DEMONSTRATION OF HOW HEALTHY ECOLOGICAL INFRASTRUCTURE CAN BE UTILIZED TO SECURE WATER FOR THE BENEFIT OF SOCIETY AND THE GREEN ECONOMY THROUGH A PROGRAMMATIC RESEARCH APPROACH BASED ON SELECTED LANDSCAPES

Deliverable #2: Annual Report

February 2015

Submitted to the Water Research Commission
by

Centre for Water Resources Research
University of KwaZulu-Natal

Project K5/2354

ABBREVIATIONS

BEDS	School of Built Environment and Development Studies
CHAT	Critical Historical Activity Theory
CoGTA	Cooperative Governance and the Department of Traditional Affairs
CWRR	Centre for Water Resources Research
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DEWATS	Decentralized Wastewater Treatment Systems
DUCT	Dusi uMngeni Conservation Trust
DUT	Durban University of Technology
DWAS	Department of Water Affairs and Sanitation
DWAF	Former Department of Water Affairs and Forestry, South Africa
EI	Ecological Infrastructure
EPCPD	Environmental Planning and Climate Protection Department
EWS	eThekwini Water and Sanitation
KZN	KwaZulu-Natal
LULC	Land use/land cover
PRG	Pollution Research Group
PRP	Palmiet Rehabilitation Project
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SANCIAHS	South African National Chapter of the International Association for Hydrological Sciences
SASS	South African Scoring System
SIP	Strategic Infrastructure Project
TOR	Terms of Reference
UEIP	uMngeni Ecological Infrastructure Partnership
UKZN	University of KwaZulu-Natal
WESSA	Wildlife and Environment Society of South Africa
WRC	Water Research Commission

TABLE OF CONTENTS

1 INTRODUCTION

1.1 WRC Project K5/2354 - Overview

In April 2014, the Centre for Water Resources Research (CWRR) and partners were awarded a 5 year research project through a Water Research Commission (WRC) solicited call.

The project is entitled:

“Demonstration of how healthy ecological infrastructure can be utilized to secure water for the benefit of society and the green economy through a programmatic research approach based on selected landscapes”.

The uMngeni catchment has become a focus area and pilot study site through various initiatives, now becoming consolidated through the uMngeni Ecological Infrastructure Partnership (UEIP) (SANBI, 2013). Through this initiative, more than 30 government departments, academic institutions, private companies and Non-Governmental Organisations have signed a Memorandum of Understanding which documents their commitment to investing in restoring, maintaining and managing Ecological Infrastructure (EI) towards improved delivery of water-related ecosystem services. The initiative also aims to provide a suite of additional benefits such as job creation, agricultural productivity, aesthetics, cultural benefits, flood attenuation and adaptive capacity to climate change impacts, which will increase the return on investment (SANBI, 2013).

The project seeks to identify sites in the uMngeni catchment at which investment into the protection and/or restoration of EI can produce long-term and sustainable returns in terms of the delivery of water-related ecosystem services. These services could include water quality and quantity, and flood protection. In essence, the project aims to guide catchment managers when deciding “what to do” in the catchment to secure a more sustainable water supply, and where it should be done. This seemingly simple question encompasses complexity in time and space, and in the connections between different biophysical, social, political, economic and governance actors in the catchment. For example:

- In order to understand whether there is value in “investing” in EI, it is necessary to better understand the potential mechanisms and benefits of this approach i.e. where there is opportunity for investment in the natural infrastructure that provides services, rather than paying for the services themselves; and
- Not only does investment in EI need an understanding of where the EI is found in the catchment, but critically whether the investment will bring a return (a societal benefit) and whether there is a willing partner (be it a municipality, farmer or individual) and the risks associated with the investment.

The approach and deliverables adopted in this project reflect this integrated complexity.

The approach towards achieving this is described fully in Deliverable 1 of the project which was submitted in September 2014. Year 1, a low budget start-up phase of the project is drawing to a close and activities will intensify from April 1, 2015.

1.2 Report Structure

The project will produce 15 Deliverables over the next four years, all of which are linked to the various project aims (Figure 1). Whilst the due date for many of these is some time in the future, activities to address these Aims are ongoing. Thus, Section 2 provides a brief overview of progress towards achieving each Project Aim and Deliverable, Section 3 provides an update on capacity development and Section 4 provides some concluding comments and the work plan for the forthcoming year.

