets (e.g. adjustment of the water tariffs with downstream municipalities). In addition, little if any, consideration has been given to date to the implementation of offsets and the associated financial provision; these costs were not factored into the overall project budgets. There is consequently uncertainty regarding how and when budget for final planning and implementation will be secured.
- ii. It has been a limitation having to engage with stakeholders in a context of uncertainty with regards the likelihood of implementation arising from the issue described in (i), above.
- iii. The issue related to funding and associated delays in implementing this plan may lead to a loss of momentum with landowners. These delays could potentially lead to some offset options falling off the table, requiring that much of this planning is redone (as was the case post the 2004 bridging study).
- iv. The field work was undertaken in winter due to the project deadlines. This is not optimal for assessing the state and biodiversity importance of wetland and grassland systems and/or determining offset requirements accurately, as the vegetation is an important indicator of the health of these systems, and is dormant at this time of year. Moreover, some potential species of conservation concern would not have been detectable at this time.
- v. As noted in Section 1, the EA was issued for the construction of the dam and separate EIA processes were followed for the transfer pipeline, powerlines and other elements of the MMTS II project. The consideration of offsets in this report therefore relates only to the residual impact of constructing SGD.
- vi. Following from point (v), the offsets investigation and planning process does not consider the downstream impacts of the transfer scheme in terms of altered flow characteristics

(volume, timing and variability). Apart from this impact relating to a separate EIA process for the pipeline which facilitates the transfer, it was also not considered because offset principles require that 'significant' residual impacts are offset. As per the following extracts, the EIA concluded that the impact on Mooi River system downstream of SGD would be of low significance, and for the receiving streams it would be reduced to "medium significance" if the proposed mitigation were implemented i.e. the IFR was built into the dam operating and the transfer rules.

DOWNSTREAM OF DAM								
9.1.11.1	Decrease in flow volume	Regional	Post-decommission	Medium	Probable	Medium	Medium	Low
9.1.11.2	Decrease in sediment load	Regional	Post-decommission	Medium	Probable	Medium	Medium	Low
9.1.11.3	Change in temperature and oxygen content of Mooi River	Regional	Post-decommission	Medium	Probable	Medium	Medium	Low
RECEIVING STREAMS OF WATER TRANSFER								
9.3.1	Erosion of riverbanks	Regional	Post-decommission	Medium	Probable	High	Medium	Medium
9.3.2	Raised water levels	Regional	Post-decommission	High	Definite	High	-	-
9.3.3	Flow stability and biodiversity	Local	Post-decommission	Medium	Probable	High	Medium	Medium

- o *The Reserve in terms of Section 1(1)(xviii) of the National Water Act (Act 36 of 1998) (NWA) provides for the water needs of humans and the water required to protect the aquatic ecosystems of the water resource. The water resource operating rules for the Mooi River Catchment will be implemented to ensure that the Reserve requirements are met. The Reserve for the Mgeni River has not been determined yet, but previously determined flow management measures will be implemented during transfers of water.*

In addition to the implementation of the IFR, more specific mitigation was proposed for the receiving stream impacts in the EIA. Stakeholders raised a concern about the efficacy of the IFR and operating rules, particularly on the receiving streams during the offsets planning process. While the authors have concerns about the accuracy of IFRs', especially were they seem outdated and with few local reference sites, it was beyond the scope of the offsets investigation to review the accuracy of the IFR and or question the conclusions of the EIA in terms of the significance ratings.

- vii. It became clear in the first phase of the offset investigation (baseline and target setting) and in this planning phase that river systems have not received the same attention as terrestrial or wetland systems in the development of offset policy in South Africa. This is illustrated by the lack of guidance in the case of rivers in the Draft KZN Guideline, or specific offset ratios as developed for terrestrial systems. This led to the application of a basic 1:1 ratio for the length of river lost within the dam basin, which is not based on any scientific grounding. In the absence of policy, it was decided to restore and secure at least an equivalent length of river lost. The neglect of rivers in the development of biodiversity offset policy has been raised with South African National Biodiversity Institute (SANBI) who is drafting the National Guideline and reviewing draft provincial biodiversity offset guidelines.

2. INITIAL OFFSET SITE SELECTION & PRIORITIZATION

2.1 Point of Departure

The point of departure for the initial site selection was that offsets would need to be secured on privately-owned land through some form of stewardship arrangement, rather than through land acquisition¹². Protection of these offset sites against future transformation and associated biodiversity loss, as well as rehabilitation of degraded habitat and effective ecosystem management, would constitute acceptable activities to satisfy the conditions of environmental authorisation.

The issue of 'Averted Loss' is important to understand and consider within the context of this investigation. It was apparent through engagement with landowners that, regardless of landowners placing value in or having a preference for extensive agricultural practices like beef farming, the combination of financial pressure, uncertainty regarding land tenure and personal circumstances (no next of kin interested in continuing with farming) means that there is significant pressure to transform, or risk of future landowners not placing the same value in farming on an 'extensive basis'. In addition, despite natural systems having legal protection against transformation, pressures on these ecosystems from expanding agriculture and dam construction are increasing, as is evident from levels of loss and degradation in the adjacent catchments. The need to protect natural systems in good condition, thereby '*averting their loss*', is an important objective. A further motivation for protection is that it is impossible to restore a degraded system to its natural state, and is often a more expensive option.

This section summarises the process and activities followed in identifying and prioritizing offsets sites on which preliminary planning was undertaken.

2.2 Selection and Collation of Data Sets

The identification and prioritization of offset sites was undertaken through spatial analysis using ArcGIS. This required the identification and collation of spatial data that depicted where criterion defined at the end of Phase I would be met within the offset planning area. A workshop was held with the specialist team and selected stakeholders on 3 April 2014¹³. The aim of the meeting was to:

- i. Review the objectives and criteria established for the offsets, as defined at the end of the baseline investigation.
- ii. Present and discuss the suitability of the data sets selected to use in applying each of the criteria.
- iii. Discuss the prioritization of data sets for use in selecting sites.

Based on the outcomes of the workshop, the preliminary list of data sets was refined and the process of accessing, collating and manipulating the data sets where required, commenced.

¹² Land acquisition using the Expropriation Act (Act 63 of 1975) was not an option, as the Directive provided by the Minister to TCTA only allows for the acquisition of land for the sole purposes of the government water works. Similarly, land could not be acquired to enable public access to the dam. Note this has nothing to do with cost constraints, but what the Act allows.

¹³ The minutes of this workshop are provided as Appendix 1.

The list of these data sets and their relevance to the offset objectives and criteria is provided in Appendix 2 along with 7 Figures which illustrate the location and spatial extent of the features associated with each data set. These data sets formed the information within the GIS 'Project' through which prioritization was undertaken. The GIS enables analysis of the extent to which offset targets could be met at different sites, and confirms how many objectives could be met by intersecting properties.

2.3 Offset Site Prioritization

2.3.1 Development of the Prioritization Matrix

The prioritization matrix was developed to identify the most appropriate habitats and properties for meeting the offset criteria and targets most efficiently. The matrix was applied to the desktop information compiled from the data selected in the process described in Section 2.2. Much of this information is captured at a provincial, regional or catchment scale, so it is not accurate at a site-specific scale (i.e. it was anticipated that the actual area of different systems available as offset options would change through the site assessment process as more accurate mapping was done and landowners delineated areas available on their properties). While this process did refine the areas, up until such stage that the agreements are signed by the relevant landowner and the party responsible for the implementation of the offset, these factors remain uncertain.

The overriding criterion guiding the prioritization of potential offset sites was landowner willingness to set aside land for conservation on their properties. This issue was particularly critical in light of the timing and financial constraints mentioned in Section 1.4.

For the above reasons, the offset team focused on properties where there is already some level of landowner commitment to conservation, and targeted sites where a range of conservation organisations have been working with landowners over several years. A further benefit of working on these sites is that they have been targeted by these organisations because they have high conservation value at an ecosystem and/or species level, and in most cases, a level of ecological assessment regarding the importance and condition of these sites has already been undertaken. The properties identified for further investigation are consequently classified according to the organisations that have been engaging the landowners. Further information about each category of properties is given below, and their spatial extent is shown in Figure 3:

- **WWF Stewardship Sites:** Properties where World Wildlife Fund (WWF) has been working to proclaim properties under the various options offered under the provincial (i.e. EKZNW) stewardship programme and on their 'Water Balancing Initiative' which involves clearing of alien invasive species.
- **Midlands Conservancies Forum, Stewardship Sites:** Properties where this NGO has been working to proclaim properties under the various options offered under the provincial stewardship programme.
- **De Beers Properties:** Properties purchased by the De Beers Consolidated Mines for the purposes of conservation and research.

- **Hlatikulu Collaborative Management Area (HCMA):** The HCMA forum was established for the member landowners to deal with conservation issues. These properties are currently classified as ‘Sites of Conservation Significance’ (SOCS) - the lowest level of protection available under the Stewardship programme. Several organizations have worked with these landowners including the EKZNW Stewardship Programme and the EWT Crane Conservation Programme.
- **Possible HCMA Expansion to Highmoor:** It is proposed that these properties are included within the HCMA. As shown in the Figure 3, they would link the existing HCMA area to the Drakensberg-Ukhahlamba World Heritage Site.
- **‘Bridging Study Properties’:** These properties were identified in the 2004 study which investigated offset sites to address the loss (of wetlands only) within Spring Grove Basin, identified as an issue in the original 2001 assessment. In most instances, landownership has changed and there is therefore a need to revisit these sites. Detailed rehabilitation plans were developed for wetlands on these sites, considered priorities for conservation in 2004.
- **Other Properties:** There are several properties where landowners are required to conserve natural systems for various other reasons – in several cases involving legal compliance issues. In these cases, the nature of the potential offset varies. It may be that the landowner is willing to set aside additional areas over and above what is required to meet legal compliance and/or be willing to secure the site in the long term, which may not be an existing requirement.

The prioritization matrix comprises 12 criteria related to the offset objectives and targets. A description of the criteria used in the prioritization matrix is included as Appendix 3, along with a table showing the results of applying the matrix to the properties shown in Figure 3.

The following approach guided the application of the matrix:

- i. The greater the number of criteria that could be met on a single property the more efficient its selection as an offset would be, and the higher the priority it should be afforded. Where a criterion is not met for a property, the column is left blank.
- ii. Since different criteria could be met either partially or fully on a particular site, the overall contribution of each site to meeting the offset targets must be taken into account. For example, even if a site has wetland, grassland and river, the extent (hectares and kilometres of river) of these systems occurring on the property may be very small and therefore less efficient compared with a site where fewer criteria can be met but at a significant scale and thereby a greater contribution to the targets.

In view of the above points, analysis has been undertaken to prioritize the extent to which each of the criteria could be met by a particular site. The analysis is based on a comparison across the variation within each criterion (e.g. wetland area) – not between different criteria (area of wetland and grassland). The same colour code has been applied to each criterion.

Priority 1
Priority 2
Priority 3
Priority 4

2.3.2 Application of the Prioritization Matrix

Prioritization was obtained by ranking sites based on the sum of 'priority 1' and 'priority 2' ratings. This was done because simply considering the number of all criteria met on each site resulted in sites with small areas of each ecosystem emerging as priorities and such sites are inefficient. The results from the prioritization process are spatially represented in Figure 4. The outcomes pointed to a focus in the mid sections of the Mooi and Hlatikulu River Catchments where the sites were rated as either 'Very High' or "High".

Priority	Categories
Very High Priority	9-12
High Priority	5 -8
Moderate Priority	0-4

Another consideration in focussing where to initiate engagement with landowners within this suite of properties was the ***need to for the offsets to achieve additional conservation outcomes*** to what is already being undertaken on a property. Offset actions can be summarized as including:

- Rehabilitation of degraded systems (plugging drained wetlands, removing alien invasive plants, restoring dongas and erosion).
- Improved management through improved/alterd burning practices and grazing regimes.
- Securing sites – and thereby averting risk of their future loss.

For example, in the Upper uMngeni Catchment, there are several properties that are being secured under stewardship by WWF. WWF have also facilitated clearing of alien invasive plant species under their 'Water Balance' initiative, and the Working for Wetlands Programme has already undertaken planning for wetland rehabilitation. The options for the SGD Offset planning to add value to sites in the Upper uMngeni Catchment is thus limited, unlike on properties in the Mooi and Hlatikulu catchments where the level of rehabilitation and conservation activities is not as high. In summary, the sites within the Mooi and Hlatikulu catchments emerged from the process as priorities in terms of their rating and the level of 'additionality' that can be achieved on these sites. These areas are highlighted in Figure 4. The next step in the investigation involved engaging landowners in these priority areas, on the understanding that if there was insufficient area identified in the Mooi and Hlatikulu catchments to meet the offset targets, landowners in the Upper uMngeni would be engaged.

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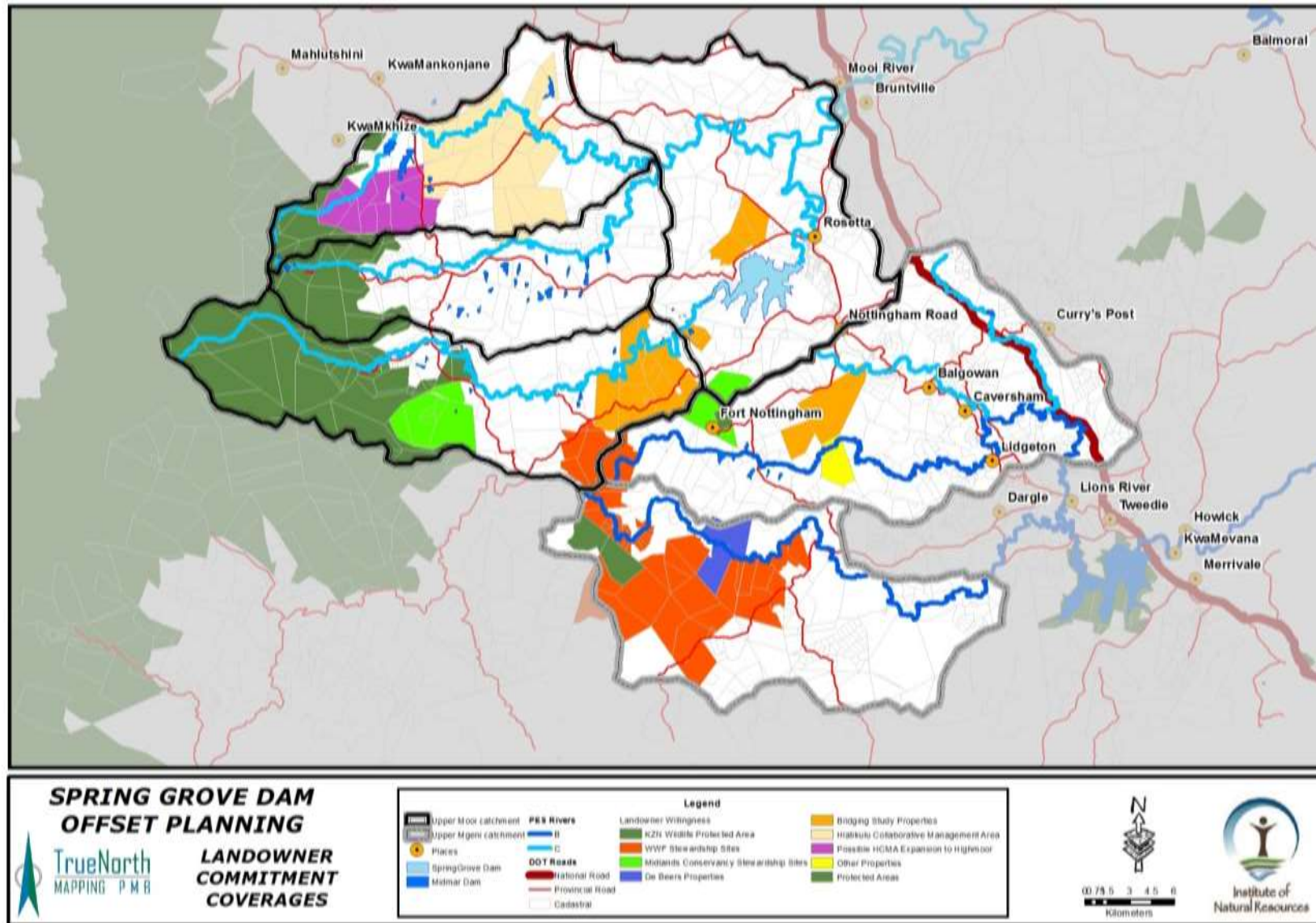


FIGURE 3 Properties with an established level of landowner willingness

MOOI-MGENI TRANSFER SCHEME PHASE TWO: SPRING GROVE DAM
Preliminary Planning of Wetland Rehabilitation and Biodiversity Offsets

