

ANNEXURE 6: POLICY REVIEW

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REPORT

Current status of groundwater policy and governance in
South Africa with a focus on the role of local partners to
support local groundwater resource management: DRAFT
Final Report

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OneWorld Sustainable Investments
5th Floor, The Hudson
30 Hudson Street
Cape Town 8001
South Africa
www.oneworldgroup.co.za

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PROJECT BACKGROUND

This project has been commissioned by WWF South Africa and is intended to support and further facilitate **WWF South Africa's work towards sustainable groundwater governance of the Table Mountain Strategic Water Source Area (TMSWSA)**. As such, this report provides an overview of the current groundwater situation within the TMSWSA, particularly in terms of the policy requirements, governance structures and mandates associated with groundwater management and the TMSWSA. In addition, this report provides a gap analysis, and recommendations on how to address the current challenges and future significance of groundwater to make use of opportunities for the use, protection, and augmentation of groundwater resources within the City of Cape Town area.

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Details of Submitting Organisation

Name and email address of the Lead consultant	Belynda Petrie belynda@oneworldgroup.co.za
Name of organisation	OneWorld Sustainable Investments (Pty) Ltd
Type of organisation	Private, For-Profit Company
Tax Reference Number	9542235149
Postal address	PO Box 1777
Postal code	8001
City	Cape Town
Country	South Africa
Phone	+27 (0)21 286 9000
Organisation website	www.oneworldgroup.co.za
Name and email address of contact person if not the PI	Pippa Tsilik Email: pippa@oneworldgroup.co.za
Prepared for	World Wide Fund for Nature, South Africa 1st Floor, Bridge House Boundary Terraces Mariendahl Lane Newlands, Cape Town By email: Kschacht@wwf.org.za Cc: MNel@wwf.org.za



Contents

<i>Table of figures</i>	<i>viii</i>
<i>Table of tables</i>	<i>viii</i>
<i>Abbreviations and acronyms</i>	<i>ix</i>
Executive Summary	1
Introduction	5
<i>Overview</i>	<i>5</i>
<i>Project context</i>	<i>5</i>
<i>Key assumptions and limitations</i>	<i>6</i>
Part A Partnership Framework	8
A1 Benchmarking and best practice	8
<i>A1.1 Southern Africa</i>	<i>8</i>
<i>A1.2 Western Australia</i>	<i>14</i>
<i>A1.3 California</i>	<i>14</i>
<i>A1.4 Benchmarking and performance indicators for a Water Conservation and Demand Management (WCDM) Strategy</i>	<i>16</i>
A2 Key role players within the TMSWSA	21
<i>A2.1 Introduction</i>	<i>21</i>
<i>A2.2 Provincial and Local Government</i>	<i>22</i>
<i>A2.3 Catchment Management Bodies</i>	<i>23</i>
<i>A2.4 Water Users</i>	<i>26</i>
<i>A2.5 Multi-stakeholder institutions</i>	<i>27</i>
<i>A2.6 Research institutions</i>	<i>27</i>
<i>A2.7 Section 21 entities /NPOs</i>	<i>28</i>
<i>A2.8 City Improvement Districts</i>	<i>28</i>
<i>A2.9 Airports Company of South Africa</i>	<i>28</i>
A3 A framework for the Partnership	29
<i>A3.1 An emerging framework for the Partnership</i>	<i>29</i>
<i>A3.2 Purpose, governance, and core principles</i>	<i>30</i>
<i>A3.3 Characteristics and profile of the Secretariat</i>	<i>30</i>
<i>A3.4 Evolution of the TMSWSA Partnership</i>	<i>31</i>
<i>A3.5 Essential roles, responsibilities and actors</i>	<i>32</i>
<i>A3.6 Recommendations and way forward</i>	<i>34</i>
<i>A3.7 Proposed next steps and activities</i>	<i>35</i>

Part B Situation Analysis	36
B1 Background: TMSWSA, water supply, groundwater, ecological & cultural value	36
<i>B1.1 Introduction</i>	36
<i>B1.2 Table Mountain Strategic Water Source Area</i>	37
<i>B1.3 Table Mountain Group Aquifer</i>	39
<i>B1.4 Cape Flats Aquifer</i>	39
<i>B1.5 Groundwater exploration</i>	40
<i>B1.6 Ecological and cultural value</i>	40
B2 Key policy and legislation	45
<i>B2.1 Summary of key policy and legislation</i>	45
<i>B2.2 Land-use activities and the associated policy mechanisms</i>	51
B3 IWRM Institutional arrangements and mandates	54
<i>B3.1 Perspectives on governance</i>	54
<i>B3.2 Integrated Water Resource Management in South Africa</i>	55
B4 Groundwater-related governance, regulations and activities	62
<i>B4.1 Introduction</i>	62
<i>B 4.2 Monitoring of ground water resources</i>	64
<i>B4.3. Water demand and forecasting</i>	66
<i>B4.4. Managed Aquifer Recharge</i>	66
<i>B4.5. Environmental management</i>	68
<i>B4.6. Managing Invasive Alien Species</i>	69
5	71
References	71

Table of figures

FIGURE 1: CRITICAL ELEMENTS OF GOOD GOVERNANCE	10
FIGURE 2: STAGES OF CAPACITY BUILDING (DWAf, 2004B)	18
FIGURE 3: HOW BEHAVIOUR CHANGE IS ACHIEVED THROUGH AWARENESS AND EDUCATION (DEPARTMENT OF WATER AFFAIRS AND FORESTRY, 2004)	19
FIGURE 4: PHOTOGRAPHS OF THE CLEAN-UP IN GUGULETHU (PHOTO CREDIT: REV. RACHEL MASH)	20
FIGURE 5: AN EXAMPLE OF A POSTER THAT WAS SUBMITTED FOR THE COMPETITION (PROVIDED BY DAMIEN HEWITT)	21
FIGURE 6: HOW CAPE TOWN'S WATER RESOURCE RELIANCE IS ANTICIPATED TO SHIFT FROM 2021 2040	10 23
FIGURE 7: CONCEPTUAL DIAGRAM ILLUSTRATING A PROCESS TO ESTABLISH A CATCHMENT MANAGEMENT FORUM	26
FIGURE 8: AN EMERGING FRAMEWORK FOR THE PARTNERSHIP	29
FIGURE 9: AN INCREMENTAL APPROACH TO DEVELOPING THE PARTNERSHIP	31
FIGURE 10: EXTENT OF THE TMSWSA, INCLUDING CONSIDERATION OF INDIVIDUAL SOURCE AREAS	38
FIGURE 11: TABLE MOUNTAIN STRATEGIC WATER SOURCE AREA BOUNDARY	39
FIGURE 12: GROUNDWATER RECHARGE, VULNERABILITY AND EXPLOITATION POTENTIAL FOR THE WESTERN CAPE	40
FIGURE 13: LOCATION OF SENSITIVE TERRESTRIAL AND AQUATIC ECOSYSTEMS RELATIVE TO THE TMSWSA	42
FIGURE 14: STATUS OF FISH SPECIES IN THE CATCHMENTS OF THE TMSWSA	43
FIGURE 15: PRESENT ECOLOGICAL STATUS OF WETLANDS AND RIVERS	44
FIGURE 16: CONCEPTUALISATION OF WATER INSTITUTIONAL ARRANGEMENTS	58
FIGURE 17: PROPOSED GROUNDWATER GOVERNANCE FRAMEWORK	62

Table of tables

TABLE 1: CORE FUNCTIONS AND INSTITUTIONAL MAPPING	33
TABLE 2: SUMMARY OF NATIONAL AND LOCAL POLICY AND LEGISLATION RELEVANT TO WATER GOVERNANCE OF THE RESOURCE AND ASSOCIATED INFRASTRUCTURE	45
TABLE 3: SUMMARY OF LAND USE THEMES THAT ARE DIRECTLY OR INDIRECTLY LINKED TO GROUNDWATER GOVERNANCE, AND THE KEY POLICY AND LEGISLATION RELATED TO THESE ACTIVITIES	51
TABLE 4: OVERARCHING RESPONSIBILITIES OF THE THREE SPHERES OF GOVERNMENT	55
TABLE 5: SUMMARY OF GOVERNANCE AND MANAGEMENT ROLES OF WATER INSTITUTIONS, RELEVANT IN THE CAPE TOWN CONTEXT	59
TABLE : APPLICATIONS OF MANAGED AQUIFER RECHARGE, (MURRAY ET AL., 2006).....	67
TABLE : HIGH-LEVEL INSTITUTIONAL ARRANGEMENTS ASSOCIATED WITH PERMITS/LICENSES THROUGH NATIONAL ENVIRONMENTAL MANAGEMENT ACT AND NATIONAL WATER ACT	68

Abbreviations and acronyms

CMA	Catchment Management Agency
CMC	Catchment Management Committee
CMF	Catchment Management Forum
CoCT	City of Cape Town
COGTA	Department of Cooperative Governance and Traditional Affairs
CSIR	Council for Scientific and Industrial Research
CWF	California Water Foundation
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
GA	General Authorisation
GCTWF	Greater Cape Town Water Fund
IWRM	Integrated Water Resource Management
MAR	Managed Aquifer Recharge
MEL	Monitoring, Evaluation and Learning
NGS	National Groundwater Strategy 2016
NICRO	South African National Institute for Crime Prevention and the Reintegration of Offenders
NWA	National Water Act 36 of 1998
OECD	Organisation for Economic Co-operation and Development
PSGQM	Policy and Strategy for Groundwater Quality Management in South Africa 2000
SALGA	South African Local Government Association
SANBI	South African Biodiversity Institute
SPLUMA	Spatial Planning and Land-use Management Act 16 of 2013
SWSA	Strategic Water Source Area
TMSWSA	Table Mountain Strategic Water Source Area
TNC	The Nature Conservancy
WARMS	Water-use Authorization and Registration Management System
WCDM	Water Conservation and Demand Management
WCWSS	Western Cape Water Supply System
WESSA	Wildlife and Environment Society of South Africa
WRAC	Water Resilience Advisory Committee
WRC	Water Research Commission
WSA	Water Services Authority
WSI	Water Service Institute
WSP	Water Service Provider
WUA	Water User Association
WULA	Water Use Licence Authorisation

Executive Summary

Water governance should be considered a priority for development as it is intimately linked to many other pressing development issues such as poverty alleviation, health and well-being. It should be inclusive and coordinated across sectors and scales. The City of Cape Town (CoCT)'s 2016-2018 drought and its 'Day Zero' event in April 2018 (as well as the 2010 drought), have highlighted the importance of water governance in this region, following widespread installation of boreholes during the latter part of the 2016-2018 drought. However, the groundwater governance arrangements for the Table Mountain Strategic Water Source Area (TMSWSA) are unclear. Importantly, the Table Mountain Group Aquifer straddles the Breede-Gouritz WMA that is managed by the BGCMA, and the Berg-Olifants WMA managed by the National DWS. The CMA functions have not been fully delegated, thus limiting the contribution they can make to good water governance within the WMAs. In addition, local level management via WUAs has been limited, further contributing to poor groundwater management.

Further, as demonstrated by the unregulated borehole drilling that took place during Cape Town's drought, groundwater governance is not currently able to support a sustainable groundwater-oriented water strategy. Whilst there is a requirement for private individuals and industries to declare and license their abstraction points to allow for monitoring of groundwater resources, there appears to be no enforcement or consequences for those who do not do so.

To achieve sustainable use of groundwater resources, it is critical to understand and control the quantities abstracted and manage the external environment, along with numerous other factors. Following the drought, a CoCT strategy was launched to augment the Western Cape Water Supply System with a variety of sources, including desalination, increased, but limited expansion of reliance on groundwater resources (noting concerns of over-exploitation and contamination), reuse, and a reduction in reliance on surface water. Whilst groundwater exploitation potential is high, so is groundwater vulnerability, indicating that careful management of all parts of the water system is required to prevent overextraction and pollution. It is also important to understand the strongly interrelated nature of surface water and groundwater, to prevent a reduction in groundwater quality.

Sustainable usage of the Table Mountain Aquifer water, based off sound geological surveys, is necessary to allow water to be abstracted without causing the aquifer to drain beyond its recharge capacity, providing valuable water resources for Capetonians, without disrupting important ecological processes. In addition, the ecological value of the TMSWSA is also under threat (e.g. from the presence of invasive species), and surface biological conservation efforts will not be successful if groundwater quality and availability is not well managed.

All of the above suggests the overriding need for a clear governance framework and strategy to steer bring together the multiple stakeholders and cement a partnership between the key role players, which will be able to drive the necessary groundwater resilience in the TMSWSA, while protecting and enhancing this important strategic water source area.

Gaps in management and governance of water resources

There are several gaps in the management and governance of water resources:

- **Monitoring of the groundwater resource** from abstraction points/ enforcement of the requirement to report – as noted above
- **Establishment of Catchment Management Agencies (CMAs)** - CMAs are meant to be created by the CoCT to bring together stakeholders for the purpose of building partnerships and networks and



promoting consensus on water management issues in an empowering, democratic and transparent manner. This has not been done in the City (as is the case in most parts of the country), and hence there are key gaps in stakeholder engagement.

- **Forecasting water demand:** CMAs are meant to be involved in the process of forecasting water demand. Given that the CMAs have not been established, this is not taking place in an inclusive manner with all stakeholders concerned. Sustainable water resource management requires accurate and inclusive forecasting to prevent over- or under-preparedness.
- **The role of Water Service Institutions (WSIs) being the key institutions in water services provisioning in South Africa (Water Boards, Water Services Authorities (WSAs), and Water Service Providers (WSPs)) – The Department of Water and Sanitation (DWS) has taken care to guide WSIs on benchmarking and performance monitoring systems that are auditable, however there don't appear to be any steps taken to ensure that auditing takes place.**
 - WSIs appear to be responsible for **ensuring capacity building**. However, it would certainly also be useful to provide capacity building information for higher level institutions as well. WSIs have an important role to play in the physical distribution of water resources, but there are undoubtedly departments in the local government, DWS regional office, etc., that could greatly benefit from capacity building initiatives; for example, in setting up clear and consistent CMAs.
- **Water boards and monitoring water quality** - Whilst Water Boards are mandated to follow national guidelines for the water they supply, there appears to be *no mandate for them to follow standards, policies and by-laws created by the regional DWS office*. Although there do not currently appear to be any significant issues regarding the quality of water provided in Cape Town, the lack of mandates could potentially lead to disruption in quality as development continues.
- **A flexible institutional arrangement for the Partnership that is closely aligned with mandated bodies, is necessary** – while a WUA could, but not necessarily be, the ultimate objective, the Partnership needs to function and increase its stakeholder footprint with minimal red tape. It should do this with the right mix of partners that collectively and individually can deliver against all the key functions set out for and by the Partnership, under the umbrella host institution and secretariat. Critically, this institutional arrangement must be embrace the key functions that the Partnership needs to embody.
- **As such (i.e. in the absence of a WUA structure) the Partnership needs to be hosted by a credible, legitimate and credit worthy institution** that can attract and channel funding for the Partnership, act as a secretariat and provide other key functions that the Partnership needs and which are not brought by other members.
- **Community level engagement in groundwater resource development, management and monitoring is a pivotal success factor sustainable groundwater management**, given the distributed nature of groundwater resources. Targeted efforts and dedicate resources towards mobilising and maintaining Community Management Forum networks that are representative of the key locations and issues are largely absent from the groundwater strategy implementation.
- **Management of invasive alien species** - DWS has set out detailed guidelines for the management of invasive alien species with regards to the protection of water resources. However, there appears to be no institution mandated to conduct the recommended work.

With these and other gaps and challenges in mind, the following are the key recommendations for solidifying and evolving the Partnership:

- **Adopt a set of defining principles for the Partnership, and locate adaptive management – or learning by doing – as the pivotal principle** for underpinning the Partnership Framework.
- **Agree and adopt a definition of sustainable groundwater management for the**



TMSWSA, noting that Water governance should be considered as a priority for development as it is intimately linked to many other development issues such as poverty alleviation, health and well-being. It should be inclusive and coordinated across sectors and scales.

- **Consider establishing the Partnership as a Water User Association in the longer term and only if considered necessary based on the learnings and outcomes of ongoing Monitoring, Evaluation and Learning (MEL):**

The establishment of WUAs, or for the Partnership to become an established WUA, seems like a logical set in the evolution of the Partnership, providing legal standing and mandate. However, this structure requires ministerial approval, and therefore may result in delays and further red tape to the Partnership's progress.

- **Evolve the current Partnership model (as launched in November 2021) into a flexible but clearly mandated institutional arrangement** for the Partnership that is closely aligned with mandated bodies such as the CoCT.

While a WUA could, but not necessarily be, the ultimate objective, the Partnership needs to function and increase its stakeholder footprint with minimal red tape. It should do this with the right mix of partners that collectively and individually can deliver against all the key functions set out for and by the Partnership, under the umbrella host institution and secretariat. Critically, this institutional arrangement must embrace the key functions that the Partnership needs to embody.

- **Ensure that the Partnership structure embodies all the key functions that the Partnership needs** to deliver to be effective (and as outlined in Table 1 above) and that the roles and responsibilities of the different members are clearly articulated, communicated and monitored.

The key functions of the Partnership should include visioning and vision management resource mobilisation and monitoring and reporting, data management and TMSWSA resource monitoring, secretariat services, communication and awareness raising, among others.

- **Agree a host institution for the Partnership** that is a credible, legitimate and credit worthy institution that can attract and channel funding for the Partnership, act as a secretariat, effectively coordinate the Partnership and its function and activities, while also providing other key functions that the Partnership needs, and which are not brought by other members.
- **Consider establishing and mandating WWF South Africa, which has provided a strong facilitation role for the establishment and launch of the Partnership, as the host institution and secretariat.** In addition to its demonstrated ability to mobilise and manage resources in an accountable manner, WWF South Africa also has capacities for holding the Partnership's vision which aligns well with WWF South Africa's vision and mandate, mobilising, implementing and supporting communication and awareness activities, and for supporting the mobilisation of community fora for TMSWA development and monitoring.
- **Empower the Partnership, through its host institution and as supported by other appropriate partners, to mobilise inclusive, community level engagement in TMSWSA** development, management and monitoring is a pivotal success factor for the TMWSA, given the distributed nature of groundwater resources. The Partnership needs to make targeted efforts and dedicate resources towards mobilising and maintaining a network of CMFs that are representative of the key locations and issues that comprise and face the TMSWSA.
- **Through the host institution, pursue an open and engaging communication with the relevant municipal departments and the provincial Department of Water and Sanitation (DWS), among other key partners,** on an ongoing basis. A strong relationship is

needed between DWS, the CoCT and the Partnership, so that the relevant officials / departments may guide and facilitate processes and procedures. At the same time, this open communication will enable the Partnership to easily and quickly raise concerns and requests for assistance, during their journey to achieving a well-functioning and effective Partnership, and sustainable groundwater governance. Open and robust communication between the key partners and actors is a critical success factor for the effectiveness and sustainability of the Partnership.

Immediate next steps and activities are further recommended for the Partnership. At the next Partnership Steering Committee, it is recommended that the below be agreed, followed by the implementation of the roadmap for the next 18 months (as agreed in the SC meeting):

- Consolidate the TMSWSA vision, and the process captured above, for the evolution of the Partnership, some of which this project has already achieved.
- Agree the five core principles (adaptive management, inclusivity, partnerships and leverage, equity, and evidence-based decision-making) as well as the functions for the Partnership, and establish these in a Partnership Terms of Reference. Include specific provision for identifying and mobilising an inclusive cross-cutting stakeholder base, and in particular communities that are vulnerable, through strengthening existing and mobilising additional CMFs.
- Identify and establish the umbrella organisation (i.e. the host institution and secretariat) through WWF South Africa as recommended above, or identify an alternate institution.
- Develop a Terms of Reference (ToR) for the host institution and secretariat.
- Identify suitable data repositories and enable data collection from monitoring sources, likely located in the CoCT. Agree protocols and channels for data collection and dissemination with the CoCT and empower the host institution to coordinate the dissemination of data to all key data users, through the Host Institution ToRs.
- Simultaneously, elaborate and begin an education and awareness raising campaign (or campaigns, targeted at different actors: community level, industry, business, local government, national government) to promote the principles.
- Establish a roadmap for the Partnership, along with an accompanying MEL process, for the next 18 months (incorporating the above where appropriate) and deploy the MEL process to inform subsequent roadmap iterations.

Think big, start small and scale fast is an important recommended motto for the Partnership, using MEL to identify the timing and entry points for scaling up activities.

Introduction

Overview

This report is the final deliverable under the project, **Current status of groundwater policy and governance in South Africa with a focus on the role of local partnerships to support local groundwater resource management**, commissioned by WWF South Africa on behalf of the Table Mountain Water Source Partnership (hereby referred to as the ‘Partnership’).

This project and report are intended to support and further facilitate the Partnership’s work towards sustainable groundwater governance of the Table Mountain Strategic Water Source Area (TMSWSA). The Partnership was formed in March 2020 and has been officially launched on 15 November 2021.

The main objective of this assignment is to **deepen the understanding of policy requirements** and governance structures and mandates, specifically with regard to groundwater management and the TMSWSA; and to provide **recommendations** on how to address the current challenges and future significance of groundwater; and opportunities for the use, protection and augmentation of groundwater resources within the City of Cape Town (CoCT) municipal boundary.

Report structure

Following this introduction which gives an overview of the assignment, the report is divided into two parts. Part A provides an overview of a recommended Partnership Framework whilst the second, Part B, provides a situation analysis (previously presented as the second deliverable in this project), which provides the evidence base for the proposed framework in Part A. Part A is divided into three sections. The first provides information on benchmarking and best practices followed by section 2 that presents the key role players within the TMSWSA. The final section in Part A presents a framework for the partnership. Part B consists of four sections. The first provides background to the TMSWSA in terms of its significance as a groundwater supply and its ecological and cultural importance. This is followed by key policy and legislation. The third section in Part B identifies institutional arrangements and mandates relevant to TMSWSA. The final section presents the groundwater governance structures and regulations in place, relevant to TMSWSA.

Project context

Established in November 2021, the Partnership aims to improve our understanding of groundwater and fast track the monitoring and sustainable management of it as a resource, to ensure water resources can continue to support people and the ecosystem in and around the TMSWSA. As such, it is envisioned that the Partnership will:

- Support the mandated government bodies in enacting their roles and mandates;
- Mobilise the public/local communities and the private sector;
- Bring together government, the private sector, and local communities;
- Improve the sharing of data, information, and research outputs; and



- Develop and strengthen groundwater governance in the Strategic Water Source Area (SWSA) and contribute to ensuring that groundwater is well understood, monitored, and regulated as a critical water resource.

In addition, WWF South Africa is implementing a Monitoring, Evaluation and Learning (MEL) system, funded through a grant from the Danish Embassy. The MEL aims to support groundwater governance and management in the TMSWSA. Furthermore, it is hoped that through these efforts, groundwater-related research and the implementation of projects under the Partnership will expand over the next year, and long into the future, effectively creating joint management systems for the sustainable management and sustainable use of groundwater in the TMSWSA, by 2022.

Box 1: Definition of Strategic Water Source Areas

What is a Strategic Water Source Area?

A Strategic Water Source Area (SWSA) is defined as land that meets one of the following criteria:

- Supplies a disproportionate quantity of mean annual surface water runoff in relation to its size and so is considered nationally important; or
- Has a high groundwater recharge rate and is situated where the groundwater forms a nationally important resource; or
- An area that meets both criteria (a) and (b) above.

The TMSWSA is one of 22 SWSAs in South Africa. These areas represent 10% of the land but produce as much as 50% of South Africa's water resources. Consequently, these areas are extremely important for national water security. However, they are under threat because of development and land-use changes, with little formal protection currently in place.

Source: Le Maitre et al., 2018, Centre for Environmental Rights, n.d.