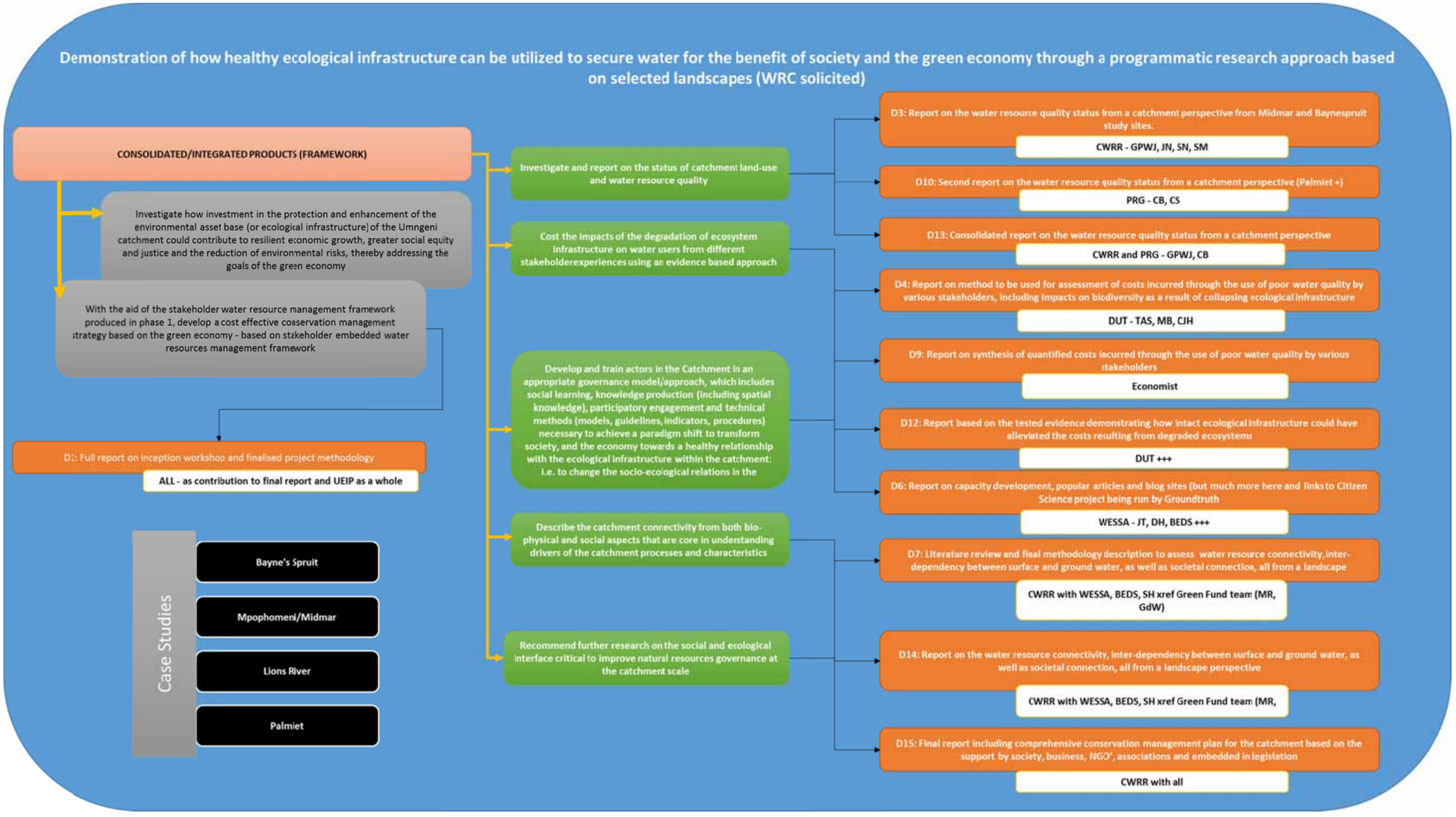

Figure 1: Relationship between Project Aims and Deliverables

2 Project Progress

2.1 Finalisation of Project Team

Changes in staff at Durban University of Technology meant that the institution was no longer in a position to lead on the economic components of the project. Dr Stuart Ferrer (UKZN Resource Economist) has agreed to lead this component of the project with the support of Ms Michelle Brown (Independent Consultant and PhD Student registered at Rhodes University). The rest of the team remains as per the proposal submitted. Sub-contracting of team members external to UKZN is ongoing.

2.2 Collaboration and Co-Funding

This project collaborates closely with other projects currently being undertaken through the UEIP as well as those supported by Umgeni Water through the Umgeni Water Chair of Water Resources Management. In particular, the activities of the Development Bank of South Africa (DBSA) Green Fund project entitled "Investing in ecological infrastructure to enhance water security in the uMngeni River catchment" are closely aligned and provide a basis for Project Aims expressed in 2.4.1, 2.4.2. and 2.4.3 below.

2.3 Deliverables Completed

Following consultations and workshops amongst the project team and visits to the key field sites, Deliverable 1 was submitted to the WRC in September 2014. The Deliverable was accepted by the Project Manager and funds have been transferred.