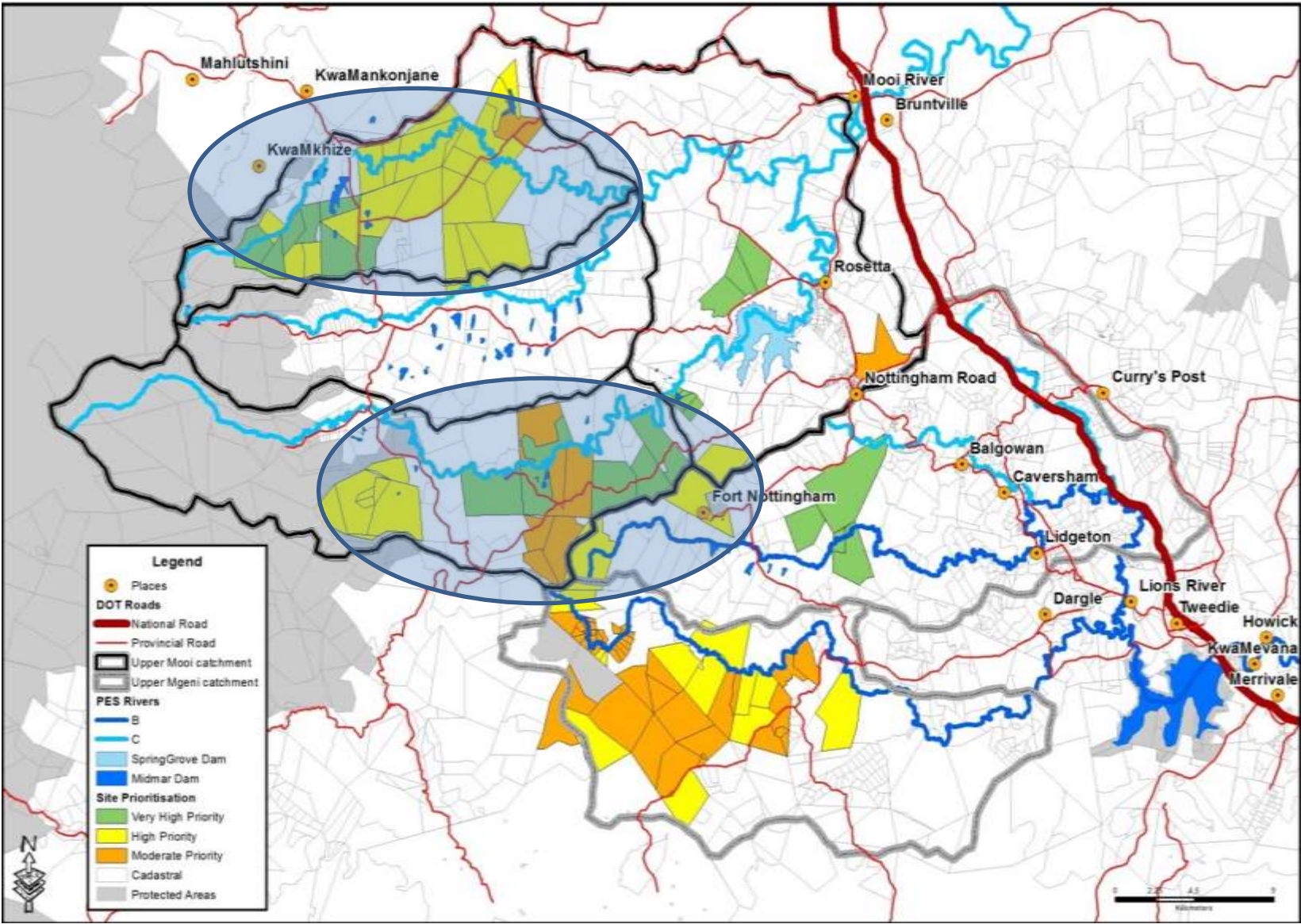


FIGURE 4 Spatial representation of the offset site prioritization process

3. INVESTIGATION OF OFFSET SITES

The prioritization exercise undertaken on the preliminary suite of offset sites enabled investigations to focus on those particular properties:

- most suitable for meeting the biodiversity offset objectives (high conservation value across various systems), and
- with the highest likelihood of the landowner being agreeable to establishing offsets on their property, and which
- meet the need for 'additionality'.

The aim of the next stage of investigation was to establish more detailed information regarding the ecological suitability of each site, and the costs of securing and implementing the biodiversity offset on each site in the long term. The outcomes are:

- A high level plan for each property describing the extent, type, condition and conservation value of the biodiversity occurring on each property, the required offset activities and the estimated costs for implementing the offset plan.
- The mechanism preferred by the landowner for securing the site, and any specific conditions relating to offsets taking place on their property. These site summaries are provided as Appendix 4 to this report and the assessment informed.
- A comparison across the sites to determine the most suitable suite of offset sites in terms of biodiversity value and efficiency.

3.1 Approach to Investigation

The following approach was taken in the investigation:

▪ *Initial Landowner Engagement*

Landowners were engaged through the assistance of third parties who have been working with them to date. The purpose was to:

- Explain the background to the offsets and the offset targets;
- Discuss the requirements and commitments asked of the landowner, and potential benefits that they would accrue should they agree to become involved;
- Drive through the property to understand the farming operations (current and planned), identify management issues such as erosion and alien invasive plants, and visit any important biodiversity features (e.g. Wattled Crane nest sites, waterfalls);
- Develop preliminary maps of natural areas that would be the target of offsets and which the landowner could consider placing under some form of stewardship; and
- Discuss the various options to the landowner within the stewardship programme, and the implications of each in terms of duration, benefits and restrictions.

▪ *Specialist Investigation*

In the event that landowners were comfortable with the concept and willing to make areas available for securing offsets, the next step was for the specialist team (Appendix 5) to undertake field work which involved mapping and categorising the extent of land cover in terms of the:

- *Production areas* - non-natural areas used for commercial activities including farm buildings, crops, pastures, dams, etc.
- *Areas requiring rehabilitation* - evidence of different invasive species, eroded areas, etc.
- *Areas of natural habitat* - rivers, grasslands and wetlands that could contribute to meeting the offset targets. These systems were classified, and an indication of their condition was established. The species associated with each of the natural systems were also documented.

The specific approach and outcomes of the investigation for each of the ecosystem types, namely river, wetlands and grasslands, are summarized in the sections to follow.

3.2 River Investigation

3.2.1 Methodology

The river team applied the approach documented in their specialist report, which is included as Appendix 6, to assess the state and conservation value of a 42 km section of the Hlatikulu River and a 22 km section of the Mooi River. The following summary provides insight to the approach as context for considering the outcomes of the assessment.

i. Site Selection

The entire stretches of both the Hlatikulu and Mooi Rivers along which landowners were willing to consider offsets were split into 2km reaches. These stretches were selected based on the need to:

- a. Groundtruth and visually assess as large a portion of the entire river as possible,
- b. Assess as many different riparian land uses/areas along the longitudinal profile of the rivers in question, and
- c. Assess biologically interesting features such as waterfalls and also impacts on riparian and instream zones (e.g. weirs, stands of alien invasive species, etc.).

ii. Present Ecological State

A modified and shortened version of Present Ecological State (PES - DWA, 2013) was used in the field at selected sites to provide a broad qualitative assessment of both the instream and riparian components of the river according to six metrics. This qualitative assessment of sites using PES was used to provide a groundtruthed evaluation of sites that could be used to inform a more focused desktop assessment of each 2km reach of the study rivers using the index of habitat integrity (IHI).

iii. Index of Habitat Integrity

Following the in-field evaluation of sites and descriptions of biologically interesting features (waterfalls) and significant impacts, each of the 2km was assessed using IHI in a desktop study based on field site PES scores, aerial imagery and Google earth fly-overs. Additionally detailed locality/extent information was gathered for major impacts to both instream and riparian habitats and, where possible, estimates of area for alien vegetation clearing were provided. The IHI model provides a score that can be interpreted as an Eco Classification

that indicates the level of modification, if any, to the ecological functioning of riparian and instream zones (Table 3).

iv. Sinuosity Index

Based on the recommendations of Rivers-Moore (2013) an index of sinuosity (SI) was calculated for each 2km river reach using equation (1) below of Mueller (1968).

$$SI = \frac{\text{Actual path length}}{\text{Shortest path length}} \quad (1)$$

By taking into consideration river longitudinal zone (Moolman, 2006) and river geomorphology, including meander patterns and associated oxbow lakes, species patterns are able to be related to system processes. More specifically Rivers-Moore (2013) indicates that meandering rivers (where sinuosity >1) provide suitable habitat for burrowing mayflies, a unique component of the aquatic insect fauna in South Africa. Maintaining suitable habitat for this aquatic insect group is an important consideration when setting offset targets for SGD, as suitable habitat was lost when the dam became operational. For comparative purposes, sinuosity was calculated to be 1.78 in the SGD basin (Rivers-Moore, 2013).





TABLE 3 Summary of the Index of Habitat Integrity (IHI) scoring system (After Kleynhans *et al.*, 2008)

Percentage change	Classification	Category
0%-10%	Unmodified, natural.	A
11%-20%	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	B
21%-40%	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	C
41%-60%	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	D
61%-80%	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.	E
81%-100%	Critically modified. Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	F

Table 4 provides an example of the outcomes of the IHI assessment for the instream and riparian habitats along two, 2km stretches of the Hlatikulu River. The table also indicates the SI for each stretch of river. The complete tables which cover the 2km stretches for the entire lengths of river assessed, and with the summary scores supporting the assessments are provided in the specialist report.

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TABLE 4 Example of the outputs from the river assessments for each 2km stretch or river analysed.

Site	Site PES (Y/N)	SI	Instream IHI	Main instream impacts	Photo	Riparian IHI	Main riparian impacts	Photo
H2	Y	1.08	C/B	The construction of an earth weir has drastically altered flow regime and to a degree also the physicochemical properties (higher turbidity downstream of the weir).		C	Earth weir with adjacent diversion of flow has resulted in channel modification, flow modification and some physicochemical impacts. Trout farms present in Riparian area may result in some physicochemical impacts. Water quality in large dam is generally good	
H3	N	1.09	C	Large sections of riparian land previously used for cultivation, many furrows/culverts and drains still present and functioning increasing flows. Large amounts forestry on left hand bank (facing downstream).		D	Large areas of riparian zone previously used for cultivation. Invaded by <i>Rubus cuneifolius</i> and <i>Acacia mearnsii</i> . Water abstraction has reduced water level narrowing the riparian zone.	

3.2.2 Results and Discussion

Summaries of the instream and riparian IHI assessments for the 2km reaches of both the Hlatikulu and Mooi Rivers are presented in Tables 5 and 6 respectively. A breakdown is given of percentages according to IHI scoring categories as well as farms on which the section of river is situated.

TABLE 5 Summary of *instream IHI scores* for the 2km reaches of the Hlatikulu and Mooi rivers in relation to each surrounding landowner.

Farms/community	Percentage of assessed river length according to instream IHI score					Total
	Natural (A)	Largely Natural (B)	Moderately Modified (C)	Largely Modified (D)	Seriously Modified (E)	
Hlatikulu River (a total of 23 reaches, each 2km in length)						
Tiger Hoek	0	0	8.70	0	0	8.70
Swarraton	0	0	0.87	0	0	0.87
Old Roar	0	0	0.43	0	0	0.43
Camewood	0	0	4.35	0	0	4.35
Forest Lodge	0	2.17	2.17	0	4.35	8.70
Glengarry	6.52	2.17	0	0	0	8.70
Glenannie	21.30	0	0	0	0	21.30
Stadlers Rust	1.30	0.00	0	0	0	1.30
Stadlers Rust shared with Broadmoor	10.00	1.30	0	0	0	11.30
Broadmoor shared with Falkirk	1.09	3.04	0	0	0	4.13
Falkirk shared with Burgundy	3.26	0	0	0	0	3.26
Burgundy	2.17	0	0	0	0	2.17
Burgundy shared with Sweet Home	3.91	0	0	0	0	3.91
Farleigh	5.65	0	0	0	0	5.65
Effort No. 2	6.09	0	0	0	0	6.09
Egypt	3.91	0	0	0	0	3.91
Unknown	0.00	0	5.22	0	0	5.22
Total	65.22	8.70	21.74	0.00	4.35	100.00

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Farms/community	Percentage of assessed river length according to instream IHI score					Total
	Natural (A)	Largely Natural (B)	Moderately Modified (C)	Largely Modified (D)	Seriously Modified (E)	
Mooi River (a total of 11 reaches, each 2km in length)						
Collegiate	33.64	5.45	0	0	0	39.09
Silverdale	11.82	6.36	0	0	0	18.18
Silverdale shared with The Bend	0	2.73	0	0	0	2.73
The Bend	10.00	0	0	0	0	10.00
The Bend shared with Sussex	8.18	0	0	0	0	8.18
Sussex shared with Avon	5.45	0	0	0	0	5.45
Avon	12.73	0	0	0	0	12.73
Unknown	0	3.64	0	0	0	3.64
Total	81.82	18.18	0.00	0.00	0.00	100.00

TABLE 6 Summary of *riparian IHI scores* for the 2km reaches of the Hlatikulu and Mooi rivers in relation to each surrounding landowner.

Farms/community	Percentage of river according to riparian IHI score					Total
	Natural (A)	Largely Natural (B)	Moderately Modified (C)	Largely Modified (D)	Seriously Modified (E)	
Hlatikulu River (a total of 23 reaches, each 2km in length)						
Tiger Hoek	0	0	8.70	0	0	8.70
Swarraton	0	0	0	0.87	0	0.87
Old Roar	0	0	0.43	0	0	0.43
Eyosini Community	0	0	0	4.35	0	4.35
Forest Lodge	0	4.35	0	0	4.35	8.70
Glengarry	2.17	6.52	0	0	0	8.70
Glenannie	19.57	1.74	0	0	0	21.30
Stadlers Rust	0	1.30	0	0	0	1.30
Stadlers Rust shared with Broadmoor	10.00	1.30	0	0	0	11.30
Broadmoor shared with Falkirk	4.13	0	0	0	0	4.13
Falkirk shared with Burgundy	3.26	0	0	0	0	3.26
Burgundy	0.43	1.74	0	0	0	2.17
Burgundy shared with Sweet Home	3.91	0	0	0	0	3.91
Farleigh	0	5.65	0	0	0	5.65
Effort No. 2	4.35	1.74	0	0	0	6.09
Egypt	0	3.91	0	0	0	3.91
Unknown	0	2.17	0	3.04	0	5.22
Total	47.83	30.43	9.13	8.26	4.35	100.00
Mooi River (a total of 11 reaches, each 2km in length)						
Collegiate	6.36	18.18	0	14.55	0	39.09
Silverdale	2.73	9.09	6.36	0	0	18.18
Silverdale shared with The Bend	0	0	2.73	0	0	2.73
The Bend	0	0	0.91	9.09	0	10.00
The Bend shared with Sussex	0	0	8.18	0	0	8.18
Sussex shared with Avon	0	0	5.45	0	0	5.45
Avon	0	0	12.73	0	0	12.73
Unknown	0	0	0	3.64	0	3.64
Total	9.09	27.27	36.36	27.27	0.00	100.00

The results presented in Tables 5 and 6 above are depicted spatially in Figures 5, 6, 7 and 8. The central colour indicates the condition of the instream habitat, while the outer colour indicates the condition of the riparian habitat.

The conclusions regarding the options presented by the stretches of both rivers are presented in Table 7. The concluding points are presented in terms of a comparison against the criteria of the different options in terms of meeting the river offset target. The system that is rated higher in terms of each criterion is highlighted in green. In summary, it is concluded that the Hlatikulu River, particularly between stretches H8 – H14, presents the most ecologically intact and conservation-worthy section of river to meet the offset target.

TABLE 7 Conclusions regarding the suitability of the river stretches investigated in meeting the offset target

CRITERIA	MOOI RIVER	HLATIKULU
Like for Like The need to offset with the same river type	<ul style="list-style-type: none"> Both systems are the same provincial river type as that lost in SGD basin (type 5901). The sinuosity index on the Mooi is on average higher than on the Hlatikulu. The sinuosity index averaged for all the 2km river reaches is higher in the Mooi River (2.12) than the Hlatikulu River (1.71); this is not a major benefit because the average SI on the Hlatikulu is similar to that of the stretch lost within SGD i.e. 1.78. There are also sections on the Hlatikulu (the length of the offset target) which have a higher SI than the Mooi. In summary, no section of river is better than another in terms of these criteria.	
Waterfalls Need to account for the loss of Inchbrakie Falls.	There are no waterfalls on the stretch of Mooi River investigated	There are 3 waterfalls on the Hlatikulu, none of which provides the same habitat as that at Inchbrakie. However, Waterfall 3 provides a diverse range of intact and largely unmodified instream and riparian habitat in the immediate vicinity of the waterfall and also contains a greater diversity of indigenous plant species (including lithophytes), within the surrounding riparian vegetation and rock faces, when compared to waterfalls 1 and 2. <i>Waterfall 3 is thus an important biodiversity feature on the Hlatikulu River which should be maintained and protected if possible.</i>
Length & Continuity A long continuous stretch of river associated with few landowners (both sides) of the river is more efficient to manage.	Of the 22km assessed, there are two sections on two properties: <ul style="list-style-type: none"> Collegiate (7.4 km), and Sussex (3.5km) which together total 10.9 km. This is 4.5km short of the Offset target for rivers (15.5 km). Focussing on the Mooi would require that additional sections are secured on the Hlatikulu to meet the target. This is not an efficient option. They are fragmented with several properties between these stretches. The willing landowner is also only located on one side of the river.	There is a continuous stretch of river 19.8 km in length on 4 properties belonging to two landowners (who own both sides of the river), these being: <ul style="list-style-type: none"> Broadmoor/Stadlers Rust (5.9 km) Glennannie/Glengarry (13.9km) This section also includes 2 of the 3 waterfalls occurring on the overall length of the Hlatikulu system that was assessed.