Key assumptions and limitations

The project team carried out the necessary research and reporting for this report during a defined timeframe, with limited opportunity for engagement with regulatory authorities. Consequently, relevant assumptions and limitations include, but are not necessarily limited to the following:

- Information has primarily been sourced through stakeholder engagement with key stakeholders in the public sector and to a lesser extent the private sector. A participatory approach has been taken in the development of this report, the gap analysis, stakeholder mapping and recommendations on the way forward.
- The findings of the stakeholder engagement have been supported by a desktop-based literature review of groundwater governance issues and current water resource management initiatives, policy, strategies, and by-laws which are publicly available. It is, however, possible that various internal government policies/guidelines may exist which could be relevant but have not been considered here.
- Through these investigations it has become evident that groundwater governance is in the process of transformation. While, through the lens of adaptive governance and Integrated Water Resource Management (IWRM), groundwater governance has been evolving in South Africa for some time, of relevance at this stage is the devolution of power from the Department of Water and Sanitation (DWS) to lower levels of government, as stated in the National Groundwater Strategy. This devolution of power has not been clarified in terms of for example: who should lead this process, within what timeframes this transition should take place, to what extent (or which roles or mandates) should be devolved, what the remaining relationship will be with national and provincial departments, and how these newly acquired responsibilities may be funded and managed by local government. This is a critical part of the discussion which must be addressed, within the greater argument of sustainable groundwater governance and management for South Africa.



- Furthermore, spheres of government (national, provincial, or local) or specific department(s) may be in the process of developing further guidelines or policies of relevance to this work, which was not considered in this report. This may include review and update of existing policy, legislation, and guidelines.
- The findings of this report have been further verified and developed through engagement with WWF South Africa, the steering committee of the Partnership, and knowledge shared through the MEL Implementers network.
- In some instances, case specific conditions will strongly influence relevant legislated requirements, processes, and permits. Unfortunately, all scenarios could not be considered, and therefore this document provides direction in terms of addressing such issues.
- By-laws relevant to particular municipalities may hold different requirements applicable to a specific municipal area and/or specific conditions. Because of the project focus on the TMSWSA, we, the project team, have considered the relevant policies and procedures to this region only. While there may be significant overlap in relevance with other municipalities, this should be verified on a case-by-case basis and not applied as a blanket approach to other municipal regions.
- The scope of this assignment is specific to groundwater governance and its management. However, through this research assignment it became evident that it is difficult to singularly engage with this concept without recognising and further engaging with the complex socio-ecological and socio-economic systems associated with groundwater. This implies that there are numerous connections and overlaps, related to for example surface water resources, pollution control, water-use management, infrastructure management and future planning, and land-use related activities.

Recommendation: *To mitigate for these limitations and shortcomings, we therefore recommend that the WWF South Africa and/or the Partnership, pursue an open and engaging communication with the relevant municipal departments and the provincial Department of Water and Sanitation (DWS), on an ongoing basis. A strong relationship is needed between DWS, the CoCT and the Partnership, so that the relevant officials / departments may guide and facilitate processes and procedures. At the same time, this open communication will enable the Partnership to easily and quickly raise concerns and requests for assistance, during their journey to achieving a well-functioning and effective Partnership, and sustainable groundwater governance.*

Part A | Partnership Framework

A1 | Benchmarking and best practice

This chapter first presents selected case study examples of groundwater management approaches that reflect evolving best practice, drawn from southern Africa, Australia and California, which seek to specifically highlight institutional arrangements for sustainable groundwater management that promote society-wide approaches that pivot on stakeholder dialogue. Following the case studies, the last section of the chapter presents an overview of key benchmarking and performance indicators for a Water Conservation and Demand Management (WCDM) Strategy. These indicators need to form the basis or sub-structure for development of the Partnership, in terms of technical aspects such as monitoring.

Groundwater is seldom perceived as an important and strategic water resource and is therefore given limited attention globally as well as in the CCT. This perception is underpinned by the belief that groundwater is not a sustainable resource for bulk domestic supply and is difficult to manage (Riemann et al., 2015). Yet, if managed correctly, with its role appropriately understood and positioned, groundwater can be a dependable and long-term supply of water, for example through providing an essential buffer against droughts and yielding local and additional water resources when there is insufficient rainfall (California Water Foundation, 2014).

An analysis of various countries in terms of sustainable groundwater management demonstrates that groundwater planning and management requires a society-wide and decentralised approach that integrates actors from most of the social partners rather than relying on government alone. ***Best practice further highlights ongoing stakeholder dialogue as being a critical and pivotal success factor to sustainable and effective groundwater management.*** With this, progressive and evolving policy frameworks are needed to address the complex groundwater management challenges that are highlighted throughout this report.

A1.1 | Southern Africa

The theme for the 2010 SADC Multi Stakeholder Water Dialogue was groundwater. Policy makers and stakeholders from the SADC Member States came together in Johannesburg to deliberate on issues and policy interventions needed for enhanced understanding and management of groundwater resources, widely considered at the time to be not well understood, under-exploited and unsustainably managed. Among the key outcomes of the Dialogue was the subsequent establishment of the SADC Groundwater Management Institute (SADC GMI). In 2019, SADC GMI commissioned OneWorld to undertake a study and process for establishing institutional arrangements in five SADC Member States for enhanced and sustainable groundwater development and management. During the course of 2020, the OneWorld team, on behalf of SADC-GMI, worked with in-country experts and groundwater focal persons in each of Eswatini, Malawi, Mozambique, Namibia and Zimbabwe to establish National groundwater Focal Groups (NFGs) that are fit-for-purpose and tailored to local conditions and needs.



The next sub-section (8.1.1) presents key learnings from this NFG establishment process across the five countries, while the sub-section thereafter (8.1.2) presents a more detailed case study from Eswatini. Since these NFGs are relatively newly established, the focus in the Eswatini case study outlines emergent best practice for the process for establishing an NFG. Eswatini emerged as the best practice example for the region in terms of how this country approached the establishment of its NFG, noting that the remaining countries followed similar stakeholder-led processes and dialogue, but differentiated in terms of representation and consensus building.

A1.1.1 Key Principles and Lessons Learned from the SADC NFG Establishment Process

This sub-section presents the key principles agreed on for the establishment of the SADC national groundwater NFGs (see list below). Thereafter each of these principles and key lessons that emerged from the NFG establishment process are presented, including reference to other relevant initiatives and interventions in the SADC region, and notes on the particular relevance of some of these for TMSWSA.

- i) The Partnership should have a clear purpose
- ii) The Partnership relies on a common vision to promote its sustainability, mobilise resources and to operate effectively
- iii) An effective Partnership hinges on a clear Terms of Reference (ToR)
- iv) Credible and transparent governance must visibly underpin the Partnership
- v) The Partnership must both embrace and engender participation, inclusiveness and consensus
- vi) Transparency and responsiveness should characterise the Partnership
- vii) Effectiveness and efficiency engenders legitimacy and credibility
- viii) The Partnership must uphold the rule of law and stimulate change as needed
- ix) Partnerships and networks need an institutional home and a legal structure, and should be supported by a secretariat
- x) The structure and membership of the secretariat and partnership needs to reflect local circumstances while embodying key characteristics
- xi) The Partnership must adopt, adhere to and routinely review a set of core principles

i) The Partnership should have a clear purpose

OneWorld worked with SADC-GMI to establish National Focal Groups (NFGs) for Groundwater in five SADC Member States (Eswatini, Malawi, Mozambique, Namibia, and Zimbabwe) in 2019 and 2020. Although each country established a different structure for their NFG, the purpose of all NFGs is common and clear and was validated in each country. The purpose of the NFGs is:

- To improve and enhance institutional capacity in SADC Member States and expand interest for groundwater and influence decision-making towards groundwater investments within the region.
- To ensure that sustainable groundwater management, development and use is adopted in the SADC Member States.
- To provide technical support and advice to the groundwater National Focal Point Person (NFPP) who is the conduit between the Member State and SADC-GMI.

Relevance for TMSWSA: *While this is akin to or could underpin a vision for a Partnership such as for TMSWSA, it is not necessarily a vision for groundwater development and management. Instead, developing and evolving such a common vision was left to each NFG, which they did in their initial*

workshops, as discussed below. The common purpose however was critical to identifying the most appropriate NFG Members, based on the roles and responsibilities needed to realise the NFG purpose.

ii) The Partnership relies on a common vision to promote its sustainability, mobilise resources and to operate effectively

This aspect has been a cornerstone of a different example to the NFGs outlined above, being the Polokwane Partnership (see section A1.1.3 in the following pages), now 10 years old and co-supported by AB InBev, which has 32 institutions and a strong track record of effective and relevant delivery. Developing a common vision and agreeing this through a consensus building approach was also a common characteristic in establishing the much newer five SADC NFGs, and was a cornerstone to stakeholder sign-off on the NFGs.

iii) An effective Partnership hinges on a clear Terms of Reference (ToR)

Such a ToR needs to clearly and succinctly address the goals, the functions and the structure of the NFG.

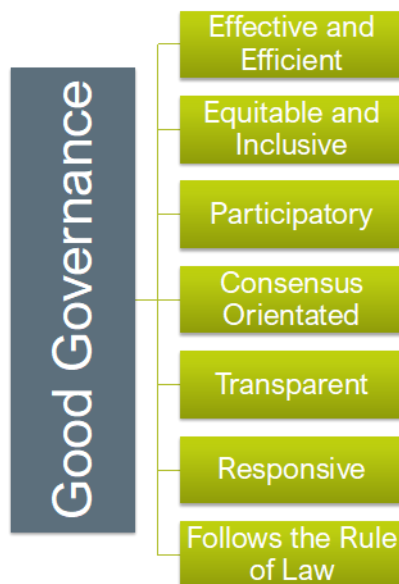
iv) Credible and transparent governance must visibly underpin the Partnership

As discussed earlier in this report, the globally adopted SDG 16 provides a clear reference point for the definition of good governance:

“Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels”

The characteristics of good governance are outlined in Figure 1 below.

Figure 1: Critical Elements of Good Governance



v) The Partnership must both embrace and engender participation, inclusiveness and consensus

This entails the following:

- Thorough stakeholder mapping
- A review of optimal membership
- Every one of the partnership members has an equal vote
- Openness to different ideas and constructive debate

Relevance for TMSWSA: We note that some of the above is the subject of the current project. We further note that stakeholder mapping and membership review is an iterative process, in line with the adaptive management principle outlined later in this section.

vi) Transparency and responsiveness should characterise the Partnership

There are a range of core behaviours and practices that enable and demonstrate transparency and responsiveness. These include making minutes of meetings available to all key stakeholders (including within and beyond the Partnership), as well as regular engagement between the Partnership and the groups and communities it represents. Regular engagement is further defined as continuous engagement that maintains momentum and keeps key stakeholders well informed at all times.

vii) Effectiveness and efficiency engenders legitimacy and credibility

Again, this can be achieved in a range of ways. Central though are the following:

- Clear roles and responsibilities, based on a realistic assessment of capacity to execute them
- Regular monitoring and reporting on activities to identify potential issues early
- Holding institutions and actors accountable, with clear accounting processes

viii) The Partnership must uphold the rule of law and stimulate change as needed

Leadership on policy and regulations arises from government, while the rule of law must be upheld by all. The Partnership needs to be seen to be upholding the rule of law while, where necessary, providing the evidence for changes as needed. The following are critical considerations in terms of the overarching role of the Partnership, through the secretariat:

- Ensure compliance with the rule of law
- Ensure that local policies, procedures, etc., are in line with national and regional laws
- Make everyone subject to the law, rather than allowing exceptions for some

ix) Partnerships and networks need an institutional home and a legal structure

It is important that partnerships become self-sustaining and permanent (sustainable). As such, they need an institutional home, in an institution that is legally incorporated, that could support their administrative and finance functions. At the same time, lessons learned have demonstrated that a level of subject knowledge is a critical success factor. This does not necessarily mean that the institution has to have deep technical subject matter knowledge on all the facets surrounding groundwater management. Rather, or in addition to this, strategic understanding of groundwater is essential.

x) The structure and membership of the secretariat and partnership needs to reflect local circumstances while embodying key characteristics

The status of the entity must be legal but this could take many forms, such as an association, a club, an NGO, a not-for-profit, a CSO, a private company or state owned entity. The membership composition is particularly important to reflecting local circumstances and needs and the following considerations are applicable:

- Bring together water stakeholders, including groundwater, across various sectors in the area to support sustainable groundwater resource management, development and use
- The Partnership should comprise a minimum of five (5) members, one of whom may be the Chairperson
- All prospective members should be required to complete a membership application form that requires that members agree to certain basic principles of the partnership as specified. *These principles are suggested in the next section.*

xi) The Partnership must adopt, adhere to and routinely review a set of core principles

A central learning from all of the research that has underpinned this report is that an **adaptive management, learning-by-doing approach is essential**. The relatively low levels of knowledge and understanding of the role groundwater does and can play in ensuring and improving water security necessitates this. This means that an incremental approach to evolving the TMSWSA partnership is unavoidable as flexibility is a must as we learn by doing, take actions, achieve successes, and make mistakes. Adaptive management is thus identified as a key principle for underpinning the Partnership Framework.

Other key principles, justified by lessons learned from experiences of establishing other (Ground) Water Partnerships and Networks around southern Africa and globally, are outlined as follows:

- Inclusivity
- Partnerships and leverage
- Equity
- Evidence-based decision-making

A1.1.2 Eswatini Case Study

As discussed in the section above, the SADC GMI project aimed to establish groundwater National Focal Groups (NFGs) in five SADC Member States. In the Kingdom of Eswatini, the approach to establishing a groundwater NFG was discussed extensively with the Department of Water Affairs and the SADC-GMI National Focal Person. A decision was taken to use a consultative approach in creating a shortlist of recommended groundwater NFG members that focused on hosting a workshop with all key stakeholders. The groundwater stakeholder meeting was held on August 11, 2020. Stakeholder institutions were grouped according to the role they play in the groundwater space according to the following categories:

- 1) **Policy and Regulations** - institutions that are mandated to formulate groundwater policy and regulations
- 2) **Groundwater Extraction** - institutions involved in groundwater extraction and supply such as water surveyors, drillers and equipment suppliers
- 3) **Monitoring and Evaluation** - institutions involved in monitoring and evaluation of groundwater use
- 4) **Funding** - institutions involved in financing groundwater activities
- 5) **Research** - institutions involved in groundwater research and training
- 6) **WASH Partners** - a special group of institutions that have partnered for water supply and sanitation, particularly in rural areas where groundwater constitutes 70% of their water resources
- 7) **Civil Society Groups** - e.g. the media, NGOs focused on the environment
- 8) **Operation and Maintenance** - a set of institutions that play a vital role in ensuring that the boreholes drilled are operational. Many boreholes drilled fail to supply, mainly because of operation and maintenance issues. These institutions are then called by communities and Government to rehabilitate the boreholes and ensure proper operation and maintenance including the installation of solar power to reduce energy costs.

Each group was asked to nominate the institution, and an alternate institution, that they felt would best represent their interests and contribute meaningfully to the work of the Eswatini groundwater NFG. The alternate member institution was included in order to ensure that when the substantive member institution is unavailable the alternate would be present. The list of the nominated member institutions was then presented to the Department of Water Affairs and the NFP for endorsement. The stakeholders also considered and deliberated on the issues of the host institution and chairperson of the Eswatini Groundwater NFG. When deliberating on the proposed host institution, stakeholders were asked to

consider institutions that have a proven capacity and track record of handling donor funds and have demonstrated clean audits as well as the capacity to provide offices and secretariat services for the Eswatini NFG. Three (3) institutions were shortlisted. The NFP for Eswatini and National Director of the Department of Water Affairs provided further advice on selection.

The stakeholders at the workshop also discussed how the NFG would operate within the Eswatini context. One of the main issues discussed was to ensure that the NFG does not infringe on the mandate of other statutory water bodies in the country but rather complement these. This is critical for all NFGs in each Member State as the groundwater NFG is intended as a support to the National Focal Points. The consensus was that groundwater NFG would help fill the gap that exists between the policy-making body (National Water Authority – Water Act, 2003) and the implementation of the policies and regulations on groundwater outlined in the Water Act, 2003.

While the Water Act, 2003 is very clear about what needs to be done in groundwater management, the capacity to ensure that this is done is still lacking. This is mainly because it took a while to establish the River Basin Authorities (RBAs) who are tasked with the responsibility of implementing the regulations enshrined in the Water Act, 2003. The prevailing drought in the country and the increase in the demand for groundwater extraction coupled with the lack of capacity, has resulted in too many uncoordinated players in the groundwater space. ***Critically, the groundwater NFG is seen as an institutional grouping that would bring these players under one umbrella to instil focus on groundwater management.***

Furthermore, it is important to avoid the groundwater NFG implementing its own agenda outside that of the National Water Act, the supreme body that advises the Minister responsible for water resource management in the country. It is for this reason that the formation of the groundwater NFG included both the National Water Act, Department of Water Affairs (as chairperson of the groundwater NFG), the Joint River Basin Authority Operations Board as well as the WASH partners who are the drivers of groundwater extraction. This was a strategic approach to avoid duplication of responsibilities between the groundwater NFG and other key water groupings in the country. The meeting determined that the NFG will be Hosted by WaterAid who will thus provide the secretarial services to the secretariat function for the Eswatini groundwater NFG.

Source: Adapted from OneWorld, 2020

A1.1.3. Polokwane Partnership

The Strategic Water Partners Network (SWPN) is a multi-stakeholder partnership working collectively to close the gap between water supply and demand (SWPN, 2019). Their Vision is to contribute to efficient, equitable and sustainable water supply access to water and sanitation for all South Africans through the identification and application of innovative and cost-effective solutions. As part of one their thematic areas, namely water-use efficiency and leakage reduction, SWPN have implemented a water partnership project that aims to develop a water conservation and water demand management (WCWDM) strategy and business plan for the city of Polokwane, to reduce water losses, and unbilled and unaccounted for water.

The WCWDM strategy and business plans should enable the municipality to get government or other funding and increase water security of the municipality and greater Limpopo catchment. The key partners are SAB (AB InBev) and Anglo American. SAB and Anglo American have contributed R10.2 million as seed money to execute the project. This project falls within the pilot/implementation group of projects that are undertaken by SWPN. It is an area-specific project, involving the implementation of water loss reduction or treatment initiatives that are typically funded by one or more partners with dedicated funds.

A1.2 | Western Australia

Australia has introduced the Australian Water Partnership (AWP) as an innovative partnership model that provides an effective mechanism to connect requests for assistance from government internationally through the Department of Foreign Affairs and Trade, to Australian water expertise. The Partnership seeks to collaborate with government internationally to respond to development challenges in support of sustainable water resources management. They have three broad groups of partnerships, namely Australian, In-Country and International partnerships, all to enhance sustainable water management in the Indo-Pacific and beyond.

The AWP identifies nine key requirements for a valued and trusted partnership:

- A high-level common purpose, which is the vision of AWP and the recipient country's vision for sustainable water management
- Identifying specific issues preventing sustainable water management. Only through identifying the issues are they able to assign appropriate expertise in addressing the issue
- An agreement to act together to achieve agreed outputs and outcomes
- Including all relevant stakeholders in the process of articulating and framing the issue
- Collaborating to ensure that the issue is addressed in a manner that is feasible and relevant to its environmental, political, and cultural context
- The risk and responsibility of success should be shared
- To be politically acceptable policymakers, decision-makers, and implementers
- Being appropriately funded and resourced
- Partners are in it for the long-term and ensuring that solutions are sustainable from a financial and capability perspective

Source: Australian Water Partnership, 2015

A1.3 | California

In 2014, in response to an extreme and prolonged drought, the Californian Brown Administration released the California Water Action Plan, which **highlighted the importance of groundwater resources and the need to manage groundwater at the local level**. This Administration followed this Plan with a request to the California Water Foundation (CWF) to initiate a stakeholder dialogue (Dialogue) and to prepare an outcomes report with recommendations for the Administration as to how to achieve sustainable groundwater management. Notably, the CWF was established in 2011 with a view to moving California to a more sustainable water management system for the benefit of farmers, households and cities, and the environment. The establishment of the CWF was predicated on the observation that a range of stressors, such as climate change, population growth/change, ageing infrastructure, and a degraded environment have combined to reduce the resilience and sustainability of this state's water system. Among the CWF's key investments was in demonstration projects and stakeholder coalitions. These and other investments (stormwater capture, flood management, wastewater recycling and urban conservation) demonstrated the importance and role of groundwater in California, and the value of local management.

The Dialogue process engaged a wide range of knowledgeable people from around the state to collectively frame recommendations for a primary local management role with clear targets, flexible local governance arrangements, the need and role for technical assistance and funding and a meaningful government role in oversight and enforcement. A key objective of this initial and foundational Dialogue was to integrate key interests as far as possible. CWF engaged water agencies and associations, advocates of natural resource conservation and environmental justice, the agriculture sector, water quality advocates and administrative and legislative officials.

The Dialogue did not seek to build consensus towards unanimous agreement but focused rather on identifying and understanding each stakeholder's concerns, ideas and opinions. ***Stakeholders were encouraged to provide critiques and recommendations based on their individual experiences and expertise and were not asked to formally represent their organisations or broader constituencies.*** This maximised openness and facilitated trust building, thus enabling CWF to implement an ambitious process. Furthermore, the Dialogue was conducted across three layers of governance and engagement activity:

- i) **A steering committee** comprising stakeholders from a range of organisations and representing diverse expertise and perspectives. The committee was tasked with identifying key issues, needs, potential solutions and policy recommendations.
- ii) **Interest Groups** (five) organised around conservation organisations, the environmental justice community, county representatives (equivalent to district municipalities in South Africa), agriculture groups and water agencies. A consistent agenda applied across all the Interest Groups aimed to explore the context, approaches, advice and solutions for sustainable groundwater management.
- iii) **Numerous one-on-one or small group meetings** to address specific groundwater issues.

Notable points of convergence across these three layers were identified by the CWF and elaborated into the recommendations that the Dialogue, through CWF, was intended to come up with.

The Dialogue further proposed solutions to address the following key issues:

- Adequate representation of disadvantaged communities affected by groundwater decision-making.
- The relationship between new groundwater management agencies and existing land-use and water management authorities and entities.
- The potential role of state government in oversight and enforcement, noting concerns as to micro-management and lack of appreciation for local challenges.
- The need to treat and manage different types of aquifers with differentiated approaches.
- The challenges associated with attracting and managing predictable flows of funding while avoiding the creation of unfunded mandates.
- The challenges of climate change, which include potentially ongoing reductions in available surface water and environmental degradation.

A set of critical and key findings emerged from the Dialogue and underpinned the groundwater management strategy:

- Groundwater is essential to the economy, environment and public health and safety of California.
- Current groundwater trends are not sustainable, with numerous sub-basins experiencing accelerated groundwater decline, impacts to surface water supplies and reduced water quality.
- Integrated water management is necessary, with separate management from other parts of the water system being “unreasonable” and “artificial”.
- Groundwater is most effectively managed at the local and regional level, noting that local management plans can be tailored to managing different sub-basin characteristics, and to reflect local conditions based on local knowledge.

- Improvements to local groundwater management relies on better tools and better authorities.
- Protection of private property and water rights is imperative, necessitating a better understanding of the physical elements of groundwater systems as well as clearer authorities for the management and resolution of disputes.
- Clearer and meaningful government roles are needed to protect state interests in groundwater management.
- Groundwater is an important source of drinking water, with an estimated 30 million Californians receiving at least part of their drinking water from groundwater.
- Time is an important factor. An effective groundwater management programme will need to provide sufficient time and resources for the formation of local groundwater management entities and to support the development of effective groundwater management plans with measurable objectives.
- Funding is needed to support effective and sustainable groundwater management.
- Access to information is central to groundwater management and citizen understanding, involving both reliable and good data to inform management decisions and for explaining the role of groundwater in the overall water system.
- A comprehensive regulatory and policy framework is necessary to address fragmentation and the complexity of groundwater management challenges.

Recommendations that emerged for developing a sustainable groundwater management strategy

The key issues and findings were then distilled into a set of seven recommendations, each inclusive of a rationale, and accompanied by the range of views, support and concerns as expressed by stakeholders to the Dialogue:

- i) Adopt a definition of sustainable groundwater management
- ii) Develop a prioritised state-wide programme covering all sub-basins
- iii) Establish local groundwater management entities
- iv) Provide local groundwater management entities with sufficient groundwater management authority
- v) Require local groundwater management plans
- vi) Establish a clear and coordinated role for local and regional government for technical assistance, oversight and enforcement
- vii) Provide funding for groundwater management

Source: Adapted from California Water Foundation, 2014.