2.4 Activities towards Project Aims

2.4.1 Aim 1: Investigate and report on the status of catchment land-use and water resource quality in the selected catchment

Extensive research through student projects is ongoing. Bi-weekly sampling of water quality, through both conventional methods and citizen science-based approaches, at key sites upstream of Midmar Dam is ongoing. Umgeni Water have agreed to analyse these samples at no cost to the project – a significant and meaningful contribution which equates to a value of approximately R150 000 per year.

A paper and poster providing background information, as well as details on the approach adopted to achieve this Aim, have been produced. These are included as Appendix 1 and Appendix 2.

Revised and up to date (to November 2014) estimates of pollution loads to Midmar Dam are being calculated, and a paper reporting the findings is being developed by MSc student Sanele Ngubane. There is no flow data available for the Mthimzima stream, a key tributary and contributor of pollutants to Midmar Dam. Thus, the *ACRU* model was configured and run for the catchment, and the streamflow simulated by the model was used to estimate pollution loads for this catchment by Honours student Nantale Sirbiwa (Figure 2) in her 2014 project.

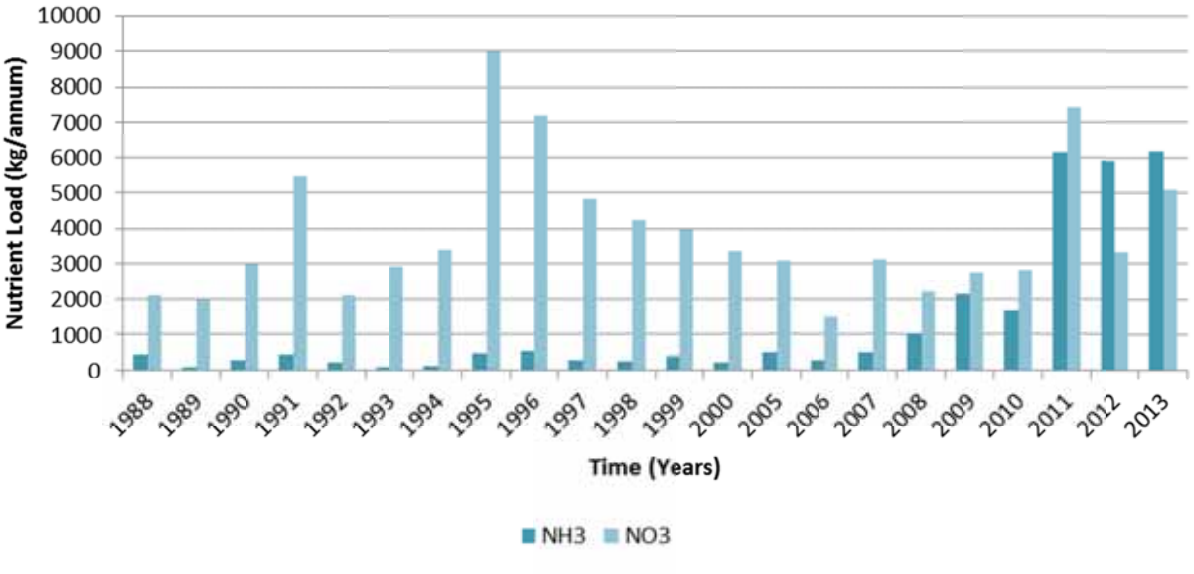

Figure 2: Estimated Nitrogen loading from the Mthinzima Catchment

An extensive vegetation and soil survey of the Lions River wetland has been undertaken by MSc student Hlengiwe Ndlovu as part of her MSc. Initial results from this survey and the regular sampling indicate that the wetland is fairly degraded, but there are clear opportunities for rehabilitation, particularly in the context of the wetland being a key component of the ecological infrastructure supporting the uMngeni River and Midmar Dam. This aspect of the project is supported by substantial contributions in-kind from SAPPI.

Figure 3: Wetland expert Dr Donovan Kotze assists students with grass species identification

Figure 4: Soil survey in progress

Ongoing research is currently assessing the role of land use and land cover (LULC) on water quantity and quality in the catchment. There has been significant LULC change since 1980, as illustrated by ***Error! Reference source not found.*** *and* **Error! Reference source not found.**.