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<p>Condition</p> <p>The better the condition of the system, the higher the importance to preserve it and lower the costs of returning it to its optimum condition.</p>	<p>The instream IHI scores are on average higher than for the Hlatikulu, but the condition of the riparian habitat is much lower (C and D).</p> <p>In many cases the impacts relate to farming activities and infrastructure (roads) in the floodplain. Rehabilitating these impacts would be financially preclusive, because it would likely include an opportunity costs associated with the lost production from these pastures.</p>	<p>While the average instream IHI is lower than the Mooi, there are longer sections (Stadlers Rust to Forest Lodge, H8 – H20) where the instream and riparian IHI are both an A of B category. The costs of rehabilitation would be far lower.</p>
<p>Landscape/Habitat Integrity</p> <p>The linkages with adjoining systems (grassland and wetland)</p>	<p>The degraded nature of the riparian habitat along the section of the Mooi River means that there is poor continuity with the adjoining wetland and grassland habitat.</p>	<p>While the upper sections of the catchment (H1- H7) are disturbed through crop, timber farming and settlement, from H8 – H23 there the river is bounded by grassland and wetland in an integrated mosaic that provides excellent habitat.</p>

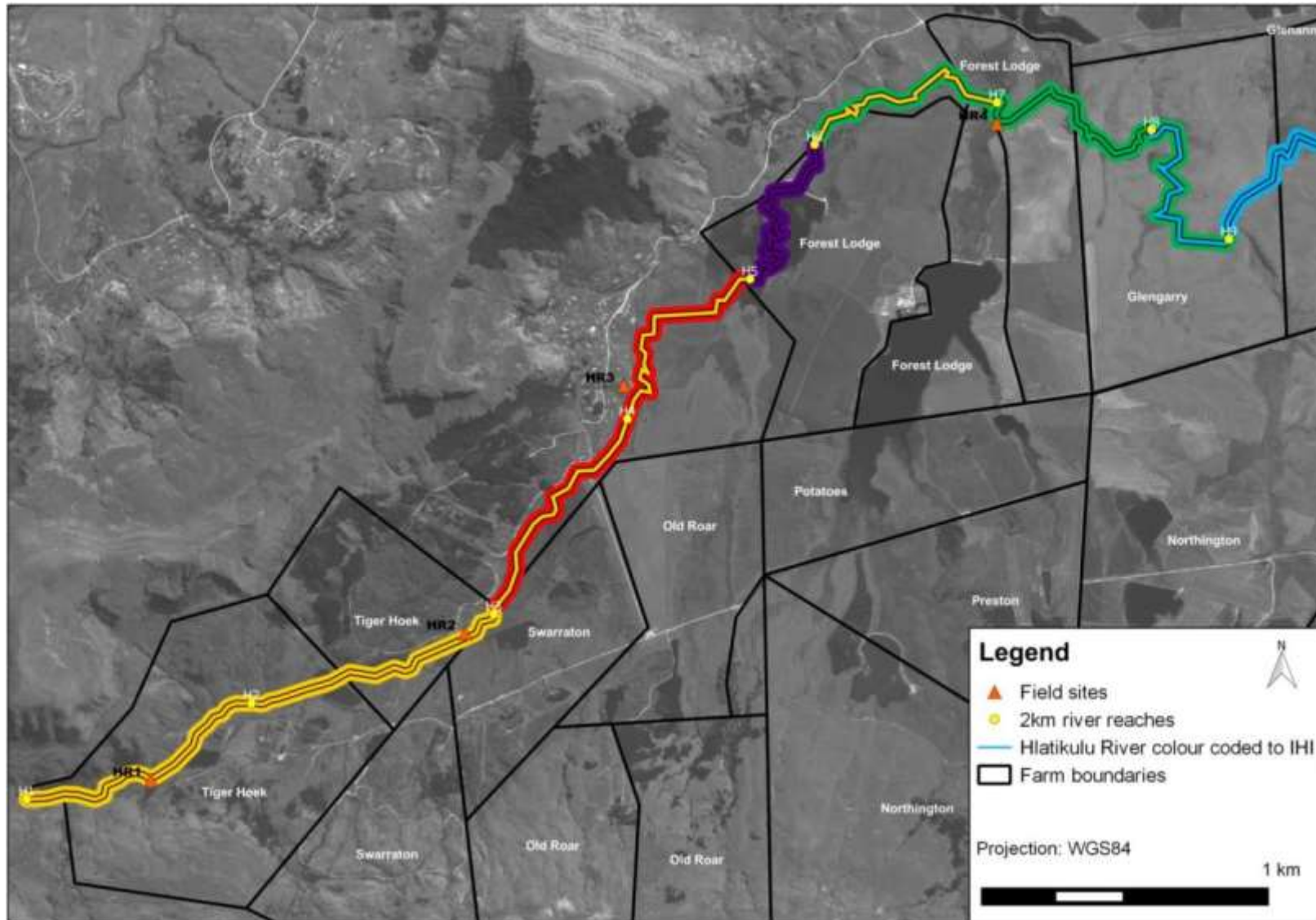


FIGURE 5 Visual representation of IHI scores for both instream and riparian habitats for 2km reaches (H1-H8) of the Hlatikulu River.

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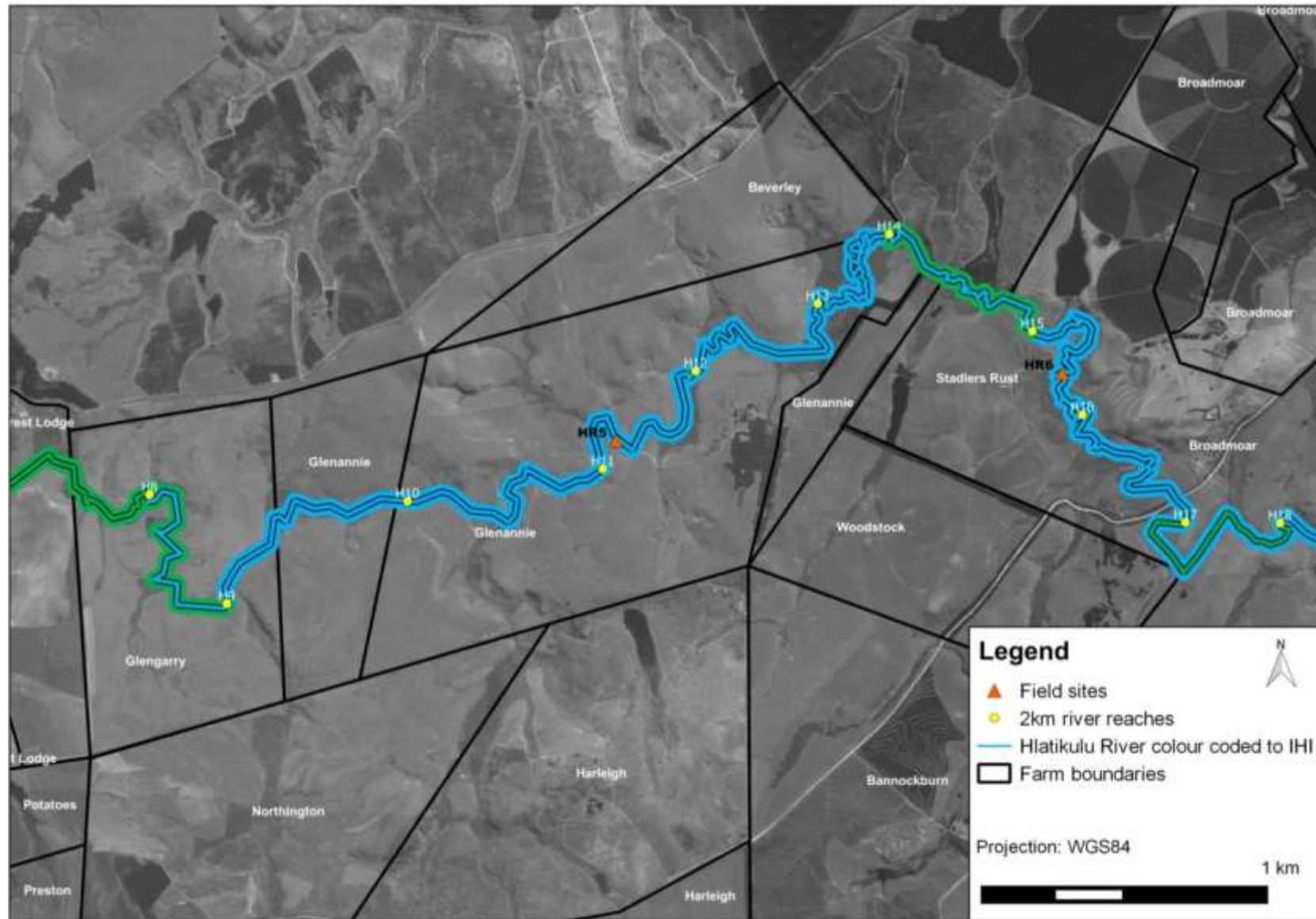


FIGURE 6 Visual representation of IHI scores for both instream and riparian habitats for 2km reaches (H8-H17) of the Hlatikulu River.

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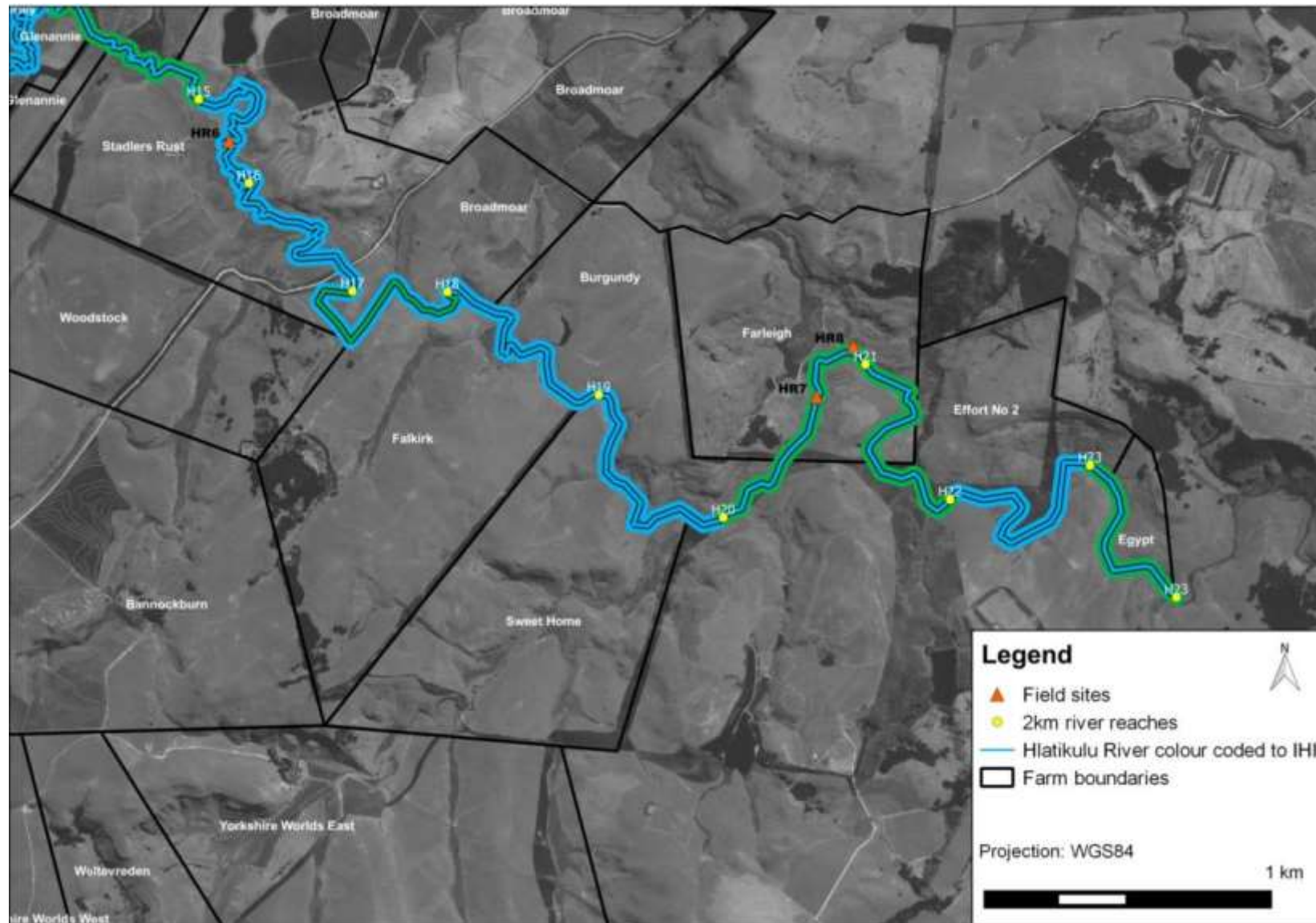


FIGURE 7 Visual representation of IHI scores for both instream and riparian habitats for 2km reaches (H17-H23) of the Hlatikulu River.

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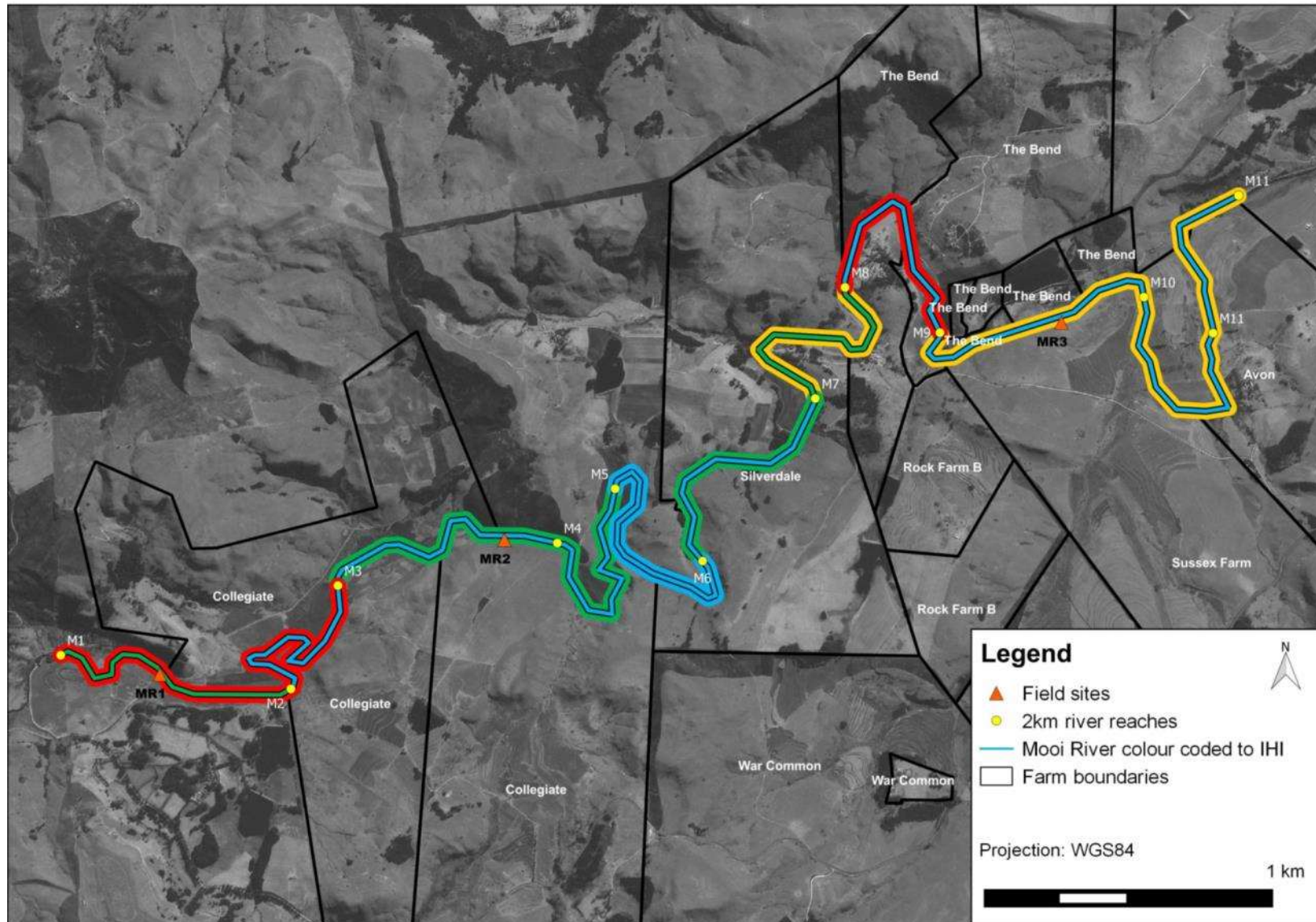


FIGURE 8 Visual representation of IHI scores for both instream and riparian habitats for 2km reaches (M1-M11) of the Mooi River

3.3 Wetland Investigation

3.3.1 Methodology

The specialist team undertook the following activities in developing an understanding of the wetlands within the suite of potential offset sites:

i. Desktop Assessment

A desktop assessment was undertaken using digital imagery to review the wetlands on each property. The purpose of this process was to identify areas for further investigation in the field. This included:

- *Refining the mapping* - identifying where the existing provincial wetland layer may be inaccurate,
- *Classification* – of the wetlands according to landform setting and other factors that inform wetland type, and
- *Identifying impacts* - within the wetland that may require remedial action, such as drains, erosion and alien invasive plants, and undertaking preliminary mapping.

ii. Field visit

Each potential wetland offset wetland site was then visited with a focus on the features identified in the desktop assessment. Both a wetland ecologist and engineer visited the site in order for an appropriate response to the impacts identified could be agreed on – for example, the location and nature of structures to block drains. Mapping (the wetland boundary) and classification of the systems was also verified *in situ*.

iii. Reporting

The understanding generated through the field work was used to refine the mapping and classification of each wetland. It was also used to determine high level design options for structures and the probable costs for rehabilitation by the engineering team. A summary was developed for each property and forms part of the site plans provided in Appendix 4. The summary classifies the wetland type, details its area, describes the current condition and impacts (drains, alien invasive species, etc.). A table (in Appendix 4) is also provided listing the interventions required for each of the impacts and the costs of these interventions (mainly structures in drains).

3.3.2 Results and Discussion

A summary of the wetland type and area per property for the Hlatikulu, Mooi and uMngeni River catchments is provided in Table 8. The location of these wetlands is shown in Figures 9 and 10.

In total there are 1 490ha of wetland available across these sites. Given that the wetland offset target is 1 380ha, the majority of the wetland on these properties will be required to meet this target.