A1.4 | Benchmarking and performance indicators for a Water Conservation and Demand Management (WCDM) Strategy

Part of establishing a sustainable WCDM strategy and essential to general water resource management is benchmarking, which is what allows for continuous improvement in the water system. Performance measuring should be conducted at all levels of the water system, covering the full range of activities within the system. It should be unbiased, easily available (both in terms of data gathering, and understanding), clearly defined and spatially and temporally referenced. The DWS has set out guidance for use by WSIs, ensuring that benchmarking and performance monitoring is conducted consistently and fairly. This guidance aims to ensure that benchmarking is auditable and accurate. ***However, there appears to be***

no mandate for auditing to take place, and from the available literature it is not clear if auditing does take place.

A1.4.1 Equitable access

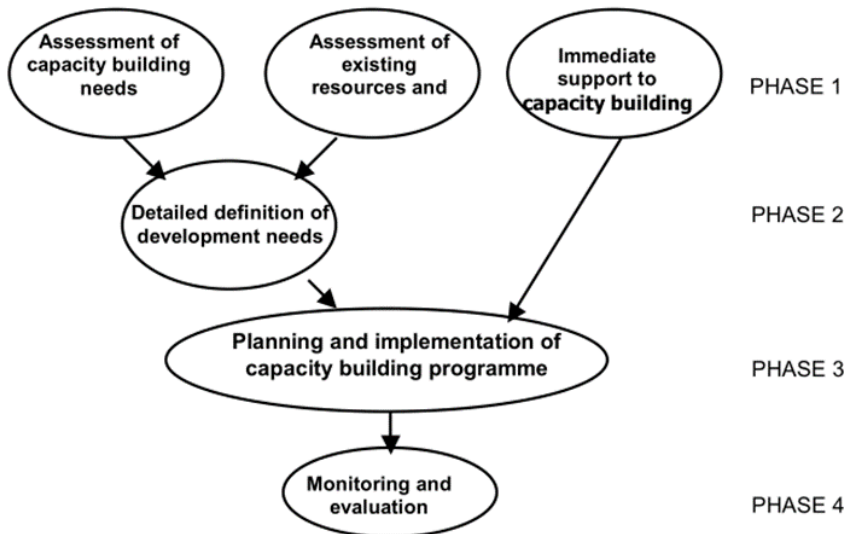
Despite Cape Town (and the Western Cape) having the lowest correlation between water pollution and economic prosperity (compared to other parts of South Africa), it has been suggested that there is a need for further investigations to understand hidden inequalities in water policy (Yerema et al., 2020). For example, “block tariffs” were meant as a pro-poor policy, where poor households are provided with a minimum volume of water for free, while households and businesses are charged lower rates for an initial volume of water, and then significantly more for larger volumes. However, this led to high-volume households with extended family members having low per-capita consumption, but high household usage and being charged significantly more (Enqvist and Ziervogel, 2019). Additionally, whilst the 1997 Water Services Act promotes a strategy for the resource to be managed sustainably, equitably and efficiently, there needs to be a step-by-step implementation plan, rather than simply a wish-list (MacKay, Rogers and Roux, 2004). The ‘Day Zero’ event highlighted a lack of trust and poor communication; both of which need to be addressed in a new water policy structure. ***Water governance should be considered as a priority for development as it is intimately linked to many other development issues such as poverty alleviation, health and well-being. It should be inclusive and coordinated across sectors and scales.***

A1.4.2 Capacity building

Capacity building for sustainable water resources management is mainly focused on decision-making, sector efficiency, and managerial performance in planning/implementing programmes and projects (DWAF, 2004b). This is to support increasing the ability of all aspects of the water system to fulfil their mandated roles. The DWAF suggest that there are six key dimensions of “capacity”:

1. local political and decision-making capacity (“governance”)
2. administrative capacity (human resources, organisational structure, skills development requirements)
3. financial capacity (revenue base, expenditure requirements)
4. technical capacity related to water services (engineering, operations and maintenance of infrastructure)
5. developmental capacity (policy-making and programme design capacity)
6. social capital (the role of development forums and water committees, and their interaction with local government).

Figure 2: Stages of capacity building (DWAF, 2004b)



Before solutions can be identified to build capacity, problems need to be identified. These problems can be found in the following areas:

1. Information systems
 - extent and condition of assets
 - operational data
 - other management information
2. Tariffs and billing systems
3. Administering indigent policies
4. Staff skills levels
5. Operations and maintenance
6. Payment culture
7. Management of water services in rural areas, especially farmland
8. Water conservation and demand management

For example, the DWS is suffering from a lack of staff, which results in the issuance of water-use licences taking up to 300 days or longer, despite the prescribed process requirement recently being reduced from 365 days to 90 days. Additionally, the forthcoming retirement of 22% of experienced workers without a work plan to replace them will result in a significant skill shortage, and mentoring and training new staff has become a major challenge (OECD, 2021). Not only does this mean that current capacity is low (resulting in delays), but that future capacity building will be very difficult if capacity is not increased quickly. Groundwater management (and water management as a whole) is increasing in importance and without capacity building the goals of the CoCT water strategy will not be met.

The DWAF has suggested a 4-phase plan for capacity building, and that implementing a sustainable WCDM requires intervention at each of these levels to ensure that the institutions involved in the water system have the resources that they need to function efficiently at or beyond their mandated level.

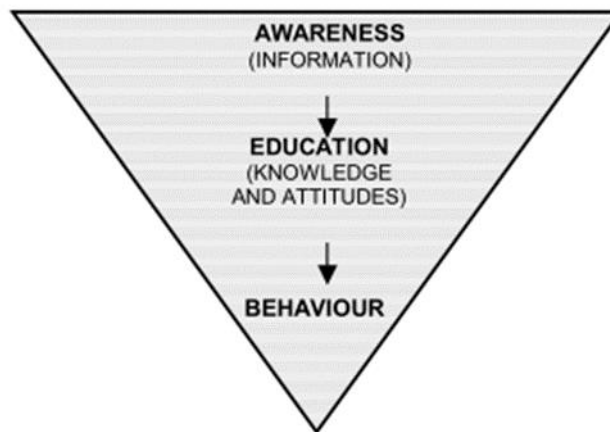
Phase 4 is shown as ‘Monitoring and ‘Evaluation’. As with many aspects discussed in this report, a sustainable, longer-term WCDM approach requires forward-planning, and schemes implemented now must have the capacity to continue to function and develop in the future.

A1.4.3 Education and awareness

Education and awareness is key to achieving behaviour change in citizens and stakeholders, which is important in achieving sustainable water use. Citizens of Cape Town are said to be capable of working within restrictions during water shortages, however in periods of normal water availability, they are not so careful (Parks et al., 2019). It is not just citizens who should be involved in awareness campaigns - all stakeholders, including WSIs and local governments should be involved. Like invasive alien species control, awareness campaigns must be long-term and ongoing, to continue to educate all generations of sustainable water-use and water demand management issues.

DWS has published guidance for different methods of awareness raising to improve water-use behaviour, including both the different types of awareness campaigns, and the mediums for communicating these (Department of Water Affairs and Forestry, 2004) (Figure 3). However, considering the cross-cutting nature of issues related to water governance, education and awareness are the responsibility of various departments across the spheres of government, and not solely the responsibility of DWS.

Figure 3: How behaviour change is achieved through awareness and education (Department of Water Affairs and Forestry, 2004)



As noted elsewhere in this report, the CoCT does provide various education and awareness resources to the public and uses opportunities when engaging with businesses to provide further education on sustainable water use. However, other institutions also play a role in disseminating information to the public and mobilising behavioural change and related activities, such as research platforms, catchment management forums, ‘friends’ associations (e.g. Friends of the Liesbeek), religious associations, ratepayers’ associations, etc.

Community involvement is key for several reasons:

- Involving the community in goal development and implementation serves as an education function, enhancing the success of capacity building programmes.
- Ongoing involvement helps maintain support for achieving goals and spreading knowledge of the effort, which further helps build capacity.
- Participants can offer valuable linkages to key groups and stakeholders.

Examples of opportunities for community involvement include the projects that have been run by the local WWF team which focused on community involvement and education in groundwater. The Green Anglican Church assisted WWF’s vision by engaging with the youth about the spirituality of groundwater. Various thematic prayers and talks were undertaken, as well as hikes, and even a clean-up in Gugulethu and planting of trees and other plants (Figure 4).

During another project, Greenpop ran a groundwater poster competition with local schools. This included generating and sharing relevant educational material with teachers to help them to educate learners, as well as YouTube videos to further facilitate learning and sharing on the topic.

Both projects are excellent examples of how education and involvement can be implemented at the community level, thus educating and empowering communities to be part of the journey to developing healthier and more sustainably managed ecosystems.

Figure 4: Photographs of the clean-up in Gugulethu (photo credit: Rev. Rachel Mash)



Figure 5: An example of a poster that was submitted for the competition (provided by Damien Hewitt)



A2 | Key role players within the TMSWSA

A2.1 | Introduction

This section outlines the key role players at the local level that the Partnership could or should consider as stakeholders or members. While national government has a central role to play in setting strategic direction with legislation and policy and other key instruments, **regional and local action are critical for good water governance**, because much of the management and decision-making takes place at this level, with significantly greater focus on local action being envisaged in the future, as outlined in the

National Groundwater Strategy. In addition, there is a strong focus on **broad, multi-stakeholder engagement and participation**. The key role players have been categorised as follows:

- Provincial and local government
- Catchment management bodies
- Water users
- Multi-stakeholder institutions
- Research institutions
- Section 21 entities / NPOs
- City Improvement Districts
- Airports Company of South Africa

A2.2 | Provincial and Local Government

A2.2.1 Provincial Department of Water & Sanitation

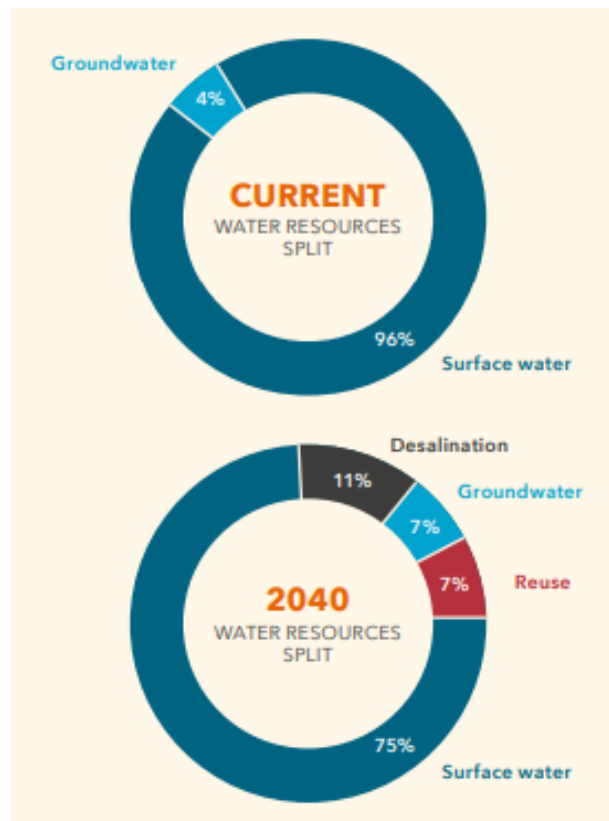
As described in Section B.3, the regional DWS plays a critical role in assisting with monitoring and regulating legislative functions. Even as powers are devolved to lower levels of government, provincial departments of DWS should be included in engagements as they may offer guidance and support.

A2.2.2 City of Cape Town

The CoCT as the WSA is responsible for providing water resources and related infrastructure to the community of Cape Town, for a variety of purposes. As such, the CoCT accesses groundwater through various well points and boreholes across the municipality, with conditions established under WULA granted by DWS. Cape Town's 2016-2018 drought and its 'Day Zero' event in 2018 (and the 2010 drought), highlighted how important water governance is in this region. Following these events, the CoCT has created a strategy to augment the Western Cape Water Supply System with a variety of sources, thus sustainably increasing municipal water supply to residents of Cape Town. This includes desalination, limited expansion of reliance on groundwater resources, reuse, and a reduction in reliance on surface water (Figure 6) (CoCT, 2021). ***To achieve sustainable use of groundwater resources, it is critical to understand and control the quantities abstracted and manage the external environment, along with numerous other factors.*** As demonstrated by the unregulated borehole drilling that took place during Cape Town's recent drought, groundwater governance is not currently able to support a sustainable groundwater-oriented water strategy.

The CoCT is also a key role player through various other responsibilities that it holds, such as the responsibility of establishing a monitoring committee, as well as relevant Catchment Management Agencies – which are critical roles for groundwater governance.

Figure 6: How Cape Town's water resource reliance is anticipated to shift from 2021 to 2040



Source: CoCT, 2021, page 30

A2.3 | Catchment Management Bodies

A2.3.1 Catchment Management Agencies

In line with the White Paper on Water and Sanitation (1996), WSAs have the “responsibility for the development, apportionment and the management of available water resources, where possible and appropriate to a catchment or regional level in such a manner as to enable interested parties to participate”. This is further supported by the National Water Act 36 of 1998 which provides for WMAs and CMAs, to enable decentralised management and realise broader socio-economic objectives as per the National Development Plan (2012) (Department of Water and Sanitation, 2017). This direction is consistent not only with the National Water Act, but also with both the 2002 and 2013 National Water Resource Strategies and the National Policy Positions on Water (2014) (Department of Water and Sanitation, 2017), as well as further guidance and recommendations provided by the National Groundwater Strategy (2017) in support of CMAs to effect local action.

Institutionally, CMAs are established by the Water Services Authority (WSA) or local government as state-owned-enterprises, protecting, using, developing, conserving, managing and controlling water resources in a cooperative manner within the boundary of their respective allocated WMA. Since groundwater is a water resource, aquifers located in a CMA would therefore be subject to their management. This would require them to play a central and coordinating role with regards to water use, linking national, provincial and local government as well as a host of sector partners and stakeholders (BGCMA, 2020).

In 2012 the proposed 19 WMAs were rationalised into nine because of a lack of technical and managerial expertise in the country (National Department of Water and Sanitation, 2017). More recently DWS has

proposed six WMAs instead. Previously, under the nine WMA structure, three WMAs overlapped with the Western Cape – Olifants-Doorn, Berg and Breede. In this region, the Breede-Gouritz CMA (BGCMA) has been established. The only other established CMA is the Inkomati-Usutu. Now, under the nine WMA structure, the Breede-Gouritz will be extended to cover the entire Western Cape (to include Berg and Olifants). The WMA is now referred to as Breede-Gouritz-Olifants.

The BGCMA (now the Breede-Gouritz-Olifants as described above) was established in July 2005 in terms of the National Water Act 36 of 1998 and plays a key role in delivering the National Water Resource Strategy II (NWRS). In particular, the CoCT's water is supplied from surface water resources primarily from the Berg-Olifants catchment, located adjacent to the BGCMA.

At this stage, two important points are worth noting:

- The Table Mountain Group Aquifer straddles the Breede-Gouritz WMA that is managed by the BGCMA, and the Berg-Olifants WMA managed by the National DWS.
- The CMA functions have not been fully delegated, thus limiting the contribution these CMAs can make to good water governance within the WMAs. In addition, local level management via WUAs has been limited, further contributing to poor groundwater management.

It is not clear how shifts in the water policy, particularly around water governance mandates, will adapt and/or incorporate SWSAs or how household users will be included at this time. It is however anticipated that SWSA will have a significant role going forward, as more recently outlined in the National Water and Sanitation Masterplan (2020) and National Groundwater Strategy, respectively. However, the National DWS Regional Office will ultimately play an oversight and regulatory role and is in the process of withdrawing its operational presence in the former Breede-Gouritz WMA in support of the BGCMA's development process (Breede-Gouritz Catchment Management Agency, 2020).

A2.3.2 Catchment Management Forums

CMFs are interactive organisations that are essentially multi-stakeholder, with a primary focus on matters pertaining to the protection, use and management of water resources in a selective catchment. They should enable the public (anyone) to participate meaningfully in water resources management. They are, therefore, powerful platforms intended to facilitate meaningful engagement with water users in the catchment as well as applicable authorities (DWA 2001).

The DWS guideline framework (2001) mandates CMFs to bring together all stakeholders for the purpose of building partnerships and networks and promoting consensus on water management issues in an empowering, democratic and transparent manner. In this way, CMFs could provide valuable platforms through which stakeholders and customers can communicate their water needs and be educated about their rights, allowing all residents and industries within the catchment to ensure their needs are articulated and met. This may include the formulation of a catchment vision, determination of resource-directed measures and the development of a catchment management strategy.

Current, only the Zandvlei catchment Forum appears to be active. This CMF was established in 1998 when the Catchment, Stormwater and River Management Branch of Transport Roads and Stormwater Directorate within the CoCT municipality, lobbied for a forum to discuss issues of the catchment, and interact by exchange relevant information. Today, the forum is attended by a long list of members, including: CoCT – various departments, Table Mountain National Park, Friends of Constantia Valley Greenbelts, Friends of Tokai Plantations, Friends of Die Oog, Friends of Kirstenhof Wetlands, Friends of Park Island, Friends of Keyzers River, Wildlife and Environment Society of South Africa (WESSA), Working for Wetlands (Western Cape), SANBI, Constantia Property Owners Association, Constantia Hills Residents Association, Zandvlei Trust, Wetland Solutions, and Constantia Wine Route.

Other Catchment Forums include the Kuilsriver Catchment Forum, and potentially the Western Cape Wetland Forum. However, it is not clear if these forums are active.

It is also worth noting that the WRC have published [guidelines on how to establish and run Catchment Management Forums](#) and USAID has published a [guideline for developing charters of agreement for Catchment Management Forums](#). These are useful guidelines for individuals and institutions operating in this space. Although recognising the importance of adaptive management, the latter helps to clarify the role and function of CMFs, and how to establish them.

A conceptual diagram illustrating a process to establish a Catchment Management Forum is shown in Figure 14, whilst Box 2 shows the role and characteristics of these forums.

Box 2: Role and characteristics of Catchment Management Forums

Role of a Catchment Management Forum

CMFs function to enable stakeholder participation in WRM, including the following generic roles:

- Promoting understanding between different interest groups about their needs and problems.
- Assist with communication between stakeholders.
- Ensure that implementation and management of water resources is grounded in increased understanding and involve co-operation in decisions about catchment water resource management.
- To facilitate stakeholder consultation and participation around the establishment and functioning of the CMA and to support the development and implementation of the Catchment Management Strategy.
- To develop institutional capacity in the WMA during the period prior to CMA establishment, and possibly the consolidation period following CMA establishment.
- To promote integrated planning and cooperative resource management between the CMA and other organs of state and role players; and
- To support the WRM operation of the CMA, by performing activities and implementing projects under the auspices of the Catchment Management Strategy.

It should be noted that although water resource policy states that a catchment forum may perform WRM functions (where delegated), ***its principal motivation is to enable stakeholder participation in WRM, particularly in association and alignment to the CMA.***

DWAF (2001) further describes that catchment forums are not formally established under the National Water Act. Although the Minister may make regulations for consultative forums, in terms of section 90(1)(b) of the National Water Act.

Character of a Catchment Management Forum

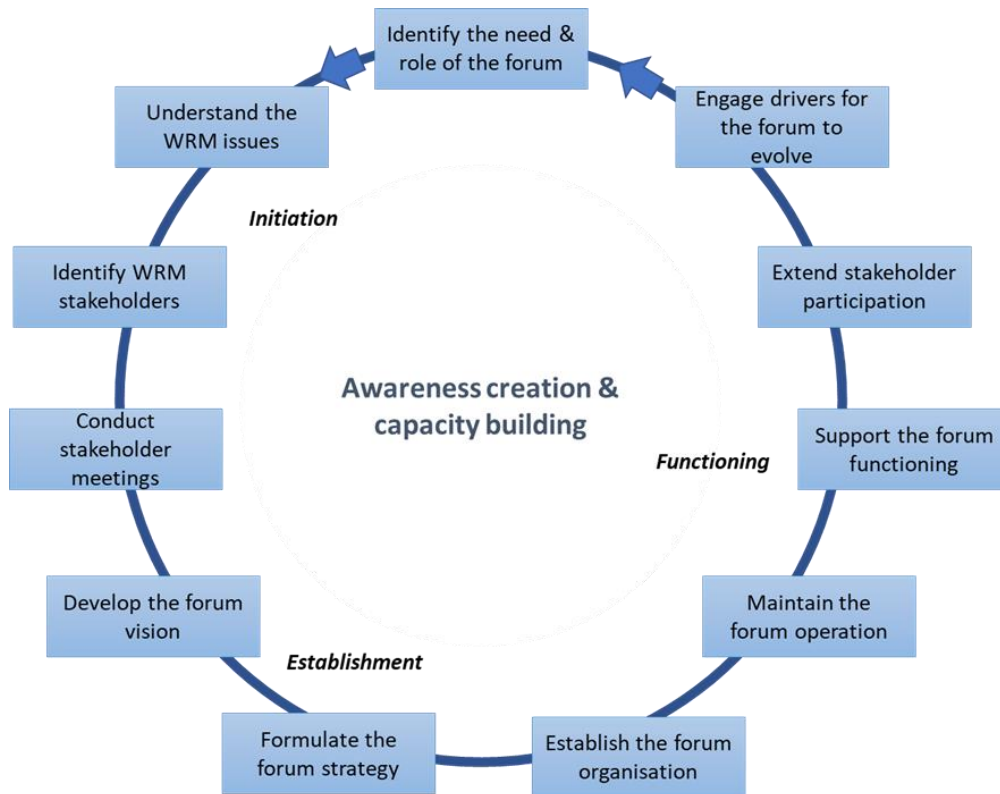
Facilitating stakeholder participation in water resource management (particularly around the development of a Catchment Management Strategy) is the catchment forum's core role. Catchment forums should:

- Be stakeholder consultative (participatory) bodies.
- Representing multiple (multi-lateral) viewpoints.
- Which is water-sector interest-based (particularly water resources management).
- Organised to operate in a participatory manner.
- Exist to enable stakeholders to participate to achieve agreed objectives.

There is often confusion between the role and desirability of a catchment forum versus a multi-sectoral WUA. The latter are statutory bodies established by the Minister of DWAF under Section 92 of the National Water Act. Both provide the opportunity for water users (authorised under the National Water Act) to pool their resources to perform collective activities that are generally related to the management of water resources schemes. However, WUAs have a stronger relationship to the CMA functioning as they must also fulfil the comprehensive requirements of a constitution, business plan and management arrangements specified in the National Water Act. A WUA is

accountable to its members (the water users) and the Minister. This differs from a catchment forum, which is primarily accountable to all stakeholders (whether water users or not) that wish to participate in water resource management.

Figure 7: Conceptual diagram illustrating a process to establish a Catchment Management Forum



Source: DWAF 2001

A2.4 | Water Users

A2.4.1 Schedule 1 water users

Domestic use of groundwater is allowed without a licence under Schedule 1 of the National Water Act. This is primarily because roughly two thirds of South Africans rely on groundwater for essential domestic needs. In particular, rural communities require access to groundwater without regulatory restrictions. However, in recent years, and certainly catalysed by the 2016-2018 drought and the Day Zero scenario in Cape Town, the number of homeowners installing boreholes has increased. Such boreholes are largely unregulated and unmetered; hence the CoCT as the regional WSA could not accurately understand how much water was being abstracted from aquifers. However, if working relationships can be formed with community representatives, such as homeowner associations and neighbourhood watches, these platforms could be used to enable early response to emergencies, dissemination of information, monitoring and potentially citizen science, and assist with behavioural change among communities.

A2.4.2 Industry and large water users

As mentioned in the introduction, industrial sectors and manufacturing use only a fraction of the country's overall water consumption, although industry may be significantly associated with point water pollution sources. In the Cape Town region, industry is however, particularly relevant to this study as industrial

zones access groundwater sources for their requirements. This includes the Atlantis Industrial Zone which is fed solely by groundwater and forms part of the Managed Artificial Recharge (MAR) area; as well as the industrial zones in Epping, Elsies River, Bellville, Montague Gardens and Parow, which also rely on groundwater resources.

If the link between surface water and groundwater is considered, large surface water users may also need to be considered. This may include golf courses, SA Breweries and food and beverage companies, and even the tourism sector.