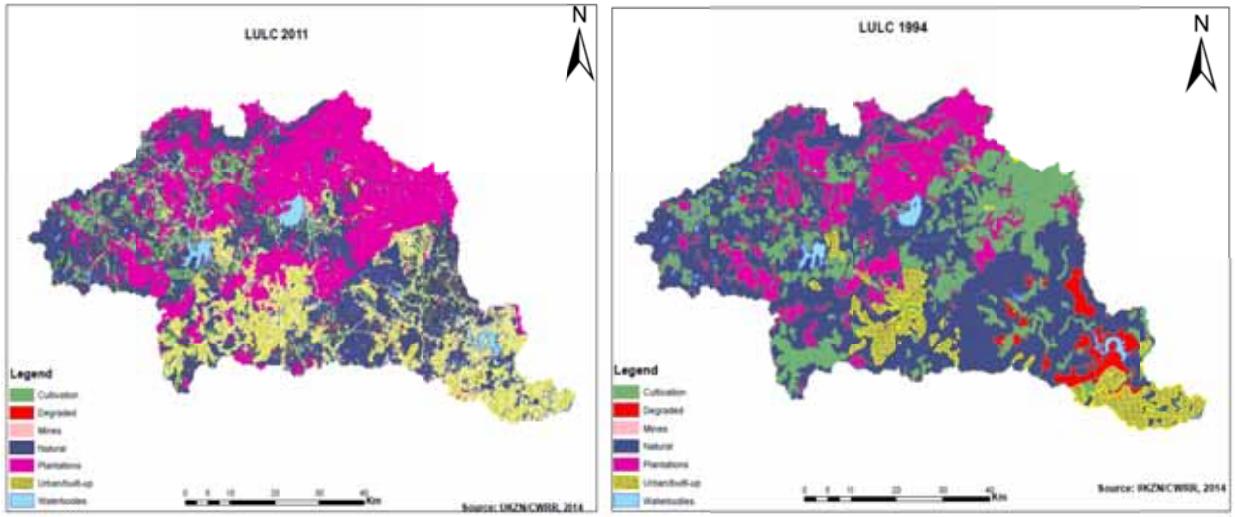

Figure 5: uMngeni catchment land cover 1994 vs 2011

Table 1:uMngeni catchment land cover 1996 to 2011

ID	LULC Classes	1996	2000	2008	2011
1	Natural	50.84	56.54	43.46	41.47
2	Cultivation	19.90	13.01	8.87	10.18
3	Degraded	3.39	2.28	3.62	3.37
4	Urban/built-up	7.01	8.20	16.27	17.01
5	Waterbodies	1.50	1.99	2.12	2.25
6	Plantations	17.34	17.92	25.60	25.65
7	Mines	0.01	0.06	0.06	0.07
	Total	100%	100%	100%	100%

Research by PhD student Catherine Hughes and GroundTruth's Gary de Winnaar for the DBSA Green Fund project illustrates how hydrological response to the different LULC types differs in time and space (Figure 6). Fellow PhD student Jean Namugize is in the process of relating the LULC change since 1980 to water quality.