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TABLE 8 Summary of wetland types and areas within the Mooi, Hlatikulu and uMngeni river catchments

Mooi Catchment Farms	Area (Ha)				
	Flood Plain	Unchannelled Valley Bottom	Channelled Valley Bottom	Seep	Total
Allendale	13.20				13.20
Shelter No. 1	4.84				4.84
Lot 12	29.40				29.40
Lot 13	22.22				22.22
Lot 14	58.70				58.70
Reekie Lynn	7.75	17.38		17.36	42.49
Collegiate	46.30		92.97		139.27
Rock Farm B			40.61		40.61
Sussex Farm			84.22		84.22
War Common			14.40		14.40
Ederburg			10.65		10.65
Howard			11.71		11.71
Total	182.41	17.38	254.57	17.36	471.72

Hlatikulu Catchment Farms	Area (ha)				
	Floodplain	Unchannelled Valley Bottom	Channelled Valley Bottom	Seep	Total
Bannockburn		16.18	2.07	16.50	34.74
Broadmoar	31.14		47.94	5.71	84.79
Farleigh	6.10				6.10
Effort	3.44				3.44
Falkirk	12.96	10.99		8.08	32.03
Forest Lodge	68.18		37.99		106.17
Glenannie	131.44		24.37		155.81
Beverley	11.44		4.10		15.54
Gleangarry	39.08	2.44	4.57	3.75	49.84
Harleigh (Greg Symmons)			45.42	10.08	55.50
Harleigh (Moors)			11.19	2.19	13.38
Northington		18.74	55.78	6.04	80.56
Old Roar			51.23		51.23
Camewood	104.50				104.50
Swarraton			47.40		47.40
Tiger Hoek	19.86		14.64		34.50
Stadlers Rust	57.43	7.23	1.46	1.79	67.91
Woodstock		12.25	4.51	5.24	22.01
Totals	485.56	67.83	352.67	59.38	965.44

Lions River Catchment Farms	Area (Ha)				
	Flood Plain	Unchannelled Valley Bottom	Channelled Valley Bottom	Seep	Total
Shawlands (Holly Lodge & Leeuw Bosch)			46.04	7.01	53.05
Total	0.00	0.00	46.04	7.01	53.05

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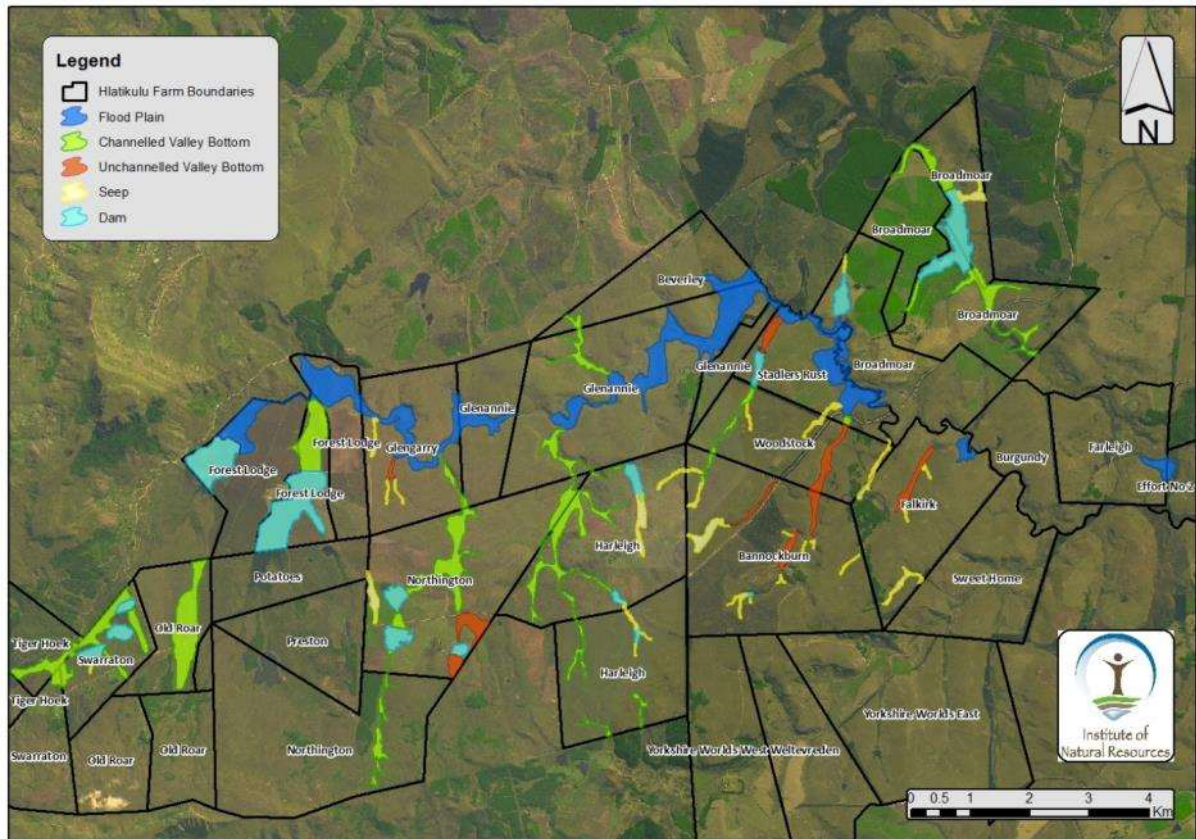


FIGURE 9 Location and wetland type occurring on potential offset sites in the Hlatikulu River catchment

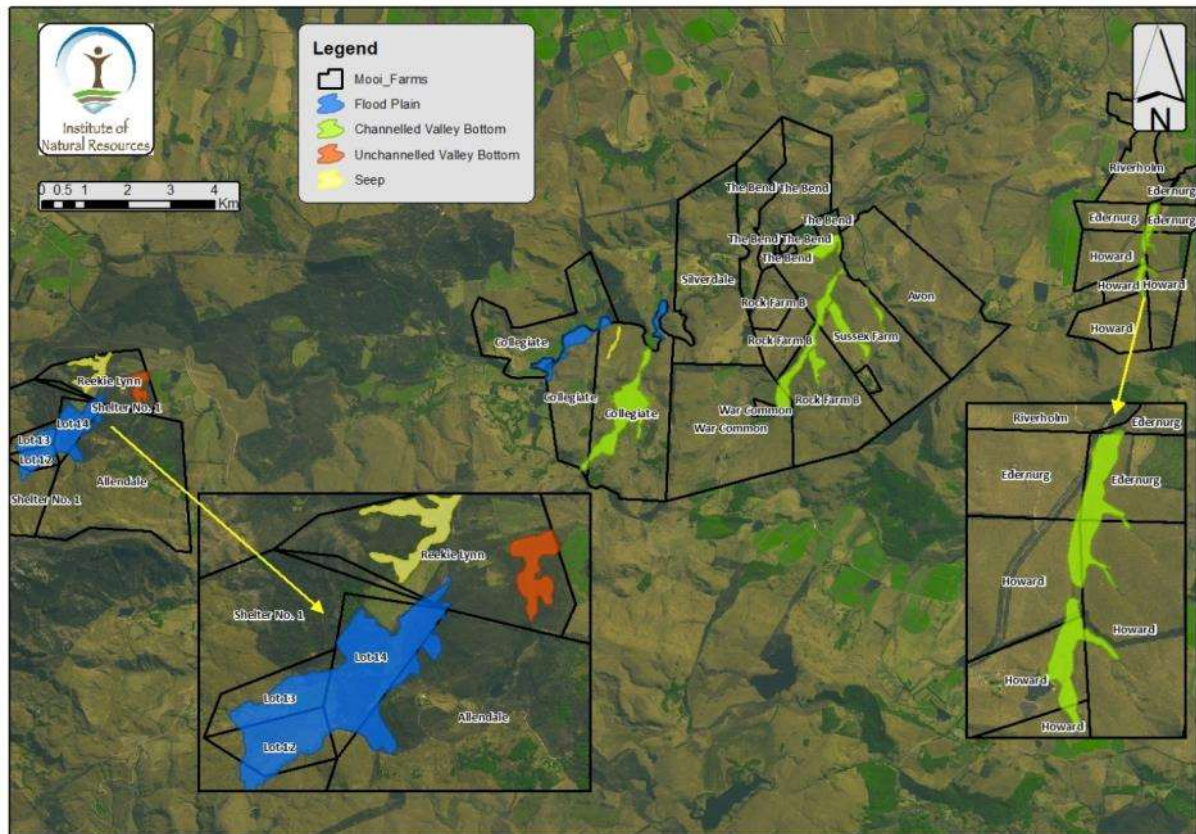


FIGURE 10 Location and wetland type occurring on potential offset sites in the Hlatikulu River catchment

Unlike in the case of grasslands and river systems where the focus is purely on biodiversity, the condition of RoD relating to wetlands requires the consideration of the need to mitigate both biodiversity (habitat) and wetland function.

Table 9 summarises the area of wetland that could benefit from rehabilitation, and those sections of wetland that are in good condition and require protection, from which the following is evident:

- The wetlands in the Hlatikulu River catchment are in a far better condition than the Mooi River catchment, as shown by the fact that 82% are in good condition and worth protecting. The contrary is the case in the Mooi and Lions River catchments where the areas requiring rehabilitation are 70.7% and 86.8% respectively.

TABLE 9 Summary of areas of wetland that could be protected and rehabilitated in each catchment

Catchment	Area (ha)		Total
	Rehabilitation	Protection	
Hlatikulu Catchment	168.78 (22%)	796.27 (82%)	965 ha
Mooi Catchment	338.09 (70.7%)	139.87 (29.3%)	478 ha
Lions River Catchment	46.04 (86.8%)	7.01 (13.2%)	53 ha
TOTAL	552.90 ha	943.15 ha	1490 ha

- The majority of the systems identified for offsets are of the same type as those that were lost due to SGD, i.e. floodplain (44.8%) and channelled valley bottom systems (43.8%). These two wetland types constitute over 90% of freshwater ecosystems that were lost. The need to offset like-for-like is therefore met.

TABLE 10 Summary of wetland types as percentage of the total potential wetland offset area.

Wetland Type	Flood Plain	Unchannelled Valley Bottom	Channeled Valley Bottom	Seep	Total
Total Area	667.97	85.21	653.28	83.75	1490.20
% of Total Area	44.8	5.7	43.8	5.6	100

The following conclusions can be drawn from the understanding and information generated in the wetlands investigation:

- Almost all the available offsets sites (1 490ha) will be required to meet the offset target (1 380ha) - there is only a surplus of 110ha.
- The like-for-like requirement would be met.
- The Hlatikulu River catchment is best suited to meeting the biodiversity target. This is demonstrated by the fact that the catchment is the most productive Wattled Crane breeding area in the country (Wattled Crane are the best indicator of pristine grassland/wetland complex). Importantly, they are also sensitive to disturbance which highlights the importance of this catchment and the large areas under grassland which buffer disturbance.
- The area that could benefit from rehabilitation (552ha) is greater than the total area of wetland that was lost within SGD (480ha). At a high level, this area closely approaches the required functional target for wetland rehabilitation.
- The distribution of the wetlands across the various catchments would assist in maintaining catchment integrity, as opposed to concentrating in one particular area.

3.4 Grassland Investigation

3.4.1 Methodology

The grassland specialist, with support from the GIS specialist, mapped the grassland and impacts within the grassland environment in the following way:

- Grasslands were classified in terms of their type, as defined by the KZN vegetation map, which also indicates the conservation or threat status of the different grassland types (Critically Endangered, Endangered, Vulnerable, Near Threatened).
- Grassland condition was categorized according to the categories used in the baseline assessment of the grassland lost in SGD Basin, these being: good, moderate and poor. This was based on the level of alien infestation, grass cover, species variety.
- The GIS analyst mapped erosion dongas within the grasslands.
- The grassland specialist mapped areas of wattle and pine.
- Initially an attempt was made to map dense bramble patches, but this proved too time consuming and beyond the level of this preliminary assessment and planning. As an alternative approach, the following ‘percentage infestation’ was applied to the different categories of grassland condition to arrive at an estimate of the bramble requiring removal and management i.e. the area of grassland was multiplied by the percentage of bramble coverage.
 - Good – 5% bramble coverage.
 - Moderate – 20% coverage.
 - Poor – 40% coverage.

The ‘areas’ arrived at through this approach have been used in the process of costing the offsets and are provided as Appendix 7. However, because they are effectively within the grassland (unlike, for example, wattle which was mapped a separate polygon) the bramble is not shown on the summary landcover maps presented in the next section. The ‘percentage coverages’ used for each category are considered more conservative than if each individual, condensed area had been mapped.

3.4.2 Results and Discussion

A summary of the extent and condition of the grassland occurring on the different properties in the three catchments is provided in Table 11. The spatial overview of the areas under natural grassland and the different condition categories (good, medium and poor) are shown in Figures 11 and 12 in the next section, along with the various other landcover categories.

These figures show that:

- i. There is a significant area of almost 5 5000ha (if only the good and moderate categories are considered) are available from which to meet the grassland target (640ha).
- ii. The majority (83%) of this occurs in the Hlatikulu River catchment where the entire target could be met on a single property (Glenannie), where more than 80% of the grassland is in good condition.
- iii. There is no grassland available on the two offset sites in the uMngeni River catchment.
- iv. A significant portion (81%) of the total grassland across the offset sites is in a good condition, which implies good existing management practices and validates the selection of these sites through the prioritization process as having high conservation value and worthy of securing.

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- v. Given that meeting the wetland target will require securing the vast majority of offset sites, the grassland offset target will be exceeded. However, as the project is only responsible for the area required to meet offset targets, rehabilitation costs for grassland would only apply to the optimal suite of sites selected for meeting the river and wetland targets. Alternatively, only the wetlands and their immediate catchment or a set buffer could be surveyed out and secured through stewardship or conservation servitude.

TABLE 11 Extent of different categories of grasslands condition across properties in the various offset catchments

LANDCOVER CATEGORIES	PROPERTY CATEGORIES	NATURAL CATEGORIES			
LANDOWNER	SGO_NAME	GOOD GRASSLAND	MEDIUM GRASSLAND	POOR GRASSLAND	TOTAL AREAS
MOOI RIVER CATCHMENT					
Mr Frank Reardon	Allendale				
	Lot 12				
	Lot 13				
	Lot 14				
	Reekie Lynn				
	Shelter No. 1				
Mr D Breedt	Collegiate	206.91	13.58	24.21	244.7
	War Common	14.94	5.3		20.24
	Rock Farm B	79.39	5.25	0.73	85.37
	Sussex Farm	146.28	10		156.28
Mr B Smythe	Howard	431.7	8.2		439.9
	Edernurg	58.56			58.56
Mooi River Totals		937.78	42.33	24.94	1005.05
% of Total Grassland Area		93.3	4.2	2.5	
HLATIKULU CATCHMENT					
Mr David Worrall	Bannockburn	335.16	77.75	9.08	421.99
Mr Mark Winter	Beverley	207.18			207.18
	Glenannie	737.48	26.34	30.49	794.31
	Glengarry	292.04	15.33	2.64	310.01
Mr Greg Symmons	Broadmoar	441.44			441.44
	Stadlers Rust	34.51	22.74	4.64	61.89
	Harleigh GS	80.43	3.89	13.66	97.98
Mr Danie Steyn	Forest Lodge				0
	Camewood			15.56	15.56
Mr Mark Basel	Effort No 2	141.3	26.28		167.58
	Egypt	35.17			35.17
	Farleigh	121.52	72.43	67.25	261.2
Mr Robert Moor	Falkirk	174.78	29.71	16.15	220.64
	Woodstock	193.47	40.75		234.22
Mr Malcolm Moor	Harleigh MM	349.32	16.59		365.91
Mr Chris Dwen	Northington	262.21	20.19	3.95	286.35
Mrs Veronica Speed	Old Roar	333.9	4.79	72.2	410.89
Mr Nic Shaw	Swarraton	125.91	50.73	46.1	222.74
Graham Pitt	Tiger Hoek	260.12		101.71	361.83
Hlatikulu Totals		4,125.94	407.52	383.43	4,916.89
% of Total Grassland Area		83.9	8.3	7.8	
UMNGENI CATCHMENT					
Mr Chris Worrall	Holly Lodge				
	Leeuw Bosch				
Umngeni Totals		0	0	0	
TOTAL AREAS		5,063.72	449.85	408.37	5,921.94

3.5 Suitability of Offset Sites to Meet Biodiversity Targets

The spatial overview of the outcomes of the investigations are summarised in Figures 11 and 12. The areas shown in these figures are summarized in Table 12 in terms of four categories:

i. Property Categories

Landowner willingness is the fundamental factor underlying the proposed mechanism for securing offsets, namely through the stewardship programme. The entire approach has therefore been to document information per property, even where there are several properties owned by a single landowner. This approach was used because, in the implementation phase, landowners may decide only to consider making one and not all of their properties available for securing the offset.

ii. Production Categories

These are categories that relate to production in terms of land use such as crops, pastures, infrastructure (farm buildings) and dams, which are built for production purposes such as irrigation and watering cattle, and are unnatural aquatic systems. While grasslands are very much part of production in the case of beef farming, grasslands are natural systems which have significant biodiversity value and deliver important ecosystem services. They are therefore considered under the 'natural categories' (iv).

iii. Rehabilitation Categories

These account for those landcover categories that require rehabilitation in order to improve the ecological state and functioning of the landscape in which they occur. A distinction is made between invasive alien species (wattle, pine) and whether they are located in grasslands or along river courses (riparian) because the cost of removing these trees differs between the species and their location (e.g. rates for clearing wattle trees are higher along river courses than in grassland areas). In addition to the 'tree categories' the other two categories requiring rehabilitation are:

- **Cleared Wattle Areas** – which require rehabilitation to develop cover on bare soils and prevent erosion, control infestation by alien species and restore ecosystem function.
- **Bramble** – as discussed under the grassland section, the bramble was not mapped as discrete areas so it is not reflected separately in the table.

iv. Natural Categories

These are the landcover classes for natural systems including grassland, wetland and very small areas of natural bush or forest. Of these classes only grassland and wetland contribute to the offset targets.