A2.5 | Multi-stakeholder institutions

A2.5.1 Western Cape Water Supply System Steering Committee (Water Supply Augmentation)

In 2007, the then-DWAF and the CoCT developed a Water Availability and Use Reconciliation Strategy to ensure the ongoing reconciliation of supply and requirement from the Western Cape Water Supply System (WCWSS). A steering committee was established to ensure the Strategy's implementation. Whilst this is not a decision-making body, the objectives are for monitoring implementation progress, making recommendations and communication. It is however influential with regards to determining demand, reconciliation and identifying interventions through recommendations and it was under its direction that the Cape Flats Aquifer Management Strategy (2016) was prepared.

A wide range of stakeholders are represented, including all spheres of government, BGCMA, and water user associations such as the Berg Water Users Association. It is chaired by the Department of Water Affairs' Chief Director.

A2.5.2 Greater Cape Town Water Fund (GCTWF)

In 2016, the CoCT invited The Nature Conservancy (TNC) to explore the potential of a Water Fund to assist in addressing long-term water security concerns in a way that also tackles near-term social and ecological priorities. While the City took the initiative forward, the water fund concept was initially identified in the Provincial Biodiversity Strategy and Action Plan and thereafter tested in the Atlantis Aquifer in 2017. Based on this success, a partnership with the TNC was established, now called the 'Greater Cape Town Water Fund'. The purpose of the Fund is to safeguard water supplies, biodiversity, and rural livelihoods. Work includes clearing alien invasive plant species from catchments that supply Cape Town's water.

The potential fund benefits are ecological, social and economic. These benefits will be accrued in a variety of ways, including alien invasive plant removal from Cape Town's water supply catchments, where two thirds are affected. Important supporting information has also been prepared as part of the Fund's business case that illustrates the cost-effectiveness of alien plant removal as an alternative to grey, engineered infrastructure. TNC and the GCTWF Steering Committee are currently exploring further institutional development towards an independent entity.

A2.6 | Research institutions

Research partners such the Water Research Commission (WRC) and academic institutions play an important role in establishing needs and priorities, stimulating and funding research, promoting the transfer of information and technology, and enhancing knowledge and capacity building in the water sector. Its areas of focus encompass water resources management (including groundwater), water-linked ecosystems, water-use and waste management, and water use in agriculture (OECD, 2021).

While the WRC is the main research partner, there are others located in academic institutions. Future Water and ACDI at the University of Cape Town and the Water Institute at Stellenbosch University are important partners for the CoCT and in addition to providing valuable research also ***act as intermediaries by building relationships between local government and communities.***

A2.7 | Section 21 entities / NPOs

A2.7.1 Philippi Economic Development Initiative

Also important are the land-use management activities that play a significant role in the health of groundwater resources and the entities that manage and operationalise them. As such organisations such as the Philippi Economic Development Initiative, a Section 21 company that works with the local communities, farmers and other businesses in the Philippi Horticultural Area should be included in a broader management strategy and could fulfil an active implementing role.

A2.7.2 Community-focused NPOs

A number of civil society organisations and NGOs/NPOs are involved in initiatives to strengthen the resilience of water management especially as it relates to urban sustainability, within poorer communities across the CoCT. The South African Water Caucus (SAWC) and the Environmental Monitoring Group for example both work closely with communities around water-related issues, learning processes and building relationships.

A2.8 | City Improvement Districts

The CoCT's City Improvement Districts (CIDs) operate in specific areas and assist with providing additional services, including cleansing, communication and working with business partners. They too have networks of businesses and/or residents (depending on the area the CID services) and therefore offer leverage into communities.

A2.9 | Airports Company of South Africa

The Airports Company of South Africa (ACSA) is also a substantial landowner of the Denel site (otherwise known as Swartklip), where the airport is located. ACSA wants to develop the site as part of its runway expansion plan. How the substantial area upon which the airport is located and the Swartklip site is developed and managed will impact the Cape Flats Aquifer, making ACSA an important partner.

A3 | A framework for the Partnership

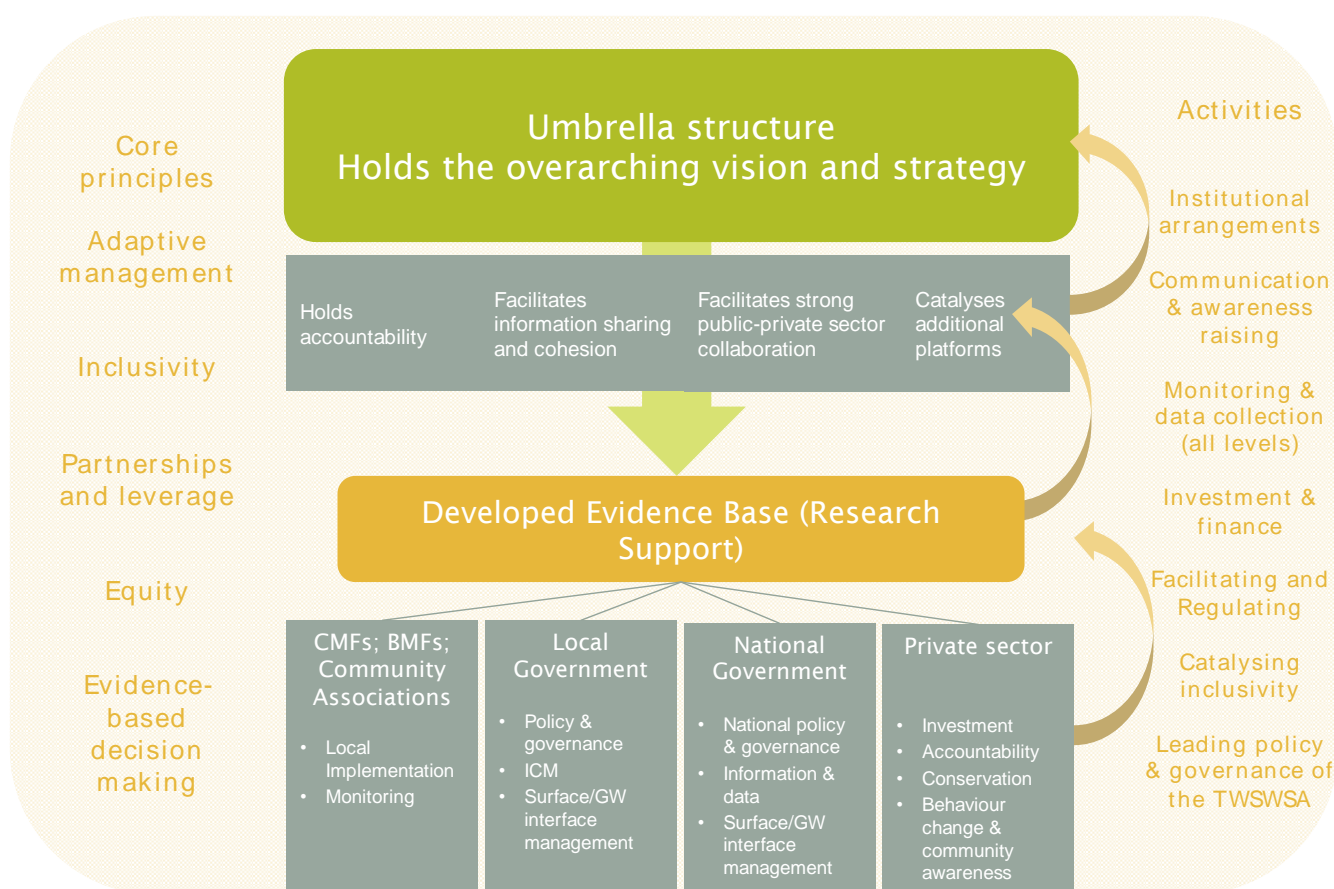
This section presents a draft framework for the emerging Partnership, structured as follows. The first section provides a diagram that graphically captures the proposed framework. Thereafter, the core principles and governance aspects appear as section 3.2, followed by a section on the secretariat as 3.3, and the evolution of the partnership (as section 3.4). Roles and responsibilities are discussed in section 3.5 and recommendations provided, in 3.6.

A3.1 | An emerging framework for the Partnership

The figure below presents a graphical representation of the structure, principles, activities and key pillars and partnerships of the emerging framework.

Key to the figure: The upward arrows at the right of the diagram indicate the feedback flows in the iterative/adaptive management cycle. In other words, the whole structure is subject to an iterative process of review and monitoring and learning by doing. The structure incorporates feedback flows from top-down and bottom-up, underpinned by the core principles of the framework, alongside.

Figure 8: An emerging framework for the Partnership



A3.2 | Purpose, governance, and core principles

This section is based largely on the lessons learned and principles that emerged from the case studies in the previous chapter, and therefore repeat key aspects of what has been said there.

A3.2.1 Core Principles

The Partnership should be based on a set of core principles: A central learning from all of the research that has underpinned this report is that an ***adaptive management, learning-by-doing approach is essential***. This will support a growing knowledge and understanding of the role groundwater can and does play in ensuring and improving water security. An incremental approach to evolving the TMSWSA partnership will provide the flexibility needed as we learn by doing, take actions, achieve successes, and make mistakes that we learn from. **Adaptive management is thus a key principle underpinning the Partnership Framework.**

Other key principles, emerging from lessons learned from experiences of establishing other (Ground) Water Partnerships and Networks around southern Africa and globally, are: Inclusivity, Partnerships and leverage; Equity; and Evidence-based decision-making.

- xii) The Partnership should have a clear purpose
- xiii) The Partnership relies on a common vision to promote its sustainability, mobilise resources and to operate effectively
- xiv) An effective Partnership hinges on a clear Terms of Reference (ToR)
- xv) Credible and transparent governance must visibly underpin the Partnership
- xvi) The Partnership must both embrace and engender participation, inclusiveness and consensus
- xvii) Transparency and responsiveness should characterise the Partnership
- xviii) Effectiveness and efficiency engenders legitimacy and credibility
- xix) The Partnership must uphold the rule of law and stimulate change as needed
- xx) Partnerships and networks need an institutional home and a legal structure, which in turn should be supported by a secretariat
- xxi) The structure and membership of the secretariat and partnership needs to reflect local circumstances while embodying key characteristics
- xxii) The Partnership must adopt, adhere to and routinely review a set of core principles

A3.3 | Characteristics and profile of the Secretariat

The secretariat would play the umbrella function outlined as critical from the key lessons learned above. Given its varied and integral core functions, the secretariat will firstly need to have legal standing and financial and management credibility.

Other critical characteristics include demonstrated knowledge and competence of water, at the strategic level, the ability and standing needed to catalyse community voices, and the capacity to act as an independent facilitator, which in turn could embody a regulatory function.

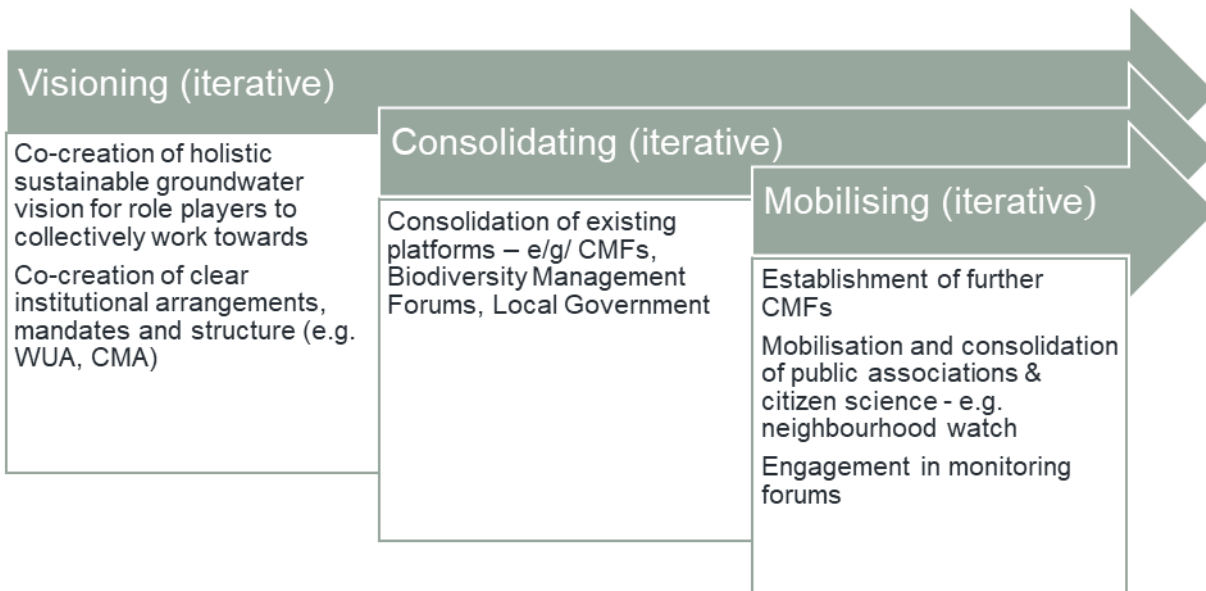
Notably, water resource management within the CoCT does not currently have in place and experience the benefits of an independent regulator. Until such time as it does, if this should happen, the secretariat could play this role to some extent.

A3.4 | Evolution of the TMSWSA Partnership

The Partnership was established and launched in November 2021, facilitated for WWF South Africa. It has a brand, a Partnership membership base and a vision, along with a governance structure in the form of a steering committee, which meets quarterly. The Partnership was launched during this project’s lifecycle.

In the run up to and following the partnership launch, the project team proposes that the Partnership adopts an incremental approach to evolving and formalising the Partnership and its members, while ensuring that the core functions, as outlined above, are enabled at the outset, so as to ensure that the evolution of the Partnership balances the need for urgency, scale and cohesion. **Figure 9** below sets out the incremental steps of visioning, consolidating and mobilising various elements of the Partnership. Progress has already been made, particularly in terms of visioning and mobilisation. However, all of these are iterative steps, and further validation and refinement is both possible and desirable. For example, a strategy for mobilising community voices would be useful, as well as revitalising existing CMFs and facilitating the creation of others.

Figure 9: An incremental approach to developing the Partnership



In terms of the core principles and governance requirements identified in earlier in this section, the Partnership model would include the secretariat (Facilitator/Integrator), serving as the umbrella structure in the medium term and perhaps even longer term. The key function institutions to the Partnership (e.g. WWF and CoCT, among others as outlined in Table 1 below) would contribute the core functions in accordance with their mandate and core competencies, as discussed earlier in this report. Notably, the Polokwane Partnership has functioned effectively under this type of structure for 10 years and is not seeing the need to change that at this point.

Box 3: Proposed thematic focus areas and leadership

Thematic focus areas and leadership

The Partnership will focus on a set of key areas or themes that are critical to unlocking the current challenges facing ground and surface water management in the TMSWSA context. While further research is ongoing to understand what these are for the next phase of the Partnership, the following themes are likely, given the MEL work and stakeholder reflections carried out under this project:

- **Monitoring and Data Collection** (including of licensing and registration of boreholes, of pollutants, of saltwater intrusion, water usage and abstraction, and discharge, enforcement, etc.)
- **Pollution Mapping** (noting that a key issue in the tension between ground and surface water management is contamination of groundwater resources because of inadequate surface water management)
- **Land-use planning and return flows analysis**
- **Behaviour change**

A public-private leadership structure is proposed, with communities considered as private sector and playing this co-leadership role as appropriate to the theme concerned. Community organisations are for example critical to the Monitoring and Data Collection thematic area, while large industry is central to pollution mapping and control action. Thus, co-chairs for Monitoring and Data Collection could be the CoCT and CFMs, while co-chairs for pollution mapping could be the CoCT and Industry, such as AB InBev.

A3.5 | Essential roles, responsibilities and actors

A key aspect in establishing a successful Partnership is establishing clear roles and responsibilities. In other words:

- ***What are the functions that an effective partnership must have***, without which it will be unable to deliver effectively?
- ***Which are the institutions and/or actors best positioned*** to deliver each function?

Of course, some institutions can play more than one role, and Table 1 below seeks to address this, bearing in mind that a key objective is that the Partnership be as lean as possible, to avoid it becoming encumbered by an unwieldy structure.

The research conducted for this project to date (through desk research, expert interviews, stakeholder engagement and benchmarking of other, related experiences) has highlighted the following as being among the key roles and responsibilities that are likely to be the essential, or core functions and services of the Partnership:

- Visioning
- Leading policy and governance
- Facilitating and regulating
- Catalysing inclusivity
- Managing accountability and governance
- Mobilising and managing resources
- Collecting and managing data
- Ecosystem management
- Strengthening interaction and planning between land-use, surface and groundwater management ‘

- Catalysing behaviour change
- Investing and financing

The results of mapping institutions against these core functions are reflected in Table 1 below. These results should be considered as emerging, rather than final. Further stakeholder engagement that is underway is needed to cement and enhance this analysis.

Table 1: Core functions and institutional mapping

Core function	Lead institution(s)/Actor(s)	Key support institutions/Actors
Visioning	Secretariat (Facilitator & Regulator)	City of Cape Town Department of Water & Sanitation
Leading policy and governance	City of Cape Town	Secretariat (Facilitator & Regulator)
Facilitating and regulating	Secretariat (Facilitator & Regulator)	City of Cape Town Department of Water & Sanitation
Catalysing inclusivity	Secretariat (Facilitator & Regulator)	Targeted NGOs
Managing governance and accountability	Secretariat (Facilitator & Regulator)	City of Cape Town
Mobilising and managing resources	Secretariat (Facilitator & Regulator)	City of Cape Town, DWS
Communications and Awareness Raising	Secretariat (Facilitator & Regulator)	Targeted NGOs
Collecting and managing data	City of Cape Town (Department of Water)	Department of Water and Sanitation (National Groundwater Archive) Research Institutions Targeted NGOs / Community Based Organisations
Ecosystem management	City of Cape Town (Department of Environment and Spatial Planning)	Community Fora (through the secretariat)
Strengthening interaction and planning between land-use, surface and groundwater management	Secretariat (Facilitator & Regulator)	City of Cape Town/Research Institutions
Catalysing behaviour change	Secretariat (Facilitator & Regulator)	Targeted NGOs
Investing & financing	Industry	City of Cape Town Greater Cape Town Water Fund

As is evident from the above table, the role of the secretariat is central. It is therefore worth outlining the key characteristics of this secretariat, and its role and functions.

A3.6 | Recommendations and way forward

The project team makes the following key recommendations for the continued evolution of the Partnership:

- **Adopt a set of defining principles for the Partnership, and locate adaptive management – or learning by doing – as the pivotal principle** for underpinning the Partnership Framework.
- **Agree and adopt a definition of sustainable groundwater management for the TMSWSA**, noting that Water governance should be considered as a priority for development as it is intimately linked to many other development issues such as poverty alleviation, health and well-being. It should be inclusive and coordinated across sectors and scales.
- **Consider establishing the Partnership as a Water User Association in the longer term and only if considered necessary based on the learnings and outcomes of ongoing Monitoring, Evaluation and Learning (MEL):**

The establishment of WUAs, or for the Partnership to become an established WUA, seems like a logical set in the evolution of the Partnership, providing legal standing and mandate. However, this structure requires ministerial approval, and therefore may result in delays and further red tape to the Partnership's progress.

- **Evolve the current Partnership model (as launched in November 2021) into a flexible but clearly mandated institutional arrangement** for the Partnership that is closely aligned with mandated bodies such as the CoCT.

While a WUA could, but not necessarily be, the ultimate objective, the Partnership needs to function and increase its stakeholder footprint with minimal red tape. It should do this with the right mix of partners that collectively and individually can deliver against all the key functions set out for and by the Partnership, under the umbrella host institution and secretariat. Critically, this institutional arrangement must embrace the key functions that the Partnership needs to embody.

- **Ensure that the Partnership structure embodies all the key functions that the Partnership needs** to deliver to be effective (and as outlined in Table 1 above) and that the roles and responsibilities of the different members are clearly articulated, communicated and monitored.

The key functions of the Partnership should include visioning and vision management resource mobilisation and monitoring and reporting, data management and TMSWSA resource monitoring, secretariat services, communication and awareness raising, among others.

- **Agree a host institution for the Partnership** that is a credible, legitimate and credit worthy institution that can attract and channel funding for the Partnership, act as a secretariat, effectively coordinate the Partnership and its function and activities, while also providing other key functions that the Partnership needs, and which are not brought by other members.
- **Consider establishing and mandating WWF South Africa, which has provided a strong facilitation role for the establishment and launch of the Partnership, as the host institution and secretariat.** In addition to its demonstrated ability to mobilise and manage resources in an accountable manner, WWF South Africa also has capacities for holding the Partnership's vision which aligns well with WWF South Africa's vision and mandate, mobilising, implementing and supporting communication and awareness activities, and for supporting the mobilisation of community fora for TMSWA development and monitoring.

- **Empower the Partnership, through its host institution and as supported by other appropriate partners, to mobilise inclusive, community level engagement in TMSWSA** development, management and monitoring is a pivotal success factor for the TMWSA, given the distributed nature of groundwater resources. The Partnership needs to make targeted efforts and dedicate resources towards mobilising and maintaining a network of CMFs that are representative of the key locations and issues that comprise and face the TMSWSA.
- **Through the host institution, pursue an open and engaging communication with the relevant municipal departments and the provincial Department of Water and Sanitation (DWS), among other key partners,** on an ongoing basis. A strong relationship is needed between DWS, the CoCT and the Partnership, so that the relevant officials / departments may guide and facilitate processes and procedures. At the same time, this open communication will enable the Partnership to easily and quickly raise concerns and requests for assistance, during their journey to achieving a well-functioning and effective Partnership, and sustainable groundwater governance. Open and robust communication between the key partners and actors is a critical success factor for the effectiveness and sustainability of the Partnership.

A3.7 Proposed next steps and activities

At the next Partnership Steering Committee, it is recommended that the below be agreed, followed by the implementation of the roadmap for the next 18 months (as agreed in the SC meeting):

- Consolidate the TMSWSA vision, and the process captured above, for the evolution of the Partnership, some of which this project has already achieved.
- Agree the five core principles (adaptive management, inclusivity, partnerships and leverage, equity, and evidence-based decision-making) as well as the functions for the Partnership, and establish these in a Partnership Terms of Reference. Include specific provision for identifying and mobilising an inclusive cross-cutting stakeholder base, and in particular communities that are vulnerable, through strengthening existing and mobilising additional CMFs.
- Identify and establish the umbrella organisation (i.e. the host institution and secretariat) through WWF South Africa as recommended above, or identify an alternate institution.
- Develop a Terms of Reference (ToR) for the host institution and secretariat.
- Identify suitable data repositories and enable data collection from monitoring sources, likely located in the CoCT. Agree protocols and channels for data collection and dissemination with the CoCT and empower the host institution to coordinate the dissemination of data to all key data users, through the Host Institution ToRs.
- Simultaneously, elaborate and begin an education and awareness raising campaign (or campaigns, targeted at different actors: community level, industry, business, local government, national government) to promote the principles.
- Establish a roadmap for the Partnership, along with an accompanying MEL process, for the next 18 months (incorporating the above where appropriate) and deploy the MEL process to inform subsequent roadmap iterations.

Think big, start small and scale fast is an important recommended motto for the Partnership, using MEL to identify the timing and entry points for scaling up activities.

Part B | Situation Analysis

B1 | Background: TMSWSA, water supply, groundwater, ecological & cultural value

B1.1 | Introduction

As an arid country, South Africa faces significant water-related challenges. As populations increase in urban areas, the demand for water and wastewater services grows, placing further pressure on ageing water supply and wastewater treatment infrastructure. The current estimated annual water consumption in South Africa is over 16 billion cubic metres, of which more than 60% is used for non-domestic purposes and is obtained from raw water sources. Primary water-use sectors such as agriculture, mining, and afforestation use about 93% of this water, while secondary industrial sectors and manufacturing use the remainder (IFC, 2019). Coupled with an increasing water demand, are the impacts of climate change and, an erratic and in some instances dwindling, water supply that is unable to keep up with the demand. Consequently, the National Water and Sanitation Master Plan states that South Africa will require 17% more water by 2030, than is currently available (Department of Water and Sanitation, 2018). South Africa is thus on an unsustainable water consumption path, with demand projected to outstrip supply in the medium term.

Historically, in this region, groundwater utilisation was regarded to be low, as Cape Town predominantly relied on surface water resources (CoCT, 2019). As evidenced by the 2018 Day Zero crisis, surface water is no longer an adequate, sustainable water supply for the city and its residents. Consequently, the CoCT's water strategy 'Our Shared Water Future' (2019) highlights groundwater as a valuable resource to augment surface water resource use during specific periods when surface water supplies are low. This will be coupled with several other strategies to reduce consumption patterns and augment supply.

