



## water & sanitation

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Department:  
Water and Sanitation  
**REPUBLIC OF SOUTH AFRICA**

# REHABILITATION MANAGEMENT GUIDELINES FOR WATER RESOURCES

## INCEPTION REPORT

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**Republic of South Africa**

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**Final**

DEPARTMENT OF WATER AND SANITATION

***Rehabilitation Management Guidelines for  
Water Resources***

**Inception Report**

**Sources Directed Studies Report No: RDM/RMG/00/IHP/SDS/0321**

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## Rehabilitation Management Guidelines for Water Resources

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1.2	Gap Analysis Report	<a href="#">RDM/RMG/00/IHP/SDS/0220</a>
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AMD	Acid Mine Drainage
CARA	Conservation of Agricultural Resources Act
CD: WEM	Chief Directorate: Water Ecosystems Management
CGS	Council for Geoscience
CMA	Catchment Management Agency
CPD	Continuing Professional Development
CSIR	Council for Scientific and Industrial Research
DALRRD	Department of Agriculture, Land Reform and Rural Development
DCL	Document Change Log
DCOGTA	Department of Cooperative Governance and Traditional Affairs
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DFFE	Department of Forestry, Fisheries and Environment
DMP	Disaster Management Plan
DMRE	Department of Mineral Resources and Energy
D: SDS	Directorate: Sources Directed Studies
DWS	Department of Water and Sanitation
EGI	Electricity Grid Infrastructure
EIS	Ecological Importance and Sensitivity
EPWP	Expanded Public Works Programme
GIS	Geographic Information System
GEF	Global Environment Facility
ILASA	Institute of Landscape Architects of South Africa
IRR	Issues and Response Register
IWQMS	Integrated Water Quality Management Strategy
MEA	Millennium Ecosystem Assessment
MWP	Mondi Wetlands Project
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Governmental Organisation
NWA	National Water Act
NWRS	National Water Resource Strategy
NWSMP	National Water and Sanitation Master Plan
PES	Present Ecological State
PDP	Personal Development Plan
PMC	Project Management Team
PSC	Project Steering Committee
RDM	Resource Directed Measures
RQOs	Resource Quality Objectives
SACLAP	South African Council for the Landscape Architectural Profession
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SAWS	South African Weather Services
DCS	Source Directed Controls
SDGs	Sustainable Development Goals
Sub-TT	Sub Technical Task Team

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<b>SMMEs</b>	Small, Medium and Micro Enterprises
<b>TTT</b>	Technical Task Team
<b>USAID</b>	United States Agency for International Development
<b>WfW</b>	Working for Water
<b>WfWet</b>	Working for Wetland
<b>WRC</b>	Water Research Commission
<b>WWF</b>	World Wide Fund
<b>WESSA</b>	Wildlife and Environment Society of South Africa

## **1. PROJECT BACKGROUND AND INTRODUCTION**

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### **1.1. OVERVIEW**

The Department of Water and Sanitation (DWS) is the custodian of water resources in South Africa. The Chief Directorate Water Ecosystems Management within the DWS is mandated in terms of Chapter 3 of the National Water Act (Act 36 of 1998) (NWA) to ensure protection, use, conservation and management of water resources in an efficient, sustainable and equitable manner. Furthermore, the NWA is founded on the principle that the National Government has overall responsibility and authority over water resource management for the benefit of the public without adversely affecting their functioning.

In 2020, the DWS Directorate Sources Directed Studies (SDS) initiated an in-house project for the development of Rehabilitation Guidelines for Water Resources (i.e. rivers, wetlands, lakes, dams, estuaries and groundwater) in South Africa. The project responds to one of the objectives of the Chief Directorate Water Ecosystems Management which is to conduct sources directed studies as a means to ensure water resource protection.

The sustainable management of water resources requires that water quality degradation be avoided, minimised, and remedied where applicable. Sections 19 and 20 of the NWA, respectively, make provisions that environmental polluters carry the responsibility to remedy their pollution. Furthermore, in case of an emergency where the responsible person fails to comply or inadequately complies, the Catchment Management Agency (CMA) or DWS (where a CMA is not yet established) may take the necessary remediation measures and recover the cost from every responsible person. The development and use of water resources (and ecosystems within them) must not exceed the level beyond which their integrity is jeopardized. Sensitive and vulnerable water resources require specific attention in management and planning procedures, especially where they are subjected to significant human use and development pressures.

In order to achieve this objective, Chapter 3 of the NWA provides for the protection of water resources through the implementation of Resource Directed Measures (RDM) and Source Directed Controls (SDCs) which are founded on principles of improving resources deterioration where applicable.

This project is aimed at the development of rehabilitation management guidelines and thereafter translation of these guidelines into Practice. The development of the guidelines is a tool to effect RDM, particularly the Resource Quality Objectives (RQOs) and SDCs. Inherently encompassed in the RDM outputs is the Present Ecological State (PES), Ecological

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Importance and Sensitivity (EIS) tools and other ecological water resource monitoring tools utilized in the determination of RQOs and water resource classes.

These guidelines will also give effect to broader DWS strategic objectives and actions, particularly strategic objective 5.3 which requires protection and maintenance of existing freshwater ecosystem priority areas in good functional condition by managing riparian and wetland buffers and critical groundwater recharge areas as well as carrying out rehabilitation of strategic water ecosystems such as rivers, wetlands, lakes, dams, estuaries and groundwater resources (NW&SMP, 2018). The guidelines are also in line with Objective 1 of the National Water and Sanitation Master Plan (NW&SMP, 2018) which calls for 'resilient and fit-for use water supply'.

The objectives of the 2030 Agenda for Sustainable Development Goals (SDGs) are to end poverty, conserve biodiversity, combat climate change and improve livelihoods for everyone, everywhere. These objectives are unlikely to be met unless ecosystem degradation is prevented and ecosystem rehabilitation is undertaken at the immense scale of hundreds of millions of hectares globally (UN, 2020).

### **1.2. MOTIVATION AND AIMS OF THE PROJECT**

The Development of Rehabilitation Management Guidelines is informed, but not limited, by the below policies and strategies.

- The National Water Resource Strategy (NWRS) which calls for the development of government policies and strategies for proactive measures to mitigate water resource quality degradation and address legacy deterioration; while maintaining healthy water ecosystems (rivers, wetlands, estuaries, lakes, dams and groundwater) to ensure their continued provision of ecosystem services.
- The National Water and Sanitation Master Plan (NWSMP) Volume 1 (2018) which prioritizes the protection and restoration of ecological infrastructure to maintain water ecosystems.
- The Draft Environmental Rehabilitation Policy (2014) which is aimed at addressing other types of environmental rehabilitation which were not previously covered by the DWS and ensure inclusion of the rehabilitation of all characteristics of watercourses which include flow drivers in the landscape, namely surface flows, interflows, groundwater flows, water quality and geomorphology and responses like habitat and biota.
- The Integrated Water Quality Management (IWQM) Policies (2016) and Strategies for South Africa (2017), amongst the guiding concepts of IWQM is Principle 10 which

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- focusses on the promotion of ecological infrastructure restoration and rehabilitation;
- The implementation of Resource Directed Measures (RDM), particularly the Reserve, RQOs and SDCs is founded on principles of improving water resources quality and reducing deterioration where applicable, and the Rehabilitation Management Guidelines are tools to effect such a need.
- DWS Level 1 Disaster Management Plan (DMP) which promotes the principle of disaster risk reduction planning by reducing hazards that impact water resources by reducing either the severity of the hazard or the vulnerability of the receiving water resource by changing the physical, social, economic, or environmental characteristics of the receiving water resource. The Level 1 DMP promotes increasing the capacity of the affected community, society or organization by implementing disaster risk reduction plans and initiatives.

### **The project aims to:**

- Establish the status quo and integrate various initiatives and practices on rehabilitation management for water resources (rivers, wetlands, estuaries, lakes, dams and groundwater);
- Map out the legislative framework supporting rehabilitation management for water resources in South Africa; and
- Develop best practices guidelines for rehabilitation management of water resources.

## **2. PURPOSE AND LAYOUT OF THE REPORT**

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The purpose of this Inception Report is to:

- Define the project scope;
- Frame the nature of the project and ensure alignment with the expected outcomes/deliverables;
- Review available information to establish the status quo with regards to rehabilitation practices and interventions for water resources in South Africa; and
- Confirm the proposed project approaches, programme, deliverables, timelines and budget.

The layout of the report is as follows:

- **Section 1** contains the document signatories, document index and status, acknowledgements, table of contents, list of figures, tables and acronyms;
- **Section 2** of the report presents an initial assessment on previous work done, studies, programmes and initiatives that will be considered to inform the basis of this project;
- **Section 3** defines the scope of work in detail and the project parameters based on the

preliminary assessment results on available literature and information;

- **Section 4** describes the project plan, milestones and procedure to be followed for the project;
- **Section 5** details the capacity building envisaged;
- **Section 6** presents the project reporting structures followed by a list of references;
- **Section 7** is an annexure of the detailed findings and results on the preliminary status quo of water resource in relation to rehabilitation studies, programmes and initiatives.

### **3. CONTEXTUALISATION OF REHABILITATION**

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#### **3.1. CONCEPTS AND DEFINITIONS**

The most commonly used concepts in literature on the subject area of rehabilitation of water resources are *rehabilitation* and *restoration*. In most of the contemporary literature, both are essentially aiming for the same outcome which is the return of the structure and function of a degraded ecosystem to the *closest achievable approximation* of its natural (pre-impact) state (WRC, 2003a).

*Rehabilitation* is not the same as *restoration*, which is the manipulation of a site in order to revert the watercourse back to its full range of natural (historic) processes and functions. Restoration therefore is the attempt to restore habitats back to their natural (historic or so called Reference State) conditions. In the South African context, this means restoring rivers back to an A Reference State Ecological Category. *Rehabilitation*, by comparison, only aims to improve aspects of the degraded state (such as some of the identified assets and processes of a system), and although this should be a reversion back towards the natural state, it does not achieve the Reference or natural historical state, but rather improve watercourse condition and functions for the benefit to society and the environment (WRC, 2016a).

Other concepts such as *enhancement*, *improvement*, *mitigation*, *ecological reclamation* and *habitat creation* among other things, are part of restoring an ecosystem to its natural condition (Roni *et al.*, 2002). When these activities do not completely restore an ecosystem, they are referred to as rehabilitation (Stanford *et al.*, 1996; Roni *et al.*, 2005). These concepts will be explored in more detail in the upcoming *Situation Assessment Report*.

#### **3.2. GLOBAL CONTEXT OF REHABILITATION**

The practice of rehabilitation or restoration of degraded ecosystems has over recent decades been supported and further directed by large government agencies or public-private partnerships, through various programmes and initiatives in the United States, Britain, parts of Europe, China, Germany, Australia, New Zealand and Asia. Below are few examples of

rehabilitation efforts around the world as summarized by Simsek (2012):

- The rehabilitation practices in the United States are typically aimed at enhancing riparian zones, improving water quality, improving stream ecosystems and strengthening banks;
- The main rehabilitation measures in Brazil are sewage collection system implementation, riverbank rehabilitation using engineering and bioengineering techniques, riparian vegetation rehabilitation and flood alleviation;
- In China, the Funan River was revitalized by building a park with the inclusion of pumps, settling ponds, reconstructed wetlands, natural water purification system, various plant species and steps going down to the river;
- Germany developed and implemented a rehabilitation management plan since 1990 which advocated the rehabilitation of all water bodies within the Emscher catchment basin for the sustainability of water and provision for the future needs of the region.