Considering the summaries for the previous system specific sections of the report, and the overall figures and maps shown here, it can be concluded that the cluster of ***properties within the Hlatikulu River catchment have emerged as the most appropriate for meeting the offset targets from a biodiversity point of view, of which Glengarry and Glennannie, are core priorities*** for the following reasons:

i. Offset area:

These 19 properties (11 landowners) offer the largest area for achieving the offsets with over 4 000ha of good condition grassland, 965ha of wetland and 42km of river.

ii. Biodiversity Value:

- *Habitat Condition:* The condition of the large majority of the wetland, grassland and river habitat is good.
- *Species:* This area is the most productive Wattled Crane breeding area in the country. This is evidence of the high value habitat provided by the contiguous mosaic of grass and wetland within which these species are buffered from disturbance that is common in more transformed landscapes.
- *Ecosystem process:* An important feature of this area is the continuity of the landscape - the river and floodplain wetlands are in most areas buffered by good quality grassland and valley bottom wetland that drain into the Hlatikulu floodplain and river. The Hlatikulu River catchment also falls within the “uThukela North Macro Ecological Corridor” identified in the provincial conservation plan.

iii. High Value Individual Sites

Within this suite of sites in the Hlatikulu River catchment, it is possible to meet 100% of the grassland, 90% of the river and 22% of the wetland target on only three properties: Glennannie, Glengarry and Beverley, which are owned by the same landowner. The quality of the ecosystems on these properties is the highest across the area as supported by the fact that there are two Wattled Crane nest sites, Oribi and a range of other species of conservation significance. The adjacent properties (Woodstock, Stadlers Rust, Broadmoor, Falkirk and Bannockburn, and Farleigh) all have valuable wetland and grassland habitat and consequently host one or more nesting pairs of Wattled Crane.

iv. Landowner Organisation

The fact that the key properties of Glennannie, Glengarry and Beverley are owned by a single landowner facilitates the process of stewardship and offset management negotiation. A further benefit of the sites within the Hlatikulu River catchment is that the landowners (from Farleigh at the bottom of the study area, through to Glengarry) are members of the Hlatikulu Collaborative Management Association (HCMA). There is also a move to include the properties in between the HCMA and the Ukhahlamba-Drakensberg World Heritage Park (UWP) within the HCMA. There is a high level of conservation commitment by landowners on several of these properties between the HCMA and the UWP, which are managed with a strong conservation focus, notably Tigerhoek, Swarraton (Entabeni Crane Sanctuary) and Old Roar (National Heritage Site). The strong level of landowner organisation, collaboration and commitment could provide important synergies in working towards securing biodiversity across the landscape and addressing threats, such as poaching, in an integrated way.

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TABLE 12 Summary of the extent of various landcover categories mapped in the investigation process

LANDCOVER CATEGORIES		PROPERTY CATEGORIES		PRODUCTION CATEGORIES					REHABILITATION CATEGORIES				NATURAL CATEGORIES					
LANDOWNER	SGO_NAME	REMAINING AREA	SETTLEMENT	FARM BUILDINGS	EXISTING LANDS	PROPOSED LANDS	OLD LANDS	DAM	PINE	WATTLE	CLEARED WATTLE	RIPARIAN AIS	INDIGENOUS BUSH	GOOD GRASSLAND	MEDIUM GRASSLAND	POOR GRASSLAND	WETLAND	TOTAL AREA
MOOI RIVER CATCHMENT																		
Mr Frank Reardon	Allendale	711.21															13.19	724.4
	Lot 12	11.37															29.4	40.77
	Lot 13	19.94															22.22	42.16
	Lot 14	11.31			6.59												58.71	76.61
	Reekie Lynn	141.22			23.62												42.49	207.33
Mr D Breedt	Shelter No. 1	521.28			3.74												4.84	529.86
	Collegiate	406.86			71.51					5.18		3.76		206.91	13.58	24.21	139.36	871.37
	War Common	583.45			50.74									14.94	5.3		14.4	668.83
	Rock Farm B	299.82			98.11					1.48				79.39	5.25	0.73	40.61	525.39
	Sussex Farm	235.63			98.81					0.21		0.42		146.28	10		84.22	575.57
Mr B Smythe	Howard	31.27								0.33				431.7	8.2		11.71	483.21
	Edernurg	107.56												58.56			10.65	176.77
Mooi River Totals		3080.92	0	0	353.12	0	0	0	0	7.2	0	4.18	0	937.78	42.33	24.94	471.8	4922.3
HLATIKULU CATCHMENT																		
Mr David Worral	Bannockburn				189.24	42.29				8.5	0.31			335.16	77.75	9.08	34.75	697.08
Mr Mark Winter	Beverley				19.55									207.18			15.51	242.24
	Glenannie						34.26			24.12		0.08		737.48	26.34	30.49	155.7	1008.47
	Glengarry									0.3				292.04	15.33	2.64	49.84	360.15
Mr Greg Symmons	Broadmoor	3.74			548.84			49.3						441.44			84.49	1127.81
	Stadlers Rust	1.64			107.95			5.23		0.05	0.02			34.51	22.74	4.64	67.91	244.69
	Harleigh GS	0.08			355.6			10.53						80.43	3.89	13.66	55.62	519.81
Mr Danie Steyn	Forest Lodge	71.83			317.84			106.79									106.39	602.85
	Camewood		61.74		12.1			12.33								15.56	104.54	206.27
Mr Mark Basel	Effort No 2									1.41		0.22		141.3	26.28		3.44	172.65
	Egypt									0.95		0.21		35.17				36.33
	Farleigh			4.53			33.15		0.28	10.34		2.35	5.54	121.52	72.43	67.25	6.1	323.49
Mr Robert Moor	Falkirk					127.48				25.3	3.22			174.78	29.71	16.15	32.03	408.67
	Woodstock			0.62	0.04	54.61		0.31		0.78	14.2			193.47	40.75		22.55	327.33
Mr Malcolm Moor	Harleigh MM	0.08		2.7	355.6	102.1		1.06						349.32	16.59		13.35	840.8
Mr Chris Dwen	Northington	0.23			212.7			24.72						262.21	20.19	3.95	80.55	604.55
Mrs Veronica Speed	Old Roar				19.08				61.91	39.45				333.9	4.79	72.2	51.23	582.56
Mr Nic Shaw	Swarraton			4.37				9.85	111.1			0.07		125.91	50.73	46.1	47.4	395.5
Graham Pitt	Tiger Hoek			5.07					93.47	22.72	1.47	1.94	5.49	260.12		101.71	34.5	526.49
Hlatikulu Catchment		77.6	61.74	17.29	2138.54	326.48	67.41	220.12	266.7	133.92	19.22	4.87	11.03	4125.94	407.52	383.43	965.9	9227.7
UMNGENI CATCHMENT																		
Mr Chris Worrall	Holly Lodge	1217.46															14.77	1232.23
	Leeuw Bosch	556.06															38.28	594.34
		1773.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53.05	1826.6
TOTAL AREAS		4932.04	61.74	17.29	2491.66	326.48	67.41	220.12	266.7	141.12	19.22	9.05	11.03	5063.72	449.85	408.37	1490.75	10983

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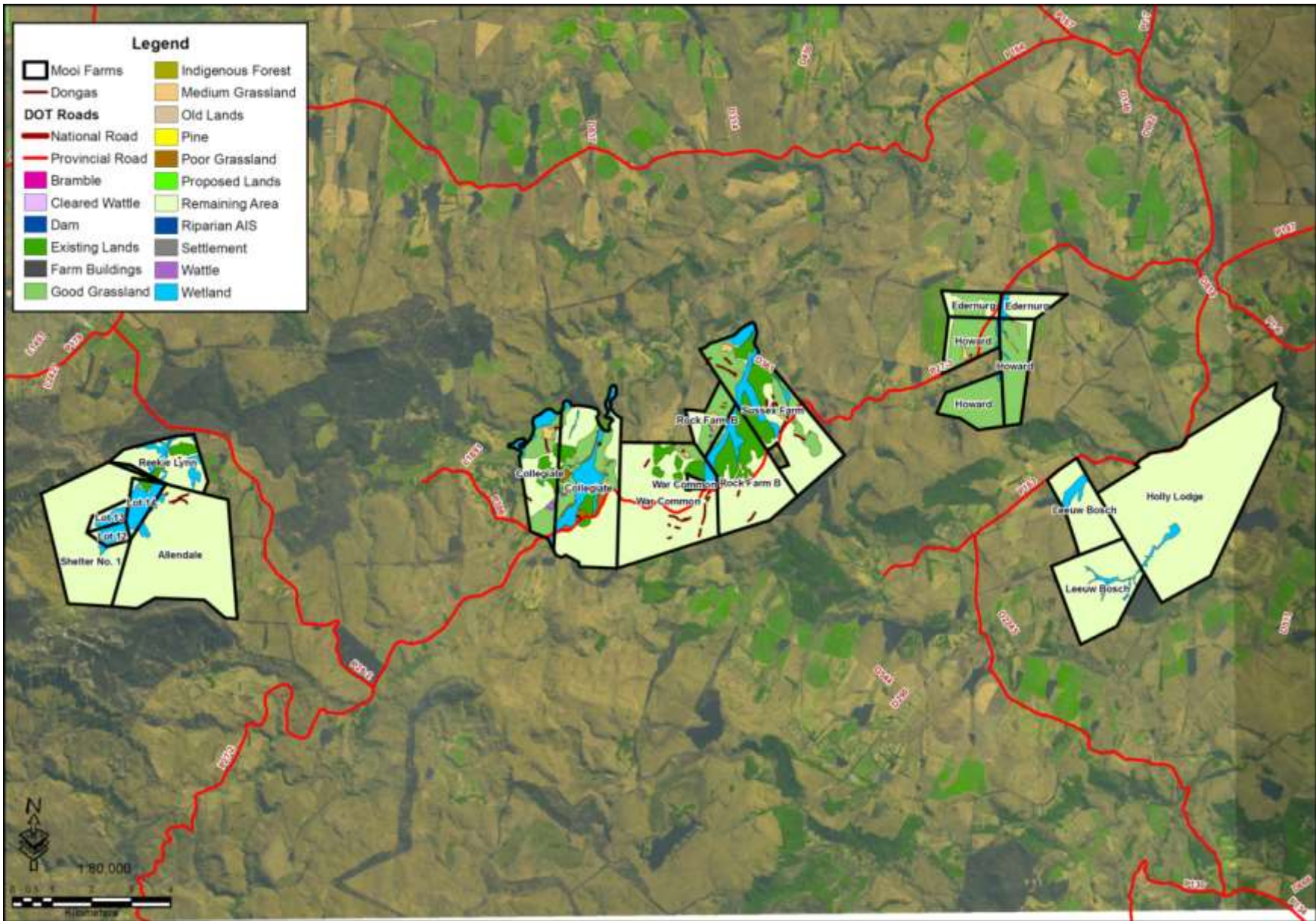


FIGURE 11 Summary map of landcover categories in potential offset sites in the Hlatikulu River catchment

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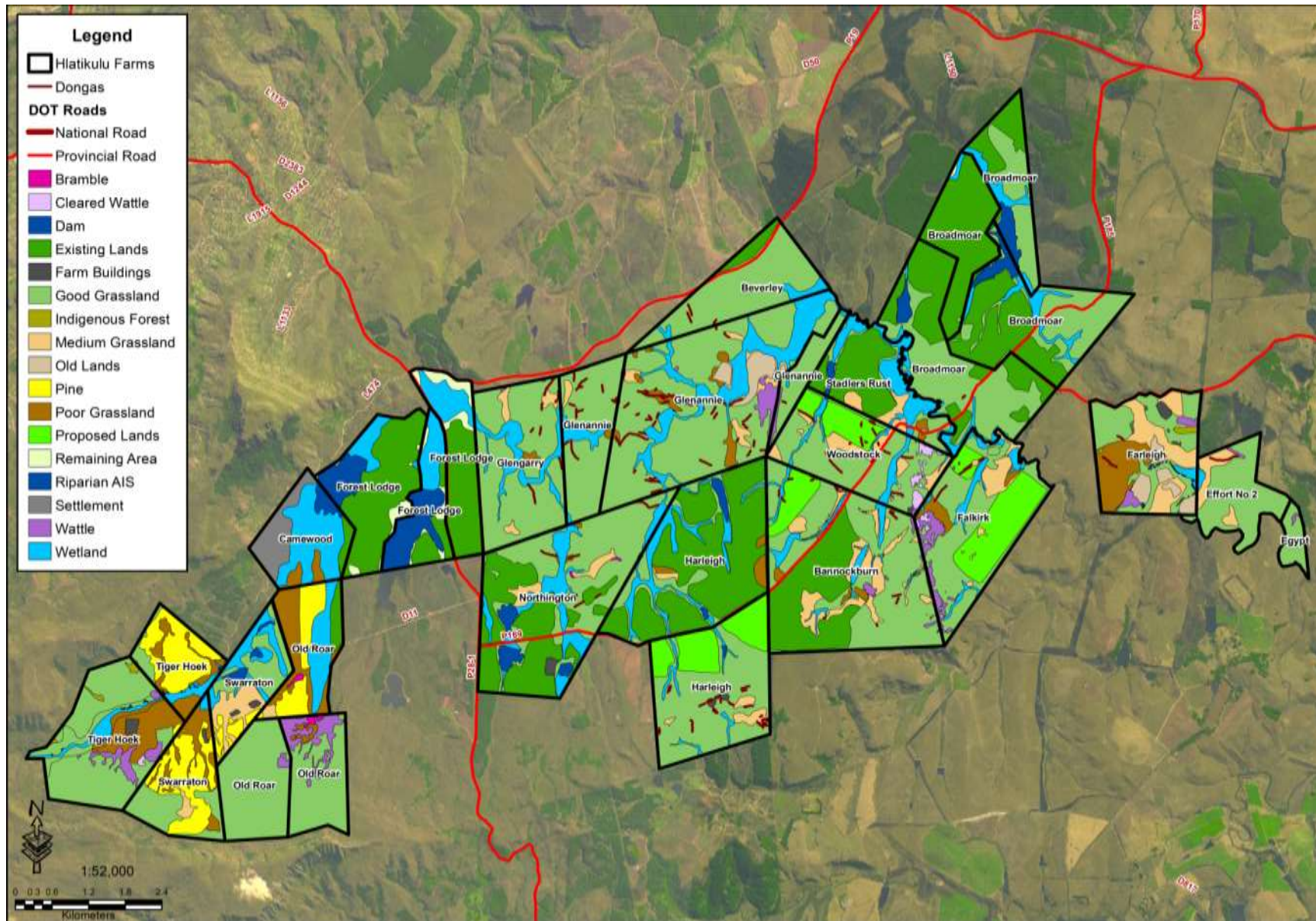


FIGURE 12 Summary map of landcover categories in potential offset sites in the Hlatikulu River catchment

An important consideration relating to the sites identified is that, since areas likely to be targeted as offsets are on privately owned farms and would not necessitate withdrawal from production or displacement of land use activities elsewhere (with subsequent impacts on biodiversity), negative impacts of securing these areas for conservation and improving their condition are improbable. Instead, by improving these areas, the offsets are likely to result in ecosystem services benefits to the region as a whole and in particular to downstream beneficiaries.

3.6 Consideration of the Mpofana Irrigation Project

The proposed MIP is a multi-faceted agriculture project that aims to optimize the potential of the agricultural sector within the Mpofana Catchment¹⁴. The project involves further development of dairy, beef, vegetables and organics production within the region. The project has a strong focus on transformation across the various areas which are supported by a range of training and education initiatives. The focus of job creation is through increased irrigation¹⁵ of approximately 3 000ha which requires the construction of one or more dams. DWS advised the MIP that if they could prove that there was adequate water within the Mooi Catchment after existing demands (including the MMTS) were met, they would consider an application to construct the storage dams necessary to facilitate the increased irrigation (*pers comm G Armstrong*¹⁶).

The MIP has undertaken a detailed reconciliation of water use in the Mooi River catchment and identified a range of sites for two storage dams, one on the Hlatikulu River (various sizes) and one on the Little Mooi River. It is likely that, as for SGD, the construction of these dams will require biodiversity offsets as a condition of their EA.

There is therefore potential for synergy with the investigation of offset sites for SGD, in that offset requirements for both projects could be targeted in priority areas and the MIP could assist in the engagement with landowners in the region who are in many cases members of the irrigation board, the MIP, and/or the relevant farmer associations. There is, however, also the potential for conflict and competition, where prime offset sites are secured for the SGD offsets and there are inadequate or unacceptable offset opportunities available to meet the requirements for the MIP project. This is of particular concern to the MIP members given their sensitivities about the negative impact of SGD on the options for expansion of agriculture in the Mooi River catchment¹⁷.

High level mapping of what might be lost in each of the MIP dam sites in terms of wetlands and river length was conducted by the INR¹⁸ in order for an initial understanding of offsets targets for the MIP could be established. Table 13 summarizes the extent of wetland and river habitat that may be lost and the likely offset targets based on the same ratios applied in the SGD case.

¹⁴ Business Plan for the MPOFANA IRRIGATION PROJECT: Agricultural transformation through infrastructure and education. 2012. MIP under the auspices of the Mooi River Irrigation Board and the Mooi River Farmers Association.

¹⁵ It has been explained that this will primarily be required for existing dryland areas, which alleviates the need for offset areas for grassland that would be required where veld was to be ploughed.

¹⁶ Chairman, MIP project - gcarmstrong@bundunet.com, 082 854 57466.

¹⁷ The Mooi River Irrigation Board initially appealed the RoD of Spring Grove Basin based on the fact that water from the dam was unaffordable (charged at domestic rates) and reduced the quantity of water available for expansion of agriculture in the region. The appeal was withdrawn on the basis that DWS would consider the irrigators constructing their own dams.

It is estimated that approximately 164ha of wetland would be inundated if the main on-channel Dams: Kamberg, Hlatikulu (at the largest size) and at Forest Lodge are constructed, as well as the Harleigh Dam on a tributary to the Hlatikulu River. This would translate to an offset target of approximately 492ha. In the case of river habitat, approximately 15.5km of river would be inundated in the two main channel dams. It should be noted that this is a worst-case scenario, given that the dams on the Hlatikulu River may not be required, or they may be of a reduced size.