Other shifts in practices during the recent drought, and thereafter, include a sharp increase in the development of boreholes and wellpoints for households and commercial use. Consequently, there is growing concern regarding the impact of shifts in groundwater consumption on this resource. There is also a concern that the existing groundwater management approach is not able to successfully present a comprehensive understanding of the status of groundwater systems, and thus inform effective, sustainable management of this resources.

Groundwater is not only a valuable resource for human consumption – it plays a valuable role in supporting the ecosystems that Table Mountain is famous for. This includes the Cape Floristic Region, several protected areas including the Table Mountain National Park, and invaluable riparian sites considered to be National Freshwater Ecosystem Priority Areas, including fish breeding sites, and various critical biodiversity areas of both terrestrial and aquatic systems. It is therefore a valuable resource to local ecosystems which in turn also provide ecological goods and services to local communities (e.g. flood attenuation, carbon sink), including recreational, cultural-heritage and tourism value. Considering the interdependence of the urban environment and natural ecosystems it is important that groundwater is both carefully managed and protected to ensure the water that feeds these ecosystems is not over-utilised or polluted.

Whilst the CoCT, as the local **Water Services Authority (WSA)**, could benefit from increasing local utilisation of groundwater, it is essential that a holistic evidence-based approach to resource use and management is put in place, which includes an understanding of private utilisation and interlinkages with land-use activities and development planning, including infrastructure requirements. Without robust governance and support systems, groundwater abstraction and use are unlikely to be sustainable, which represents a risk to water resources, ecological systems reliant on groundwater, and affects the water resilience of Cape Town, and its people. WWF South Africa, and several other actors including relevant government departments, recognise the importance of groundwater governance of the TMSWSA. Importantly, this includes the need for groundwater governance to be further developed to address the current and future challenges related to the use, protection and augmentation of groundwater resources within the CoCT area.

B1.2 | Table Mountain Strategic Water Source Area

The concept of SWSAs first emerged in the National Freshwater Priority Areas research and associated publication (i.e. ATLAS of National Freshwater Priority Areas, 2011). SWSAs are sub-quaternary catchments of relatively high mean annual runoff, high water yield areas and high groundwater recharge areas (CSIR, 2020). High water yield areas are defined as sub-quaternary catchments in which mean annual runoff is at least three times the average for the related primary catchment. These areas constitute only 4% of South Africa's surface area and are the 'water factories' of the country. However, only 18% of high water yield areas have any form of formal protection (DWS, 2019; Faragher, 2021). Consequently, these are key strategic areas that must be protected and maintained if national water security is to be achieved.

Since this initial identification, various efforts have been made to clarify the understanding of SWSAs, and to effectively integrate this knowledge into policy. Consequently, SWSAs and Critical Groundwater Recharge Areas have been identified through a research study conducted in 2013 by the South African Biodiversity Institute (SANBI), National DWS and the Council for Scientific and Industrial Research (CSIR). The WWF South Africa took this work further with the CSIR in 2013 (WWF, 2020), and more recently, in 2016, the WWF South Africa and Centre for Environmental Rights embarked on the Secure our Strategic Water Source Areas project to identify and advocate for the urgent adoption of legal mechanisms to protect our strategic water sources. This project relied on a comprehensive body of work undertaken by the Water Research Commission (WRC), the CSIR, the SANBI, the DWS, and the Department of Environmental Affairs, with review and refinement by the CSIR and WWF South Africa (Le Maitre et al, 2018; SANBI, 2020; Faragher, 2021).

The TMSWSA is one of 22 surface SWSAs in South Africa, and a significant contributor to water security. At only 45,943 hectares of surface area, it is the smallest water source area (Centre for Environmental Rights, n.d.), despite feeding South Africa's largest municipality (Figure 10 and Figure 11). This SWSA covers the extent of Table Mountain, the Cape Peninsula and Cape Flats. Since 2015, 81% bulk water has been supplied from the Boland SWSA and via the Western Cape Water Supply System (WCWSS) with a lesser 1.7% coming from the TMSWSA. The supply from 2019 onwards, however, includes water from other 'new augmented' sources including groundwater (Naicker, Holloway & Barrow, 2020 in Faragher, 2021). Following the water crisis and Day Zero, many residents (particularly of more affluent households) have developed access to additional water supply through boreholes and rainwater harvesting. In addition, the CoCT is in the process of developing additional supply sources (e.g. desalination, reverse osmosis, groundwater sources).

Table Mountain and its surrounding slopes receive higher rainfall than the surrounding Cape Flats region. The average rainfall for Cape Town is 600 mm a⁻¹. Whilst the slopes of Table Mountain receive 992-1697

mm a⁻¹ (measured between 1996 and 2008 at University of Cape Town on the eastern slopes, Harris *et al.*, 2010).

Figure 10: Extent of the TMSWSA, including consideration of individual source areas

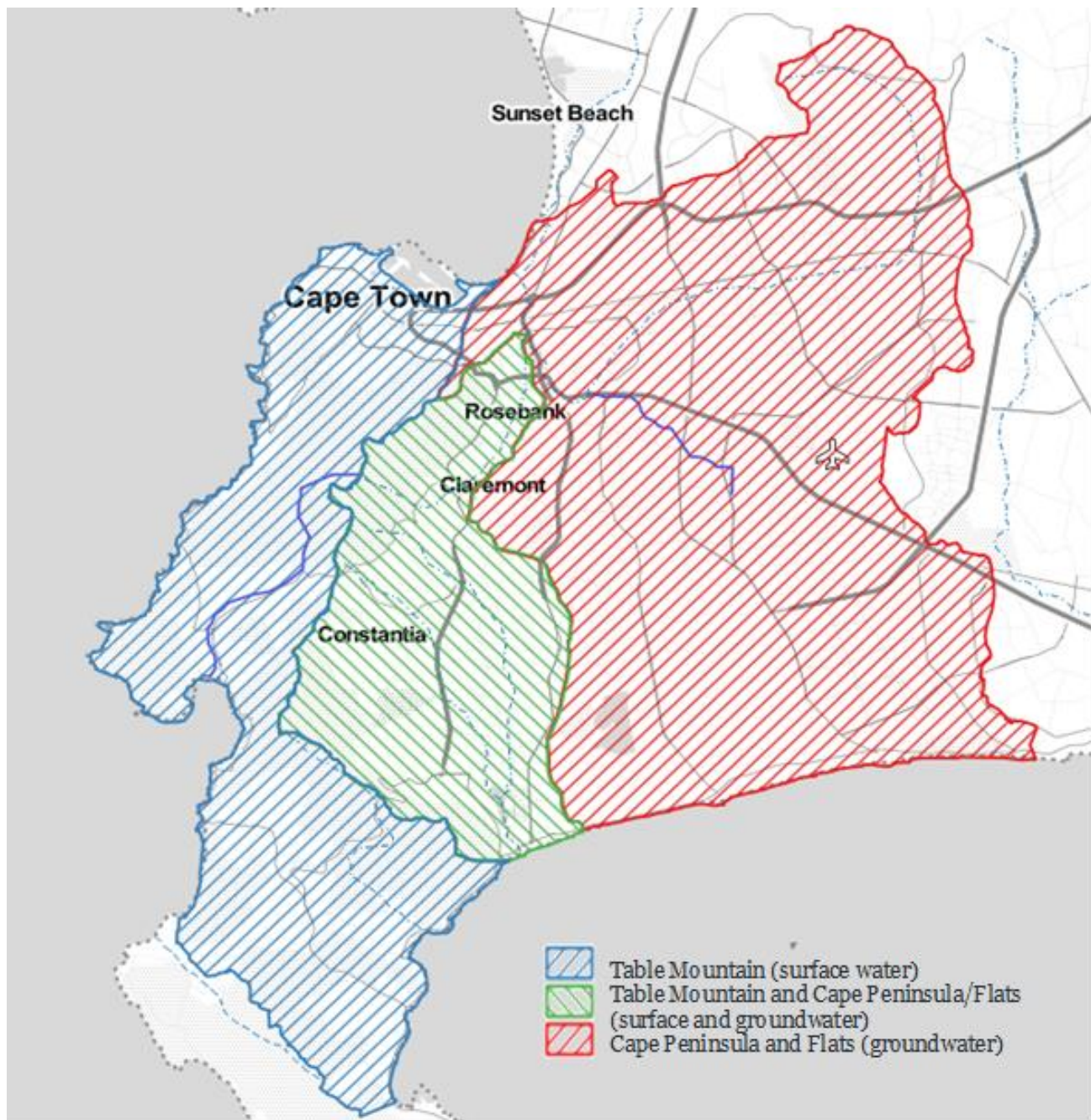
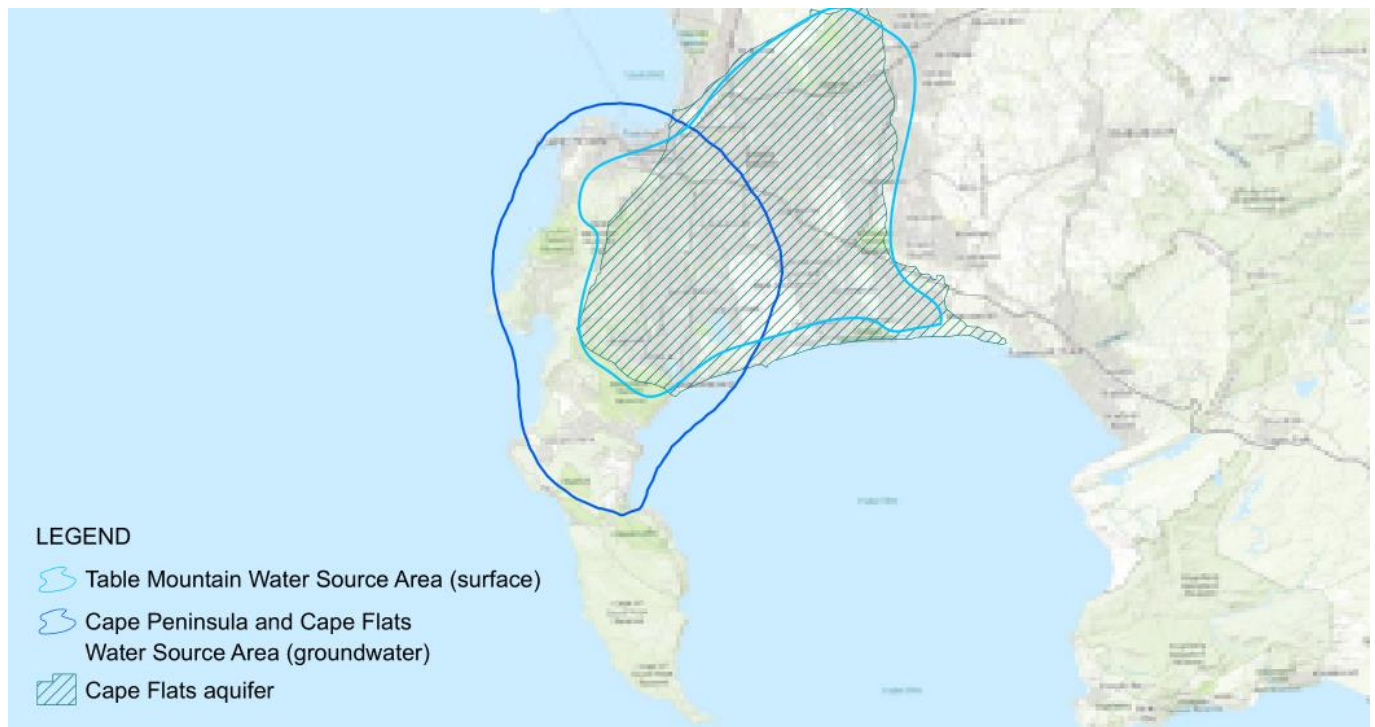


Figure 11: Table Mountain Strategic Water Source Area boundary



Source: WWF, 2020

B1.3 | Table Mountain Group Aquifer

The Table Mountain Group Aquifer is composed of mainly sandstone overlying granite. It is a fractured rock aquifer system, with uncertainty regarding aquifer properties, storage capacity and recharge rates - all of which change throughout the aquifer, primarily due to fractures and their properties.

Despite this uncertainty, the Table Mountain Group Aquifer has the potential to provide significant bulk water supply if utilised sustainably. Unfortunately, previous abstraction projects have failed because abstraction exceeded recharge as a consequence of a lack of geological surveys. Estimations by Harris et al., 2010, suggest that recharge is relatively quick, with 50% recharge being possible in three years. Sustainable usage of the Table Mountain Group Aquifer water, based off sound geological surveys, is necessary to allow water to be abstracted without causing the aquifer to drain beyond its recharge capacity, providing valuable water resources for Capetonians, without disrupting important ecological processes.

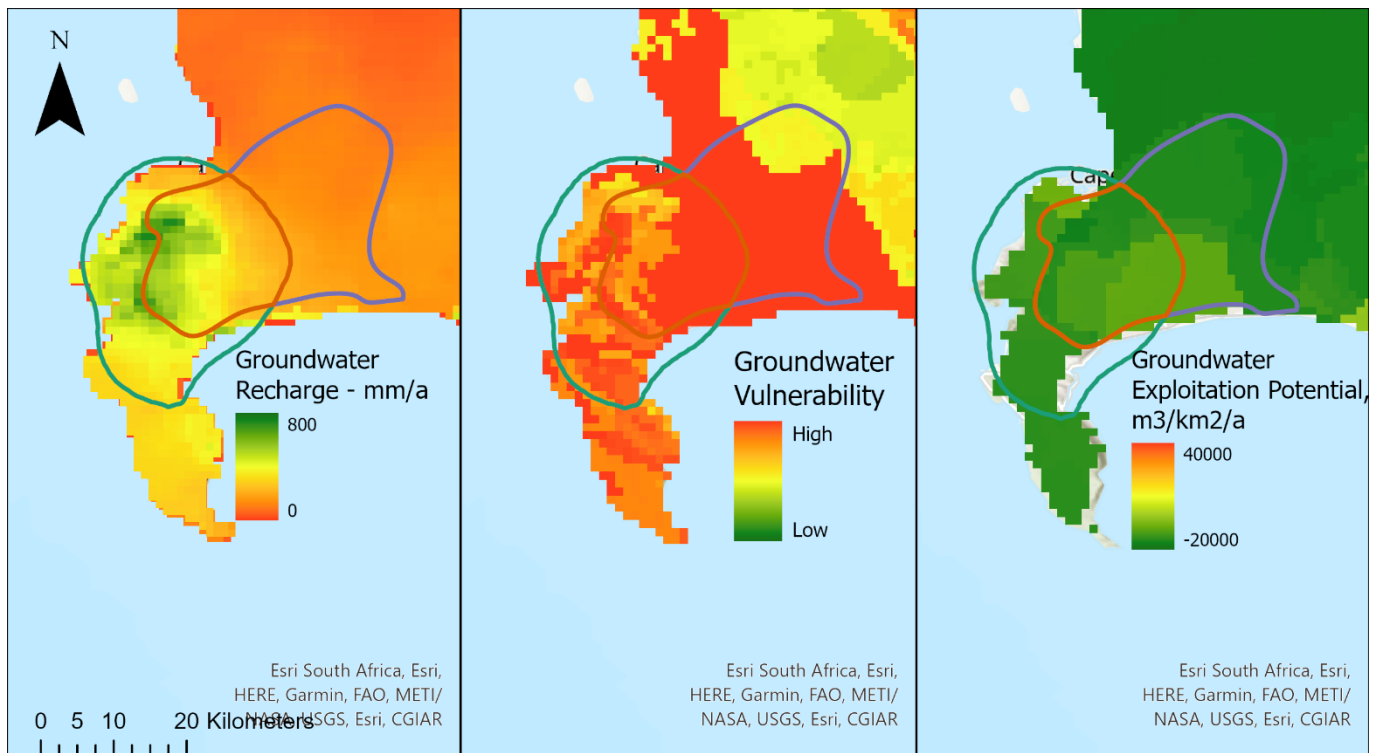
B1.4 | Cape Flats Aquifer

The Cape Flats Aquifer is a coastal plain sand aquifer, with predominantly good quality water, but confined sources of pollution are disrupting the quality of certain areas. Due to its geology, it is particularly vulnerable to pollution from the surface, and groundwater management systems must take this into account (Adelana, Xu and Vrbka, 2010). Both point and diffuse pollution sources affect the aquifer, and hence it has been suggested that careful zoning must be used to prevent widespread pollution (Adelana and Xu, 2006). Studies have also shown that managed aquifer recharge (MAR) can give multiple benefits to the Cape Flats Aquifer, because of its physical characteristics. Due to seasonal flooding and the seasonal nature of surrounding wetlands, it has been recommended that the aquifer is used for summer water supply in Cape Town, treating the Cape Flats Aquifer as a water storage mechanism. Achieving the correct balance of abstraction and MAR in the Cape Flats Aquifer could not only yield significant amounts of water for Cape Town, but also prevent winter flooding, without impacting surrounding wetlands (Mauck, 2017).

B1.5 | Groundwater exploration

Figure 12 illustrates the overall status of groundwater in the greater Cape Town area, considering both the Cape Flats Aquifer and the Table Mountain Aquifer. Whilst groundwater exploitation potential is high (c), so is groundwater vulnerability (b), showing that careful management of all parts of the water system is required to prevent overextraction and pollution. Additionally, given the interconnected nature of the water system, understanding the strongly interrelated nature of surface water and groundwater is important to prevent a deterioration in groundwater quality. This is discussed further in section 2.4 (Ecological Value), with descriptions of the present ecological status of wetlands and watercourses (Figure 13).

Figure 12: Groundwater recharge, vulnerability and exploitation potential for the Western Cape



Water Source Area

- ▭ Cape Peninsula and Flats Groundwater
- ▭ Table Mountain Surface Water
- ▭ Table Mountain Surface Water, and Cape Peninsula and Flats groundwater

Source: Data sourced from the National Groundwater Archive, August 2021

B1.6 | Ecological and cultural value

A significant part of the TMSWSA encompasses conservation areas, sites of conservation significance, or national park land, all with significant biodiversity (Figure 13). Table Mountain National Park itself is a World Heritage Site due to its unique biodiversity (Van Wilgen, 2012), which mainly consists of Fynbos vegetation, but also contains more than 2000 species of plants, many of which are endemic (Chadwick, 2016). It is suggested that this diversity is in part caused by the climatological differences in such a small area, including the winter-rainfall regions of the Table Mountain where climate also changes with altitude,

and the drier surroundings. Additionally, the western coastal slopes of Table Mountain are exposed to heavy seas, which combine with north-westerly winter winds to carry and deposit salt-laden aerosols on wet terrestrial soils, supporting different plant species (Cowling et al., 1996).

The Cape Floristic Region: Table Mountain, and parts of the surrounding Cape, make up the Cape Floristic Region. As the smallest and richest of the Earth's six floral kingdoms, and home to half the country's plant species, the Cape Floristic Region is a unique hotspot of biodiversity that holds significant cultural and scientific value (Table Mountain Fund, 2021).

Invertebrates: Table Mountain is noted as a particular area of importance for invertebrates, which provide significant ecosystem services for the native floral species (Picker & Samways, 1996). Invertebrate species distribution is not well studied in comparison to floral species. However, it is known that population density and diversity decrease with altitude (Pryke & Samways, 2008), and hence the lower slopes of Table Mountain and surrounding areas are of high importance. Unfortunately, these areas have the greatest disturbance, threatening assemblages not only through loss of habitat because of urbanisation and related anthropogenic activities; but also, through the support of competing species. Examples include the European wasp, which threatens native species on the peninsula, and the invasive Argentine ant, which thrives in these environments (Pryke & Samways, 2008). In particular, the Argentine ant spreads through waterways, originating in disturbed and polluted areas, and hence forest stands surrounding waterways have been found to have significantly lower numbers of local species (Human & Gordon, 1999). Waterway management is therefore critical to prevent pollution and the displacement of local species.

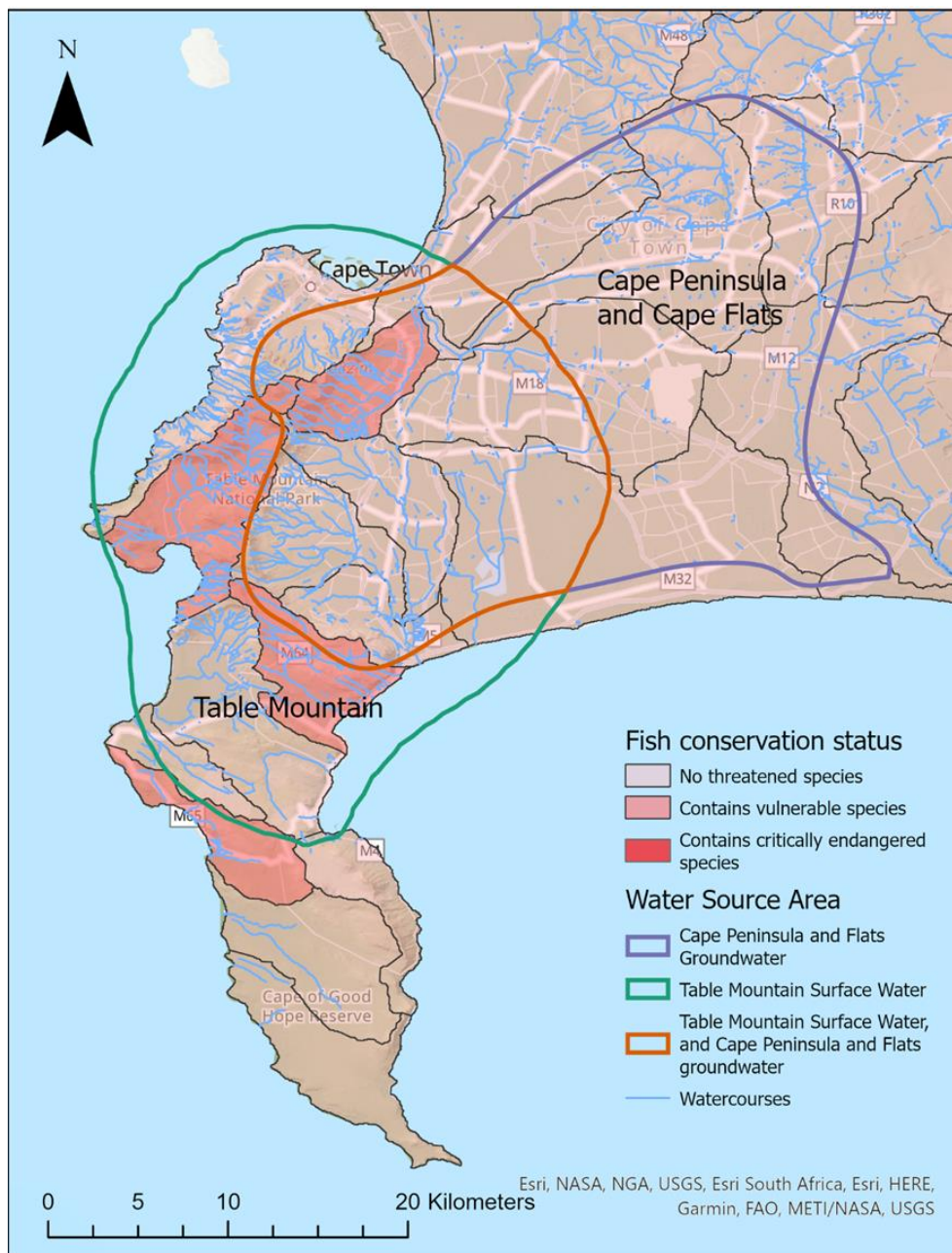
Fish conservation is another conservation activity closely tied with water management. Freshwater fish species are vulnerable to the impacts of siltation, freshwater deprivation through abstraction, pollution and general degradation of waterways (Whitfield & Cowley, 2010). Unlike floral species or most vertebrates and invertebrates, most fish species associated with southern African estuaries cannot be confined to specific protected areas by barriers (Whitfield, 1997). This does not mean that all areas of freshwater and shoreline must be protected. However, there must be sufficient space for species to breed and feed safely. In addition to water quality, there is concern that overfishing is leading to the decline of certain species (Whitfield, 1997), and whilst this is not directly related to groundwater, it is related to the holistic biological condition of aquatic ecosystems and highly vulnerable to external influences, it cannot be ignored in conservation efforts. Figure 14 provides a snapshot of the status of fish species in the TMSWSA catchments, with several areas containing vulnerable and critically endangered species.