The Situation Assessment will provide a detailed account of rehabilitation management practices of water resources at a global, regional and local level.

### **3.3. PREVIOUS AND CURRENT STUDIES, PROGRAMMES AND INITIATIVES**

This section of the report aims to provide an account on the various water resources rehabilitation related studies, programmes and initiatives that have been undertaken with specific reference to rivers, wetlands, lakes, dams, estuaries and groundwater resources in South Africa. The main focus is on preliminary information gathering to identify and highlight progress made to date in terms of rehabilitation in order to provide a compilation of the most up to date available literature relating to rehabilitation and refine, narrow or broaden the project scope of work. Previous and existing research results and other related information were relied upon to support the information needs of the project. This preliminary literature gathering and review has been initiated as part of this Inception Report and will be expanded during the Situation Assessment Phase of the project. **Therefore, at this stage, available information is not considered to be exhaustive as the literature review exercise is ongoing.** The detailed key findings and results on the status quo of water resources relating to rehabilitation studies, programmes and initiatives is presented in **Annexure A** (to be read in conjunction with this report) whilst the summarized findings are provided in **Table 1** below.

Table 1: Summary of findings on status quo in relation to rehabilitation practices in South Africa

STUDIES, PROGRAMMES, INITIATIVES	IMPACTS IDENTIFIED	SUMMARY OF INTERVENTIONS AND BEST MANAGEMENT PRACTICES IMPLEMENTED
<b>THEME 1: Rivers:</b>		
<p><b>Studies and Reports:</b></p> <ul style="list-style-type: none"> <li>• Integrated River Management, Sabie-Sand Catchment (2003)</li> <li>• River Rehabilitation: Literature Review, Case Studies and Emerging Principles (2003b)</li> <li>• Development of River Rehabilitation in Australia: Lessons for South Africa (2003a)</li> <li>• Restoring Urban Rivers from their Source to the Sea (2005)</li> <li>• A Consultative Project to Situate, Contextualise and Plan for a Water Rehabilitation Program (2004)</li> <li>• State of River Report: Greater Town's Rivers (2005)</li> <li>• Umzimvubu Catchment Restoration of Local Ecosystem Services (2011)</li> <li>• Resilient Cities Pilot Project: Community Based Interventions to Improve River Health, (2017)</li> </ul> <p><b>Policy/Guidelines/Manuals:</b></p> <ul style="list-style-type: none"> <li>• The Development of a Comprehensive Manual for River Rehabilitation (2016a)</li> <li>• Wetland Rehabilitation in Mining Landscapes: An Introductory Guide (2016b)</li> <li>• Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (2017)</li> </ul> <p><b>Programmes and Initiatives:</b></p> <ul style="list-style-type: none"> <li>• Working for Water</li> <li>• LandCare Programme</li> </ul>	<p><b>Sabie-Sand River Catchment (Mpumalanga):</b> global climate change, population growth and distribution, overutilization, changes in land use along the rivers and invasive alien plants which led to water scarcity, land degradation, siltation of canals and affected riparian zone health</p> <p><b>River in the Greater Cape Town Province:</b> impacts relating to flood management, water quality impacts, sedimentation, and erosion, modified rivers and flows, canalisation and abundant alien fish and plant life</p> <p><b>uMzimvubu River Catchment (Eastern Cape):</b> rapid rates of degradation in the watershed, presence of alien plants, population growth, increased economic activity and intensification of land use practices</p> <p><b>Rondegat River Ecosystem (Western Cape):</b> dense infestations of the invasive species (alien trees and predatory alien fish)</p> <p><b>Aller River (Kwazulu-Natal):</b> invasive alien plants, waste pollution and sewage spills</p>	<p>Initial assessment of available literature shows that a great deal of research has been conducted in South Africa to get a better understanding on the discipline of river rehabilitation, providing local and site specific river rehabilitation intervention examples to enable more effective protection and management of rivers.</p> <p>There is a number of existing river rehabilitation guidelines which have been developed with the knowledge gained over the years that detail the technical methods for undertaking rehabilitation activities and also provide an overarching framework to consider for the planning, designing, implementation and monitoring phases of rehabilitation interventions.</p> <p>There are also programmes and initiatives that are currently in place to ensure natural river rehabilitation, improvement and management.</p> <p>The impacts on rivers have been clearly identified and contextualised for each of the studies reviewed. A range of management options have been implemented to address the various impacts i.e. the Diep, Hout Bay and Keyzers Rivers were upgraded. Bank rehabilitation undertaken on the Kuils River, improvement of Moddergat River and flood control measures for Silvermine River. Other interventions include clearing of alien invasive species from the riparian zone, followed-up by the eradication of the smallmouth bass using pesticide rotenone (a commonly used pesticide to eradicate fish populations).</p>

STUDIES, PROGRAMMES, INITIATIVES	IMPACTS IDENTIFIED	SUMMARY OF INTERVENTIONS AND BEST MANAGEMENT PRACTICES IMPLEMENTED
<ul style="list-style-type: none"> <li>• South African National Biodiversity Institute (SANBI) Living Catchments</li> <li>• Tsitsa Project</li> <li>• SANBI GEF projects</li> <li>• Harties-Metsi-A-Me (Hartbeespoort Rehabilitation Initiative)</li> </ul>		
<b>THEME 2: Wetlands:</b>		
<p><b>Studies and Reports:</b></p> <ul style="list-style-type: none"> <li>• Prioritizing Catchments for Wetland Rehabilitation Planning at a National Level (2015)</li> <li>• Rehabilitation Plan as part of the Working for Wetlands Programme (2016, 2017a-f)</li> <li>• Draft Provincial Strategic Plan: 2019 – 2024 (2019)</li> </ul> <p><b>Policy/Guidelines/Manuals:</b></p> <ul style="list-style-type: none"> <li>• Guideline to the Wetland Management Series (2007a-b -2008a-g): <ul style="list-style-type: none"> <li>○ WET-Road Map</li> <li>○ WET-Origins</li> <li>○ WET-Management Review</li> <li>○ WET-Rehabilitation Plan</li> <li>○ WET- Prioritise)</li> <li>○ WET-Legal</li> <li>○ WET- Eco Services (version 2, 2021)</li> <li>○ WET- Health (version 2, 2020)</li> <li>○ WET-Rehabilitation Evaluate</li> <li>○ WET-Outcome Evaluate (version 2, 2019)</li> </ul> </li> <li>• Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (2017)</li> <li>• Draft Wetland Management Guidelines within South African Municipalities (2018)</li> </ul> <p><b>Programmes and Initiatives:</b></p> <ul style="list-style-type: none"> <li>• Working for Wetlands</li> </ul>	<p><b>Gauteng:</b> urbanisation (formal and informal), gold mining, surface and groundwater abstraction, agriculture (intensive), agriculture (extensive i.e. grazing), informal Invasive alien species, discharge of sewage and effluent dams</p> <p><b>North-West:</b> urbanisation (formal and informal), mining, surface and groundwater abstraction, agriculture (intensive and extensive), informal invasive alien species, discharge of sewage and effluent dams</p> <p><b>Eastern Cape:</b> coastal development, urbanisation surface and ground water abstraction, surface mining, infrastructure development (solar, wind, Electricity Grid Infrastructure-EGI), invasive alien species (often plants), afforestation and discharge of sewage effluent</p> <p><b>Limpopo:</b> urbanisation, water abstraction, mining infrastructure development, invasive alien species, afforestation, agriculture (intensive and extensive) and sewage discharge</p> <p><b>Northern:</b> urbanisation, sewage, effluent and other</p>	<p>Similar to theme 1, the assessment of literature shows there is existing knowledge and experience gained in the field of wetland rehabilitation in South Africa. There are existing integrated tools for assisting users to achieve well-informed and effective wetland management and rehabilitation.</p> <p>Numerous wetlands rehabilitation guidelines are in place providing appropriate practical and strategic approaches to wetland rehabilitation. The guidelines also promote wetland rehabilitation and assist with insight on wetland rehabilitation planning, design and implementation.</p> <p>There are programmes and initiatives in place to better manage wetlands and come up with measures and plans to rehabilitate different types of wetlands in various provinces.</p> <p>Impacts on wetlands around the country are well understood and documented. There is knowledge in terms of wetland rehabilitation priority areas and successful rehabilitation interventions that have been implemented, examples include:</p> <ul style="list-style-type: none"> <li>• Hogsback Wetland (Eastern Cape);</li> <li>• Sterkfontein, Ararat, Boschkloof and Monontsha wetland systems (Free State);</li> <li>• Tweefontein and Enkangala wetlands (Gauteng);</li> <li>• Kruger National Park, Mapungubwe National Park and Sekhukhune wetlands (Limpopo); and</li> <li>• Steenkampsberg and Wakkerstroom wetlands, (Mpumalanga).</li> </ul>

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STUDIES, PROGRAMMES, INITIATIVES	IMPACTS IDENTIFIED	SUMMARY OF INTERVENTIONS AND BEST MANAGEMENT PRACTICES IMPLEMENTED
<ul style="list-style-type: none"> <li>• SANBI - Freshwater Programme;               <ul style="list-style-type: none"> <li>○ Mondi Wetlands Programme</li> </ul> </li> </ul>	<p>pollution, water abstraction, mining, infrastructure, invasive alien species, agriculture (intensive) and livestock grazing</p> <p><b>Western Cape:</b> coastal development, urbanization mining, infrastructure development (solar, wind, EGI) invasive alien species, afforestation, agriculture, intensive agriculture, extensive (grazing), discharge of sewage effluent, water abstraction, surface and ground water abstraction</p>	
<b>THEME 3 &amp; 4: Estuaries; and Lakes &amp; Dams:</b>		
<p><b>Studies or Reports:</b></p> <ul style="list-style-type: none"> <li>• Managing Estuaries in South Africa: A step by step guide (2005)</li> </ul> <p><b>Policy/Guidelines/Manuals:</b></p> <ul style="list-style-type: none"> <li>• Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (2017)</li> </ul> <p><b>Programmes and Initiatives:</b></p> <ul style="list-style-type: none"> <li>• Global Environment Facility (GEF) program at Isimangaliso to restore estuarine hydrodynamics on St Lucia mouth</li> </ul>	<p>Limited knowledge on impacts of estuaries, lakes and dams currently. Further research to be conducted in the Situation Assessment Phase</p>	<p>The preliminary review of available literature revealed that there are limited current studies on estuary rehabilitation or the management thereof. Literature shows that lack of management of estuaries is due to the extensive land and resource use changes in the catchments and along the coastline, resulting in limited opportunity for re-instating many of the natural landscape processes that influence estuaries.</p> <p>The step by step guide developed by WRC (2005) is a plan on the general estuarine management and does not necessarily provide actual guidelines on the rehabilitation of estuaries. This plan proposes general management of estuaries which must be undertaken within a range of legal and management framework. At the time the guide was compiled, there was no framework that existed for estuarine management. The guide does, however, provide assistance to managers in developing a rehabilitation plan at the local estuary scale.</p> <p>There is also the GEF program at Isimangaliso to restore estuarine hydrodynamics on St. Lucia mouth.</p>
<b>THEME 5: Groundwater:</b>		
<p><b>Studies or Reports:</b></p> <ul style="list-style-type: none"> <li>• Policy-Based Research on Groundwater Management</li> </ul>	<p>There is currently limited knowledge on impacts. Further research to be</p>	<p>No known local interventions currently whilst there is extensive international literature on</p>