TABLE 13 Extent of wetland and river habitat lost within the MIP dam sites and likely offset requirements

SYSTEM	DAM	AREA/LENGTH	OFFSET REQUIREMENT (Area * offset ratio of 3:1)
Wetland	Kamberg	59 ha	492 ha
	Hlatikulu	60 ha	
	Harleigh	19 ha	
	Forest Lodge	26 ha	
	TOTAL WETLAND AREA	164 HA	
River	Little Mooi	4.5 km	15.5 km
	Hlatikulu	11 km	
	TOTAL RIVER LENGTH	15.5 km	

What the preliminary investigation shows is that the SGD Offset investigation has identified adequate length of river (more than 60km) to meet the requirements of both the SGD project and the MIP.

In the case of wetlands, if the main Hlatikulu Dam and the Forest Lodge Dam are not constructed, there will still be an MIP offset requirement of approximately 234ha. The surplus wetland identified for the SGD Offset needs was approximately 110ha. Therefore, depending on what combination of dams are required, there would be a shortage of wetland options for the MIP in what has been identified to date of between 134ha and 382ha. As per the minutes of the meeting with the MIP (provide in Appendix 1), there is a high level of confidence that these additional areas could be identified in the Kamberg Valley, where there are significant areas available for wetland rehabilitation. The confidence is based on the fact that many of the landowners in the Hlatikulu and Mooi River catchments are members of the irrigation board and would benefit from the MIP either directly or indirectly.

Furthermore, there are additional properties in the Hlatikulu River catchment that were not investigated due to time constraints, and in the Upper uMngeni River catchment, that were identified in the initial part of the SGD investigation.

The detailed planning for the SGD Offsets and further investigation for the MIP will increase the level of confidence in the offset areas available, the offset requirements for the MIP and in a successful outcome regarding securing the required offset sites. It is important that communication between the parties responsible for both processes and the relevant authorities are maintained.

4. PRELIMINARY OFFSET BUDGETING

The achievement of the biodiversity offset objectives and targets require financing of the following phases and associated activities. The purpose and outcomes of each phase are described below, as well as the approach to budgeting, the costs considered for each phase, and an explanation of how the costs were derived.

The section concludes with a summary of the overall estimated cost for each site. The predicted budget for achieving the offset, if it is implemented on the priority sites in the Hlatikulu River catchment, is discussed in the previous section.

4.1 Approach to Preliminary Budgeting

It is important to note that the costs presented here are only provisional and high-level at this stage, as their primary purpose is to assist in providing the likely costs for detailed design and implementation. It should be understood that landowner engagement and conclusion of agreements in the implementation phase may result in the second or third priority sites being secured; therefore the overall offset budget would alter accordingly. The following points summarize the approach that has been taken to budgeting.

Conservative Approach

A conservative approach has been taken at this stage regarding likely costs. For example:

- It has been assumed that landowners would opt to have portions, rather than the whole, of their property involved in a stewardship programme, necessitating costs to have those included portions surveyed. In many instances, however, an entire property could be proclaimed under stewardship with the relevant natural portions being managed to meet conservation objectives; this approach could negate the need for land survey and associated costs. However, given the conservative approach, costs have been included for surveying sections of the property, which is more expensive.
- Different per hectare costs are available from the NRM programmes for clearing invasive alien plants, based on the density of the infestation and the size of the trees. Given the high level nature of the field work, it was not possible to define accurately the density and/or age of the alien species mapped. The budgets for clearing alien invasive plants have therefore been based on a 'worst case' scenario of adult trees at 100% density.

Scheduling of Financial Provision

These high level costings would need to be refined in the subsequent, detailed design and implementation stage of the work. The final costs would provide a reliable basis for the necessary financial provision and sequencing of its delivery. Given the need first to secure and then to manage the offset sites, it would be necessary to schedule financing accordingly, namely:

- An initial payment for land survey, legal and any public participation costs associated with site declaration and/ or permitting processes¹⁹, and other site establishment expenses;

¹⁹ Some rehabilitation activities may trigger the EIA regulations in terms of the National Environmental Management Act 1998, requiring environmental authorisation, and/or may require a water use licence in terms of the National Water Act 1998.

- Relatively high payments during the first five years of the overall 30 year offset period, as this is when wetland rehabilitation, extensive invasive alien plant clearing and rehabilitation of erosion gullies will take place; and
- Relatively small annual instalments for the remaining 25 odd years of the overall offset life span. These amounts are required for maintenance clearing of aliens, ongoing management support to landowners, monitoring and auditing of offset sites.

4.2 Preliminary Budgeting

This section describes the basis for the high-level costs provided and any assumptions, limitations of amendments made to arrive at the figures provided. A breakdown of the costs for each of the phases and aspects listed below is provided in Appendix 7.

The total costs for implementing the full spectrum of offset activities on all properties investigated (Sections 4.2.2 to 4.2.5) are summarized in Table 15 and amount to approximately R66.3 million²⁰. Table 15 also summarizes the contribution of each candidate site to the offset targets. The actual offset costs would be substantially lower than this figure however, because:

- not all of these properties would need to be secured to meet the offset targets; and
- it is not necessary to manage the full range of ecosystems on these properties to achieve the targets to remedy the residual negative impacts of the SGD.

If the priority sites identified in the assessment process were secured, it is anticipated that the likely budget for offset implementation could be approximately R 48 million (Section 5).

4.2.1 Costs of Detailed Planning

This investigation has highlighted a suite of optimum sites for achieving the offsets, and preliminary planning has been undertaken for each. The conditions of RoD, however, require that detailed plans are developed for wetland rehabilitation and offset establishment and management, and that separate plans must be submitted for each individual wetland. The project team is of the view that this exercise requires detailed mapping, baseline assessments of the systems being secured, detailed designs of any rehabilitation structures and alien clearing required, setting up monitoring and management plans, agreeing on the level of stewardship to secure the site, establishing the institutional framework for ensuring offsets are implemented as planned, and refining the provisional cost estimates. This detailed planning requires a specialist team, such as that responsible for the initial planning. The costs for undertaking the detailed planning were estimated to be in the region of R1.5million, and increased in line with the conservative approach to R 3 million. This figure will require refinement, depending on how the recommendations made in this document for detailed planning are taken forward and will be defined through a tender process.

²⁰ These values are based on present day rates.

4.2.2 Offset Establishment Costs

Offset establishment involves securing the offset site and providing 'up front' and 'once off' costs of:

- land survey;
- legal services to draw up the relevant biodiversity management agreements and/or notarial deeds, and the 'intention to declare' notices;
- public participation or consultation processes, and associated advertising and gazetting of relevant notices associated with protected area declaration;
- registration of notarial deeds (if relevant); and
- preparing a Management Plan for the offset area.

The costs for offset establishment have been provided by the EKZNW Stewardship Unit based on their experience with stewardship arrangements. These costs have been calculated on a per hectare basis using figures that assume government officials would be undertaking much of the work. In the case of the offsets, while the stewardship unit and associated agencies would still have oversight of offset activities, their limited capacity means that certain tasks, such as the baseline assessments and preparation of management plans, would need to be undertaken by service providers (specialist consultants). The per hectare costs have been amended accordingly, with a reduction in the time and budget for government officials, but an increase in costs required to use specialist consultants.

4.2.3 Initial Rehabilitation Costs

The initial costs of offset implementation will be relatively high during the first five years, due to the need for rehabilitation of:

- wetlands and clearing of invasive alien species;
- grassland areas by stabilising and rehabilitating erosion gulleys, and clearing of invasive alien species; and
- riparian areas and clearing of invasive alien species.

It is anticipated that, provided that these activities are undertaken effectively and efficiently, the costs of offset management would be substantially reduced from year 1, when rehabilitation structures, structures which represent the greatest single cost are assumed to have established. The other significant cost is clearing alien species, which will take place over the first 5 years. The first year is intensive after which the costs are halved per annum in the follow up. From year 5 onwards, costs are limited to ongoing management and monitoring.

4.2.4 Long-term Management Costs

Subsequent to securing the offset sites and carrying out the initial, relatively intensive rehabilitation actions described above, the following activities would need to be undertaken:

- ongoing management, advice and assistance;
- monitoring and evaluation of offset sites; and
- periodic independent environmental auditing of offset performance, to check that the offsets are being effectively managed in relation to targets set out in the relevant management plan, that all parties are performing their specified roles and that the necessary funds have been provided. The cost for this activity was estimated to be

R30 000.00 a year, required over a period of 30 years, which equates to a total budget of R930 000.00.

Both the initial rehabilitation and the long-term management of the offset sites are central to meeting the conditions of authorisation, which require long-term management of the offsets, stated as the 'operational life of the dam'. The related costs are derived from ecologists' and engineers' input and field work, using the Norms and Standards provided by DEA's NRM programme, and also from average figures for legal, survey and establishment costs, as well as ongoing management costs from the EKZNW Stewardship Programme.

4.2.5 Once Off Costs and Contingencies

There are certain once off costs that have been taken into account in determining a budget for the offsets; these costs would apply across the selected offset sites and are described below:

i. Environmental Authorisation

In some instances, EA (the preparation of a Basic Assessment Report) would be required where proposed rehabilitation activities (particularly with regard to the erection of structures in wetlands) trigger a listed activity in terms of the NEMA EIA regulations. In addition, a water use license will be required in some situations. A general provision of R 1 500 000.00 for these authorisation/licensing processes has been made based on the following thinking. It is proposed that the offset sites are grouped into the 'Hlatikulu' and Mooi' Catchments, with the latter incorporating the one uMngeni site. This would enable the process to benefit from the economies of scale. The costs of these processes would also be reduced because the large proportion of the specialist work would be undertaken as part of the offset planning process. An allocation of R750 000 per catchment area has been proposed to arrive at the overall budget for this line item.

ii. Contingency

A 10% contingency has been included to account for certain additional offset activities for which costs are not clear at this point and would need to be defined in the detailed planning. An example of such activities would be annual budgets to deal with the issue of poaching. Addressing this issue requires a multi-pronged approach involving increased awareness and education, increased policing and development of relationships between the various role-players. This contingency would also account for a situation where several landowners decide not to proceed with the high level agreement established in this process and additional engagement is required to secure sites and meet the offset targets. This risk is mitigated by the fact that offset areas, far in excess of the targets have been identified and investigated (les so in the case of wetlands where there was only a buffer of approximately 100ha).

iii. Escalation

An escalation of 8% per annum has been applied to the costs over the 30 year period defined as the lifespan for the offset. The additional cost is limited because, as discussed

above the large proportion of the costs are utilized in the first year and by the 5th year it is reduced mainly ongoing management and maintenance.

4.2.6 Employment Opportunities

In the current socio-economic climate it is important to consider the job opportunities that may be generated through the various stages of the offset life cycle i.e. initial clearing/restoration and follow/maintenance over the 30 year period.

The projected number of person days is summarized for each phase in Table 14. It should be noted that because the costing for rehabilitation work has been undertaken on the basis that the NRM models would be applied, the job opportunities are maximized because this is a labour-intensive model. The negative implication is that the overall costs would be far higher because commercial contractors utilizing a mechanized approach are able to undertake the rehabilitation work (where the majority of the person days are generated) at a lower cost.

The NRM model, requires that labour is sourced from surrounding communities, thereby increasing the job creation associated with the construction of the dam, if even indirectly.

TABLE 14 Number of person days created for undertaking various rehabilitation actions

PROPERTY CATEGORIES		PERSON DAYS PER REHABILITATION CATEGORY					
LANDOWNER	SGO_PROPERTY NAME	BRAMBLE	PINE	WATTLE TERRESTRIAL	WATTLE RIPARIAN	WETLAND INTERVENTIONS	DONGA INTERVENTIONS
MOOI RIVER CATCHMENT							
Mr Frank Reardon	Allendale					2176	
	Lot 12						
	Lot 13						
	Lot 14						
	Reekie Lynn Shelter No. 1						623
Mr D Breedt	Collegiate	387		233	252	346	5502
	War Common	31					7518
	Rock Farm B	90		66		1069	1943
	Sussex Farm	158		10	28	347	11631
Mr B Smythe	Howard	395		15			1620
	Edernurg	50					1502
Totals		1,111	-	324	280	3,938	30,339
HEATIKULU CATCHMENT							
Mr David Worrall	Bannockburn	611		382.5		1203	7884
Mr Mark Winter	Beverley	176					1938
	Glenannie	924		1085	5		40301
	Glenarry	318					6975
Mr Greg Symmons	Broadmoor	375					626
	Stadlers Rust	138				487	
	Harleigh GS	72					
Mr Danie Steyn	Forest Lodge						
	Camewood	44					
	Effort No 2	209		63.5	14.8		1314
Mr Mark Basel	Egypt	62		43	14.7		
	Farleigh	807		465	157.5	421	2371
	Falkirk	359		1138.5		587	4271
Mr Robert Moor	Woodstock	303		35		229	11197
	Harleigh MM	353					13595
Mr Chris Owen	Northington	318				248	6121
Mrs Veronica Speed	Old Roar	791	1919	1775			
Mr Nic Shaw	Swarraton	593	3443	1022	5	1360	
Graham Pitt	Tiger Hoek	913	2897		130		
Totals		7,367	8,259	6,010	327	4,535	96,593
UMNGENI CATCHMENT							
Mr Chris Worrall	Holly Lodge	1217				345	
	Leeuw Bosch	556				300	
Totals		1,774	-	-	-	645	-
TOTAL PERSON DAYS		10,251	8,259	6,334	607	9,118	126,932

TABLE 15 Summary of the costs for establishing, rehabilitating and managing offsets on all the offset sites investigated

LANDCOVER CATEGORIES	PROPERTY CATEGORIES	COST CATEGORIES				CONTRIBUTION CATEGORIES		
						Wetlands	Grasslands	River
LANDOWNER	SGO_NAME	ESTABLISHMENT COSTS	WETLAND, GRASSLAND & RIVER REHABILITATION	ONGOING MANAGEMENT (over 30 years)	TOTAL COSTS	% of target achieved per property	% of target achieved per property	% of target achieved per property
MOOI RIVER CATCHMENT								
Mr Frank Reardon	Allendale		R 733,430	R 13,860	R 747,290	0.95	0	0
	Lot 12		R 424,120	R 30,870	R 454,990	2.12	0	0
	Lot 13		R 176,970	R 23,340	R 200,310	1.6	0	0
	Lot 14		R 1,226,380	R 61,650	R 1,288,030	4.24	0	0
	Reekie Lynn		R 34,320	R 44,610	R 78,930	2.66	0	0
	Shelter No. 1		R 0	R 5,070	R 5,070	0.35	0	0
	TOTAL				R 2,774,620	11.92	0	0
Mr D Breedt	Collegiate	R 74,622	R 1,299,545	R 377,850	R 1,752,017	10.22	35	47.44
	War Common	R 48,441	R 282,650	R 36,360	R 367,451	1.04	3.21	0
	Rock Farm B	R 45,917	R 216,378	R 131,520	R 393,815	2.93	13.43	0
	Sussex Farm	R 44,655	R 2,426,583	R 244,440	R 2,715,678	6.08	24.81	2.58
	TOTAL				R 5,228,961	20.27	76.45	50.02
Mr B Smythe	Howard	R 42,009	R 602,506	R 474,180	R 1,118,695	1.53	69.83	0
	Edernurg	R 20,332	R 491,966	R 72,660	R 584,958	0.78	9.3	0
	TOTAL				R 1,703,653	2.31	79.13	0
Hlatikulu Catchment					R 9,707,234.00			
HLATIKULU CATCHMENT								
Mr David Worrall	Bannockburn	R 27,113	R 4,599,264	R 470,040	R 5,096,417	2.55	65.54	0
	TOTAL				R 5,096,417	2.55	65.54	0
Mr Mark Winter	Beverley	R 27,113	R 653,392	R 233,820	R 914,325	1.05	32.89	0
	Glenannie	R 65,433	R 15,047,544	R 965,490	R 16,078,467	11.24	121.24	60.65
	Glengarry	R 33,008	R 2,483,223	R 375,060	R 2,891,291	3.6	48.79	29.3
	TOTAL				R 19,884,083	15.89	202.92	89.95
Mr Greg Simmons	Broadmoar	R 71,390	R 279,795	R 552,240	R 903,425	6.12	70.07	38.06
	Stadlers Rust	R 27,140	R 553,298	R 136,290	R 716,728	4.9	9.09	
	Harleigh GS	R 44,591	R 38,037	R 146,940	R 229,568	4	13.38	0
	TOTAL				R 1,849,721	15.02	92.54	38.06
Mr Danie Steyn	Forest Lodge	R 45,767	R 0	R 111,720	R 157,487	7.66		10.97
	Camewood	R 25,314	R 23,066	R 109,770	R 158,150	7.54	34.87	18.06
	TOTAL				R 315,637	15.2	34.87	29.03
Mr Mark Basel	Effort No 2	R 17,684	R 480,247	R 179,580	R 677,511		26.6	21.1
	Egypt	R 16,816	R 18,904	R 36,930	R 72,650	0	5.58	9.35
	Farleigh	R 45,767	R 0	R 11,720	R 57,487	0.46	30.79	16.32
	TOTAL				R 807,648	0.46	62.97	46.77
Mr Robert Moor	Falkirk	R 35,433	R 2,457,463	R 248,340	R 2,741,236	2.31	32.46	21.61
	Woodstock	R 31,380	R 4,963,861	R 296,610	R 5,291,851	1.59	37.21	0
	TOTAL				R 8,033,087	3.9	69.67	21.61
Mr Malcolm Moor	Harleigh MM	R 57,040	R 6,482,603	R 4,741,780	R 11,281,423	0.97	58.8	0
	TOTAL				R 11,281,423	0.97	58.8	0
Mr Chris Dwen	Northington	R 80,792	R 2,537,385	R 381,090	R 2,999,267	5.81	44.83	0
	TOTAL				R 2,999,267	5.81	44.83	0
Mr Mike Speed	Old Roar	R 44,332	R 977,844	R 410,220	R 1,432,396	3.7	53.76	0
	TOTAL				R 1,432,396	3.7	53.76	0
Mr Nic Shaw	Swarraton	R 34,774	R 2,178,171	R 253,530	R 2,466,475	2.93	28.04	12.26
	TOTAL				R 2,466,475	2.93	28.04	12.26
Graham Pitt	Tiger Hoek	R 41,325	R 1,081,864	R 309,360	R 1,432,549	2.49	41.29	24.52
	TOTAL				R 1,432,549	2.49	41.29	24.52
Hlatikulu Catchment					R 55,598,703.00			
UMNGENI CATCHMENT								
Mr Chris Worrall	Holly Lodge	R 76,612	R 799,800	R 15,510	R 891,922	1.64	0	0
	Leeuw Bosch	R 44,717	R 0	R 40,200	R 84,917	2.18	0	0
	TOTAL				R 976,839	3.82	0	0
Umgeni Catchment					R 976,839.00			
TOTAL					R 66 282 776			

Prioritization Categories	
1-5% contribution	
Over 5% contribution to target	
Over 10% contribution to target	
Over 50%	

5. BUDGET FOR OFFSETTING ON OPTIMAL SITES

Table 16 provides a detailed budget using the sites identified as the most efficient and appropriate in meeting the offset targets, and their associated costs.