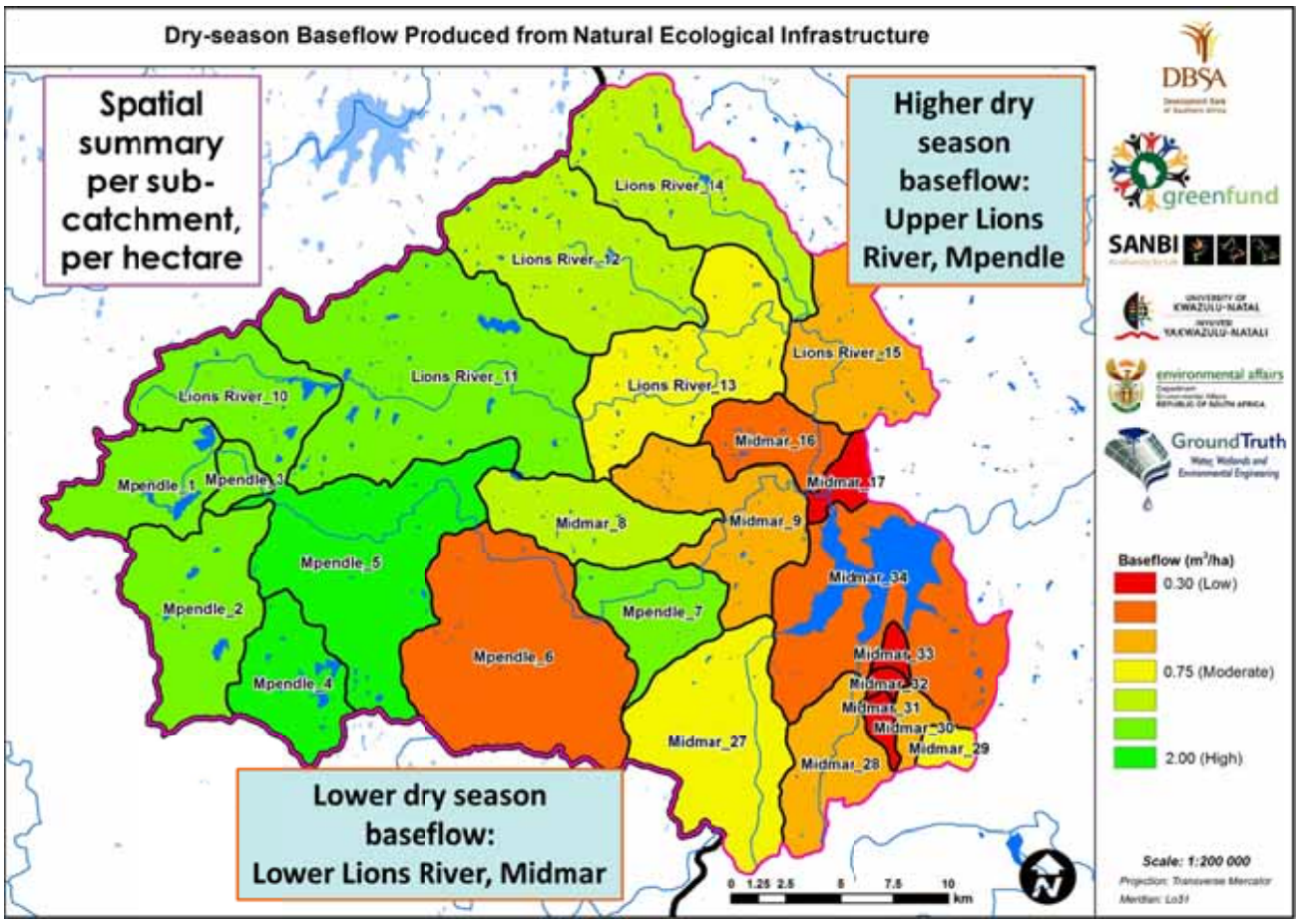

Figure 6: Dry season baseflow in m^3 per hectare per month from ecological infrastructure in the Upper uMngeni catchment (above Midmar Dam) - Preliminary

2.4.2 Aim 2: Cost the impacts of ecosystem degradation on water users from different stakeholder experiences using an evidence based approach

As noted above, Dr Stuart Ferrer has agreed to lead this component of the research. Little progress has been made to date, but Deliverable 4, which will confirm the methodological approach to be used to achieve this aim, will be the focus for the period March-September 2015.

2.4.3 Aim 3: Investigate how an intact ecological infrastructure could secure and enhance the benefits provided to society and economy in the catchment

This aim will draw on those outlined in the other sections, so no direct progress has been made to date.

2.4.4 Aim 5: Develop a cost effective conservation management strategy based on the green economy - based on stakeholder embedded water resources management framework

This aim draws on the others mentioned in this section, and provides a consolidated product for the project. No direct progress has been made to date.

2.4.5 Aim 6: Develop and train beneficiaries on appropriate methods (models, guidelines, indicators, procedures) necessary to achieve a paradigm shift to transform society, and the economy towards a healthy interaction with the ecological infrastructure within the catchment

The crisis of water quality, quantity and equity within the uMngeni catchment is essentially human induced. Therefore, the solutions need to be human-centred and can be achieved through well designed and effectively implemented human capacity development processes, supported by creative and innovative tools. This work needs to be supported by dialogues within the catchment that meaningfully include all relevant stakeholders. In addition to the dialogue processes, meaningful human capacity development processes on the subject of ecological infrastructure need to be developed and implemented. Such efforts are designed to promote understanding and implementation of key scientific findings. These efforts are urgently required to secure healthy ecological infrastructure in this catchment.

Progress:

In 2013, a Socio-Ecological contextual profile was undertaken in the uMngeni Catchment (Rowlands, Taylor, Barnes and Morgan, 2013). This profile established the key stakeholders who are responsible for managing the ecological infrastructure in the catchment. The study went further to establish which organisations had high degrees of influence and which had high, or low, levels of understanding of processes of ecological infrastructure. Following a brief review of this research, a process of human capacity development is now being implemented. This is reported on below.

Since the project commenced, the socio-ecological study findings have been shared with a number of key institutions. Presentations at different forums have been done and meetings with key institutions and people have been held. Workshops and courses are planned for the next reporting period. A ‘stories of change’ approach is being considered as a methodology to evaluate the effectiveness of the project.

Report on capacity development, popular articles, and blog sites

WESSA and Dr Jim Taylor undertake a wide range of capacity development activities under the banner of the UEIP. This project contributes to the funding that supports these activities, details of which are reported below.

Capacity Development

A range of accredited and non-accredited courses were developed and implemented. In this review period, 801 people, mostly from municipalities, successfully completed accredited courses and a further 320 (plus) completed non-accredited courses. The accredited courses provide an overview of Ecology (Ecological Infrastructure) before offering 3 elective options in Water, Waste and Biodiversity. Participants were either managers and supervisors at level 5 or workers at SAQA level 2. New courses are in the development stages. Each individual who successfully completes a course must submit a change project as a ‘portfolio of evidence’ (POE) which demonstrates how he/she has changed towards sustainability. These course processes are verified by a Quality Management System (QMS) which involves assessors, verifiers and moderators. All accredited courses are accredited by the SA Qualifications Authority.