STUDIES, PROGRAMMES, INITIATIVES	IMPACTS IDENTIFIED	SUMMARY OF INTERVENTIONS AND BEST MANAGEMENT PRACTICES IMPLEMENTED
and Use in South Africa (2020)	conducted in the Situation Assessment Phase	<p>'groundwater remediation' available.</p> <p>The most recent DWS (2020) study conducted on "Groundwater Management and Use" confirms that the DWS has a number of Legislative or Policy Framework provision including supporting instruments (strategies, protocols, regulations, guidelines, etc.) used by DWS officials to ensure effective groundwater management and use. The research does note that some of the legislation is outdated and recommends that they must be updated. Observations made from the study is that the majority of legislation currently in place is geared only towards management and use and protection of water resources but not rehabilitation of polluted or contaminated groundwater resources.</p> <p>D:SDS is also of the view point that polluted and contaminated groundwater areas/<b>aquifers</b> or hotspots need to be identified and guidelines must be develop on how these can be rehabilitated.</p>

### 3.4. FINDINGS FROM LITERATURE AND AVAILABLE INFORMATION

Available literature and information were reviewed in **Section 3** and **Annexure A** respectively to obtain preliminary status quo on rehabilitation practices and interventions on water resources in South Africa, with specific reference to rivers, wetlands, lakes, dams, estuaries and groundwater. From the review conducted, water resources are under extreme impacts and pressures. Rivers and aquifers are drying up or becoming too polluted to use. More than half the world's wetlands are degraded. According to Nel and Driver (2015) in NW&SMP (2018), more than 50% of wetlands have been lost in South Africa, and of those that remain, 33% are in poor ecological condition.

Climate change is also altering patterns of weather and that of water resources, causing water shortages and droughts in some areas and floods in others. There is growing realization around the impacts and the costs of rehabilitation for poorly functioning water resources, for instance, the decline of fisheries, the increasing need for expensive water quality treatment, sedimentation of reservoirs, increasing severity of floods and flood damage, the need for expensive flood-control measures, the loss of recreational and biodiversity values, and much more. Due to these impacts and challenges, rehabilitation of water resources has gained attention over the years in the country.

It is evident from existing literature that a great deal of research has been conducted in South Africa to understand the discipline of river and wetland rehabilitation to provide local and site specific rehabilitation interventions to enable more effective protection and management of rivers and wetlands. There are a number of existing river and wetland rehabilitation guidelines that detail the technical methods for undertaking rehabilitation activities and also provide an overarching legislative framework to consider for the planning, designing, implementation and monitoring phases of rehabilitation interventions. There are also programmes and initiatives that are currently in place to ensure natural river and wetland rehabilitation improvement and management. The impacts on rivers and wetlands are also clearly identified and contextualised for each of the studies reviewed. A range of management options have been implemented to address the various impacts identified. This existing work will be of assistance to the project team to formulate a comprehensive plan in terms of creating linkages and integration of relevant rehabilitation programmes, initiatives and processes as well as information and expertise sharing at a local, provincial and national level.

At this stage of the project, there is limited knowledge on rehabilitation studies, programmes, and initiatives on lakes, dams, estuaries and groundwater resources, as well as the characteristics of watercourses. This is viewed by the project team as an information gap for further research/investigations to be conducted in the Situation Assessment Phase.

## **4. SCOPE OF WORK**

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### **4.1. PROJECT INCEPTION**

The inception phase is a critical phase of the project since it will serve as a roadmap for the project roll out and form the basis of the scope of work required for the rest of the project. The purpose of this component is to clearly define the specific project scope to ensure alignment between the project objectives and expected final deliverables to be produced. Existing literature will be reviewed and assessed as part of the report to obtain preliminary status quo on rehabilitation practices and interventions on water resources. This phase will confirm approaches to be followed, project plan, deliverables and the study budget.

A preliminary contextualization of the available literature and information has been completed in **Section 3** and **Annexure A** as part of this Inception Report, succinctly taking stock on the progress made to date with regards to rehabilitation of water resources. Information was sourced and collated from reports, previous studies, ongoing water resource management and protection initiatives and programmes; in addition to current knowledge and experience residing within the DWS officials in different DWS directorates who are actively participating in the project. This task has assisted the project team to clearly identify key components to be

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included in the project, those requiring urgent attention and further investigations and those that will not be covered as part of the project. Current gaps were also identified to a certain extent, based on the preliminary review and will be comprehensively discussed as part of the upcoming Situation Assessment Phase and other phases of the project.

The project focus is on the rehabilitation of water resources which are grouped into the following themes:

- **Theme 1:** Rehabilitation of Rivers (i.e. streams, tributaries, weirs etc.);
- **Theme 2:** Rehabilitation of Wetlands;
- **Theme 3:** Rehabilitation of Estuaries;
- **Theme 4:** Rehabilitation of Lakes and Dams;
- **Theme 5:** Rehabilitation of Groundwater Resources (i.e. aquifers).

It must be noted that the focus in terms of water resources may be narrowed or broadened during the project life cycle depending on the outcomes of the comprehensive assessment that will be conducted in the Situation Assessment Phase.

### **Project Inception Deliverables:**

The deliverable for the inception phase will be the **Study Inception Report** that includes the following:

- Integrated Work Programme;
- Capacity Building Plan/Programme,
- Stakeholder Engagement Plan including an ongoing Stakeholder Database; and
- Project Activities requiring Budget.

## **4.2. SITUATION ASSESSMENT**

The primary objective of this component is to conduct a comprehensive review of a compendium of existing studies, publications, reports, projects, programmes and initiatives that are specific to South Africa are and have been implemented in support of rehabilitation of water resources. This review is expected to gather detailed progress made in terms of rehabilitation practices and further identify the knowledge gaps. Data gaps will be identified as part of the gap analysis and recommendations on the extent of additional work required will be made. The outcome of this situation assessment will guide the rest of the project programme. In the case where guidelines, manuals or best practices are readily available for certain water resources, work will not be duplicated; instead, efforts will be put into review and integration of existing work across various disciplines, government and non-government departments as well as institutions in order to ensure the harmonization and centralisation of

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the existing work to date. Where there are no guidelines in place or any other previously related rehabilitation work done for other water resources, further investigations will be conducted to assist in identifying gaps that will underpin development of proper management guidelines for water resources.

This situation assessment component will entail (but not limited to) the following:

- Comprehensive contextualisation of global, regional and local rehabilitation management practices of water resources;
- Review and outline of legislative framework governing rehabilitation management practices with the aim to align it to policies and strategies within various departments and water resource management institutions;
- Further assessment and identification of key local impacts on water resources, as the results of the preliminary review show strong correlation between the types of impacts (site-specific) and the type of rehabilitation management interventions implemented;
- Standardisation on rehabilitation related terminology to be used during the project i.e. rehabilitation vs remediation, restoration and environmental rehabilitation;
- Assessment of previous and current work done to draw boundaries, parameters and avoid duplication of efforts and wasteful expenditure;
- Establishing linkages on co-operative governance, stakeholder engagement and relevant partnerships to formulate a plan on the creation of structures with practical linkages and integration of relevant rehabilitation programmes, initiatives and processes; in addition to information and expertise sharing at local, provincial and national level.

### **Situation Assessment Deliverables**

The main deliverable for this component will be a **Situation Assessment Report** which will include the Literature Survey Report and a Database covering the components listed in paragraph 2 above.

### **4.3. DEVELOPMENT OF REHABILITATION GUIDELINES**

The Development of the Rehabilitation Management Guidelines is the main component of the project. It will entail collation of knowledge obtained in the Situation Assessment i.e. standardized glossary or terminology, contextualized relevant global, regional and local rehabilitation management trends, all key water resource impacts, available work done and legislative framework relating to rehabilitation. The process of developing the guidelines will be systematically approached per water resource theme and ultimately producing five (5) separate guidelines.

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The following are aspects envisaged to be covered in the guidelines for each water resource theme:

- Overview and description of the key water resource impacts that gives rise to water resource degradation to better understand the problem and subsequently establishing effective rehabilitation guidelines;
- Step by step guidelines on rehabilitation measures/interventions for executing rehabilitation planning, design, implementation and monitoring;
- Applicable legislative framework when undertaking site-specific rehabilitation activities on a local, provincial and national level; and
- Alignment with relevant policies and strategies.

### **Guidelines Development Deliverables**

Deliverables for this component will include stand-alone Rehabilitation Management Guidelines for rivers, wetlands, lakes, dams, estuaries and groundwater resources.

#### **4.4. PUTTING GUIDELINES INTO PRACTICE**

It is intended that the guidelines will be translated into practice to ensure that they are clear, practical steps provided on the implementation of a wide range of rehabilitation activities which take cognisance of legal, social, economic and ecological issues and aspects that affect management options and opportunities. This practice document will also be very clear on the roles, responsibilities and mandates within government and water institutions and the water sector at large. This component will therefore entail the following:

- Developing guidance on implementation actions necessary to turn the Guidelines into action;
- Definition of the roles and responsibilities of the various role players (co-operative governance) in the Department and larger water sector in undertaking those actions;
- Developing mechanisms and platforms for monitoring, integration and reporting on the progress/outcomes of those actions and the success of the guidelines; and
- Guidelines into Practice Report for rivers, wetlands, lakes, dams, estuaries and groundwater.

In defining how the guidelines can be translated into practice, priority actions should be highlighted and possible risks identified. The actions should not only be relevant to the DWS, but to all other relevant stakeholders aligning to other actions that have been put in place to implement related executive policies and strategies. Roles, responsibilities and timeframes for undertaking the actions required to give effect to the guidelines may be updated as the project proceeds.

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Given the large number of organizations that play a role in development of the Rehabilitation Guidelines, integration and co-operation will need to be a facilitated process and recommendations for co-ordination platforms for the achievement of the integration component must be provided. To ensure that the guidelines lead to actions, a monitoring and reporting system will also be required. The system should include the use of indicators that not only measure progress (output) but also meaningfully measure the success (outcomes) of the guidelines. Stakeholder engagement should be used to provide inputs to this component.

### **Putting Guidelines into Practice Deliverables**

This component aims to deliver the following:

- Guidelines into Practice Report detailing the actions, roles and responsibilities, timeframes, and the co-ordination structures;
- Defined implementation approach in order to achieve the desired product;
- Development and testing of an organized method (system) for monitoring and reporting on the conversion of guideline into practice and on the ground realization of the rehabilitation guidelines;
- Recommendations for rehabilitation management projects, programmes and initiatives.

## **4.5. EXTERNAL REVIEW**

All project outputs and deliverables will be circulated to the Project Steering Committee (PSC) members for review and inputs as the initial step of external review. An external reviewer will be assigned through the project management team. Once the process of developing guidelines has been completed, the reviewer will be included in team workshops and key steps in the project process as well as during the review of the final draft deliverables.

### **External Review Deliverable**

Externally Reviewed Report, with written comments/inputs/edits.