Offset Target

As documented in Section 3.5, the combination of the properties Glennannie, Glengarry (which have the same landowner) would be the most efficient or optimal for meeting offset targets because all of the grassland, 90% of the river and 16% of the wetland targets could be met on these two properties. By adding the adjoining properties Stadlers Rust and Broadmoor, the entire river target would be also be achieved and 27% of the wetland target. Importantly, it is not just the efficiency of these sites but also the nature and quality of the habitat which make these sites a priority from a biodiversity point of view:

- The river runs through the middle of these properties so that it is buffered by the grassland areas and wetland on either side; i.e. it is the most contiguous block of adjoining grass, wetland and river complex across all the sites investigated.
- The wetland and grassland habitat, and river are in good condition.
- The value of the habitat is illustrated by the range of species of conservation significance occurring on these properties, including several Wattled Crane nest sites which are the selected indicator of high value grassland/wetland habitat.
- The sites adjoin one another so that they provide a contiguous matrix of high value grasslands, wetland and river habitat, thereby meeting the aim of securing consolidated blocks rather than small fragmented areas.
- Targeting clusters of sites would enable more cost-effective and efficient management.

Budget

Offset costs are largely dictated by the characteristics of the sites required to meet offset targets. For practical reasons, property boundaries are used to delineate offset sites. As indicated previously, almost all of the sites identified in this report are needed to achieve the offset target for wetlands (1 380ha)²¹. However, securing these sites would also mean securing significantly greater areas of grassland and riparian habitat than strictly needed to meet the offset targets for these ecosystems. The requirements for the SGD offsets are defined in the RoD, therefore it would be unreasonable for the party responsible for implementing the offsets to take responsibility for substantially larger areas of habitat than required. For this reason, a pragmatic approach to apportioning responsibility is proposed. The following example is used to illustrate this approach:

If the combination of Glenannie and Glengarry, and Broadmoor and Stadlers Rust, were selected to achieve the full grassland and river target, and 27% of the wetland target, the full costs of wetland, grassland and riparian rehabilitation would reasonably be required for these sites. (Although the costs of rehabilitation are relatively high at R19 million²², the value and suitability of the habitat in terms of the offset objectives make these sites optimal.)

²¹ This target includes both the biodiversity element and the restoration of ecosystem functions provided by wetlands which are crucial to the transfer scheme as they include water quality and flow regulation.

²² The costs of rehabilitating numerous long and deep erosion dongas located on steep slopes is high and accounts for more than 50% of the calculated rehabilitation costs. They represent a small portion (area) of the candidate sites, however, and are located within high value grasslands and wetlands.

The costs associated with securing and managing the other offset sites necessary to achieve the remaining portion (73%) of the wetland target would be addressed in the following way:

- The costs of securing the property through stewardship or registering conservation servitude around the wetland and buffer would still be required. There would therefore be no change or reduction in this budget.
- The costs of wetland rehabilitation would remain as part of the offset budget. The costs of rehabilitating the grasslands and river areas would be excluded from the offset costs, since DWS would already have met offset targets for these habitats.
- The ongoing management cost would be calculated on the wetland area alone, rather than on the combined areas of wetland, grassland and riparian habitat.

The outcomes of this example are provided in Table 16, and show that the likely budget for the offsets would be in the order of approximately R 48 million²³. The columns to the right (contribution to offset targets) highlight the key properties (Glengarry, Glenannie, Broadmoor and Stadlers Rust) that met the full grassland and river targets, and a large proportion of the wetland target.

²³ It should be noted given there was a surplus of approximately 100ha in terms of meeting the wetland target, the property Camewood (on which the available wetland was 104ha) has been excluded from the budget.

TABLE 16 Offset budget for optimal biodiversity sites

LANDCOVER CATEGORIES	PROPERTY CATEGORIES	COST CATEGORIES					CONTRIBUTION TO OFFSET TARGETS		
							Wetlands	Grasslands	River
LANDOWNER	SGO_NAME	ESTABLISHMENT COSTS	WETLAND, GRASSLAND & RIVER REHABILITATION	ONGOING MANAGEMENT (over 30 years)	TOTAL COSTS	TOTAL COSTS (inflated @8% annum over 30 years)	% of target achieved per property	% of target achieved per property	% of target achieved per property
MOOI RIVER CATCHMENT									
Mr Frank Reardon	Allendale		R 733 430	R 13 860	R 747 290	R 795 614	0,95	0	0
	Lot 12		R 424 120	R 30 870	R 454 990	R 465 596	2,12	0	0
	Lot 13		R 176 970	R 23 340	R 200 310	R 212 548	1,6	0	0
	Lot 14		R 1 226 380	R 61 650	R 1 288 030	R 1 334 011	4,24	0	0
	Reekie Lynn		R 34 320	R 44 610	R 78 930	R 99 005	2,66	0	0
	Shelter No. 1		R 0	R 5 070	R 5 070	R 14 196	0,35	0	0
	TOTAL				R 2 774 620	R 2 920 970	0	0	0
Mr D Breedt	Collegiate	R 74 622	R 318 100	R 286 518	R 679 240	R 691 835	10,22	0	0
	War Common	R 48 441	R 77 000	R 15 225	R 140 666	R 154 234	1,04	0	0
	Rock Farm B	R 45 917	R 182 175	R 131 520	R 359 612	R 503 200	2,93	0	0
	Sussex Farm	R 44 655	R 1 082 040	R 88 410	R 1 215 105	R 1 326 613	6,08	0	0
	TOTAL				R 2 394 623	R 2 675 882		0	0
Mr B Smythe	Howard	R 42 009	R 0	R 12 285	R 54 294	R 76 764	1,53	0	0
	Edernurg	R 20 332	R 215 400	R 11 550	R 247 282	R 297 622	0,78	0	0
	TOTAL				R 301 576	R 374 386	0	0	0
Hlatikulu Catchment					R 5 470 819	R 5 971 238			
HLATIKULU CATCHMENT									
Mr David Worrall	Bannockburn	R 49 980	R 1 446 600	R 36 488	R 1 533 068	R 1 868 382	2,55	0	0
	TOTAL				R 1 533 068	R 1 868 382	2,55	0	0
Mr Mark Winter	Beverley	R 27 113	R 0	R 16 286	R 43 399	R 73 118	1,05	0	0
	Glenannie	R 65 433	R 15 047 544	R 965 490	R 16 078 467	R 17 859 401	11,24	121,24	60,65
	Glengarry	R 33 008	R 2 483 223	R 375 060	R 2 891 291	R 3 578 864	3,6	48,79	29,3
	TOTAL				R 19 013 157	R 21 511 383			
Mr Greg Simmons	Broadmoar	R 71 390	R 279 795	R 552 240	R 903 425	R 1 578 898	6,12	70,07	38,06
	Stadlers Rust	R 27 140	R 553 298	R 136 290	R 716 728	R 966 662	4,9	9,09	
	Harleigh GS	R 44 591	R 0	R 58 401	R 102 992	R 209 678	4	0	0
	TOTAL				R 1 723 145	R 2 755 238			
Mr Danie Steyn	Forest Lodge	R 45 767	R 0	R 111 720	R 157 487	R 361 358	7,66	0	0
	Camewood	R 0	R 0	R 0	R 0	R 0	7,54	0	0
	TOTAL				R 157 487	R 361 358		0	0
Mr Mark Basel	Effort No 2	R 17 684	R 0	R 0	R 17 684	R 17 684		0	0
	Egypt	R 16 868	R 0	R 0	R 16 868	R 16 868	0		
	Farleigh	R 31 173	R 727 620	R 6 300	R 765 093	R 776 898	0,46		
	TOTAL				R 799 645	R 811 450	0	0	0
Mr Robert Moor	Falkirk	R 35 433	R 774 820	R 33 600	R 843 853	R 905 329	2,31	0	0
	Woodstock	R 31 380	R 380 098	R 23 625	R 435 103	R 476 775	1,59	0	0
	TOTAL				R 1 278 956	R 1 382 104		0	0
Mr Malcolm Moor	Harleigh MM	R 57 040	R 0	R 14 070	R 71 110	R 96 753	0,97	0	0
	TOTAL				R 71 110	R 96 753	0	0	0
Mr Chris Dwen	Northington	R 80 792	R 299 400	R 84 578	R 464 770	R 619 298	5,81	0	0
	TOTAL				R 464 770	R 619 298	0	0	0
Mr Mike Speed	Old Roar	R 44 332		R 53 760	R 98 092	R 196 385	3,7	0	0
	TOTAL				R 98 092	R 196 385	0	0	0
Mr Nic Shaw	Swarraton	R 34 774	R 1 297 200	R 49 770	R 1 381 744	R 1 452 388	2,93	0	0
	TOTAL				R 1 381 744	R 1 452 388	0	0	0
Graham Pitt	Tiger Hoek	R 41 325		R 36 225	R 77 550	R 143 273	2,49	0	0
	TOTAL				R 77 550	R 143 273	0	0	0
Hlatikulu Catchment					R 26 598 724	R 31 198 012			
UMNGENI CATCHMENT									
Mr Chris Worrall	Holly Lodge	R 76 612	R 799 800	R 15 510	R 891 922	R 944 024	1,64	0	0
	Leeuw Bosch	R 44 717	R 0	R 40 200	R 84 917	R 134 560	2,18	0	0
	TOTAL				R 976 839	R 1 078 584	0	0	0
Umgeni Catchment					R 976 839	R 1 078 584	110	249	128
Detailed Planning						R 3 000 000			
Environmental Authorisation (To undertake Basic Assessment for all sites)						R 1 500 000			
Annual Auditing (Annual cost of R30 000 over 30 years)						R 930 000			
Total Budget Excl contingency						R 43 677 834			
10% Contingency						R 4 367 783			
TOTAL BUDGET Incl contingency						R 48 045 617			

6. GOVERNANCE FRAMEWORK

Implementation of the offsets needs to take place within a well-structured governance framework that clearly defines roles, responsibilities, targets and outcomes, as well as the source and flow of finances and processes for decision making and reporting. This framework should also define the most appropriate processes and mechanisms to facilitate and support the various role-players in undertaking their responsibilities in a transparent and efficient manner.

The governance options and proposed framework have been identified through engagement with a range of role-players during this planning phase, and are based on the understanding that:

- like the plans for the specific offset sites, the framework may change depending on which service provider is selected to implement and/ or manage the offset,
- the way in which the offsets are financed may influence their governance, and
- DWS does not have the necessary in-house skills and capacity, or mandate, either to implement or undertake the 'hands on' practical management of the offset sites.

The options discussed in this section therefore aim to utilize the most appropriate organizations in terms of their mandate, skills and capacity for undertaking specific aspects of offset implementation, building on existing initiatives and relationships. The proposed framework and options within it are depicted in Figure 13 and are explained as follows:

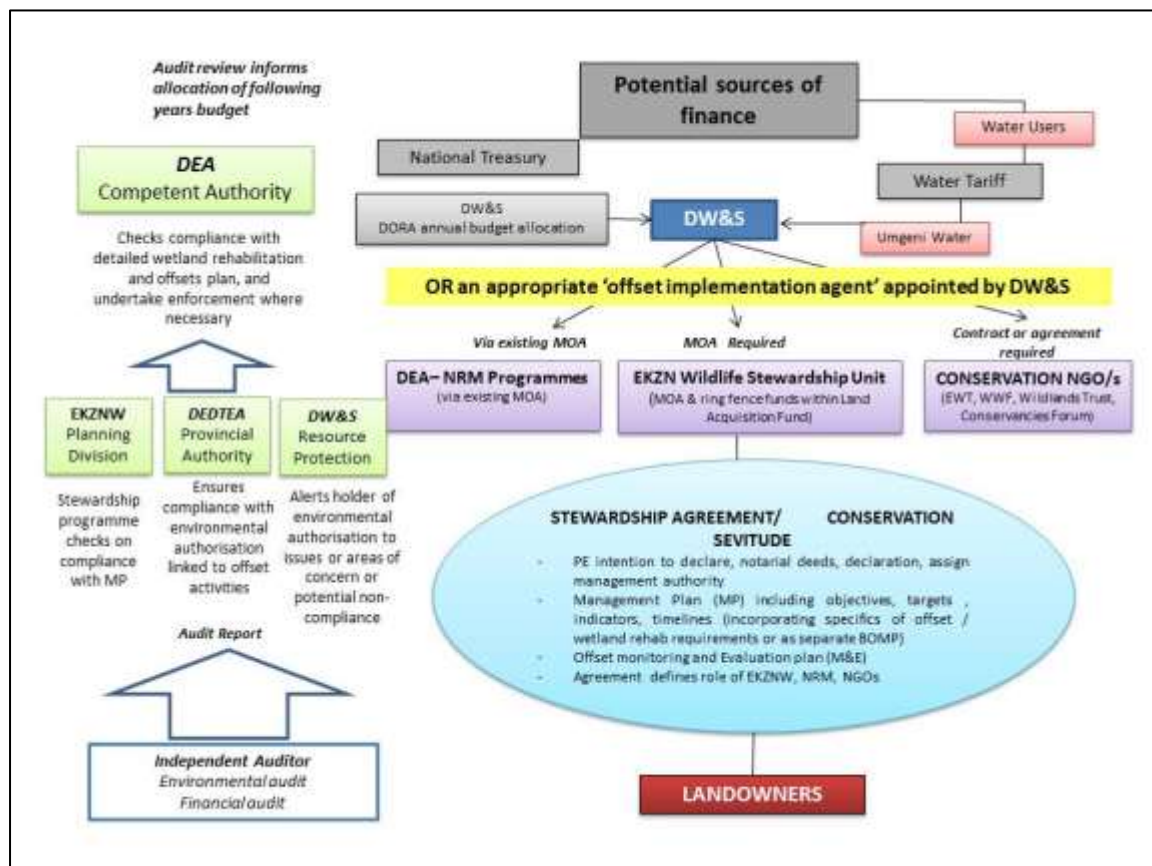


FIGURE 13 Graphic overview of the proposed governance framework

6.1 Financing Sources and Budget Flows

Although the conditions of RoD are not explicit about having to make financial provision to implement wetland rehabilitation and offsets, the intention and spirit of the conditions were clearly that the necessary resources to ensure effective implementation 'during the operational phase' of the dam must be provided by the applicant (DWS).

6.1.1 Sources of Finance

It is useful to preface the consideration of options for financing the offsets with a discussion regarding the principles and current context for financing offsets for large government-funded infrastructure projects in South Africa such as SGD and the N2 Toll Road. Historically, the costs associated with significant residual impacts of large projects on the environment were not accounted for in the development costs and were effectively transferred to society as externalities e.g. loss of ecosystem services. Offsets provide a mechanism for internalizing these costs and thereby accounting for the 'full cost' of the project. To do so would require that these costs are known and included in the capital budget submitted to the banks and other institutions that finance such projects. It is the experience of several large projects currently under development in the country that the topic of offsets has been introduced only at the end of the impact assessment process, often in the form of a condition of EA. To date, the consideration of offsets has not been included early enough in the planning, impact assessment or authorization process to be accurately accounted for in the capital budget for the project. This presents a scenario where offsets are required as a 'surprise' condition of EA but where no provision has been made for funds for the offset, potentially leading to non-compliance with this condition.

As the applicant and holder of the EA, DWS is legally responsible for satisfying its conditions regarding wetland rehabilitation and biodiversity offsets (i.e. securing and managing these offsets, with associated financial provision). In the case of SGD, taking into account the 'polluter or environmental degrader pays principle' in NEMA, the offset costs should either have been included in the capital budget for the project and/or transferred to water users via the water tariff during the operational phase of the project (applying a 'user pays' principle). TCTA, as the appointed agent for DWS, has a contractual responsibility to meet the conditions of EA but, given that that responsibility effectively ends on completion of dam construction, it cannot be held responsible for management of offset sites during the dam's operational phase. DWS have not made financial provision to undertake the detailed planning for, or implementation of, the wetland rehabilitation and offsets. During the planning process it emerged that there is a clear difference in opinion between the DWS as the holder of the EA and the DEA (as the competent authority) regarding the responsibility for financing the implementation of offsets (i.e. beyond the finalization of this document). The positions of these departments are recorded in the minutes of the authorities meeting held on 10 September 2014 (Appendix 1), along with the agreed steps for resolving their differences. It was agreed at this meeting that the issue would be elevated to a senior level within the respective departments in order that the issue be dealt with as a matter of urgency.