Vegetation quality: Additionally, vegetation quality can significantly influence groundwater availability. Compared to other vegetation types in South Africa and commercial forests particularly, Fynbos vegetation results in less overland flow, leading to less erosion and flooding (Scott, 2000). If misuse of groundwater leads to poor vegetation quality, a negative feedback loop could begin, where the degradation of vegetation leads to more 'water repellent' soils (Scott, 2000), accelerating the reduction in groundwater quality and availability, as well as increasing other water-related disasters such as flooding. It is therefore important to consider biological conservation as a very important element of groundwater management in the Table Mountain National Park and its surroundings. To preserve biodiversity, groundwater must be well managed, and to preserve groundwater, biodiversity must be well managed.

Figure 13: Location of sensitive terrestrial and aquatic ecosystems relative to the TMSWSA



Figure 14: Status of fish species in the catchments of the TMSWSA

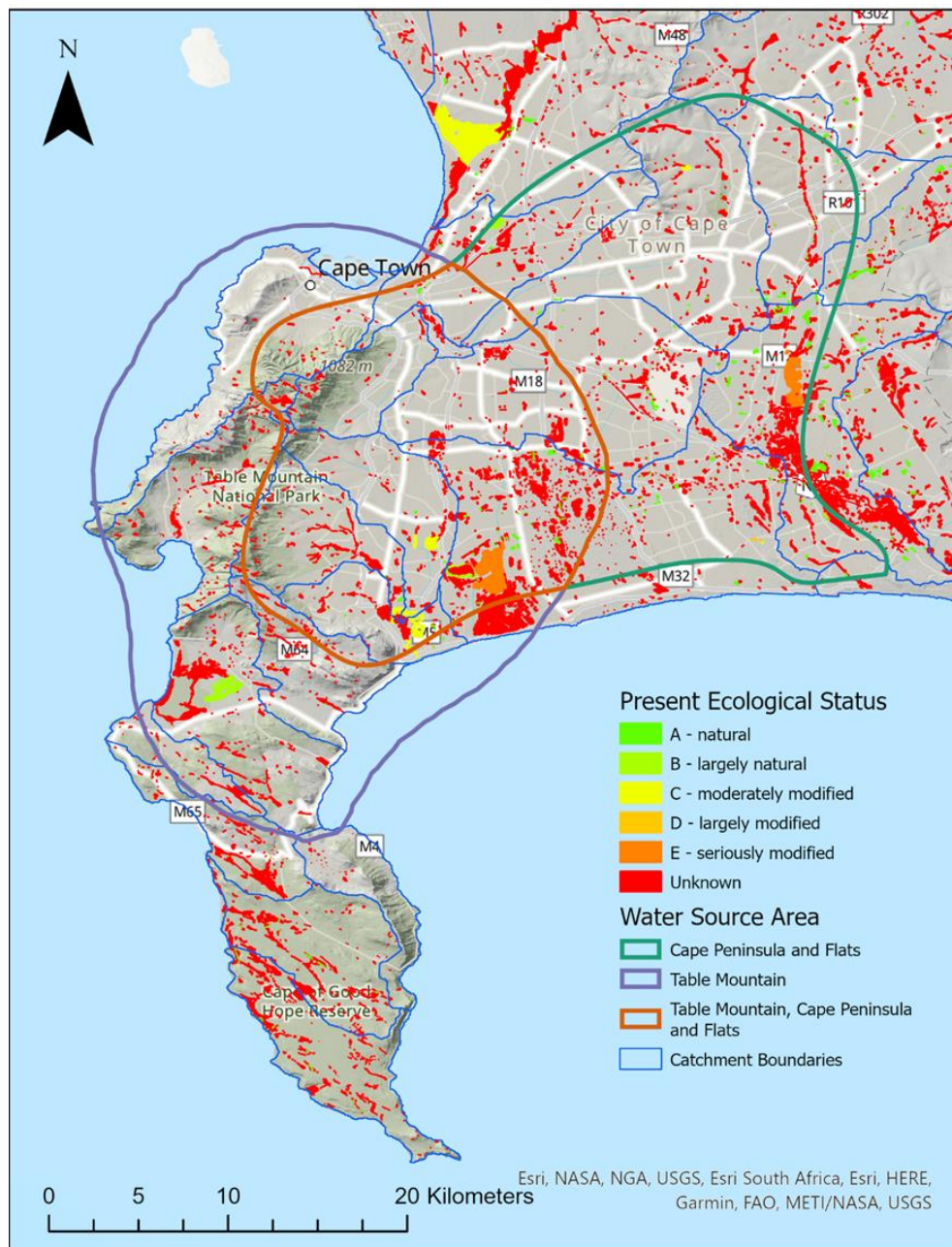


Source: CoCT Open Data Portal, National Freshwater Ecosystem Priority Areas, August 2021

Human activities: Whilst the area is a microcosm of biogeographical diversity, it is also a hotspot for the human activities that threaten biodiversity, including urbanisation (formal and informal), pollution of all forms, introduction of alien organisms, poorly managed plant harvesting, and tourism (Cowling et al., 1996; Picker and Samways, 1996). Figure 15 illustrates the impact of anthropogenic activity on water bodies, with a large number reported to be modified to seriously modified, indicating that they are no longer ecologically functioning. This is no surprise given that most rivers in the metro are canalised, with high levels of pollution. The protection of biodiversity requires a multipronged approach to land-use management, and the holistic management water systems. Particularly groundwater, is of great importance - groundwater quality and availability are key to the survival of species and continuation of biodiversity and species conservation efforts. Slight changes in groundwater quality can cause extinction of endemic species, but can promote hybridisation with common species, complicating difficult

conservation procedures (Picker & De Villiers, 1989), and therefore surface biological conservation efforts will not be successful if groundwater quality and availability is not well managed.

Figure 15: Present Ecological Status of wetlands and rivers



Source: City of Cape Open Data Portal, August 2021

B2 | Key policy and legislation

B2.1 | Summary of key policy and legislation

Water management has evolved significantly over time in South Africa, from responding to the early concerns of pre-colonial settlers and colonial settlers regarding property rights, to more recent grappling, in strategies, policies and legislation, with more complex and interrelated issues of equality, accessibility, integrated resource management, pollution control and management, infrastructure, and future planning. Table 2 provides a summary of key legislation and policy relevant to groundwater governance. Thereafter, Table 3 presents this information viewed through the lens of key land-use and water user activities. Table 3 also further highlights various overlaps in legislated requirements, key points of guidance and links to roles and responsibilities in terms of water governance, as envisioned by these key instruments.

Table 2: Summary of national and local policy and legislation relevant to water governance of the resource and associated infrastructure

Theme	Instrument	Brief description
Water & wastewater resources & associated infrastructure and policy and strategy	National Water Act 36 of 1998 (NWA)	<p>Drafted based on the guidance provided in the White Paper on Water and Sanitation (1997), commonly referred to as the National Water Policy, for developing water law, water management systems and principles to guide policy development that can give effect to responsible groundwater use, and water resource management and use that is equitable, sustainable, and efficient.</p> <p>Together with the Water Services Act and the supporting regulations, the NWA provides a critical legal framework for all water-related activities, and water resource management and use, across the country. In addition, it provides the imperatives for integrated water resource management and describes the purpose and objectives that inform the National Water Resource Strategy, and various other regional and local policies.</p> <p>Some noteworthy points which the NWA enables, considering the focus of this paper:</p> <ul style="list-style-type: none"> ● Water belongs to the people. ● The state fulfils the role of custodian, and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner. ● National government is responsible for and holds authority over the nation's water resources and their use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters. ● Groundwater use is described in the regulations under four categories: <ul style="list-style-type: none"> ○ Existing lawful use ○ Schedule 1 - which is typically considered to be domestic water use, and emergency situations) – no application to DWS is required for authorisation. However, boreholes should be registered with provincial offices, and monitoring of consumption values should be provided monthly (see section 5.2.2). ○ General authorisation (GA) – required for specific

Theme	Instrument	Brief description
		<p>water uses, as well as for a threshold of water use (greater than domestic consumption but less than what is required for a licence). The list of activities is published by the Minister in the NWA regulations, and typically apply to water abstraction and discharge, but differ across the country based on various conditions and reserve¹ determination.</p> <ul style="list-style-type: none"> ○ Licence use – referred to as a water-use licence authorisation (WULA), and covers a range of water abstraction, use and recharge related activities that fall outside of the previous categories. The application process of a WULA is typically rigorous and can take a year to complete, covering a range of aquatic and water quality studies, to inform both resource and source-directed measures. Should the WULA be granted, it may contain various conditions (e.g., monitoring, quality thresholds, etc.), and may be conditional on other licences/permits (e.g., National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) regulations and associated Strategic Environmental Management Acts (SEMAs)). The WULA is granted for a limited period. ● Both the GA and WULA are currently issued by DWS. ● Chapter 14, Part 2 requires the establishment of a national monitoring and information system (or systems) because the availability of information about water resources is critical to the main purpose of the NWA. Section 139.2(a) refers to a national groundwater information system, which has been realised as the National Groundwater Information System (NGIS) Portfolio. This includes the National Groundwater Archive (NGA) which is updated regularly and provides data to the public and private sector for free (specifically data focused on geosites or boreholes, dug wells, seepage ponds, springs, etc.).
	Water Services Act 108 of 1997	<p>Builds on the White Paper on Water Supply and Sanitation (1994) and gives effect to the constitutional right of South Africans to sufficient water for basic human needs. It provides a framework for the provision of water supply services to households and commercial users, including sanitation services, domestic wastewater treatment, sewage and effluent related to commercial water use. Its main objectives are to provide for:</p> <ol style="list-style-type: none"> (a) the right of access to basic water supply and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health or well-being; (b) the setting of national standards and norms, and standards for tariffs in respect of water services; (c) the preparation and adoption of water services development plans by water services authorities; (d) a regulatory framework for water service institutions and water service intermediaries;

¹ The water reserve refers to the base flow required in a water body to meet the needs of basic human requirements and ecological functioning (often referred to as the ecological reserve).

Theme	Instrument	Brief description
		<p>(e) the establishment and disestablishment of Water Boards and water services committees and their duties and powers;</p> <p>(f) the monitoring of water services and intervention by the Minister or by the relevant Province;</p> <p>(g) financial assistance to water service institutions;</p> <p>(h) the gathering of information in a national information system and the distribution of that information;</p> <p>(i) the accountability of water service providers; and</p> <p>(j) the promotion of effective water resource management and conservation.</p>
	National Groundwater Strategy (NGS), 2016	<p>The National Groundwater Strategy, 2016 (NGS) was established in line with a requirement under the NWA that dictates that strategies should be developed to facilitate the proper management of water resources. It is an integral part of the National Water Resource Strategy 2013 (NWRS2), which responds to several other policy instruments considered to be key drivers for change, and that are therefore national strategic imperatives as reflected in the document:</p> <ul style="list-style-type: none"> ● South Africa's vision for 2030 as articulated in the National Development Plan (NDP). ● National Government Outcomes outlined in National Government's Programme of Action 2010-2014. ● Sustainable Development Goals, in particular SDG 6: Ensure availability and sustainable access to water and sanitation for all. <p>The 2016 National Groundwater Strategy provides a review of the 2010 strategy, managed by DWS. Building from lessons learned, the 2016 strategy aims to improve the recognition of the strategic value, use and protection of groundwater in the country. It unpacks various challenges and opportunities under themes and includes a recommended institutional restructuring to improve IWRM and specifically groundwater governance, which includes the suggestion of devolution of power to local government.</p> <p>Through the national strategic imperatives (as mentioned above) this strategy frames groundwater as a significant resource for conjunctive use, towards water security for the country and transboundary users. This includes consideration of requirements addressing historical legacies, economic growth requirements, the need to improve efficiency of water use, education and training, management of pollution, ecological functioning and protection of the aquifer, and conservation.</p>
	Policy and Strategy for Groundwater Quality Management in South Africa, 2000 (PSGQM)	<p>The PSGQM provides a framework for detailed management procedures that can be developed and implemented to address broad functional strategies and institutional arrangements for groundwater quality management. These guiding policy principles are centred around sustainability related to the protection, use, development, conservation, management and control of water resources; grounded in a wholistic understanding that current basic needs must be met, allowing for equality of access across the country, sharing of resources with other countries, promotion of social and economic development through water use, and the need to establish suitable institutions to achieve the purpose of the NWA. Policy goals include:</p>

Theme	Instrument	Brief description
		<p>a) Implementation of source-directed controls to prevent and minimise 'at source' development impacts on groundwater quality by imposing regulatory controls and providing incentives;</p> <p>b) Implementation of resource-directed measures to manage impacts and protect the reserve for beneficial purposes; and</p> <p>c) Remedying groundwater quality where practical to protect the resource and ensure that remediation measures are fit-for-purpose.</p>
	City of Cape Town Water By-Law, 2018	<p>Water supplied to any premises must pass through a meter installed at the cost of the owner under supervision of the City.</p> <p>Installation of boreholes, wellpoints, or similar, must be approved by the city and be installed in accordance with demands of the city.</p> <p>Water users consuming more than 10,000 kilolitres per annum (excluding users comprised of multiple dwellings) must provide an annual water audit.</p>
	City of Cape Town Stormwater By-law, 2005	<p>Only stormwater may be discharged into the stormwater system.</p> <p>No person may obstruct or interfere with the stormwater system in any way, including excavations above, within, under or next to any part of the system.</p> <p>In the event of pollution or disruption to the system, the person responsible will, at their own cost, take all reasonable measures (in the opinion of the Council) to minimise the effects of the pollution, including the rehabilitation of the environment.</p> <p>Private stormwater systems must be maintained at the landowner's expense to the level required by the Council.</p> <p>It is the opinion of the Council that dictates to what extent citizens are responsible for maintenance or repairs of stormwater systems.</p>
	<p>Wastewater and Industrial Effluent By-law, 2013 - <i>Dictates the responsibilities of property owners</i></p> <p>National Building Regulations and Building Standards Act 1977, (Act 103 of 1977) – <i>Dictates the limits</i></p>	<p>Property owners are responsible for creating private sewers connected to the municipal sewage network.</p> <p>Industrial effluent discharge lines must have a sampling chamber. Industrial effluent must not mix with domestic sewage before the sampling chamber.</p> <p>Stormwater must not enter sewer installations, except with consent from the Council.</p> <p>Any industrial effluent containing grease, oil, fat or inorganic matter in suspension must be treated before entering any sewer. Any cleaning agents within the effluent must not form stable emulsions or solidify in the system. Any person permitted or granted to dispose of industrial effluent must pay the city a charge in accordance with the tariff decided by the City.</p> <p>Domestic and industrial effluent must comply with the standards set by the Council, including volume, temperature, pH etc. The council may disconnect any private sewer system that fails to comply at the cost of the owner.</p> <p>Blockage clearing and maintenance of private sewers must be conducted at the expense of the owner, and within a timeframe dictated by the City. Beyond that timeframe, the city may conduct maintenance of their own accord at the expense of the owner.</p> <p>CoCT must be able to receive wastewater via road transport if alternative disposal is not available. This is at the cost of the waste generator and must be arranged and approved</p>

Theme	Instrument	Brief description
Water services planning & spatial planning	Municipal Systems Act 32 of 2000	<p>Both water services planning and spatial planning are local government mandates.</p> <p>Local government operates within the framework of the Municipal Systems Act. It provides core principles, mechanisms and processes to enable municipalities to move towards the social and economic upliftment of local communities and ensure affordable universal access to essential services, such as water.</p> <p>The municipality is directed to undertake developmentally oriented planning that meets its section 152 constitutional obligation to among others, ensure the provision of services to communities in a sustainable manner and promote a safe and healthy environment.</p> <p>Municipalities are responsible for spatial planning and must therefore play a leading role. This leading role is facilitated through planning and implementation processes associated with the Spatial Development Framework (which falls under SPLUMA and local by-laws of Land Use Management), Integrated Development Plan, and associated supporting policy and planning documents including sectoral plans.</p>
	Spatial Planning and Land-use Management Act 16 of 2013 (SPLUMA)	<p>SPLUMA provides South Africa with a framework for spatial planning and land-use management. It specifies the relationship between the spatial planning and the land-use management systems, as well as other planning instruments; with the objective of providing for inclusive, developmental, equitable and efficient spatial planning within the different spheres of government. It achieves these objectives via a framework that provides for monitoring, coordination; policies, principles, norms and standards for spatial development planning and land-use management; and facilitation and enforcement.</p> <p>SPLUMA considers environmental factors that include water and the need for sustainable development that does not detrimentally impact water resources and protects the right to sufficient water.</p> <p>While water and environment-related development decisions are taken at a provincial level, city-scaled spatial planning decisions are taken by local government, as per the SPLUMA.</p> <p>The objectives of SPLUMA relevant to this research are:</p> <ul style="list-style-type: none"> ● Provide for development principles and norms and standards. ● Provide for the sustainable and efficient use of land. ● Provide for cooperative government and intergovernmental relations among the national, provincial and local spheres of government. <p>It follows that these objectives are reflected in the planning documents that the Act requires municipalities to prepare, such as the Integrated Development Plan, the Spatial Development Framework and the Land-use Scheme.</p>
	City of Cape Town, Municipal Planning By-law, 2015	<p>The Municipal Planning By-law gives effect to the SPLUMA requirements at a municipal level, guiding spatial planning and land-use management implementation, including engineering services and related infrastructure requirements. Any land-use changes would be implemented in terms of this by-law and the zonings therein.</p>
Environment	CoCT Environmental Health By-Law	<p>This by-law specifies that:</p> <ul style="list-style-type: none"> ● No person shall allow foul or polluted water/liquid to flow from any premises.

Theme	Instrument	Brief description
		<ul style="list-style-type: none"> No person shall fail to maintain the sewers, drains, water fittings, wastewater fittings, water closet fittings and all other sanitary accessories, within the boundary of their property. No person shall cause or permit any stream, pool, ditch, drain, gutter, watercourse, sink, bath, cistern, water closet, privy or urinal to become foul. No person may pollute water to which inhabitants of the area have the right of use or access.
	National Environmental Management Act No. 107, 1998	<p>Under Chapter 3, it is stipulated that every national department (listed in Schedule 1 and 2) exercising functions which may affect the environment must prepare an environmental management plan, and an environmental implementation plan at least every four years. This is intended to coordinate and harmonise environmental policies, plans, programmes and decisions of national departments to minimise duplication of procedures and functions and promote consistency in the exercise of functions that may affect the environment.</p> <p>Under Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended 2014), and the associated EIA regulations, requirements have been set out for applications for authorisation related to specific environmental activities. These applications are to be made by individuals / institutions responsible for the listed activity, to the Competent Authority in their respective geographical region. This is intended to aid decision-making related to land use and associated impacts. It remains the responsibility of the Department of Environmental Affairs and Development Planning and the Department of Mineral Resources (Western Cape) to review and either grant or refuse authorisation, however various departments across the spheres of government play a critical role as commenting authorities.</p> <p>The NEMA should be considered in conjunction with the Strategic Environmental Management Acts (SEMAs), which also give effect to and guidance on management and conservation related to various other areas – Protected Areas Act, Air Quality Act, Waste Act, etc.</p>
Climate change	<p>Water and Sanitation Sector Policy on Climate Change, 2017</p> <p>Water for Growth and Development Framework (WGDF)</p> <p>National Water Resources strategy (NWRS)</p>	<p>Collectively this suite of policy contextualises water resource management and planning into the future, through the understanding of the current state of climate variability, including rainfall, stream flow, surface and groundwater levels, recharge, sea levels, temperature and evaporation. In particular, the need to understand the interdependencies between water, energy and food to reduce trade-offs and increase co-benefits is highlighted.</p> <p>Vulnerability assessment of hydrological systems, socio-economic impacts and ecosystems further provide informed decision-making, as outlined in these documents. As well as understanding of non-climatic stress factors such as land-use, situation, variations in demography and pollution.</p> <p>Through these documents there is mainstreaming of climate change adaptation into planning and management processes, into policy formulation, practice, budgeting and implementation.</p> <p>It is also worth noting that the Groundwater Management Strategy recognises that climate change adaptation strategy should be considered to assure the continuity of water supplies.</p>

Theme	Instrument	Brief description
	<p>Water and Sanitation Sector Policy on Climate Change, 2017</p> <p>Water for Growth and Development Framework (WGDF)</p> <p>National Water Resources strategy (NWRS)</p>	<p>This suite of police is intended to ensure that measures made in the water and sanitation system are not counter-productive in terms of climate change mitigation, e.g. the use of water for irrigating bio-fuel crops in a water scarce area. They aim to strike a balance between use of renewable technologies to mitigate potential effects of climate change while ensuring efficiency in water use. Mitigation and adaptation need to be worked into all sectors, processes and water management programmes.</p>
Subsidies	<p>Water and Sanitation Sector Policy on Climate Change, 2017</p>	<p>Water pricing must reflect the cost of managing the impacts of flooding, droughts, fires and other factors associated with water and climate change. Thus, water must be priced to promote sustainable use. This policy considers water and sanitation with the lens of climate change and the needs of City. As such it guides water traffics and a minimum free basic water allowance for indentured households who are registered with the CoCT.</p>

B2.2 | Land-use activities and the associated policy mechanisms

Recognising that water resources and associated infrastructure are governed within a complex environment, a long list of policy and legislative tools become interconnected and relevant – as seen in Table 2 above. Consequently, Table 3 presents this information viewed through the lens of key land-use and water user activities. Table 3 further highlights various overlaps in legislated requirements (e.g. permitting and licensing requirements), key points of guidance and links to roles and responsibilities in terms of water governance, as envisioned by these key instruments.