## **4.6. STAKEHOLDER ENGAGEMENT**

The process of developing the Rehabilitation Management Guidelines is stakeholder driven and will be strengthened by a strong stakeholder engagement process as required by Batho Pele Principles *i.e.* consultation, openness, transparency and access to information. The project process will therefore entail consultation and engagement with all three spheres of government, civil society, private sector and participation of the entire water sector stakeholders in order to ensure appropriateness and acceptability of the guidelines by different sectors responsible for implementation and monitoring thereof. This section of the report

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outlines the stakeholder engagement plan and structures.

A database of all stakeholders that need to be consulted will be compiled and updated throughout the project life cycle. All the inputs and comments received during the project process will be documented in the Issues and Response Register (IRR) as well as the Document Change Log (DCL). Throughout the project, stakeholders will be involved for ensuring oversight authority, guidance and review in the development of the rehabilitation management guidelines for water resources. Whilst the stakeholder representation will be from directly involved sectors and stakeholders in the water sector such as the three spheres of government (national, provincial and local government), industry, mining, agriculture and civil society, the meetings will be facilitated and chaired by the DWS, Chief Directorate: Water Ecosystems Management.

The scope of the communication and liaison services to be provided by the Project Management Committee (PMC) will include (but not be limited to) the following:

- Consolidated stakeholder database;
- Establishment, in consultation with the Department's top management, of appropriate institutional arrangements to facilitate the progress of the project;
- Public meetings (minimum of two at central venues);
- PSC meetings (minimum of two meetings); and
- TTT meetings (monthly meetings as the need arises) to discuss the deliverables or milestones;
- Existing rivers, wetlands, lakes, dams, estuaries, groundwater and catchment fora.

External stakeholder consultation will be undertaken with relevant water sector stakeholders to solicit inputs and partnerships to achieve the project's objectives. External stakeholders will be expected to participate at platforms such as Project Steering Committee (PSC) and Public meetings, befitting of their expertise. External stakeholders identified to date include (but not limited to) the following:

- Department of Environment, Forestry and Fisheries (DFFE);
- Department of Agriculture, Land Reform and Rural Development (DALRRD);
- Department of Economic Development, Tourism and Environmental Affairs (DEDTEA);
- Department of Cooperative Governance and Traditional Affairs (DCOGTA);
- South African Local Government Association (SALGA);
- Department of Mineral Resources and Energy (DMRE);
- Water Research Commission (WRC);
- Council for Geoscience (CGS);

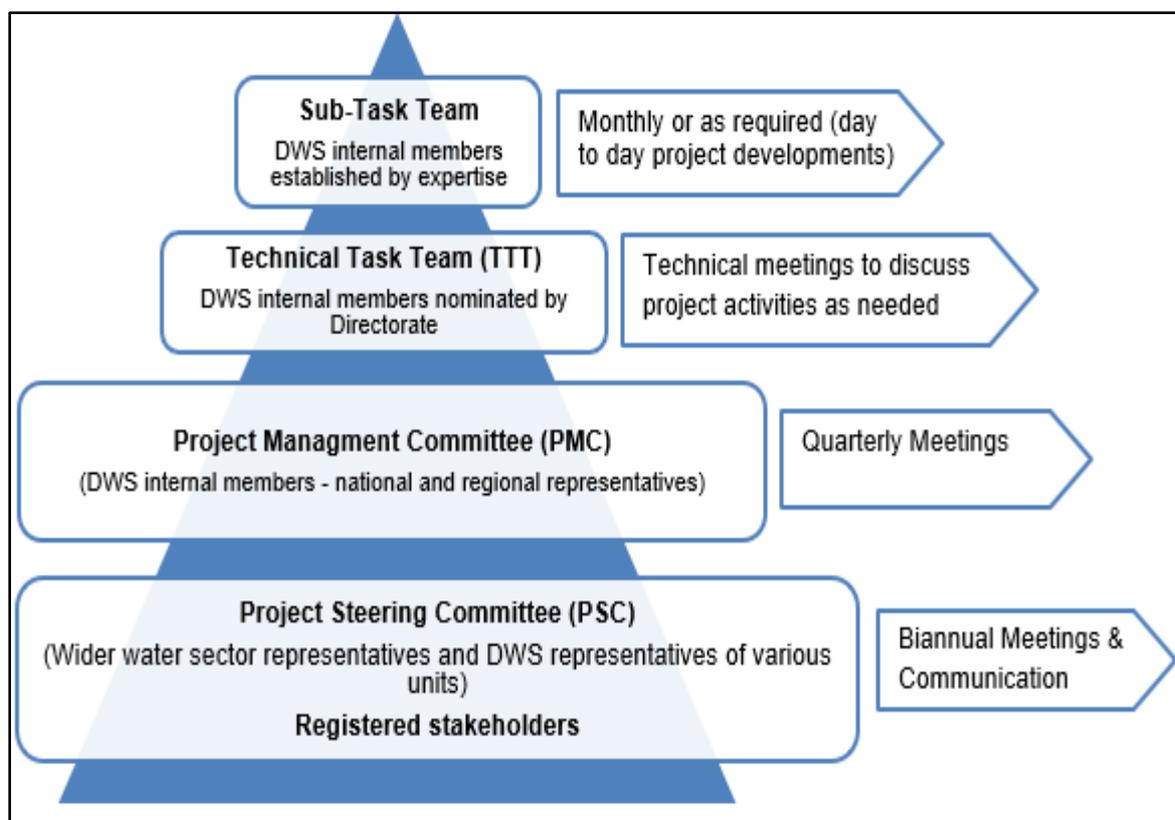
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- Council for Scientific and Industrial Research (CSIR);
- South African National Biodiversity Institute (SANBI);
- South African National Parks (SANParks);
- South African Heritage Resources Agency (SAHRA);
- Ezemvelo KZN Wildlife;
- Institute of Landscape Architects of South Africa (ILASA);
- South African Council for the Landscape Architectural Profession (SACLAP);
- Mining sector through the Mining Body (Minerals Council of South Africa)
- Agricultural and Industrial sectors;
- Private Sector and Public members;
- Breede-Gouritz, Berg Olifants and Inkomati-Usuthu Catchment Management Agencies (CMAs);
- Non-Governmental Organisations (NGO's) (i.e. WWF)
- Provincial freshwater, wetland, & estuary forums and South African Wetland Society (SAWS);
- Research Institutions (Universities and Academic Institutions).

Stakeholders are selected on the basis of their expertise and bear great responsibility to provide strategic management support as well as much needed technical guidance through the project lifespan. The main activities executed by the PSC are to review, monitor progress in project execution, provide strategic guidance, and to support communication and dissemination of project outcomes. The role of the PSC will be to guide the project in all stages as it unfolds and to provide inputs on behalf of the sectors they represent. The specific objectives of the PSC for this project are therefore to:

- Provide direction and oversight in the development and implementation of project deliverables;
- Serve as representatives in their respective bodies and organizations and report back on an ongoing basis regarding the development of the guidelines;
- Provide executive support, guidance and commitment to the direction and outcomes of the project;
- Assist DWS in ensuring that the objectives of the study are achieved;
- Review study outputs and give comments on them within a reasonable timeframe;
- Share resources, information and data or facilitate sharing where possible; and
- Act as advocates for issues and recommendations that may arise from the project.

**Figure 1** below illustrates the composition of the different levels of stakeholder engagement (TTT, Sub-TT, PMC, PSC, and Public meetings) and frequency of expected engagements.



**Figure 1: Levels and linkages of stakeholder engagement**

### **Stakeholder Engagement Deliverables**

Deliverables for this component include the following:

- A stakeholder engagement and communication plan (outlined in this Inception Report);
- A Project Information Management System (N-Drive), designed to share large deliverables for commenting by internal stakeholders; and DWS Website page for external stakeholders. The said web page content will be periodically updated and utilized by the departmental administrator to upload project information for access by external stakeholders throughout the project period;
- An Issues and Responses Register (IRR) to detail stakeholder engagement input received during meetings, via email communication during the lifespan of project needs to be maintained;
- A Document Change Log (DCL) compiled for each technical report to detail all technical inputs and comments received on project reports;
- Detailed stakeholder database and records of stakeholder engagement meetings (meeting minutes with details such as date of meeting, purpose, number of attendees,

summary of proceedings etc.);

- A Newsletter and/or Background Information Document for PSC meetings and Public Workshops to communicate study information, milestones and progress to stakeholders;
- A public “communication event”, with accompanying event documentation (invitations, programme, presentation catalogue and summary of key outcomes).
- PowerPoint presentations on project progress; and
- Project deliverables in Reports.

#### **4.7. PROJECT MANAGEMENT TEAM AND ADMINISTRATION**

The composition of the Project Management Team will be as follows:

- Sub Technical Task Team (Sub-TT) – DWS Team established according to area of technical expertise and responsible for thematic specialist support on a day-to-day basis during the project development i.e. research and contribution to sections or chapters of the project reports;
- Technical Task Team (TTT) – Team established according to DWS Directorate representatives responsible for providing guidance on the technical aspects of the project;
- Project Management Committee (PMC) - DWS (Head Office and Provincial Offices) Directorate representatives responsible for oversight and integrating inputs on initiatives within various units of DWS and CMAs;
- Project Steering Committee (PSC) – SA water sector wide representatives (i.e. CMAs, DFFE, DMRE, SANBI, WRC) responsible for providing the project team with strategic and technically sound guidance to ensure that the intended outcome of this project is achieved. The PSC will comprise of the Sub-TT, TTT, PMC members and members from various sectors with interest in the project.

The project management process will be as follows:

- Sub-TT meetings will be held on a bi-weekly or monthly basis for compilation of project deliverables;
- TTT meetings will be held on a monthly basis or when the need arises to provide technical inputs to deliverables of the project;
- PMC meetings will be held on a quarterly basis or when the need arises;
- A minimum of two PSC meetings will be held throughout the project life cycle.

## 4.8. PROJECT CLOSURE

Project Administrators will ensure that all the deliverables stated, including meeting records, databases, presentation materials are in place and submitted through the Departmental reporting structures throughout the project life cycle. A Project Closure Report will be the main deliverable for this component.

## 5. PROJECT PLAN AND MILESTONES

### 5.1. PROJECT TIMELINE

The project was initiated during the 2020/2021 financial year and it is envisaged to be concluded within 36 months from the date of initiation. The first 12 months of the project (financial year 2020/2021) were used for the planning phase. The planned project deliverables and timelines indicated on **Figure 2** below are expected to be conducted in-house, following which an external review process will be initiated.

### 5.2. PROJECT PROGRAM

A breakdown of project deliverables is given below in **Table 2**.