Career pathing for river care rangers

Following the DUCT river care teams initial project, which was funded by the Lotteries, support was given for career pathing of river care personnel. This included a one-day river ecology course for all 120 staff members. All staff than sat a short isiZulu knowledge test. Two members from each group of 20 were then selected, on merit and commitment, to attend a level 2 Environment Practices course. Further support has been given to those who successfully complete level 2 and they can progress to level 5 training on the SAQA scale.

Capacity to build capacity: The EETDP Training of Trainers course

This flagship course, the EETDP (Environmental Education, Training and Development Programme) Learnership, is a one year, training of trainers course at SAQA Level 5. See Appendix 3 for more detail on this training course. A specific component of the course "Ethics, Values and Ecological Infrastructure' was conducted for participants and included a field-work excursion to Siphumele township and urban wetland.

Other developments include:

- Two customised short courses have been developed and implemented with up to 50 key stakeholders participating.
- Three customised workshops have been designed and implemented with up to 20 key stakeholders participating in each.
- Participation at 12 relevant forums or meetings has taken place and at least 3 presentations have been made.
- Some work has been done on developing an appropriate information portal or platform.
- A set of relevant learning tools has been compiled (these are either new or adapted).

The willingness of different institutions such as the uMgungundlovu District Municipality, uMngeni local municipality, Msunduzi local municipality, Mpendle local municipality, Mtshwati local municipality, Mpofana local municipality, eThekwini metro, CoGTA (amakhosi and chiefs), SALGA etc. to work with us in this project is a clear indication that good progress is being made.

Communication and relationship building has taken place with 10 Skills Development Facilitators (SDFs), HR managers and/or strategic Managers from the local and District municipalities in the uMngeni Catchment to support the inclusion of EI training in the June 2014 Work-place Skills Plans (WSPs).

Popular Articles & Awareness Activities

1. ETV news on sustainable jobs

A key goal of this project has been efforts to raise the profile of ecological infrastructure in the uMngeni Catchment. In this regard, Dr. Jim Taylor participated in a live ETV news broadcast on the 3rd of May, three days before the national election. In the television broadcast, he provided comments on the various political parties' 'environmental manifestos' and pointed out that the current commitment to jobs in most parties' manifestos needs to include jobs that contribute to building EI rather than jobs that erode the EI life support base (e.g. extractive industries such as mining). Excellent feedback was received from this ETV news broadcast, which was re-broadcast internationally. Feedback was even forthcoming from the National University of Lesotho.

2. Councillors and Traditional leaders training workshops

A range of training courses have been conducted for community leaders from the uMngeni Catchment region. These courses have primarily been focussed on eThekwini region and have included field visits to sites of ecological interest. Over 60 community leaders and Councillors have attended these courses. Meetings on EI have also been held with CoGTA, various municipalities and an Ecological Infrastructure course was conducted for the Amakhosi EXCO in November 2014.

3. Witness article on Ecological Infrastructure

This article points out the importance of ecological infrastructure and comments on a number of risks that are currently manifesting such as the nutrient loading risk to Midmar Dam. The full article is available at http://www.witness.co.za/index.php?showcontent&global[_id]=122922

4. Environment Magazine article on water management

A detailed article on EI has appeared in the Environment Magazine (Taylor, 2014). This article includes photographs of the Deputy Minister of Water and Sanitation undertaking a citizen science excursion to the Modderfontein stream near OR Tambo International Airport.

5. Street theatre

Working with DUCT street theatre has continued in various townships around Mpophomeni. The street theatre has been presented to councillors, members of the public, schools, government departments as well as at various awareness days. Topics include water and sanitation and biodiversity.

6. Schools-based Water Projects

Over 150 Eco-Schools in the uMngeni Catchment area have been supported to undertake water projects. This project is a partnership project between WESSA and the Department of Water and Sanitation (DWS). Since such water projects often include a 'whole school development' orientation, the parent community is often involved in the projects.

7. The uMngeni Biosphere

A Biosphere project for the uMngeni catchment has been initiated. The biosphere region will extend from Midmar Dam to Albert Falls Dam, and include part of the Karkloof River. Early consultations are underway and it is envisaged that the Biosphere status will take two years to achieve. If successful, this biosphere will be the first recognised Biosphere in KwaZulu-Natal. The biosphere will have considerable potential to raise the status and publicity around ecological infrastructure.