Table 3: Summary of land-use themes that are directly or indirectly linked to groundwater governance, and the key policy and legislation related to these activities

Activity theme	Legislation	Requirement(s) for Compliance
Social and Environmental rights	Constitution of the Republic of South Africa, Bill of Rights	Consideration of socio-ecological conditions, and the impacts of the activities on the environment. This underpins all legislation, policy and strategies, and in many cases should be made clear during permitting and licensing application processes.
Business Occupancy	CoCT Environmental Health By-law	Trade Certificate
Wet industry – managing effluent generated	<p>National Water Act No. 36 of 1998</p> <p>National Environmental Management Act, EIA regulations and SEMAs</p> <p>CoCT Wastewater & Industrial Effluent by-law</p> <p>CoCT Stormwater Management by-law</p>	<p>WULA, and associated conditions. May also require an Environmental Authorisation (EIA).</p> <p>Compulsory Industrial Effluent permit application – to discharge effluent (if it meets CoCT limits in Schedule 1 – as stipulated in the WWIE by-law); if not then alternatives need be discussed, e.g. landfill site etc.; disposal certificates required to ensure no illegal discharge to municipal system.</p> <p>For more information, contact: water@capetown.gov.za</p>

Activity theme	Legislation	Requirement(s) for Compliance
		<p>Billing and related issues are explained during the application process.</p> <p>Protection of stormwater system – only rainwater allowed in this system.</p>
Dry industry	<p>CoCT Wastewater & Industrial Effluent by-law</p> <p>CoCT Stormwater Management by-law</p>	<p>Proactive occupancy inspections done for all non-residential properties to ascertain operations are purely domestic, and does not include any wet businesses</p>
Initiatives - systems and fittings	<p>National Water Act No. 36 of 1998 - DWS competency, Regional Office – Bellville (Derril Daniels/Warren Dreyer for guidance)</p> <p>S42 (5) & (6)– CoCT Water By-law, 2018</p> <p>CoCT Treated Effluent by-law</p> <p>CoCT Water by-law requirements</p> <p>CoCT Wastewater & Industrial Effluent by-law</p> <p>CoCT Water by-law</p> <p>National Groundwater Strategy</p> <p>National Water and Sanitation Sector Strategy for Climate Change</p>	<p>Compulsory since the promulgation of the 2018 Water by-law</p> <p>Treated effluent reuse for non-potable purposes.</p> <p>Borehole drilling and intended use of water – must notify the CCT Water dept 14 days prior.</p> <p>Register borehole and monitor consumption. (Borehole.Water@capetown.gov.za)</p> <p>Install RPZ valve to protect CoCT supply vs contamination.</p> <p>Water efficient fittings all round, including sub-metering at own cost – this will help with proper water balance audit to inform sewer volumetric charge and also sub-metering in multi-tenant properties.</p> <p>(Water saving – easy and quick isolation of leaks and better control and management of water use by each tenant).</p> <p>Groundwater – abstraction and recharge related.</p> <p>Regional/catchment stormwater harvesting – not allowed, reserved for CCT – as per Water Strategy augmentation future projects.</p> <p>On-site rainwater harvesting allowed – for non-potable uses only – no authorisation required.</p>
Fire suppression	<p>Disaster Risk Management Act</p> <p>CoCT Water by-law</p>	<p>Storage for fire fighting</p> <p>Guidance request and related: water@capetown.gov.za</p>
Wastewater packaged plant on site – for non-potable reuse (different types)	<p>National Water Act No. 36 of 1998 - DWS competency, Regional Office – Bellville (Derril Daniels/Warren Dreyer for guidance)</p>	<p>Licence requirements related to Water-use Licences. May also require an Environmental Authorisation (EIA).</p> <p>CoCT open for consideration.</p> <p>Policy position in our draft policy- not yet out for public comment.</p>

Activity theme	Legislation	Requirement(s) for Compliance
	National Environmental Management Act, EIA regulations and SEMAs CoCT Wastewater & Industrial Effluent by-law	CoCT must remain a backup in cases of failure on the private side.
Regional- zero wastewater discharge – not possible in current network/layout, unless dedicated separate private pipe system	Spatial Planning and Land-use Management Act – Spatial Development Framework and CoCT by-laws	Land-use Management and Building Development Management processes. Currently, none exists. Epping tried but this was not possible with the current infrastructure setup as buy-in was not successfully achieved from all businesses. Advice- individual properties to consider own on each site.
Greywater reuse /other alternative sources	National Water Act No. 36 of 1998 - DWS competency, Regional Office – Bellville (Derril Daniels/Warren Dreyer for guidance) National Environmental Management Act, EIA regulations and SEMAs CoCT Water by-law	WULA and associated conditions. May also require an Environmental Authorisation (EIA). For non-potable use only – Reduced Pressure Zone requirement. Inspections will be done by the CoCT. Protection of municipal supply must be ensured. Refer to CoCT portal for more information or contact: water@capetown.gov.za
Monitoring of groundwater sources, their use, management and protection	National Water Act No. 36 of 1998 National Environmental Management Act, EIA regulations and SEMAs National Groundwater Strategy	CoCT is required to establish a monitoring committee to oversee the boreholes that the municipality is responsible for. DWS is required to establish and maintain National Groundwater Archive. DWS is responsible for monitoring the environmental status of the countries water resources. It is mandated to ensure that water remains fit for use on a sustainable basis, and therefore monitoring of environmental effects and protection of aquatic ecosystems is their responsibility. It is however, not clear how this relates to devolution of power to local government, as per the National Groundwater Strategy.

B3 | IWRM Institutional arrangements and mandates

B3.1 | Perspectives on governance

Before examining groundwater governance and its related activities (in the following chapters), it is important to first consider the overarching water resource management requirements and institutional functions that frame groundwater governance in South Africa. As a resource and functioning natural ecosystem, groundwater is interconnected with the rest of the water system, and therefore cannot be considered in isolation. Likewise, the governance structures and policy requirements are interconnected in terms of both implementation and impact and must be considered holistically. This chapter, therefore, provides a high-level, overarching perspective of the integrated water resource management (IWRM) approach applied in South Africa, from an institutional structure perspective. Box 2 below provides a definition of governance.

Box 4: A broad perspective on the definition of governance

What is governance?

Sustainable Development Goal (SDG) 16 focuses on 'Peace, Justice and Strong Institutions', with the wording: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" (SDG 16).

Governance can be understood as the way in which society, entities or institutions arrange and manage themselves and their activities. Governance thus includes a complex array of formal and informal systems that are employed by government, non-government organisations, and even society and individuals, in terms of the choices that they make. This may include a range of formal and informal instruments, such as legislation, policy, strategies as well as guidelines, norms and standards, techniques, devices or tools, programmes, processes, procedures and tactics, or even moral standards and ethics. All of these approaches are used to shape, fashion and mobilise the choices, wishes, ambitions, aspirations and wants of individuals and the entire population (Steenkamp, 2018).

The South African Constitution emphasises cooperative governance, the promotion of social and economic rights, public participation, and accountability for decision-making. As such, the Constitution has laid the foundation for the needed societal transition and for a new policy, legislative, administrative and service-delivery regime (Barnes & Gerber, 2016). This requires that the spheres of government move away from acting as autonomous siloes, to integrated, cooperative governance (Ngamlana & Eglin, 2015), enabled through various institutional and administrative functions. These functions include improved communication; greater alignment of capital spending and political priorities; effective leadership; and meaningful engagement with citizens through all phases of planning, implementation, monitoring and evaluation (Williams, 2000; Ngamlana & Eglin, 2015).

In South Africa, the recent alignment of spatial and land-use planning legislation and policy has created an enabling legislative environment within which government can fulfil its mandate and allows for clearer guidance for private sector participation. This approach to integrated spatial planning, coupled with the realisation of cooperative governance, as stipulated in Chapter 3 of the South African Constitution, has created a structured approach to land-use planning, with clearer planning objectives, roles and responsibilities (The Constitution of South Africa, 1997).

It is also worth noting that the ethics, value systems, world views and/or rationalisation(s) that people use to interpret the world, directly inform the tools or methods which they choose to use to govern themselves and others. Individuals are influenced by a variety of societal aspects, such as culture, religion, education, or even career or personal interests. It is the diversity of rationales of these groups and individuals that results in differing practices and decision-making. These rationalities and forms of governance, and even the power dynamics associated with these groups and individuals, all form part of the complexity of social ecological systems (Woermann & Cilliers, 2012; Preiser & Cilliers, 2010). It is therefore difficult to separate these concepts (Avelino, 2011). Furthermore,

rationalities, governmentalities (forms of governance) and power dynamics are embedded within - and are interconnected within - formal and informal decision-making processes, within the structures of government and society at large. This context must be considered in an all-of-society approach to governance, how this may be inclusive of society's values, but also grounded in the inclusive needs of current and future generations.

B3.2 | Integrated Water Resource Management in South Africa

As in many countries, water governance in South Africa is a shared responsibility, both vertically, in the three spheres of government, and horizontally across relevant departments. Roles and responsibilities for policy formulation, policy implementation, operational management, monitoring, regulation and financing are allocated across a broad range of stakeholders dedicated to IWRM. This results in a complex, and at times, fragmented approach to water policy and management (OECD, 2021).

Currently in South Africa, water governance is largely undertaken through a top-down, regulated structure. This is based on an assumption that the spheres of government work cooperatively to effectively deliver on the interconnected and complex dimensions of water-related services, applying an adaptive management approach. The National Water Act further envisions that this process would be supported by stakeholders such as catchment management forums (CMF), communities, NGOs and relevant institutions. Many shifts have already taken place to better integrate roles and responsibilities, to deliver on this vision, with many more adaptations required in the future to ensure a flexible, adaptive and yet resilient water resource management system. In addition, a critical component of effective governance is also the bottom-up feedback and direction provided by local government, as well as other stakeholders, to inform strategic direction and decision-making. This view on cooperative governance is framed within an understanding of the roles of the three spheres of government (summarised in Table 4).

At the national level, the Department of Water and Sanitation (DWS) is responsible for the review and development of national legislation and water-sector policy, support and regulation, national communication strategies and the development of national water strategies – with funding and fiscal oversight provided by the National Treasury. In addition, DWS fulfils some regulatory functions, such as water-use authorisation, development of compulsory national standards for water services, and infrastructure regulation (mostly through the Water Trading Entity and National Water Resources Infrastructure Branch). DWS is also responsible for oversight of public entities reporting to the Minister, regulation of competition, and some aspects of economic regulation (setting of raw water tariffs and overseeing of bulk water tariffs by Water Boards and retail tariffs by water services authorities). Finally, DWS is responsible for monitoring sector performance, including performance against norms and standards.

Table 4: Overarching responsibilities of the three spheres of government

Sphere of government	Governance A Global Framework for Action (FAO; 2016)	Management Wijnen et al (2016) Analytical Framework
National government	Strategic Level: National groundwater policy objectives	Resource status reporting, financing measures, legal provision, policy integration or harmonisation
	Policies, authorisations & legislation	
Provincial government	Institutions and instruments to align stakeholder behaviour and outcomes with policy objectives	Basin Level Management Resource allocation, detailed planning, monitoring strategy and/or data management

Sphere of government	Governance A Global Framework for Action (FAO; 2016)	Management Wijnen et al (2016) Analytical Framework
Local government	Organisations and institutions that control the outcomes on the ground and which respond in varying degrees to rules and incentives from a strategic governance level	District/Catchment Resource administration / regulations / demand & supply measures / resource monitoring, planning / implementation, resource / source protection

Source: Adapted from Faragher (2021)

B3.2.1 Provincial and local water governance

DWS has nine regional offices that are responsible for implementing water policy and controlling monitoring services. This function is supported and implemented through provincial guidelines, and local by-laws, policies and guidelines. The DWS delegates additional roles to a regional department, which functions on a regional and local scale, such as the Western Cape DWS Regional Office which has jurisdiction over water resources in the Western Cape Province (South African Government, 2013; OECD, 2021).

B3.2.2 Water supply and delivery

The delivery of water supply and sanitation services is typically a local government function (South African Government, 2013; OECD, 2021). According to the Water Services Act of 1997, the CoCT acts as the delegated regional water utility for the metropolitan area, i.e., **the CoCT is the responsible Water Services Authority (WSA)** and is therefore authorised to ensure the provision of water services within its municipal area. As such, the CoCT is responsible for:

- The provision and management of water-related infrastructure.
- The provision of adequate quality potable water.
- The treatment of wastewater and stormwater management.
- The creation of by-laws that define the conditions for the provision of water services within the jurisdiction of the metropolitan boundaries.
- The creation of a water services development plan in accordance with consumers, potential consumers, industrial users and Water Service Institutions (WSIs) within its area of jurisdiction. Intervals for the preparation and adoption of a new and updated development plan are decided by the Minister of Water Affairs, currently being annually.
- Authorisation for the operation of water service providers (WSPs) and water service intermediaries.
- Regulation of the implementation of the by-laws, including monitoring the performance of WSPs and WSIs, to ensure that they comply with the conditions imposed by the CoCT acting as a WSA.

Furthermore, DWS Western Cape regional office acts as the WSP for the CoCT, aiming to provide safe, reliable, sustainable and affordable Water and Sanitation services to Cape Town (CoCT, 2019). In line with these responsibilities DWS Western Cape regional office is also responsible for following national legislature set out by the Water Services Act 108 of 1997, and the National Water Act 36 of 1998 (NWA).

Water Boards are responsible for managing and operating bulk water infrastructure and dams, and are established by the Minister, as a body corporate (see Table 4). **Water service institutions (WSIs)** includes the Water Boards, WSAs and WSPs. Among the WSIs, the Water Boards

are capacitated to conduct monitoring of water services. This provision of water services must follow the conditions set in the Water Services Act of 1997. Water Boards are responsible for the creation of their own business plans and policy statements; subject to approval from the Minister, who has authority to either instruct a water board to undertake a specific activity, or to desist from activities that are not in the best interests of the general population and/or lie outside of the parameters laid down in the Water Services Act of 1997.

Aside from monitoring Water Boards, the Minister must monitor every WSI to ensure compliance with standards, development plans, and policy statements. The Minister can authorise the take-over of any institute that is not fulfilling its primary goals or is doing so without meeting the required standards. The Minister may make grants and loans, or subsidise for activities from funds appropriated by Parliament, contributed by individuals, NGOs or other governments/institutions, so long as this is done equitably and transparently, and the receiving body is operating within the standards, by-laws and objectives of the Water Services Act of 1997.

The Minister has the authority and responsibility to ensure that all WSIs follow guidelines, meet standards and generally work towards the benefit of the general population. However, it can also be seen that the CoCT is the body responsible for generating these guidelines, standards and by-laws, and is responsible for monitoring WSPs and WSIs in relation to the by-laws which the CoCT creates. Furthermore, Water Boards, which are responsible for generating and supplying water to consumers, are regulated by the Minister, and required to follow the national standards for water supply. It appears that the Minister would have the power to enforce these by-laws upon Water Boards, or that it is the responsibility of WSPs and WSIs to ensure the water they provide meets the standards set by the by-laws.

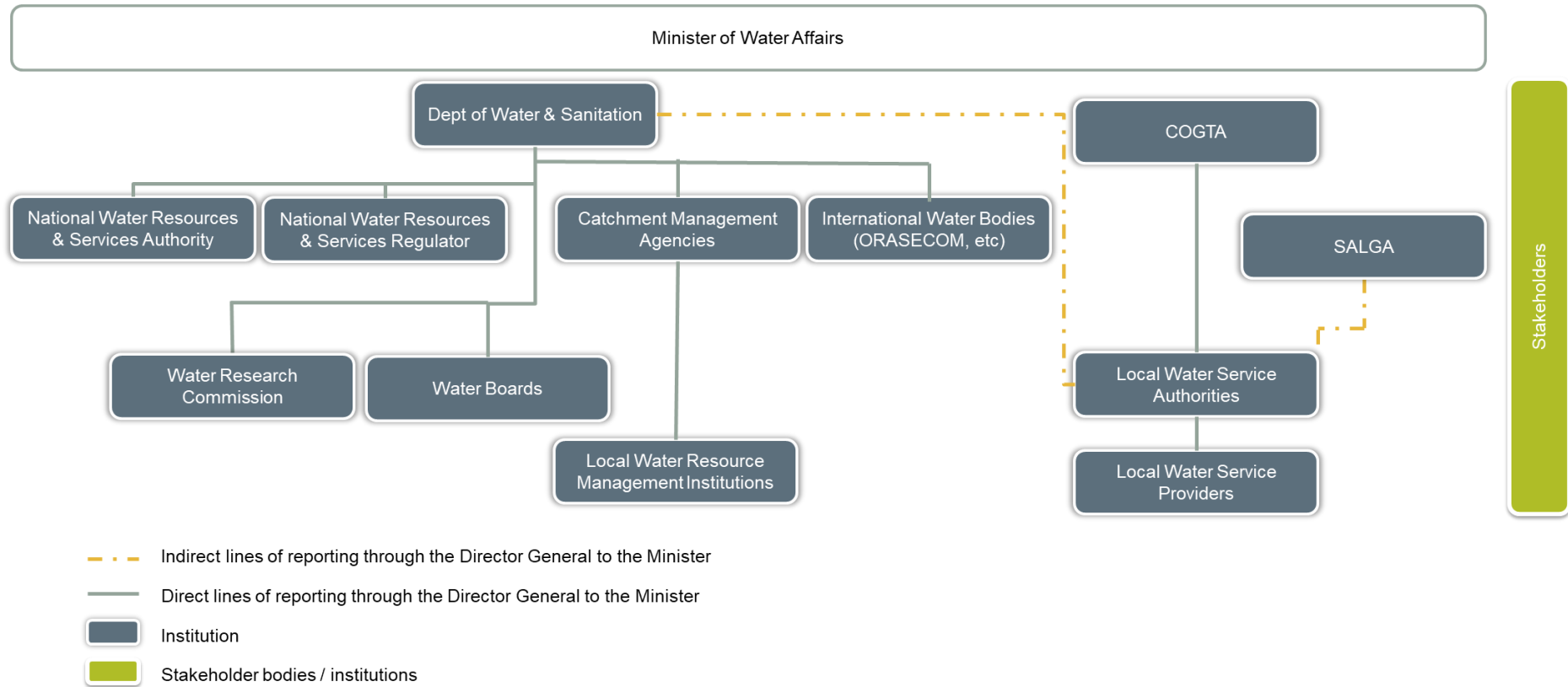
B3.2.3 An IWRM framework with multiple role players

Consequently, there is a complex web of various institutions and departments that become relevant, and numerous active role players in water governance. Another key consideration of water governance is the separation of key roles and responsibilities between ‘water resource management’ and ‘water infrastructure’. In addition, closely related but separate functions include environmental management and spatial planning and development – which are closely interconnected with both water resource management and infrastructure management. This can be further extended to include transboundary agreements and transfer schemes (which are critical in resource management and sustainability).

The figure below provides a visual representation of the governance structure and reporting lines across government departments and institutions, as well as proposed new functions – National Water Resources and Services Authority and National Water Resources and Services Regulator, and the Water User Association / Irrigation Board. This organogram has shifted significantly from what was described in 2013 by the National Water Policy Review, speaking to the continual learning and adaptive management approach within IWRM.

The organogram is not comprehensive but attempts to provide an indication of the main institutional framework and reporting lines. It does not, however, provide clarity in terms of the shifts required (currently under consideration) related to directives identified in the National Groundwater Strategy in terms of devolution of power to local governments. It does, however, begin to highlight the multitude of categories of role players within this space. It is within this overarching IWRM framework that groundwater governance must sit.

Figure 16: Conceptualisation of water institutional arrangements



Source: adapted from National Water Policy Review, 2013 and 2019, OECD, 2021

B3.2.4 Water governance and management roles for the City of Cape Town

Key IWRM related institutions or platforms, as illustrated in Figure 16 are further described in Table 5, in terms of responsibilities and operational scale. However, in addition to the above-mentioned organogram, Figure 17 (found in the next section), illustrates the proposed institutional arrangements for a **groundwater governance framework**, as identified in the National Water and Sanitation Masterplan (2019), where local government is highlighted as a key role player.

These institutional arrangements are important considerations, especially where there is a need for a close working relationship between relevant government departments and greater water catchment stakeholders for the effective monitoring and evaluation, and implementation of water strategies. It is, however, not always clear how these institutional functions and reporting lines are implemented, in full or partially. Or if these are simply planned structures, in line with an adaptive management approach, which have not yet been fully realised because of capacity issues (or otherwise), or if these departments are currently in the process of transition.

Table 5: Summary of governance and management roles of water institutions, relevant in the Cape Town context

Institution	Governance Responsibility	Operational Scale
Minister of Water Affairs	<p>Minister of the DWS is the custodian of the nation's water resources and has the power to regulate all water service institutes operating under the jurisdiction of the Minister.</p> <p>Ensures water service institutes follow guidelines, meet standards and work towards the benefit of the general population, as outlined in the Water Services Act 1997.</p> <p>Approves grants, loans and subsidies towards water institutions.</p> <p>Can demand an institution to take on further roles if they have the capacity or can take over the responsibility (or delegate to other institutions) and role that is not being adequately met.</p>	National
National Department of Water and Sanitation (DWS)	<p>Mandated and regulated by national government.</p> <p>Creates water-sector policy.</p> <p>Delegates many responsibilities to DWS regional offices.</p>	National
Western Cape DWS regional office	<p>Regulates water supply and sanitation provision, water resources planning, operation and maintenance of large dams and bulk infrastructure, water-use regulation and collecting and analysing data. This is largely done through:</p> <ul style="list-style-type: none"> • Regulation and Planning Branch - responsible for policy development and enforcement of by-laws. Fulfils national governments responsibility to prepare policy and water-sector institutional oversight. • Water-use authorisation, creation and maintenance of compulsory national standards for water services, infrastructure regulation, oversight of public entities reporting to the Minister, regulation of competition, and aspects of economic regulation (including setting raw water tariffs and overseeing the setting of bulk water tariffs by Water Boards and retail tariffs by WSAs). • Coordination of water demand management programmes, quality management, awareness programmes, information management and business reporting. • Accountable for water supply and sanitation - Delegates responsibility to the WSA (CoCT). • Revenue management, budgeting and accounting. Management of capital contracts. Directly responsible to the National Treasury that supplies 	Regional

Institution	Governance Responsibility	Operational Scale
	funding and fiscal oversight. <ul style="list-style-type: none"> Customer relations (protection and dispute resolution) and improvement to metering and billing effectiveness. 	
Water Services Authority (WSA) – City of Cape Town (CoCT)	<p>The CoCT acts as the delegated regional water utility (from the DWS). It is authorised to ensure the provision of water services at the municipal level and is therefore responsible for the provision of and management of water-related infrastructure, the provision of adequate quality potable water, the treatment of wastewater and management of stormwater. It is responsible for policy and regulation of regional water utilities, including those of its management responsibilities.</p> <p>Ensures that water services are provided in a manner consistent with the goals of water resource management.</p> <p>Responsible for creating a water services development plan.</p> <p>Responsible for tariff regulation.</p> <p>Responsible for the creation of by-laws defining the conditions of local water services.</p> <p>Supervision of contracts with utilities and/or private actors.</p> <p>Permitted to abstract groundwater for treatment and supply to customers.</p> <p>Regulation of a WSA is the responsibility of the Department of Government and Traditional Affairs in concurrence with DWS and association with SALGA.</p>	Local
Water Boards	<p>Established by the WSA, and operates under the authority of the WSA, subject to approval and control by the Minister.</p> <p>Provide service to Water Service Providers through the management and operation of bulk water infrastructure.</p> <p>Create their own business plans and policy statements, however these must be approved by the Minister annually.</p>	Regional
Water Service Institutions (WSI)	<p>Forecasting of future water demand, and implementation of management strategies to ensure resource availability and security of supply.</p> <p>Inspection of monitoring equipment.</p>	Local
Catchment Management Agency (CMA)	<p>Responsibility of the WSA (CoCT) but regulated by the Minister.</p> <p>Responsible for planning and implementation of WRM within a Water Management Area in line with the Catchment Management Strategy.</p> <p>Collaborates with local stakeholders and involve local communities.</p> <p>Can create Catchment Management Committees (CMCs) to perform specific delegated functions. Created CMCs can perform specific delegated functions.</p> <p>Designed to enable interested parties to participate in development, apportionment, and management of available water resources.</p>	Water Management Area
Catchment Management Forums or fora (CMF)	<p>Enables stakeholder participation in WRM.</p> <p>May perform WRM functions where delegated.</p> <p>Responsible for bringing together stakeholders for the purpose of building partnerships and networks and promoting consensus on water management issues in an empowering, democratic and transparent manner.</p> <p>Accountable to all stakeholders.</p>	Local, regional, or WMA

Institution	Governance Responsibility	Operational Scale
Water User Association (WUA)	<p>Undertakes water-related activities on a local scale to the mutual benefit of all stakeholders. Membership is voluntary to support the management of local water resources in the common interest.</p> <p>Provides a medium to involve stakeholders and works towards mutually beneficial results.</p> <p>Accountable to its members and the Minister (associated with the WSA and DWS).</p>	Local
Water Resilience Advisory Committee (WRAC)	<p>Established by CoCT but run by members from a variety of industries.</p> <p>Facilitates stakeholder meetings for the sharing of information and knowledge.</p>	Local
Department of Cooperative Governance and Traditional Affairs (COGTA)	<p>Support local governments (CoCT).</p> <p>Responsible for municipalities consistent performance of their basic responsibilities and functions.</p> <p>Includes support for municipal service delivery and financial management, which is essential to local governments in their duties, function, and role as WSAs.</p>	National
South African Local Government Association (SALGA)	<p>Mandated to represent, promote and protect the interests of local governments in the event of mandate changes.</p> <p>Autonomous.</p>	National

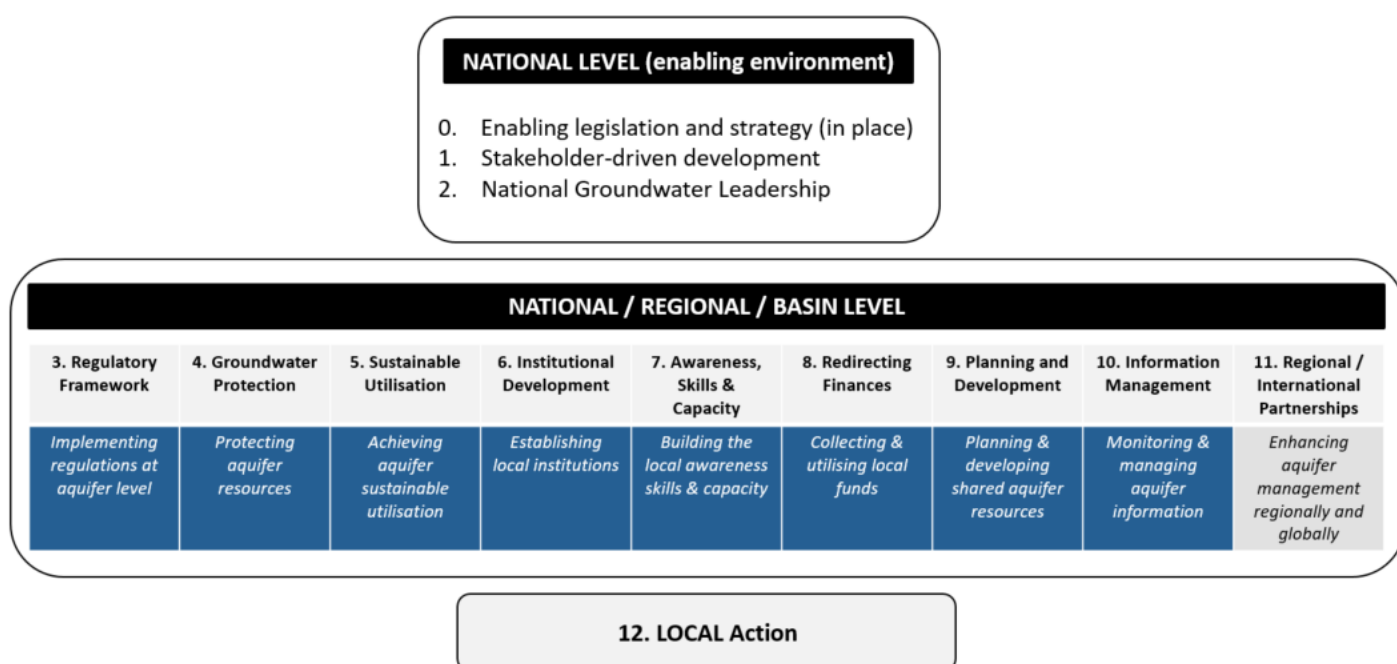
Sourced from: OECD, 2019 and 2021; Faragher, 2021; South African Government, 1997; CoCT, 2019; South African Government, 2013

B4 | Groundwater-related governance, regulations and activities

B4.1 | Introduction

Currently, groundwater management is solely a national mandate, and therefore sits with DWS. The DWS manages all groundwater use across all catchments, through the DWS groundwater unit based at both provincial and national offices. A critical shift in policy has, however, been noted in the National Groundwater Strategy, which indicates that groundwater management should become the responsibility of local municipalities. Considering the various other roles and responsibilities undertaken by local municipalities, this may be a logical step in the devolution of power and decision-making regarding both the resource and source-directed measures associated with groundwater. However, at this stage it is not clear how or when this devolution of power is anticipated to take place, or what the new relationship should be between the spheres of government. Within the above-mentioned framework of IWRM (see Section B3.1), the National Groundwater Strategy (2017) has proposed a national groundwater framework which will inform a new institutional structure and associated mandates (Figure 17).