**Table 2: Deliverables and the estimated timeframe to complete tasks.**

Component No.	Deliverables	*Estimated Timeframe (months)
1. <b>Project Inception</b>	Inception Report (Final)	2
2. <b>Situation Assessment</b>	A report on rehabilitation challenges in South Africa; and a Literature Survey Report of international, national and any other applicable policies, strategies, practices, approaches, concepts and other related information.	3
3. <b>Development of the Rehabilitation Management Guideline for Water Resources</b>	Development of the Rehabilitation Management Guidelines for Rivers	6
	Development of the Rehabilitation Management Guidelines for Wetlands	
	Development of the Rehabilitation Management Guidelines for Estuaries	
	Development of the Rehabilitation Management Guidelines for Lakes and Dams	
	Development of the Rehabilitation Management Guidelines for Groundwater resources	
4. <b>Guidelines into Practice</b>	Guidelines into Practice Report	3
5. <b>External Review</b>	An external reviewer will be identified to review study outputs and deliverables	1
	Stakeholder Engagement and Communication Strategy	

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<b>Component No.</b>	<b>Deliverables</b>	<b>*Estimated Timeframe (months)</b>
<b>6. Stakeholder Engagement and Communication</b>	Stakeholder Issues and Responses Register	Throughout the project life-cycle
<b>7. Project Management and Administration</b>	Departmental (Organisational) Reporting	Throughout the project life-cycle
<b>8. Project Closure</b>	Project close-out Report	1
	An electronic database/library of all available information collected	
<b>9. Capacity Building Plan/Programme</b>	Detailed capacity-building report (which includes the mentorship, capacity building workshops and stakeholder empowerment sessions)	Throughout the project life-cycle

The estimated timeframe indicates the period during which a particular component should be carried out and the final report be submitted to the top management.

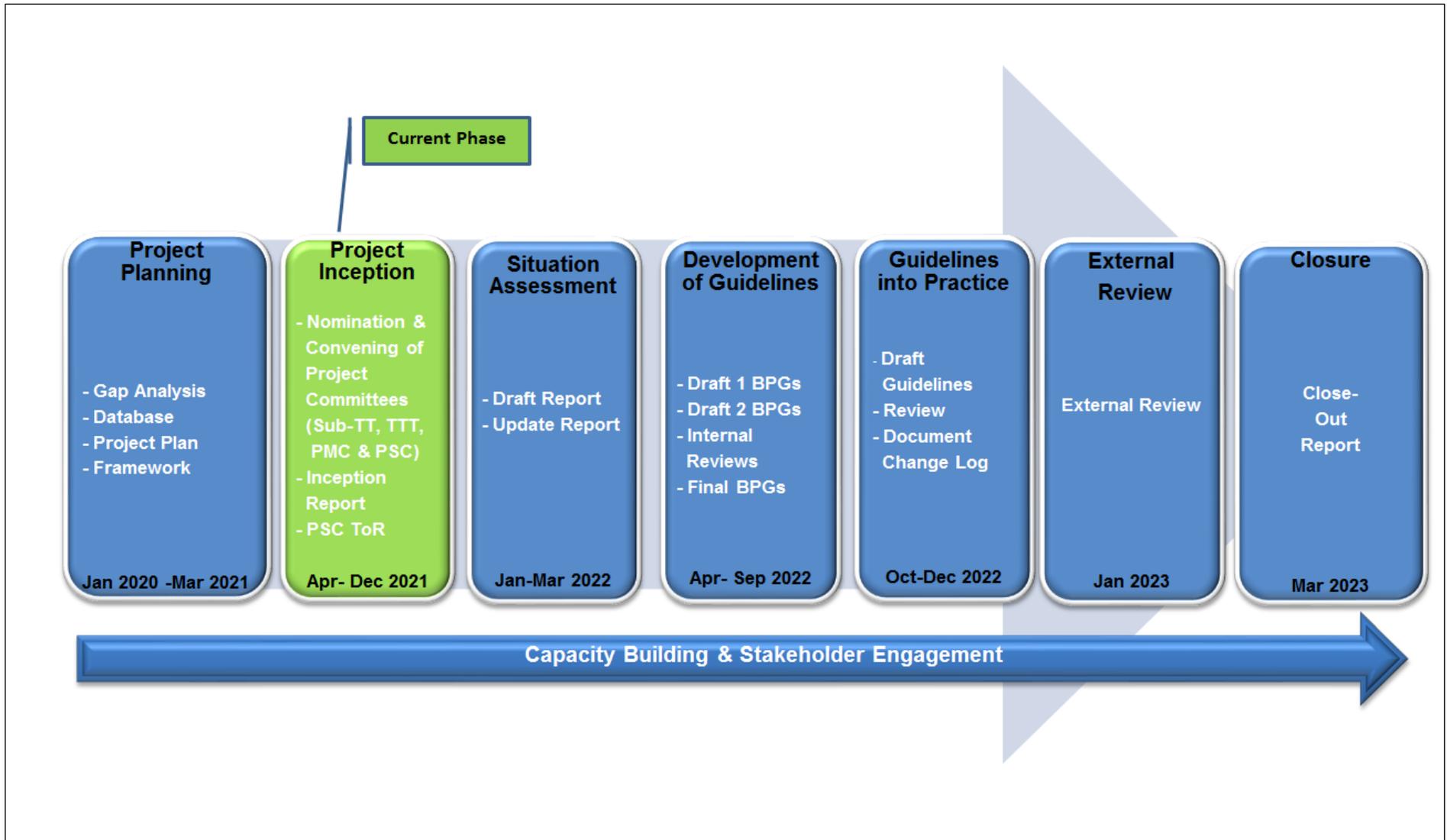


Figure 2: Project Deliverables and Milestones

## **6. DWS INTERNAL CAPACITY BUILDING**

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In order to ensure skills transfer within the DWS, capacity building will be offered at three different levels, namely:

- Mentorship programme and/or engagement of identified staff members on the process of development;
- Capacity building workshops; and
- Stakeholder empowerment sessions, if a need arises.

The capacity building candidates for this project are Mr Kgotso Mahlahlane and Dr Mampolelo Photolo who are both Scientist Production staff members of DWS. Mr Kgotso Mahlahlane is a newly appointed Production Scientist in the DWS, under a Directorate: Sources Directed Studies and has been identified for a structured mentorship programme. Dr Mampolelo Photolo is a new appointee (Graduate Scientist) in the Directorate Resource Quality Information Systems and will also receive mentorship.

The mentorship programmes (Table 3 and 4) for Mr Kgotso Mahlahlane and Dr Mampolelo Photolo are aligned to their respective skills and developmental needs as per their Personal Development Plans (PDPs) for water resources management and protection. The mentorship programmes are designed in a way that will allow the mentee/trainee to have scientific technical tasks and responsibilities whose output will feed into the overall technical milestones/deliverables of the project.

Scientists within the department are required to be exposed to scientific work, trainings, workshops, seminars and conferences to enable them to accumulate sufficient Continuing Professional Development (CPD) points for registration with the South African Council for Natural Scientific Professions (SACNASP). This is a similar case with the Graduate Trainees within the department who are required to be exposed to scientific work to help them obtain their professional registration with SACNASP.

The capacity-building will be enhanced by active participation of candidates in Departmental stakeholder engagement platforms (i.e. meetings, workshops, forums) which include a wider water resource management groups consisting of DWS (Head and Provincial offices) and the CMAs. The workshops will provide an overview of the study and the topics to be covered for such workshops will be finalised by the PMC. The participation of relevant DWS officials will ensure active sharing of ideas and contribute to the broadening of the Chief Directorate: Water Ecosystems Management skills base by being intensively involved in the day-to-day running of the project.

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Provision will also be made for stakeholder empowerment sessions (i.e. CMFs) if need arises in order to capacitate stakeholders so that they can fruitfully participate in the project and in other stakeholder engagement platforms such as the PSC and Public meetings.

**Table 3: Planned Capacity Building Plan/Programme for Mr Kgotso Mahlahlane.**

Official's Current Competencies	Official's Current Training Gaps	Capacity Building Programme
1. Integrated Water Resource Management 2. Water related and relevant environmental management legislation and policies	Project Management	Mr Kgotso Mahlahlane is currently coordinating the project and will be mentored throughout the project to gain insight on project administration and management as well as financial management.
	Financial Management	
3. Technical report writing 4. Data analysis and interpretation 5. Computer literacy and Geographic Information System (GIS)	Mentorship and Supervision Skills	Stakeholder engagement is envisaged for the project and these sessions will be linked to the project meetings. The Project Management Team (which Mr Kgotso Mahlahlane is part of) will capacitate stakeholders through the various meetings and consultation forums that are created over the duration of the project. Mr Kgotso Mahlahlane will gain mentorship and supervision skills through these sessions.
6. Coordination of stakeholder engagement relationships within the department and broader water sector 7. Writing, Verbal and Presentation Skills	River and Wetland Rehabilitation and Remediation  Rehabilitation of closed and abandoned mines	Mr Kgotso Mahlahlane is part of the authorship team which will be responsible for research and the technical write up of the project reports. Through his involvement, he will gain in-depth knowledge on how river, wetlands, lakes and estuaries function, the goods and services that they provide and activities that threaten them. The sustainable use of these dynamic systems (water resources) can only be achieved through sound governance and management practices. Mr Kgotso Mahlahlane will therefore become familiar with useful water resource management tools/approaches.
	Water Quality and water related symposium and workshops i.e. WISA Conference	Mr Kgotso Mahlahlane will be afforded the opportunity to attend and participate in stakeholder empowerment sessions, training workshops and forums and other Departmental project committees.

**Table 4: Planned Capacity Building Plan/Programme for Dr Mampolelo Photolo**

Official's Current Competencies	Official's Current Training Gaps	Capacity Building Programme
<ol style="list-style-type: none"> <li>1. Scientific Research skills.</li> <li>2. General environmental management skills.</li> <li>3. Statistics skills (basic).</li> <li>4. Scientific report writing.</li> <li>5. Administration skills including minute taking, filing and record keeping</li> <li>6. Computer skills</li> <li>7. Presentation and facilitation skills.</li> <li>8. Problem solving</li> <li>9. Laboratory analysis skills.</li> </ol>	Time management and resource allocation skills	The project comprises of various deliverables and timeframes. Each deliverable must be completed within the timeframes stipulated in the project plan. Dr Mampolelo Photolo will gain time management and resource allocation skills through each deliverable of the project
	Communication skills	Stakeholder engagement is envisaged for the project and these sessions will be linked to the stakeholder meetings. Dr Mampolelo Photolo will advance her communication skills through active participation these sessions
	Advanced GIS	It has become evident through the preliminary assessment of impacts on water resources inform the type of rehabilitation interventions that are implemented. One of the main tasks of the project will be to identify these key impacts in relation to water resources. GIS will be one of the tools that will be used to execute this task. Dr Mampolelo Photolo will gain experience on the use of GIS through this task
	Rehabilitation of Water Resources	Dr Mampolelo Photolo will work closely with the project team on the Development of Rehabilitation Management Guidelines for rivers, wetlands, estuaries, lakes and groundwater resources. She will also be part of the authorship team which will be responsible for research and the technical write up of the project reports. Through her involvement, she will gain understanding and knowledge on relevant and appropriate rehabilitation management practices for each of the resources.

### 6.1. INDICATIVE BUDGET

The project will be conducted in-house, and *Compensation of Employees* budget will apply, and the *Goods and Services* budget will be required to run the project stakeholder engagements in 2021/22 – 2022/23. Funds are available under sub programme: Water Ecosystems Management under programme 2: Water Resource Management. **Table 5** below is the summarised activities that will require budget.

**Table 5: Activities Requiring Budget**

<b>Item</b>	<b>Responsibility</b>	<b>Objective</b>
Venues and Facilities for Stakeholders Engagement; External Review	Directorate: Sources Directed Studies	Water Ecosystems Management
<b>Stakeholder Engagement and Communication:</b> 2x Public meetings 2x Specialists / sectoral workshops	Directorate: Sources Directed Studies	Water Ecosystems Management
External Review	Directorate: Sources Directed Studies	Water Ecosystems Management

## **7. REPORTING**

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The Project Administrators will report on the project management outputs as follows:

- Reporting through established project management structures (i.e. project progress, feedback and technical reporting in Sub-TT, TTT, PMC & PSC meetings); and
- Project deliverables submitted for internal Departmental reporting.