Blog Sites

The mini-SASS (Stream Assessment Scoring System) blog site is proving popular with a number of articles appearing on a weekly basis. Most notable have been the source-to-mouth hikes where members of the public have been engaging in hiking the streams and rivers and noting their river health index using citizen science techniques. Recent hikes that have appeared as 'blogs' include: Source-to-mouth: Mthimzima stream (Mpophomeni), Lions River and Palmiet. See www.minisass.org.

Other blog sites pertaining to EI include those of WESSA at www.wessa.org.za

2.4.6 Aim 7: Describe the catchment connectivity from both biophysical and social aspects that are core in understanding drivers of the catchment processes and characteristics and spatial connectivity

Some progress towards this Aim is described in Section 2.4.5 above, furthermore, research towards this Aim is progressing well for the Midmar pilot site through the research of MSc student Sesethu Matta (Figure 7). Her approach is to undertake Mini-SASS (www.minisass.org) monitoring at all sites being sampled by the project team using conventional methods in order to obtain an understanding of the robustness of the relationship between Mini-SASS scores and river water quality as measured through more conventional laboratory techniques Coupled with this, her research will then assess the level of understanding of members of the Mpophomeni community of the river's water quality, and, in turn, the extent to which Mini-SASS can provide a connection between biophysical and social aspects of the catchment. Sesethu received a student award for her presentation of this research at the SANCIAHS symposium held at the University of the Western Cape in September 2014. This work complements that being undertaken in WRC Project "Development and Innovative Use of Community Based Water Resource Monitoring Tools to Research and Mainstream Citizen Science and Improve Trans-Boundary Catchment Management", led by GroundTruth.

Figure 7: Mini-SASS sampling in the Lions River

3 Capacity Building

Progress on student projects has been included in the above sections. A list of students contributing to the project appears below in Table 2. Two students successfully completed their Hydrology Honours degrees in 2014 and a further PhD student, two MSc students and three BSc Honours students will join the project this academic year.

Table 2: Students currently registered or degree complete. New students in 2015 and those who have completed degrees are highlighted

Name	Year	Degree	Project
Jean Namugize	2014-	PhD	Effects of Land Use on Water Quality of Umgeni River
Catherine Hughes	2014-	PhD	The hydrological benefits of rehabilitation of critical areas catchment - land use change impacts - aliens and degradation
Simphiwe Ncgobo	2015-	PhD	Appropriate spatial and temporal scales for the assessment of global change
Sesethu Matta	2014-	MSc	The value of community based water quality monitoring programmes
Hlengiwe Ndlovu	2014-	MSc	The restoration of Lions River Wetland for improved downstream water quality and quantity
Sanele Ngubane	2014-	MSc	Assessing changes in pollutant loadings to Midmar Dam between 1974 and 2014.
Silindile Mtshali	2015-	MSc	Mapping the extent of invasive alien plants in the uMngeni Catchment
Jedine Govender	2015 -	MSc	Impact of water quality degradation in the Baynespruit on farmers in Sobantu
Nantale Nsibirwa **(degree complete)**	2014	Hons	Hydrological modelling to estimate water quantity and quality of the Mthimzima Stream
Nokulinga ZweZwe **(degree complete**)	2014	Hons	Assessment and monitoring of the water quality of inflows to Midamr Dam
Silindile Mtshali **(degree complete)**	2014	Hons	Estimating chlorophyll content in water bodies in the uMngeni Catchment from hyperspectral satellite imagery
Hons 2015	2015 -	Hons	A water quality profile of the Karkloof River
Hons 2015	2015 -	Hons	The impact of genus exchange on water resources of the Karkloof catchment

The report provided by Section 2.4.5 provides detail on societal and institutional capacity development and is not repeated here.

4 Conclusions and Way Forward

Despite 2014/15 being a low intensity, low budget start-up year for the project, significant progress has been made towards several of the project Deliverables. This has been largely due to the co-funding available through the DBSA and Umgeni Water.

4.1 Work Plan

The work plan for 2015 and the rest of the project is detailed in Appendix 4. Three Deliverables are in the 2015 financial year, as listed below:

Deliverable No.	Title	Due Date
3	Report on the water resource quality status from a catchment perspective from Midmar and Baynespruit study sites	31 July 2015
4	Report on method to be used for assessment of costs incurred through the use of poor water quality by various stakeholders, including impacts on biodiversity as a result of collapsing ecological infrastructure	30 November 2015
5	Annual Report of Activities including report on Rehabilitation Conference Attendance	31 January 2016

Attendance at the 6th World Conference on Ecological Restoration is planned for August 2015. An abstract and paper are in preparation.