Figure 17: Proposed groundwater governance framework



Source: National Groundwater Strategy 2017

The present lack of groundwater specific mandates and by-laws means that the current groundwater management structure is unclear and inefficient. Alongside restructuring the general water management and governance structure, groundwater governance strategies must be carefully and clearly constructed and integrated into the broader water management sphere. The relations between all these institutions are complicated and will require a change in governance structure (and a resource management structure) to avoid pitting the government against the general population as groundwater becomes a more important asset in the provision of water for the city (Faragher, 2021). While the National Groundwater Strategy (2017) attempts to bring to the fore many of the gaps and challenges, as well as opportunities, around this

much needed change, much more is still needed to achieve the desired transition to a governance structure that can deliver and maintain sustainable groundwater management.

Box 5: Key considerations relating to the devolution of groundwater management to local government, and the progress made thus far

Devolution of groundwater management to lower levels of government

The National Water Act highlights the need for groundwater governance to take place at a local government level. This is further clarified in the NWS 2016 which describes the need for groundwater management to be devolved to lower levels of government because of the strong correlation between water resource management, infrastructure management and land-use planning and management, as well as the implementation which takes place at a local government level.

The NWS further acknowledges that this devolution of power will require various transitions, which will need to be facilitated, including but not limited to shifts in policy, alignment of mandates and financing, as well as capacity development. Shifts in this regard have been slow, although some responsibilities have been devolved to provincial DWS. However, it remains unclear what overall structure is intended, including issues around power, role(s) and responsibilities, and working relationship between spheres of government and various water institutions.

What is evident from the NWS, as well as several other related policies and strategies, is the importance of CMAs for both groundwater and surface water management. Several references are made to the responsibility of groundwater management remaining with CMAs.

CMAs are an excellent integrated water management structure, which sit outside of the structure of government as independent entities. Furthermore, CMAs embody the approach to IWRM taking on a holistic perspective to water management, considering cumulative effects on the catchment, including present ecological state, flow requirements, and reserve requirements, among others. However, there are some key points to note regarding both challenges and opportunities associated with CMAs and groundwater management:

- The establishment of CMAs is the responsibility of the CoCT, but no CMA is currently in place.
- CMAs are established in association with the boundaries of Water Management Areas. However, as described earlier in this report, there has been uncertainty regarding the boundaries of Water Management Areas, with several shifts taking place in recent years.
- CMAs traditionally are associated with management of surface water resources with the above-mentioned Water Management Areas.
- Groundwater, and in particular the boundaries of aquifers, have not been assigned to specific CMAs, and in many instances, these do not clearly align with the boundaries of surface water resources. Although, the National Groundwater Strategy and National Water Act allow for an adaptive management approach to water management, which is holistic – therefore making allowance for groundwater resources to be managed under this structure.

It is worth noting that the National Groundwater Strategy provides an explanation of processes that are in place in line with the devolution of power to lower levels of governments, as well as those that are lacking, and various challenges to making this transition. This is a critical perspective which enables responsible role players with the understanding of 'where we are at'. In addition, recommendations are provided to enable this transition. This is however, not a simple transition to enact, and which requires the involvement of various parties to ensure that roles and responsibilities are effectively fulfilled across the spheres of government, recognising cooperative governance as well as the philosophy of adaptive management.

Furthermore, guidelines have been provided by DWS to assist local government with the [establishment and management of CMAs](#). This includes draft guidelines for the development of [Catchment Management Strategies](#), which is critical to the management of CMAs.

Source: National Groundwater Strategy (2017)

Under the current structure, municipalities who have been delegated the responsibility of WSA, in this instance the CoCT, access groundwater resources through boreholes and wellpoints. Access to groundwater through boreholes and wellpoints is regulated through specific conditions contained within a Water-use Licence (WUL) as authorised by DWS in accordance with the National Water Act 36 of 1998, and related regulations. The granted WULA includes compliance requirements including compliance with resource and source-directed measures, which often take the form of requirements of monitoring of both

quality and quantity, recharge requirements, among others. This water resource may be accessed for a variety of purposes including municipal activities and augmentation of water supply in support of the mandated responsibilities of the WSA.

6B4.1.1. Domestic access and use

The public is granted access to surface water sources and groundwater for reasonable domestic use in line with Schedule 1 of the National Water Act 36 of 1998. In addition, during the last year of the 2016-2018 drought, DWS announced that the public must install metres and keep a record of water consumption. This information is required to be shared with DWS via email. In addition, in support of the DWS, the CoCT Water Conservation team provides borehole registration information with the DWS groundwater unit. However, it is not clear how this information is captured or managed by DWS (personal communication, telephonic discussion with Ms Nokuzola Mhlungu, Head: Policy & Regulation – Water Demand Management & Strategy, Water and Sanitation, CoCT, 17-08-2021). However, it is anticipated that this information is reflected in the National Groundwater Archive, in line with the National Water Act requirements.

B4.1.2. Business access, use and compliance

In addition, businesses are required to apply for a Wastewater and Industrial Effluent permit to make use of groundwater (through borehole or well) or direct access to a surface water resource; and/or to discharge any wastewater related to their business activities. The CoCT accesses and approves these permits in line with their by-laws, which align with national legislation and their mandate as a WSA. ***It must, however, be acknowledged that the CoCT by-laws are outdated and currently focus on the CoCT’s infrastructure management-related mandate, and not on resource management and conservation*** – which also forms a critical part of sustainable groundwater governance (personal communication, Ms Nokuzola Mhlungu, 17-08-2021; Dr Kevin Winter, 14-09-2021). In addition, these by-laws do not consider climate change related impacts or the City’s Climate Change Adaptations Strategy or the latest water management strategy – Our Shared Future, 2020 (*ibid*).

In addition, any business that consumes > 10 000 kl per month is required to undertake a water audit, with the support of the CoCT, in line with National Water Act requirements. This information also informs necessary local taxes (personal communication, Ms Nokuzola Mhlungu, 17-08-2021). In support of this process and to facilitate sustainable water management practices, the CoCT provides water balance calculations which holistically consider all water sources and water uses; and provides additional education regarding sustainable augmentation practices and water use. Businesses may be awarded a Water Star Rating which is a non-compulsory rating system intended to encourage local business innovations towards responsible water practices, and further showcase these efforts.

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In the sections that follow, we discuss specific thematic activities related to groundwater management in the CoCT, as aligned with understanding of current practices. This includes monitoring of groundwater resources; water demand and forecasting; development of managed aquifer recharge strategies; alien invasive clearing; education and awareness raising; benchmarking and performance indicators; equality of access; capacity building; and environmental management considerations.

B 4.2 | Monitoring of ground water resources

Investigation into sustainable groundwater abstraction is an essential component of groundwater governance and management. The Table Mountain Group Aquifer has potential to provide significant water resources, however unsustainable usage could quickly drain the system. Roughly a decade ago,

groundwater in the region was perceived to be of good quality with limited pollution (Jia, 2007). However, there are several critical factors to consider, with shifts in understanding of this sensitive ecosystem, as well as various dynamics associated with groundwater use, recharge and pollution. These factors include growing numbers of private borehole users, and pressure on the WSA and WSI to meet the growing water demand; as well as complex issues related to groundwater contamination as a result of surface water pollution levels and various point sources of pollution (e.g. poorly managed landfills, dumping, spills, etc.) which accumulate in groundwater reserves. ***Holistic and consistent monitoring of both the quality and quantity of groundwater resources is therefore imperative to support a comprehensive understanding of this resource. This will provide the evidence base for designing both source-directed, and resource-directed measures for its use, management and protection.***

B4.2.1. Monitoring responsibilities of DWS

Under the National Water Act, DWS is mandated both to ensure that water remains fit for use, and to ensure water security. Therefore, DWS is responsible for monitoring environmental effects, and for protection of aquatic ecosystems. In line with this mandate DWS is tasked with several related responsibilities. These include, but are not necessarily limited to:

- **Establish, populate, and maintain the National Groundwater Archive**, which acts as a central database for various datasets related to groundwater reserves (water quality, abstraction points, etc.). This is intended to act as a reliable, comprehensive open data portal of relevant information for use by the public and private sectors to inform decision-making. Although registration is required, this is a free open data portal which simply requires registration of users.
- **Ongoing monitoring and evaluation of groundwater resources, nationwide**. This includes determination of the present ecological state of the ecosystem, reserve requirements, recharge rates, flow dynamics, water table levels, among others. This information is used to inform decision-making regarding the use, management and protection of water resources, and even the required resource and source-directed measures required by individuals and institutions applying for water-use permits in line with the National Water Act (general authorisations (GAs) or WULAs).
- **Assessing all applications for general authorisation (GAs) and WULAs**. The triggers for these authorisations are outlined in the regulations associated with the National Water Act. It is the responsibility of the water user to apply to DWS for these licences prior to commencing with the intended water use. This is typically the landowner but this is not necessarily always the case, and may include WSAs and WSIs, like the CoCT. As outlined in the Key Policy and Legislation chapter of this report, the reporting requirements for WULAs are onerous, including specialist assessments covering a wide range of aspects including both aquatic and quality considerations. GAs requires less information and are typically achieved in shorter timeframes (see Section 3, Table 2), whilst private, domestic users do not require a licence under Schedule 1 of the National Water Act regulations. DWS gathers information from these applications, whereafter it is captured in the Water-use Authorization and Registration Management System (typically referred to as WARMS). This information is also used to inform continued development and updating of regional groundwater models. This in turn is used to inform the decision-making for granting/refusing licence applications, and the conditions which are set for those authorisations which are granted.

B4.2.2. Monitoring responsibilities of water users

All registered water users (users holding WULAs and GAs) are then responsible for complying with the conditions as set out in their licence. This includes monitoring their water consumption, monitoring water quality at site, and complying with recharge rates, among other conditions as specified in the licence by DWS. Gathered monitoring data is supplied to DWS, as specified in the conditions of the licence.

Currently, as the mandated Water User Association (WUA) and Water Services Authority (WSA), the CoCT applies to the DWS for a licence when accessing groundwater. However, a large number of licences are believed to be GAs, with some WULAs, and potentially some boreholes not yet registered.

On the other hand, private household water users are not required to apply for a permit or licence, to abstract or use groundwater for domestic purposes. The reason for this, discussed further under the Key Policy and Legislation chapter (section 3), is that a significant portion of the South African population is in rural areas and rely on groundwater to meet basic needs. The NWS therefore makes provision for this.

However, in the context of the CoCT and the 2016-2018 drought, household borehole drilling and groundwater abstraction has increased significantly in recent years. These Schedule 1 water users are required to monitor their use and provide the data monthly to the DWS. However, without a formal registration and monitoring process in place it is difficult to understand the impact on the local aquifer.

In addition, it is not clear if the communication indicating the domestic user monitoring and reporting requirements provided by DWS, is applicable to all Schedule 1 water users across South Africa, thus requiring all households who make use of groundwater to provide monitoring data monthly to DWS. Or if this is only applicable to Schedule 1 water users in CoCT. We assume however, from a practicality perspective, that this is only the case in the CoCT.

In line with its responsibilities as a WUA, CoCT established a monitoring committee in 2021. It is hoped that this committee will be able to shed light on the groundwater use in the metropolitan and provide further insights and guidance on the path to more sustainable groundwater governance.

B4.3. | Water demand and forecasting

Water demand forecasting ensures that future water availability can always meet demand. A forecast must be accurate to prevent supply issues or wasted investment. Design methods and water installations rely on accurate forecasting to prevent future redundancy. According to the DWS (DWAf, 2004a), **Water Service Institutions (WSIs)** are responsible for providing water to their customers, but also for developing **water conservation and demand management (WCDM) strategies** in collaboration with CMAs.

Currently, WCDM strategies are developed by the CoCT, Department of Water and Sanitation, under the guidance of the regional DWS. To assist with this process, DWS has published guidance for WCDM strategies for the agricultural sector, industry, mining and power generation sector, forestry sector and the water services sector, alongside a national water conservation and demand management strategy.

Furthermore, WCDM business plans should be developed in the context of the operational performance and practices of all business areas of the WSI. This is on the basis that constraints (losses, increased demand, water use/storage capacity) in one area may influence implementation in other areas and as such, integrated system management is important. The WSI should develop WCDM strategies with community representatives, the CMA and other stakeholders, both regarding the demand and supply side of the WCDM issue (DWAf, 2004a). This will allow a holistic forecast, that will account for present and future needs of all sectors and industries.

B4.4. | Managed Aquifer Recharge

Managed Aquifer Recharge (MAR), sometimes referred to as an artificial recharge strategy, is a general term for several types of water management strategies relating to aquifer storage. It is a technique that is practised in different forms worldwide, most commonly to store water in the subsurface for later use. This is achieved through many different processes and technologies, such as passive infiltration basins or active

injection boreholes. Other uses include prevention of saline intrusion at coastal margins, and utilisation of natural sediments as a water treatment facility (Table 7) (Murray et al., 2006). The DWS believes that aquifer recharge should be incorporated into water resource development planning, and that it should be written into National Water Resource Strategies and Catchment Management Strategies (Murray *et al.*, 2006).

Table 7: Applications of managed aquifer recharge, (Murray et al., 2006)

Maximisation of storage	Water quality management
<ul style="list-style-type: none"> • Seasonal storage • Long-term storage (water banking) • Emergency storage • Diurnal storage 	<ul style="list-style-type: none"> • Water quality improvement • Reduction of disinfection by-products (DBPs) • Nutrient reduction in agriculture runoff • Stabilisation of corrosive water by storage in calcium carbonate aquifers
Physical management of the aquifer	Ecological benefits
<ul style="list-style-type: none"> • Restoration of groundwater levels • Reduction of land subsidence • Prevention of saltwater intrusion • Enhancement of wellfield production • Hydraulic control of contaminant plumes 	<ul style="list-style-type: none"> • Conjunctive use with surface water supplies, to reduce diversions from stream habitat • Temperature control (e.g. for industry and fish hatcheries)
	Management of water distribution systems
	<ul style="list-style-type: none"> • Maintenance of distribution system flow • Maintenance of distribution system pressure

The Atlantis Aquifer MAR has been provided in Box 6 as an example of MAR, and how this process can be implemented.

Box 6: Example of managed aquifer recharge

Atlantis Aquifer MAR

A South African aquifer recharge programme can be found at the Atlantis aquifer, 50 km north of Cape Town, and acts as a valuable case study for groundwater management in the TMSWSA. The Atlantis aquifer has lower annual rainfall and lower recharge than Table Mountain Aquifer and Cape Flats Aquifer – Atlantis sees 450 mm a⁻¹, and a recharge percentage between 15 and 30%. Both industrial and domestic wastewater undergo (separate) treatment, and then is either discharged into aquifer recharge basins, or into a coastal recharge basin for more saline industrial wastewater. This procedure was well accepted by the community, except for requests for softening plants to prevent calcium build-up on heating elements in heaters or kettles. Maintenance to the recharge system involves cleaning every 15 years to remove sediment build-up that reduces infiltration rates (basins that dry out occasionally need less or no cleaning as fine sediment blows away naturally).

This MAR contributes 30% of groundwater supply, leading to increased water security. Despite this, uncontrolled and unmonitored abstraction is still a threat, as it reduces groundwater availability and affects sustainable yield calculations. There are policies that require declaration and registration of private abstraction sites; however, many private users do not follow these protocols. Private abstraction is particularly used for irrigation (Tredoux and Cain, 2010).

Atlantis is not the only place where MAR has been considered. The potential for storage and abstraction of reclaimed effluent in the Cape Flats Aquifer was investigated by Tredoux, Ross and Gerber in 1980. This research



found that MAR on the Cape Flats Aquifer was possible. However, later research suggested that winter recharge would be limited by shallow groundwater levels.

B4.5. | Environmental management

In addition to providing important water resources for the human population, the TMSWSA, and Table Mountain in particular, is a very important ecological site, a national park, and contains a wetland area, mandated for freshwater biodiversity and currently under application to become a RAMSAR site. DWS and the national Department of Forestry, Fisheries and the Environment (DFFE), with the support of provincial departments, provincial conservation authorities, and local government, share a mandate to protect and enhance freshwater ecosystems of the national park, including protecting floral ecosystems.

The DFFE works in close alignment with the objectives of the DWS but focuses broadly on several environmental factors. This mandate is largely exercised through the National Environmental Management Act (NEMA) and associated Specific Environmental Management Acts (SEMAs). Other relevant policy and regulations include the Environmental Impact Assessment (EIA) regulations associated with NEMA, Integrated Water-use Licence Applications (IWULA) associated with the National Water Act, and the interrelated permitting and licensing requirements that may be applicable depending on the case specific context (e.g. permitting requirements for tree removal, Heritage Impact Assessment, Climate Impact Assessment). However, it is important to highlight that it is the responsibility of the landowner to ensure that all necessary permits and licences are received before commencing with a listed activity, and it will also remain the landowner’s responsibility to ensure the compliance of all relevant tenants. Therefore, this is an important consideration for landowners to ensure that they comply.

The table below provides an overview of the various roles and responsibilities held by relevant key institutions.

Table 8: High-level institutional arrangements associated with permits/licences through National Environmental Management Act and National Water Act

Institutional function	NEMA EIA regulations*	NWA IWUA*
Competent authority	Western Cape Government, Department of Environmental Affairs and Development Planning	National Department of Water and Sanitation, Provincial Department
Commenting authorities	CoCT as regional water utility (numerous provincial & local government departments relevant to the issues at hand, e.g. Environment, Water and sanitation, etc.; as well as any key institutions, such as SANBI)	CoCT as regional water utility (numerous provincial & local government departments relevant to the issues at hand)
Key stakeholders	Over-and-above the key commenting authorities, interested and affected communities and institutions within the catchment should be engaged with	Over-and-above the key commenting authorities, interested and affected communities and institutions within the catchment should be engaged with

*Note that depending on the conditions and legislative triggers, it may be necessary to run these processes in an integrated and parallel manner. In such instances the granting of the necessary permits will be interdependent (e.g.

the environmental authorisation will not be granted if the WULA is not granted, and therefore it is important that all conditions are met adequately, including the timing of the applications).

B4.6. | Managing Invasive Alien Species

The Table Mountain Aquifer suffers from alien species invasion, which without control, could cause a 30% decrease in water supply to the CoCT, with associated reductions in aquifer recharge (Le Maitre et al., 1996). Whilst management costs are high, the costs associated with reduced water availability through lack of vegetation clearing would be costlier (Van Wilgen, 2012).

Acacia cyclops (rooikrans), a dense, non-native shrub is a species of particular concern. It grows in dense stands, which leads to increased rainfall interception, and increased evapotranspiration - both of which reduce groundwater availability and recharge (Colvin *et al.*, 2002; Tredoux and Cain, 2010). Woody species (such as *acacia cyclops*) use more water than the natural species they replace, reducing quantity of water in rivers, and reducing the yield of dams and reservoirs. Management strategies must be applied to completely remove or control the species, to reduce the risk to water security, as well as the impacts to ecological resources and the associated economic impacts. This usually involves continual periodic removal, and therefore management strategies must be long-term. Aquatic species can alter the chemical balance of the water, as well as increasing water-borne disease prevalence. Invasive alien species also endanger native species, and can significantly reduce biodiversity, which is an important asset for Table Mountain (Croudace, 1999; Department of Water Affairs and Forestry, 2004).

There are various national guidelines on how long-term invasive species management should be constructed, how to prioritise locations and which species to prioritise for removal, however, **there appears to be no direct mandate for any institution to be responsible** (Department of Water Affairs and Forestry, 2004). However, the Working for Water (WfW) programme has been extremely successful in managing invasive species (see Box 5).

Box 7: Empowering communities whilst restoring ecosystem functioning

Working for Water programme

The Working for Water (WfW) programme is recognised globally as one of the most outstanding environmental conservation initiatives on the continent. The programme involves the clearing of mountain catchments and riparian zones of invasive alien plants to restore natural fire regimes, and the productive potential of land, biodiversity, and hydrological functioning. The intention is to tackle the problem of invading alien plants while at the same time addressing unemployment among less skilled people. The programme is mainly focused on rural women, youth and the disabled, although, in partnership with NICRO and the Department of Welfare, the programme has allocated jobs to ex-offenders. It also includes support programmes for workers such as child-care and educational programmes related to reproductive health and HIV/Aids, among others. Consequently, there is sustained political support for its job creation efforts and the fight against poverty. It therefore constitutes a truly transformational programme.

The main aim is to reduce the density of established, terrestrial, invasive alien plants, through labour intensive, mechanical and chemical control by 22 % per annum. This in turn ensures:

- Enhancing water security.
- Improving ecological integrity and restoring productive potential of land.
- Promoting sustainable use of natural resources.
- Investing in the most marginalised sectors of society.

WfW was launched in South Africa in 1995, administered previously through the Department of Water Affairs and Forestry and now the Department of Forestry, Fisheries and the Environment. It is a multi-departmental

programme, including provincial departments of agriculture, conservation and environment, research foundations and private companies.

Since its inception, the programme has cleared more than one million hectares of invasive alien plants and providing jobs and training to approximately 20 000 people, of which 52% are women. Currently, there are over 300 projects across the country. The WfW programme is also linked to several projects with similar social development outcomes - Alien Invasive Plants, Biocontrol, Lead Teacher Project, Wetlands Project, Outdoor Learning Project, among others. In addition, there are various other programmes and departments which work in similar spaces and often collaborate, such as the Expanded Public Works Programme (EPWP) and the CoCT Parks and Recreation.

Source: DFFE n.d. and WWF 2009

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