## **8. CONCLUSION**

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To date, the project planning phases have been completed. These included establishment of the Stakeholder Engagement committees and completion of the Gap Analysis Report, Framework Document, PSC Terms of Reference and this Inception Report. Five themes have been identified for the Rehabilitation Management Guidelines to be developed and these have been categorized into Rivers, Wetlands, Estuaries, Dams & Lakes and Groundwater as per the National Water Act.

The Scope of Work for the project has been outlined and described in this Inception Report as follows: Project Inception, Situation Assessment, Best Practices Guidelines, and Guidelines into Practice. This Inception Report was finalized with due consideration of all stakeholder inputs solicited and received through the project committees depicted on Figure 1. The Inception Report will guide the project activities for the remainder of the project cycle.

## REFERENCES

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- Conservation South Africa and Environmental and Rural Solutions. 2011. Umzimvubu Catchment Overview.
- Conservation South Africa and Environmental and Rural Solutions. 2011. Umzimvubu Catchment Conservation Programme Phase 1 Strategy Outline. Restoration of Ecosystem Services through Local Stewardship.
- Department of Water Affairs (DWA). 2013. National Water Resource Strategy, Second Edition. Pretoria, South Africa.
- Department of Water Affairs (DWA). 2014. Environmental Rehabilitation Policy. Directorate Water Abstraction and Instream Use, Sub- Directorate Environment and Rehabilitation
- Department of Water and Sanitation (DWS). 2017a. Water Quality Management Policies and Strategies for South Africa. Report No. 3.2. Integrated Water Quality Management (IWQM) Strategy. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/16. Pretoria, South Africa.
- Department of Water and Sanitation (DWS). 2017b. Water Quality Management Policies and Strategies for South Africa. Report No. 4.3. Note on the Monitoring and Evaluation Framework. Water Resource Planning Systems Series, DWS Report No.: 000/00/217115/20. Pretoria, South Africa.
- Department of Water and Sanitation (DWS). 2018. National Water and Sanitation Master Plan Volume 1: Call to Action Version 10.1.
- Department of Environmental Affairs (DEA). 2019a. Draft Provincial Strategic Plan: Working for Wetlands: Gauteng.
- Department of Environmental Affairs (DEA). 2019b. Draft Provincial Strategic Plan: Working for Wetlands: North-West.
- Department of Environmental Affairs (DEA). 2019c. Draft Provincial Strategic Plan: Working for Wetlands: Eastern Cape.
- Department of Environmental Affairs (DEA). 2019d. Draft Provincial Strategic Plan: Working for Wetlands: Limpopo
- Department of Environmental Affairs (DEA). 2019e. Draft Provincial Strategic Plan: Working for Wetlands: Northern Cape.
- Department of Environmental Affairs (DEA). 2019f. Draft Provincial Strategic Plan: Working for Wetlands: Western Cape.
- Eco-Pulse Environmental Consulting Services (Pty) Ltd. 2018. Wetland Management Guidelines: building capacity and supporting effective management of wetlands within South African municipalities.
- Greater Cape Town's Rivers. 2005. State of River Report.

## ***Rehabilitation Management Guidelines for Water Resources***

- Impson, N.D., Van Wilgen, B.W. and Weyl, O.L.F. 2013. Coordinated Approaches to Rehabilitating a River Ecosystem invaded by alien plants and fish. *South African Journal Sci* 109 (11/12).
- Macfarlane, D. and Atkinson, J. 2015. Working for Wetlands: Prioritizing catchments for wetland rehabilitation planning at a national level. Report compiled by Eco-Pulse Environmental Consulting Services (Pty) Ltd, March 2015.
- MEA [Millennium Ecosystem Assessment]. 2005. Ecosystems and Human well-being: Wetland and Water-Synthesis. World Resources Institute, Washington, D.C.
- Thompson, M., Kotze, D., Batchelor, A. and Marneweck, G. 2009. WET- Prioritise – Guidelines for Prioritising Wetlands at National, Regional and Local Scales. Water Research Commission (Report No: TT 337/08).
- Roni, P., Beechie, T.J., Bilby, R.E., Leonetti, F.E., Pollock, M.M. and Pess, G.R. 2002. A review of stream restoration techniques and a hierarchical strategy for prioritizing restoration in Pacific Northwest watersheds. *North American Journal of Fisheries Management*, 22(1): 1-20.
- Roni, P., Hanson, K., Beechie, T., Pess G., Pollock, M. and Bartley, D.M. 2005. Habitat rehabilitation for inland fisheries: global review of effectiveness and guidance for rehabilitation of freshwater ecosystems. Fisheries technical paper 484. Food and Agriculture Organization, Rome, Italy.
- Russell, W. 2008. WET-Rehabilitation Evaluate – Guidelines for Monitoring and Evaluating Wetland Rehabilitation Projects. Water Research Commission (Report No: TT 342/08).
- Russell, W. 2008. WET- Rehabilitation Methods – National Guidelines and Methods for Wetland Rehabilitation. Water Research Commission (WRC Report TT 341/09).
- Simsek, G. 2012. Urban River Rehabilitation as an Integrative Part of Sustainable Urban Water Systems.
- Stanford, J.A., Ward, J., Liss, W.J., Frissell, C.A., Williams, R.N., Lichatowich, J.A. and Coutant, CC. 1996. A general protocol for restoration of regulated rivers. US Department of Energy Publications: 43.
- Van Wilgen, B.W., Breen, C.M., Rogers, K.H., Roux, D.J., Sherwill, T., van Wyk, E., and Venter, F. 2003. Principles and processes for supporting stakeholder participation in integrated river management. Lessons from the Sabie-Sand Catchment. Water Research Commission Project K5/1062.
- United Nations (UN). 2020. Strategy of the United Nations Decade on Ecosystem Restoration.

## ***Rehabilitation Management Guidelines for Water Resources***

- Water Research Commission (WRC). 2003a. Development of River Rehabilitation in Australia: Lessons for South Africa. Water Research Commission Project (WRC Report No: KV 144/03).
- Water Research Commission (WRC). 2003b. River Rehabilitation: Literature Review, Case Studies and Emerging Principles. Water Research Commission Project (WRC Project No.: 1161/1/03).
- Water Research Commission (WRC). 2004. A Consultative Project to Situate, Contextualise and Plan for a Water Rehabilitation Program in South Africa, to link this to relevant water-related initiatives; and to trial the Australian procedure for River Rehabilitation on a small degraded urban stream. Water Research Project (WRC Report No. 1309/1/04)
- Wildlife and Environment Society of South Africa [WESSA]. 2015. TM 1683, Source to Sea: River Corridor Restoration for People and Nature, Towards the Development of an Integrated Implementation Strategy.
- Water Research Commission (WRC). 2007a. A Guideline to Wetland Management Series (2007). Water Research Commission Project.
- Water Research Commission (WRC). 2007b. Wet-Road Map – A Guide to the Wetland Management Series. Water Research Commission (Report No: TT 321/07)
- Water Research Commission (WRC). 2008a. WET- EcoServices – A Technique for Rapidly Assessing Ecosystem Services Support by Wetlands. Water Research Commission Project (Report No: TT 339/08).
- Water Research Commission (WRC). 2008b. WET- Management Review – The Impact of Natural Resource Management Programmes on Wetlands in South Africa. Water Research Commission Project (Report No: TT 335/08).
- Water Research Commission (WRC). 2008c. WET- Outcome Evaluate – An Evaluation of the Rehabilitation Outcomes at Six Wetland Sites in South Africa. Water Research Commission Project (Report No: TT 343/08).
- Water Research Commission (WRC). 2008d. WET- Origins – Controls on the Distribution and Dynamics of Wetlands in South Africa. Water Research Commission (Report No: TT 335/08).
- Water Research Commission (WRC). 2008e. WET- Rehabilitation Plan – Guidelines for Planning Wetland Rehabilitation in South Africa. Water Research Commission Project (Report No: TT 336/08).
- Water Research Commission (WRC). 2008f. WET- Health – A Technique for Rapidly Assessing Wetland Health (TT 340/08) WET- Rehabilitation Methods – National Guidelines and Methods for Wetland Rehabilitation. Water Research Commission Project (Report No: TT 341/08).

## ***Rehabilitation Management Guidelines for Water Resources***

Water Research Commission (WRC). 2008g. WET- Legal – Wetland Rehabilitation and the Law in South Africa. Water Research Commission (Report No: TT 338/08).

Water Research Commission (WRC). 2015. Managing Estuaries in South Africa: A Step by Step Guide. Water Research Commission Project (WRC Report No. TT 243/04).

Water Research Commission (WRC). 2016a. The Development of a Comprehensive Manual for River Rehabilitation in South Africa. Water Research Commission Project (WRC Report No. TT 646/15).

Water Research Commission (WRC). 2016b. Wetland Rehabilitation in Mining Landscapes: An Introductory Guide. Water Research Commission Project (WRC Report No. TT 658/16).

Water Research Commission (WRC). 2017. Buffer Zone Guidelines for Rivers, Wetlands and Estuaries. Water Research Commission Project (WRC Report No. TT 715-1-17).

Water Research Commission (WRC). 2019. WET- Rehab Evaluate – An Integrated Monitoring and Evaluation Framework to assess wetland rehabilitation in South Africa. Water Research Commission Project (Report No: 2344/1/19).

Water Research Commission (WRC). 2020. WET- Health – A refined suite of tools for assessing the present ecological state of wetland ecosystems – Technical Guide. Water Research Commission Project (Report No: TT 820/20).

Water Research Commission (WRC). 2021. WET- EcoServices – A technique for rapidly assessing ecosystem services supplied by wetlands and riparian areas. Water Research Commission Project (Report No: 2737/1/21).

Working for Wetland Programme. 2016. Rehabilitation Plan for the Hogsback Wetland Project, Eastern Cape: Planning Year 2016/2017. Prepared by Jenny Youthed, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11198.

Working for Wetland Programme. 2017a. Rehabilitation Plan for the Maluti–A-Phofung Wetland Project, Western Cape: Planning Year 2016/2017. Prepared by Jacques Pretorius and Franci Gresse, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11199.

Working for Wetland Programme. 2017b. Rehabilitation Plan for the Gauteng North Wetland Project, Gauteng: Planning Year 2016/2017. Prepared by Zoë Palmer and Franci Gresse, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11200.

## ***Rehabilitation Management Guidelines for Water Resources***

Working for Wetland Programme. 2017c. Rehabilitation Plan for the Sekhukhune Wetland Project, Limpopo: Planning Year 2016/2017. Prepared by Franci Gresse, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11201.

Working for Wetland Programme. 2017d. Rehabilitation Plan for the Kruger National Park Wetland Project, Western Cape: Planning Year 2016/2017. Prepared by Franci Gresse, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11246.

Working for Wetland Programme. 2017e. Rehabilitation Plan for the Steenkampsberg Wetland Project, Mpumalanga: Planning Year 2016/2017. Prepared by Kelly Rautenbach and Margaret Lowies, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11203.