5 References

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6 Appendices

6.1 Appendix 1: Paper

Understanding drivers and developing solutions to address deteriorating water quality in the upper uMngeni catchment

GPW Jewitt, CJ Hughes, S Matta J Namugize, H Ndlovu, S Ngubane, N Nswirba, N Zwezwe

Centre for Water Resources Research, University of KwaZulu-Natal, Pietermaritzburg

Based on various presentations at the 17th SANCIAHS National Hydrology Symposium, hosted by the Institute for Water Studies, University of the Western Cape, September 2014

6.2 Appendix 2: Poster

Understanding drivers and developing solutions to address deteriorating water quality in the upper uMngeni catchment

GPW Jewitt, CJ Hughes, S Matta J Namugize, H Ndlovu, S Ngubane

Centre for Water Resources Research, University of KwaZulu-Natal, Pietermaritzburg

Presented at Open Science Dialogue on Seeds of the Good Anthropocene 2014 held in Stellenbosch, October 2014.

6.3 Appendix 3: Environmental Education Training and Development Practice — Learnership

ENVIRONMENTAL EDUCATION, TRAINING AND DEVELOPMENT PRACTICES NQF LEVEL 5: MODULE 2 (ENVIRONMENTAL ETHICS)

2 TO 6 JUNE 2014: UMGENI VALLEY NATURE RESERVE

"I just can't believe people live in these conditions, it is just...so harsh", notes Karin Isaacs, a SANPARKS employee from Augrabies National Park. The late winter sun penetrates the dusty windows of the 16 seater WESSA taxi, bumping along the pot-holed road past the Dunlop factory and back through the small town of Howick to Umgeni Valley Nature Reserve.

Karin is one of 10 learners on the WESSA SustainEd Environmental Education Training and Development Practices (EETDP) National Certificate course, the first module of which was held in April of this year. Karin, like many of the other participants, is a bit shocked after visiting Shiyabazali squatter camp on a field trip as part of the week's activities; focusing on the theme of Environmental Ethics.

While Module 1 of the EETDP focuses on an understanding of human-environment relationships have evolved, and how this ever-changing relationship has led to environmental problems, Module 2 transports learners in to the (sometimes uncomfortable) thinking space of morals, values and attitudes in the study of Environmental Ethics.

In the initial stages of the week, learners were introduced to the idea of the "ethical space" – the changing situations in which we are all forced to make decisions about how we use natural resources. After an introduction to the history of Environmental Ethics, and a toe-dabbling into the different ethical movements over time; learners are led through group activities, ethical case studies (both films and live presentations) and field trips to illustrate the concepts introduced in class.

The field trip in particular was a highlight of the week, where learners were introduced to the Umngeni Catchment around Midmar Dam by Jim Taylor (WESSA) and Liz Taylor (DUCT). The introductory focus of the field trip centred on all the environmental decisions that have been made in the past which are pushing the dam towards a breakdown of its once healthy systems. Nutrient loads in the dam are increasing with agricultural and human waste entering via tributaries, and decisions have to be made very quickly in order to prevent a collapse of the dam's functioning ecological systems. Homes around the river below the dam were visited to study the dysfunctional sewerage systems and to be introduced to some of the stakeholders who could be involved in solutions to the health, environment and human rights issues evident along the river.

In essence, as humans with the ability make decisions: our VALUES determine our DECISIONS, our DECISIONS result in ACTIONS, and our ACTIONS result in IMPACTS. The Environmental Ethics course leads learners to analyse their own values, and how these guide the decisions we make, the actions we take and the impact we have on the world. In order to be effective Environmental Educators, we have to understand our own ethics to ever be able to say we can help others understand the world.

The group has increased since Module 1 with three Wildlands Conservation Trust Groen Sebenza Pioneers coming on board for Module 2 from the Eastern Cape, and a new learner all the way from Cape Town, Ryno Bezuidenhout. Having new faces and stories always brings about lively discussions, and so it was with the

ten learners who worked diligently and consistently, asking difficult questions of both the practice of industry and of the individual, including their own personal practice. The learners are now tasked with completing their workplace assignments for Module 2, before they head back to Umgeni Valley in July to attend Module 3.

More information on the EETDP:

Module 3 of the EETDP is Developing an Environmental Learning Programme (DELP), which focuses on taking the environmental issues or concerns that learners deal with in their workplace and effectively capacitating learners to start developing a sound environmental learning programme around that issue. Run in collaboration with WESSA Share-Net, learning resource experts step in for part of the course to guide learners through the expansive and exciting world of producing new and effective learning materials.

Module 4 of the EETDP is Facilitating and Evaluating an Environmental Learning Programme (FEELP), which delves into the highly specialized world of facilitation and evaluation, strongly linked with roles and responsibilities of the facilitator. Facilitation techniques in active learning are upfront in the learning of the course, but moreover focus is given to quality control and the evolution of learning programmes as they are evaluated and modified over time.

6.4 Appendix 4: Work Plan