All parties recognized the need for urgency given that:

- This project may set a precedent for other large-scale government-funded projects by shifting costs to other agencies, based on which the cumulative impact on budgets of the NRM programmes and conservation authorities would be immense;
- The current planning process has engaged numerous landowners. The need to maintain momentum on the ground and retain continuity with landowners in negotiating offsets is crucial if securing of suitable wetland rehabilitation/ offset sites is to succeed. There is a real risk that other initiatives that are focused on restoration of ecological infrastructure will capitalize on this offset planning process and approach landowners to undertake work on their land. Since landowners are not bound to wait for DWS to take action, delays in the SGD offset process could result in priority sites becoming unavailable and DWS being forced to find new, less efficient (in terms of spatial configuration and ease of management) offset sites at additional cost.
- Failure to act urgently on the part of DWS could lead to non-compliance with the conditions of EA, setting a negative precedent in South Africa for biodiversity offsets linked to major public infrastructure projects.

The issue of funding of offset implementation remains unresolved and is threatening to paralyze progress. It is thus both crucial and urgent to resolve this matter swiftly, to ensure that the conditions of EA can be satisfied.

While other alternatives may exist, two possible options that may be explored further are discussed below:

i. *DWS allocation from National Treasury*

An option being investigated at a policy level for other large projects requiring offsets where state entities are the developer is to utilize a portion of their existing Division of Revenue (DORA) or grant allocations from National Treasury. This option would mean that a portion of their budget could be reserved each year according to the calculated projections of offset costs, and re-directed to an appropriate agency tasked with the implementation of the wetland rehabilitation/offset activities. Since the costs associated with both wetland rehabilitation and offsets would be relatively high in the first 5 years, diminishing over time, DWS could choose to pay a relatively larger amount early on to cover these initial costs, followed by smaller payments from their annual allocation.

ii. *Adjustment of the Water Tariff*

The existing water tariff negotiated with the downstream municipalities does not include the offset costs because they are only now being established. The tariff is, however, re-negotiated on an annual basis²⁴, presenting a future option to incorporate the offset costs. Depending on the magnitude of increase in the tariff required to cover the costs of the offset, this option could be contentious, given that users are likely to have understood that all costs had already been included. The degree to which there is resistance to this option depends on the implications it has for the tariff i.e. if the increase is negligible over an

²⁴ Mr S Gillham (Umgeni Water) and N Macleod (eThekweni Municipality), *pers comm*.

extended period then it may be acceptable. Pursuing this option requires that the implications (increase) to the tariff from the offset are accurately calculated in the detailed planning phase. If the values presented in Table 16 are used to determine the cost implications, the increase in the water tariff would be approximately 1.28 cents per kilolitre , based on the calculation presented in Table 17.

TABLE 17 Summary of increase in water tariff arising from the addition of the offset costs

R1.6 billion	Total cost of the MMTS II project
3%	R 48 million as % of total project cost
42.6 cents	Increase in tariff arising from cost of MMTS II
1.28 cents	<i>Approximate increase in the tariff arising from the addition of offset costs</i>

Using the water tariff as a mechanism to finance the ongoing management of offset sites would appear to be appropriate and reasonable, given that other mitigation costs have been covered in this way. In particular:

- addition of the offset budget would lead to a relatively minor increase to the water tariff;
- the estimates for developing and securing the offsets are considered to have been undertaken conservatively, so that the overall cost could be lower; and
- this option could be used in combination with and/or to supplement the other option addressed in this section, to ensure that any increases in water tariffs would be acceptable to users (e.g. it could be used to finance ongoing offset management rather than establishment or initial rehabilitation costs).

The option of utilizing the water tariff merits further investigation with all affected parties, including the users (downstream municipalities), DWS and uMngeni Water.

6.1.2 Flows and Management of Finance

DWS is the holder of the EA and thus responsible for meeting the wetland rehabilitation and offset conditions. However, conservation is not the core function of this department, and there are other government departments, agencies and programmes whose mandate and focus are better suited to the design and implementation of wetland rehabilitation and offsets. They include the DEA's NRM programmes, which comprise Working for Water, Working for Wetlands, Working on Land and Working on Fire. These programmes plan, design and undertake rehabilitation of natural systems. Similarly, the EKZNW Stewardship Programme is responsible for facilitating and securing the long-term management of biodiversity on private land through the various mechanisms established in terms of stewardship. There are also various conservation NGOs and consultants that work with both the NRM programmes and the EKZNW Stewardship unit in undertaking NRM activities and facilitating land being entered into the stewardship programme.

Importantly, however, the involvement of these organizations in undertaking wetland rehabilitation and offset work on behalf of DWS requires the transfer of adequate funds from DWS to cover the costs of these activities.

Certain elements will need to be in place to facilitate the transfer of funds between DWS and offset implementing agents, and to trace and audit expenditure:

i. Explicit breakdown of costs per year for wetland rehabilitation and offsets

This report provides high-level costing of work required to satisfy the conditions of the EA. The next phase of work is crucial to providing a detailed breakdown of costs for the target wetland rehabilitation and offset sites, and the spread of expenditure over a 30-year period. This detailed breakdown would provide the basis for DWS' obligations for financial provision, and for auditing and compliance monitoring purposes.

ii. Agreements

DEA's NRM Programmes have an existing Memorandum of Agreement (MoA) with DWS to provide for the transfer of funds to enable specific activities to be carried out. The MoA, currently being reviewed and updated, enables the NRM programmes to undertake resource management on behalf of DWS on the condition that DWS provide the necessary funding.

No such MoA exists between DWS and EKZNW, or between DWS and other government departments/agencies, NGOs or private contractors that may be appointed as wetland rehabilitation/offset implementation agents. Such agreements or binding contracts would need to be drawn up.

iii. Financial Systems

It would be essential for the funds transferred by DWS to offset implementing agents to be ring fenced explicitly for specific offset actions or tasks within appropriate financial vehicles and systems, so that their expenditure can be clearly traced and audited.

iv. Auditing

An annual audit of the requisite transfer of funds from DWS for the purposes of wetland rehabilitation and offsets, as well as of expenditure of these funds, will be required. The ability to undertake such an audit requires that clear structures and accounting systems are set up to trace the flow of funds between organizations and track expenditure against planned activities. The allocation of finance for successive years would be reliant on the outcomes of the audit from the preceding years.

6.2 Institutional Structures & Arrangements

A number of steps remain to be taken, first in finalizing the detailed offset design, and then in actual implementation of the wetland rehabilitation and offset work (site establishment, initial rehabilitation and ongoing management, monitoring and auditing).

DWS could appoint one implementation agent to co-ordinate and manage wetland rehabilitation and offsets (e.g. EWT, Wildlands Conservation Trust or WWF). This agent would be appointed on contract to work with relevant government agencies and authorities to ensure that the detailed wetland rehabilitation and offset plans were prepared and implemented according to schedule. The agent could, where appropriate, sub-contract work to contractors and/or consultants. This arrangement

would be the least complex from DWS' perspective. Alternatively, DWS could request a number of different government agencies, who in turn could appoint contractors or consultants, to undertake the detailed design and planning for wetland rehabilitation and offsets, secure authorization for the detailed plans, establish and secure protection for offset sites, and/or implement or oversee the long term management of the offset sites. This arrangement would be relatively complex and could place a higher demand on DWS, particularly since neither ecosystem rehabilitation nor biodiversity management are their core functions.

The overall options for institutional arrangements and responsibilities are below.

1. Securing 'In Principle' Agreement with Landowners

– Institutional Arrangements

It is necessary to secure agreement with the landowners to establish the confidence to undertake detailed planning. This step would best be undertaken by the conservation NGOs currently working with the landowners in an area, for example EWT, who have been engaging landowners in the HCMA. They would work closely with the EKZNW Stewardship Programme as is currently the case. They would require technical support contracted through the finances provided by DWS. DWS could appoint the NGOs directly or, alternatively, an environmental consulting firm could be appointed. This agreement would require a high level of confidence in the anticipated restrictions, benefits and the selection of the mechanism for securing the site.

– Finance Arrangements

It is proposed that the service provider is appointed directly by DWS.

2. Detailed Design and Costing of Wetland Rehabilitation and Offset Sites

– Institutional Arrangements

Undertaken by an independent service provider working in close collaboration with the various government agencies (EKZNW, DEDEA, NRM Programmes) and NGOs who are likely to be involved in implementation.

– Finance Arrangements

It is proposed that the service provider is appointed directly by DWS.

3. Authorization of the Detailed Plans

It is possible that some of the offset activities, particularly with regard to physical/mechanical interventions for wetland rehabilitation, will require EA and/or a water use license. These authorizations would need to be obtained before the listed activities could be implemented.

– Institutional Arrangements

It is proposed that Working for Wetlands should be responsible for managing the authorization process for any EIAs and/or water use licenses. This proposal is based on the following reasons:

- The activities likely to require authorization are wetland rehabilitation.
- Working for Wetlands have standing agreements with the competent authorities for streamlining these processes, and they have experience in managing environmental assessment practitioners in undertaking EIAs for their projects.

- *Finance Arrangements*

Funds could be transferred from DWS to Working for Wetlands via DEA in terms of the current MoA.

4. Establishing the Offset

Establishing the offsets involves either signing stewardship agreements and/or registering conservation servitudes²⁵. Many of the offset sites are likely to opt for a stewardship arrangement, either a Nature Reserve or Protected Environment (Protected Area) in terms of the National Environmental Management Protected Areas Act (NEMPAA) following the required declaration and notarial registration process, and preparing a Management Plan²⁶ (incorporating the explicit recommendations of detailed planning that will emerge from the next phase of work) for the wetland rehabilitation and offset areas. Biodiversity Management Agreements would also be acceptable provided that there is at minimum a 30 year buy-in on the part of the landowner and, preferably, the conservation commitment is reflected on the title deed of the property.

- *Institutional Arrangements*

A variety of organizations could be responsible for undertaking these different activities, including the EKZNW Stewardship Programme, the relevant NRM programmes, NGOs and/or private specialist contractors acting as their appointed agents (e.g. surveyors and lawyers).

- *Finance Arrangements*

The finance should be transferred from DWS to these various agencies/contractors once MoAs and/or contracts are in place.

5. Rehabilitation and Ongoing Management

Wetland rehabilitation and management of the offset sites (including initial invasive alien plant clearing and remedying erosion gullies, for example) is crucial to their long-term success.

- *Institutional Arrangements*

A variety of organizations could be responsible for undertaking initial rehabilitation activities, including the EKZNW Stewardship Programme, the relevant NRM programmes and/or private specialist contractors or NGOs. Ongoing management would best be undertaken by an independent service provider or appropriate NGO working in close collaboration with the various government agencies (EKZNW, DEDEA, NRM Programmes).

- *Finance Arrangements*

Finance should be transferred from DWS to the relevant agencies/contractors once MoAs and/or contracts are in place.

6. Monitoring and Evaluation

Monitoring and evaluation (M&E) is focused on ensuring that the objectives and intended outcomes of the wetland rehabilitation and biodiversity offsets are achieved, thereby satisfying the conditions of EA. M&E requirements, and adaptive management informed by the results of M&E, will be guided by the Management Plan (MP) which sets out the management objectives, criteria, outcomes or targets within specific timeframes, and performance indicators for each site. The focus of monitoring and

²⁵ Information regarding options provided under the stewardship programme and conservation servitudes is provided in Appendix 8.

²⁶ This Management Plan would need to comply with the NEMPAA if the offset site were declared a Nature Reserve or Protected Environment.

evaluation would be on assessing the adequacy of implementation of required wetland rehabilitation/offset activities, as well as the response of the target systems to the rehabilitation and management activities in relation to desired outcomes/management targets. Indicators could include, for example, reviewing recovery of species diversity in grasslands, improvement in wetland structure, and/or continued use of nest sites by cranes.

- *Institutional Arrangements*

Monitoring would best be undertaken either by specialist service providers, or by staff members within EKZNW funded by DWS.

- *Finance Arrangements*

The finances should be transferred from DWS to the EKZNW Stewardship Unit or to private contractors once MoAs or contracts are in place.

6.3 Offset Compliance

Given the long-term nature of offsets, it is important to check on their performance at regular intervals to ensure compliance with the conditions of EA. It is proposed that an independent compliance audit be undertaken on an annual basis, involving:

- i. Environmental/ Technical Audit*

A specialist service provider is appointed to evaluate progress with implementing the wetland rehabilitation and offsets in relation both to the conditions of EA and the specific requirements, outcomes/targets of the MPs for these sites. The audit should ultimately verify that offset requirements have been met.

The audit would draw extensively on the M&E records of the parties responsible for managing these sites, as well as feedback from the provincial conservation agency's stewardship programme with regard to performance of the wetland rehabilitation and offset sites.

The audit report would be submitted to DWS, DEDEA, EKZNW and DEA, and should highlight any specific areas of concern and/or requiring attention. DEA, as the competent authority, should use this report as the basis for enforcement actions as necessary.

- ii. Financial Audit*

A specialist auditor should be appointed to track and verify that the transfer of funds from DWS to appointed agents has occurred according to the required schedule of financial provision provided in the detailed planning (to be undertaken in the next phase of work), in order to satisfy the requirements of the wetland rehabilitation and offsets. Moreover the audit should track and evaluate the expenditure of those funds on specific wetland rehabilitation/offset activities as specified in detailed plans. This audit report should be submitted to DWS and DEA. The findings of this report should provide the basis for any adaptive or corrective action as required to ensure the offset progress is on track.

7. CONCLUSION AND WAY FORWARD

7.1 Conclusion

This phase has taken a further step towards developing detailed offset plans required to meet the conditions of authorisation. It has involved the identification and prioritization of numerous candidate offset sites culminating in:

i. A Suite of Optimum Candidate Offset Sites

The desktop investigation identified a wide range of potential sites across the defined offset area. The prioritization process narrowed down the options to be taken forward for further investigation and planning. The final suite of offset sites represents the most efficient grouping and consolidation of properties in terms of efficient management and meeting biodiversity conservation objectives.

Many of the sites not investigated further in this study remain appropriate for use as offsets and could be investigated should any of the prioritized sites fall out as options during detailed investigation. This initial process also provides a useful tool for the MIP in terms of their EA process and helping to address its likely need for offsets.

ii. Offset Site Summaries

Summaries have been developed for the full suite of prioritized sites. These summaries constitute the high-level version of the 'detailed site plans' required in the conditions of authorisation. The summaries include:

- a map showing the extent of landcover/use (natural and other) across the property;
- the type, extent and condition of the wetland, river and grassland habitat occurring on each property;
- the species of conservation value that utilise these sites;
- the existing impacts/degraded areas within the habitats requiring rehabilitation;
- budgets for undertaking the rehabilitation work, securing the offset site and managing it in the long term; and
- notes summarizing the current and intended future use of the land, specific requirements and views of the landowner, which vary depending on ownership, use and other factors. These notes serve as a summary of the consultation undertaken with landowners during the planning process.

Based on the individual consultation with landowners that took place during the establishment of these plans, the subsequent stakeholder meeting at which several landowners were present, and the circulation of the property summaries to landowners, there is an 'in principle' agreement about what has been presented.

iii. Overarching Budget and Governance Framework

The investigation has established a high level budget based on the implementation of offsets on the sites shown to be the most suitable from a biodiversity point of view.

It has further proposed options for a governance framework, which recognizes that DWS as the developer does not have the mandate, skills or experience to undertake detailed offset planning or implement and manage the offset. The suggested framework therefore presents options for other institutions and roleplayers to undertake the work through agreements between these roleplayers, landowners and DWS, on the assumption that the requisite finance will be provided by DWS. The governance options draw on the existing institutional framework in the planning area, the benefits of existing relationships and initiatives, and matching the skills, capacity and mandates of established organisations/institutions to the tasks implicit in the detailed planning and implementation of the offset. The proposed framework also considers the broader context within which biodiversity offsets are evolving in South Africa, and how offset challenges specific to public projects are being dealt with. It is recognised that a decision on the most appropriate governance framework will only emerge during detailed planning, and will depend on the choice of implementation agent and specifics of offset financing.

7.2 Way Forward

This investigation has focussed where the offset should be implemented and provided a high-level understanding of what needs to be done and by whom, and the costs for doing so. To take the process forward, detailed planning is required in order for the plans and associated costs of implementation to be refined and confirmed. The current impasse with regard to financial provision for detailed planning and implementation of offsets needs to be resolved as a matter of priority and urgency, as agreed between the various roleplayers at the meeting of 10 September 2014.

Detailed planning would involve:

- detailed discussion and agreements with landowners regarding the areas to be utilized for the offset, the selected mechanism for securing the site in the long term (level of stewardship), whether the entire property or offset areas are secured;
- detailed design and planning of rehabilitation actions;
- detailed fieldwork to inform the preparation of site-specific plans for management, monitoring and evaluation;
- finalising the governance framework, by engaging roleplayers to confirm respective responsibilities for implementation and initial rehabilitation work, ongoing management, monitoring and evaluation, auditing, and compliance checking and enforcement. Binding agreements between roleplayers will need to be drawn up where none exists; and
- refining the budgets for offset implementation based on the finalisation of details for all of the above.

While this high-level planning process has elicited ‘in principle’ agreement from landowners regarding the candidate offset sites, it should be noted that there are no guaranteed outcomes at present. In the event that priority sites become ‘unavailable’ to the extent that offset targets can no longer be met with the remaining sites, it will become necessary to engage other landowners. The likelihood of this being necessary is limited with regards to the offset targets for grassland and river because there were significant offset area/options available over and above these targets. The likelihood is greater in the case of wetlands, however, because the buffer between the targets and the areas investigated

in this study was smaller (just over a 100ha). Nevertheless, the overall risk of not being able to meet the wetland target is considered to be negligible, despite having to undertake additional engagement with 'new' landowners, because there are significant areas of candidate wetlands in the study area, several of them adjacent to the prioritized sites. The conservative approach taken to budgeting and the contingency included the budget should cover the costs of any additional engagement.