Working for Wetland Programme. 2017f. Rehabilitation Plan for the Mapungubwe National Park Project, Limpopo Province: Planning Year 2016/2017. Prepared by Zoë Palmer and Franci Gresse, Aurecon South Africa (Pty) Ltd as part of the planning phase for the Working for Wetlands Rehabilitation Programme. Report No. 113223/11245.

## **ANNEXURE A**

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### **1. PREVIOUS AND CURRENT STUDIES**

#### ***1.1 Integrated River Management, Sabie-Sand Catchment (2003)***

**Van Wilgen et al. (2003)** investigated the coordination of upstream and downstream activities relating to river and catchment management that were negatively affected by overutilization due to population growth and distribution, changes in land use along the rivers, invasive alien plants and global climate change which led to water scarcity, land degradation, siltation of canals and affected riparian zone health. At the time this study was conducted, the main activities that imposed pressure on the rivers included forestry, agriculture, tourism, municipal activity and industrialisation. The study resulted in the development, description and communication of principles and processes that support effective, integrated and cooperative participation in river management. To date, the study promoted the following:

- Collaborative research, diverse knowledge sources and partnership between the Kruger National Park Rivers Research Programme and communities and staff from the DWS Working for Water (WfW) programme to coordinate upstream and downstream activities relating to river and catchment management.

#### ***1.2 River Rehabilitation: Literature Review, Case Studies and Emerging Principles (2003)***

**Water Research Commission (WRC) (2003)** assessed literature in the field of river rehabilitation around the world and elsewhere to draw lessons and best management practices. The study dealt on physical aspects of river degradation and rehabilitation thereof, whilst acknowledging that many other aspects, such as water chemistry and the legislative framework would have to be addressed as part of a comprehensive river rehabilitation strategy. There was also a completion of river-response case studies on three (3) Western Cape Rivers where active river management was underway and entailed local rehabilitation efforts, alien species clearance by Working for Water and flood control measures. The first draft of geomorphological and ecological principles for river rehabilitation was also derived as part of this study.

#### ***1.3 Development of River Rehabilitation in Australia: Lessons for South Africa (2003)***

**WRC (2003)** assessed literature in the field of river rehabilitation in Australia and around the world, to ascertain the links between South African water resource management and the international field of river rehabilitation. The purpose of the study was to draw knowledge in the field of river rehabilitation. The study revealed a number of programmes and projects that could link to and support the development of a standardised and scientifically founded

## ***Rehabilitation Management Guidelines for Water Resources***

approach to river rehabilitation in the country. The initiatives included the South African River Health Programme, Working for Water, Mondi Wetlands Programme, Development of Geomorphological and Ecological Principles for River Rehabilitation Project, Cape Metropolitan Council Project and the Indigenous People's Knowledge Programme. The below are a few of the recommended future directions in terms of river rehabilitation presented as a way forward for the study:

- Australian river rehabilitation process and related methodologies must be adopted, adapted and trialled on a number of different river types in South Africa as a first step towards the development of guidelines for rehabilitation;
- The links between the generic processes of RDM and River Rehabilitation were emphasised and means of developing and building on these linkages were recommended for investigation; and
- A review of national-level legislation on river rehabilitation and conflicts between different national acts, and between acts and regional/local-level laws which are implemented by authorities must be investigated; and
- Clarification on the interface between national level and local-authority level jurisdictions.

### ***1.4 Restoring Urban Rivers from their Source to the Sea (2005)***

***The Wildlife and Environment Society of South Africa (WESS)*** conducted a study in 2005 in the Zandvlei Catchment. The aim of the study was to restore urban rivers that are of importance to supporting the natural processes such as flood prevention, waste decomposition and soil generation, all which we are dependent on for survival. It was found that an integrated approach is necessary to promote coherence within government and between government and non-government collaborations.

### ***1.5 Consultative Project to Situate, Contextualise and Plan for a Water Rehabilitation Program (2004)***

**WRC (2004)** conducted a study and followed a consultative approach with the aim to address the apparent lack of synergy and information-sharing in the field of rehabilitation and to provide relevant contact information to groups requiring assistance in rehabilitation projects. The outcomes of this project revealed that there was an urgent need to implement integrated approaches to terrestrial, wetland, river and estuarine rehabilitation, investing energy and resources in the development of a central programme (or aquatic ecosystem) rehabilitation, focussed cooperative governance, the creation of structures to enable practical linkage of relevant programmes and processes and information and expertise sharing (both national and

international). The initiation of pilot rehabilitation projects at a catchment or sub-catchment scale for addressing all ecosystems was also recommended.

### **1.6 Managing Estuaries in South Africa: A Step by Step Guide (2005)**

WRC (2005) developed a guide to assist in management of the activities associated with estuaries so as to improve co-operative use and reduce the conflict that results from competing uses. The guide makes reference to the case study of the Mdloti Estuary that required significant rehabilitation due to inappropriate development and flooding. As with general estuarine management, rehabilitation was undertaken within a legal and management framework. The guide explicitly stated that no such framework existed for estuarine rehabilitation at the time the rehabilitation intervention was undertaken and general guidance in this regard was derived from a range of legislation. The guide further provides a summarized step by step plan which was aimed at assisting water managers in developing a rehabilitation plan at the local estuary scale.

### **1.7 State of River Report: Greater Town's Rivers (2005)**

The report was compiled to provide the status of the rivers in the greater Cape Town Province. This report identified and addressed amongst others, impacts relating to flood management, water quality impacts, sedimentation, and erosion. The report revealed that generally, only a few of the upper reaches of the rivers area were still in a natural or good ecological state. The development in the lowland areas had modified the rivers and resulted in their poor ecological state. There were also significant stretches of most rivers that were canalised, had poor water quality, modified flows and abundant alien fish and plant life. The report also highlighted that the Diep, Hout Bay and Keyzers Rivers were upgraded. Bank rehabilitation of Kuils River and the improvement of Moddergat River, flood control measures in Silvermine River and restoration of Rondevlei wetland were also undertaken.

### **1.8 Guideline to the Wetland Management Series (2007-2008)**

WRC (2007; 2008) developed integrated tools (guidelines) for assisting users to achieve well-informed and effective wetland management and rehabilitation of wetlands. The guidelines emanate from the Wetlands Research Programme project titled Wetland Rehabilitation (WRC Project No. K5/1408). The series of wetland management and rehabilitation tools comprise of the following guidelines:

- **WET-Road Map (Report No: TT321/07)** provides a brief outline of the documents and tools in the WET-Management series and describes how they inter-relate. It also provides an index to the wetland rehabilitation tools
- **WET-Origins (Report No: TT335/08)** describes the geological and geomorphological

processes that give rise to wetlands, and provides a background description of the geology, geomorphology, climate and drainage of southern Africa.

- **WET-Management Review (Report No: TT335/08)** guides in providing an assessment of effectiveness at programme level, including a national overview of land-uses affecting the status of wetlands and the institutional environment that affects wetlands.
- **WET-Rehabilitation Plan (Report No: TT336/08)** offers a process that can be followed to develop comprehensive wetland rehabilitation plans.
- **WET- Prioritise (Report No: TT 337/08)** helps to identify where rehabilitation should take place once the objectives of rehabilitation are identified. It works at three spatial levels. At national and provincial levels, an interactive GIS modelling tool assists in identifying priority catchments by evaluating a range of scenarios based on different combinations of 13 socio-economic and bio-physical criteria.
- **WET-Legal (Report No: TT 338/08)** presents South African legislation that is relevant to wetland rehabilitation, including the Conservation of Agricultural Resources Act (CARA), National Environmental Management Act (NEMA), and National Water Act (NWA), as well as relevant international agreements such as the Ramsar Convention on Wetlands.
- **WET- Eco Services (Report No: TT 339/08)** used as a tool to assess the goods and services that individual wetlands provide, thereby aiding informed planning and decision making. It is designed for a class of wetlands known as palustrine wetlands (i.e. marshes, floodplains, vleis or seeps). The tool provides guidelines for scoring the importance of a wetland in delivering each of 15 different ecosystem services.
- **WET- Health (Report No: TT 341/08)** assists in assessing the health of wetlands using indicators based on geomorphology, hydrology and vegetation.
- **WET-Rehabilitation Evaluate (Report No: TT 342/08)** used to evaluate the success of rehabilitation projects, and is designed with the understanding that monitoring and evaluation are closely tied to planning, which, in turn, should accommodate monitoring and evaluation elements.
- **WET-Outcome Evaluate (Report No: TT 343/08)** evaluates rehabilitation outcomes at six wetland sites in South Africa, including an evaluation of the economic value of rehabilitation.

### **1.9 Umzimvubu River Catchment Restoration of Local Ecosystem Services (2011)**

Conservation South Africa and Environmental and Rural Solutions undertook a study in the uMzimvubu catchment covering an area which is more than two (2) million hectares within the

Eastern Cape and nearly 70% of the land on which it is located is communally owned. The river system was identified as a priority river because it was regarded as one of the few “near-natural rivers” and was classified as being vulnerable due to rapid rates of degradation in the watershed, presence of alien plants, population growth, increased economic activity and intensification of land use practices. This study was therefore conducted to address the abovementioned impacts and challenges. Since the project is currently in Phase 1 of its implementation, no lessons learned have been identified which can be elaborated on. No reference is made to lessons learned in the literature as well.

### **1.10 Controlling Invasive Alien Species from Rondegat River Ecosystem (2013)**

**Impson et al. (2013)** conducted a study for implementing the simultaneous clearing of invasive alien trees and predatory alien fish from a degraded but ecologically important river ecosystem in the Cederberg region of the Western Cape Province. The aim of this ‘coordinated and pioneering alien species control project’ was to restore the native biodiversity of the Rondegat River. The river was regarded as nationally important and had become subject to the invasion of alien species and fish. To address this problem, from 2010 to 2012, dense infestations of the invasive species were cleared from the riparian zone. The clearing took place in the lower reaches of the river and was followed up by the eradication of the smallmouth bass using pesticide rotenone (a commonly used pesticide to eradicate fish populations).

### **1.11 Draft Environmental Rehabilitation Policy (2014)**

During 2014, the Department of Water and Sanitation developed a draft policy to lay the foundation and clarify the approach for the DWS to implement, regulate and facilitate Environmental Rehabilitation within its mandate as custodian authority over water resources and the NWA. The policy was formulated to address other types of environmental rehabilitation which were not previously covered by the DWS. The policy further highlighted that the NWRS 2 and NWA do not refer specifically to environmental rehabilitation but rather the NWA principle to protect, use, develop, conserve, manage and control water resources by implication means that environmental rehabilitation must be implemented as a given considering the words protection and conservation in the NWA. It listed other forms of environmental rehabilitation types also exist in South Africa that directly reflect and impacts on the DWS as custodian and that must be addressed via inter alia DWS Environmental Rehabilitation Policy. These include:

- Rehabilitation of all characteristics of watercourses which include flow drivers in the landscape, namely surface flows, interflows, groundwater flows, water quality and

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geomorphology and responses like habitat and biota;

- Riparian habitat rehabilitation and preparation of Plant Species Plans for dams, weirs, gauging weirs and other water resource development;
- Dam shoreline rehabilitation. Erosion control and Plant Species Plans for habitat creation;
- Demolishing of unused dams and weirs for ecological and economic gain;
- Including of fishways/ladders and fish lifts at old and new DWS structures. Monitoring and maintenance thereof;
- Fish composition rehabilitation - managing illegal fishing and exotic fish on a large scale;
- DWS mine rehabilitation with Department of Mineral Resources (DMR). Making rock, clay and sand mines, quarries and borrow areas safe and ecologically and socially acceptable. Techniques to inter alia include blasting/ shaping to 1:3 or flatter slopes, rock, topsoil, indigenous vegetation protection via Plant Species Plans;
- River rehabilitation. Including land buy-outs to safeguard watercourses next to/ up-stream of National Parks as priority protected areas;
- Restoring ecological connectivity;
- Large scale water quality management on a catchment level must be implemented and specifically refers to rehabilitation of sewage water treatment works;
- Making provision for ecological flow releases downstream of problematic dam/ weir structures;
- To better address flood attenuation that inter alia includes floodplain restoration, designing of man-made wetlands and bio-attenuation ponds;
- Rehabilitating floodlines
- Rehabilitating WWTW.
- Rehabilitating mines especially sand mines and AMD.
- Rehabilitating sedimentation in dams, weirs, lakes.

### ***1.12 Prioritizing Catchments for Wetland Rehabilitation Planning at a National Level (2015)***

**Macfarlane and Atkinson (2015)** initiated a study in order to support Working for Wetlands in achieving its mandate which is to rehabilitate damaged wetlands and to protect pristine wetlands throughout South Africa, with an emphasis on complying with the principles of the Expanded Public Works Programme (EPWP) and using only local Small, Medium and Micro Enterprises (SMMEs). The study undertook an initial prioritization of areas for wetland rehabilitation on a national scale based on the opportunity and need for rehabilitation whilst

also taking socio-economic factors and opportunities for partnership with other organizations into account.

### **1.13 The Development of a Comprehensive Manual for River Rehabilitation (2016)**

**WRC (2016)** developed river rehabilitation manual aimed at providing clear and practical guidelines for the implementation of a wide range of rehabilitation and remediation activities that were of relevance to South Africa. The guidelines took cognisance of legal, social, economic and ecological issues and aspects that affect river management options and opportunities. The manual comprises of three volumes, *viz* **(i) Guideline** for Rehabilitation interventions, **(ii) Technical Manual** for undertaking rehabilitation actions and **(iii)** a series of **Case Studies** which provides practical, documented examples of rehabilitation options.

### **1.14 Wetland Rehabilitation in Mining Landscapes: An Introductory Guide (2016)**

**WRC (2016)** developed an introductory guide that is specific to wetland rehabilitation in *mining landscapes* through consolidation of existing guidelines, knowledge and experience in wetland rehabilitation. This introductory guide aims to promote the standardised application of tools in wetland rehabilitation and improve clarity with respect to wetland rehabilitation planning, design and implementation in mining landscapes. The guide is intended to provide appropriate practical and strategic approaches to wetland rehabilitation, and to support the development of wetland rehabilitation and management commitments and license conditions that are realistic, achievable and can be monitored. The guide was structured to provide users with the core principles that should inform planning and decision-making at different phases of wetland rehabilitation, namely planning, implementation, and monitoring and long-term management phases. Key elements integral to wetland rehabilitation in each phase are summarised in easy-reference checklists that help users ensure that the guidelines provided in this document are adhered to. The study further makes recommendations on well planned and implemented wetland rehabilitation to avoid a range of risks for proponents, government and affected communities and ensure compliance with environmental legislative provisions and authorisation requirements.

### **1.15 Rehabilitation Plan as part of the Working for Wetlands Programme (2017)**

Wetland Rehabilitation Projects for the 2016/2017 planning cycle were identified during the Phase 1 activities associated with the Working for Wetlands (WfWet) Programme and conducted by Aurecon South Africa (Pty) Ltd on behalf of the formerly Department of Environmental Affairs: Natural Resource Management. These projects were informed by the catchment and wetland prioritisation assessment studies undertaken by Macfarlane *et al.* 2015 whereby the objective was to identify priority catchments and associated wetlands within

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which rehabilitation work needed to be completed. A review was undertaken to determine local knowledge and identify existing studies of the quaternary catchments in each province. The programme's five year strategic plans were further used as a guide to identify wetlands, as well as data from the National Freshwater Ecosystem Priority Areas (NFEPA) project. Decisions on priority areas were informed by input from wetland forums, biodiversity/conservation plans, municipalities, state departments and various other stakeholders. To date, the following wetlands have been rehabilitated in each province:

- Hogsback Wetland Project - Eastern Cape Province;
- Sterkfontein, Ararat, Boschkloof and Monontsha wetland systems of the Maluti–A-Phofung - Free State Province;
- Tweefontein and Enkangala wetlands of the North of Gauteng Province;
- Kruger National Park, Mapungubwe National Park and Sekhukhune wetlands - Limpopo Province; and
- Steenkampsberg and Wakkerstroom wetlands, Mpumalanga

### ***1.16 Resilient Cities Pilot Project: Community Based Interventions to Improve River Health, (2017)***

Many rivers in the eThekweni Municipal Area are under stress due to invasive alien plants, waste pollution and sewage spills. These are regarded as threats to human health and the environment. To address this problem, eThekweni Municipality commissioned a pilot project on a 5.8 km stretch of the Aller River and other selected rivers. The objective of the project was to restore river health through assessments, rehabilitation, various restoration strategies and resource mobilisation. Significant progress was made in the clearing and reduction of alien plants and waste in the section of the Aller River. There was an improvement sharing information on the status quo updates and incident reports (i.e. sewage spills) to stakeholders, project managers and relevant municipal departments such as the eThekweni Water and Sanitation Pollution control unit.

### ***1.17 Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (2017)***

**WRC (2017)** developed guidelines aimed to determine appropriate buffer zones for rivers, wetlands and estuaries. The guidelines are divided into two parts as follows:

- **Part 1: Technical Manual** provides the step-wise assessment procedure developed to determine appropriate buffer zones. This includes the rationale for the approach taken, together with important supporting technical information which was used as a basis for developing the tools for buffer zone determination;
- **Part 2: Practical Guide** aims to assist users with the practical application of the Buffer

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Zone Tools. It includes field sheets and practical guidance for collecting and interpreting relevant desktop and field information. Supporting information required to assess selected criteria has also been compiled, and includes a range of spatial datasets.

### ***1.18 Draft Wetland Management Guidelines within South African Municipalities (2018)***

**Eco Pulse Environmental Consulting (2018)** conducted a project aimed at the protection of priority natural wetland resources, thus enabling the supply of ecosystem services and promoting resilient communities under a changing climate within South Africa. The project was funded by the United States Agency for International Development (USAID) and implemented by **ICLEI – Local Governments for Sustainability**. The project is currently being implemented in nine (9) district and two (2) metropolitan municipalities across the country. **The project also produced draft guidelines which are a component of a series of project outputs designed to support municipalities** with improving wetland management going forward.

### ***1.19 Draft Provincial Strategic Plan: 2019 – 2024 (DFFE, 2019)***

The Provincial Strategic Plans for the WfWet programme are plans which have been compiled in support of the WfWet mandate to achieve strategic objectives related to the conservation of wetlands and poverty alleviation. WfWet is undergoing a strategic shift from focusing on heavily degraded wetland systems to lightly degraded ones. This will enable the programme to achieve a wider footprint with less complex, “softer” and cheaper interventions. The draft plans have been completed to date for Gauteng, North-West, Western Cape, Northern Cape, Eastern Cape and Limpopo Province. Previous statistics (2005-2018) from the plans reveal that approximately 1 500 wetlands (about 68 000 ha) are currently under rehabilitation with a target of 61 900 wetlands to be rehabilitated by 2030. Approximately R1.1 billion has been spent with an average of R 730 000 spend per wetland and about 33 000 jobs created for poverty alleviation and skills development.

### ***1.20 Policy-Based Research on Groundwater Management and Use in South Africa (2020)***

The Specialist Unit: Water Services Strategy & Evaluation (former Directorate: Policy) within the DWS embarked on a research with the primary purpose to conduct a systematic search and mapping of all available policy and regulatory tools for groundwater management and use in South Africa. A review of local and international (Denmark, Australia and California) literature on groundwater management and use was undertaken to identify gaps from the identified literature and highlight lessons on how the gaps are addressed in other parts of the world. The research makes the following recommendation relating to rehabilitation: “There is

a need to develop a regulation governing rehabilitation of boreholes that are no longer in use as such boreholes tend to become a point source of pollution for underground water during rainfall seasons”.

## **2. PROGRAMMES AND INITIATIVES**

### **2.1 Working for Water**

Working for Water (WfW) is programme that was launched in 1995 and administered previously through the Department of Water Affairs and Forestry. This programme works in partnership with local communities, to whom it provides jobs. WfW currently runs over 300 projects in all nine of South Africa’s provinces with the aim of improving water supply by clearing alien invasive species from river basins using a range of methods that include mechanical and chemical methods as well as biological and integrated controls.

### **2.2 Working for Wetland**

Working for Wetlands (WfWet) is a joint initiative of the Department of Environment, Forestry and Fisheries (DFFE) and DWS. WfWet pursues its mandate of wetland rehabilitation and wise use in a manner that maximises employment creation, supports small emerging businesses, and transfers skills to its beneficiaries. In line with EPWP norms, the programme targets those groups most excluded from the mainstream economy, with particular emphasis on women, youth and people with disabilities. WfWet is based on key interlinked concepts that ensure effective and sustainable wetland rehabilitation through Wetland Protection, Wise Use and Rehabilitation, Skills and Capacity Development, Co-operative Governance and Partnerships, Knowledge Sharing and Communication as well as Education and Public Awareness.

### **2.3 South African National Biodiversity (SANBI) - Freshwater Programme**

The Freshwater programme is a South African National Biodiversity (SANBI) initiative which recognises the value and threatened status of South Africa’s freshwater biodiversity, and the need to build competence and leadership in this area. Initiatives falling within the Freshwater Programme to date include Working for Wetlands, which focus on the rehabilitation, protection and sustainable use of wetlands, National Wetland Inventory, which is involved in mapping the extent, distribution and diversity of freshwater ecosystems and National Freshwater Ecosystem Priority Areas project (NFEPAs), which aims to identify a national network of freshwater conservation areas and to explore institutional mechanisms for their implementation.

#### ***2.4 LandCare Programme***

LandCare Programme is a national government-supported community-based initiative, driven by both the public and private sectors through partnerships and cooperation. It seeks to conserve natural resources, use them in a sustainable way, create a conservation ethic through education and awareness, create jobs and address poverty by launching various natural resource rehabilitation, improvement and conservation projects. Through its efforts, the programme has identified serious concerns about land and water degradation in each province and specific projects address these issues. The projects are implemented through the LandCare Conditional Grant, whereby ring-fenced funding is transferred to provinces. Four sub-programmes, namely WaterCare, VeldCare, SoilCare and JuniorCare are all part of the programme.

#### ***2.5 Mondi Wetlands Programme***

Mondi Wetlands Project (MWP) was established by Wildlife and Environment Society of South Africa and World Wide Fund (WWF). The MWP's mission is to work towards the social change required to improve wetland sustainability practices. Improved wise use of communal wetlands in rural tribal areas through raised awareness (wetlands through the generation of publicity on wetland importance, topical wetland issues, their rehabilitation, sustainable utilization and management), increased capacity and competence, establishment of wetland governance structures, and implementation of better management practices.