

1 Introduction

1.1 OVERVIEW OF THE BREEDE-OVERBERG AREA

The Breede-Overberg Water Management Area (WMA) is situated in the south-west corner of South Africa. While, it derives its name from the largest river within its boundaries, namely the Breede River, a significant portion of the WMA consists of the rivers of the Overberg.

The Breede WMA falls entirely within the Western Cape Province and is characterised by mountain ranges in the north and west, the wide Breede River valley, and the rolling hills of the Overberg in the south. The Breede valley is flanked by the Franschhoek and Du Toit's Mountains in the west as its boundary with the Berg WMA, the Hex River Mountains to the north between the Olifants-Doorn WMA and the Langeberg Mountains as the eastern watershed with the Gouritz WMA. The Overberg meets the Indian Ocean along its southern coast, including the southernmost tip of Africa.



Figure 1.1. Catchments and local municipalities in the Breede-Overberg Water Management Area.

The population of the Breede-Overberg WMA is estimated to be about half a million people, two thirds of whom live in towns and villages. There are seven local municipalities in the region, including the Witzenberg, Breede Valley and Langeberg in the north, Theewaterskloof and Overstrand in the south-west, and the Cape Agulhas and Swellendam in the south-east.

The land use is dominated by commercial agriculture, ranging from intensive irrigation in the Breede and Rivieronsderend valleys as well as in the west of the Overberg, to extensive rain fed cereal cultivation and livestock in the Overberg. Irrigated agriculture (wine and table grapes, dairy and deciduous fruit), livestock farming, dry land agriculture (wheat and canola cultivation) and associated

activities such as processing and packaging are the primary economic activities in the region. This WMA produces 70% of South Africa’s table grapes, apples and fynbos for international export.

The towns and manufacturing activity are largely support the agricultural economy, except along the south coast tourism-residential strip. There are strong social and economic linkages between the Breede-Overberg region and Cape Town, which is located less than 100 km to the west. A number of protected areas and biosphere reserves are located in the region, with important biodiversity conservation status. The estuaries and rivers of this region are also ecologically important for commercial fisheries, recreation and biodiversity conservation.

In the past various studies have delineated the Breede-Overberg WMA in different ways. Building on these delineations, six management zones have been defined for development and implementation of the Breede-Overberg Catchment Management Strategy (CMS). Four zones were defined by the Breede River, while the Overberg catchments were grouped into two zones, based on similar biophysical, economic and social characteristics.



Fig

ure 1.2. Management zones of the Breede-Overberg Water Management Area.

1.2 BREEDE-OVERBERG: CHALLENGE AND OPPORTUNITY

Water is increasingly being recognised by the public, media and business as a critical resource to support social well-being and economic development. This has long been recognised in the Breede-Overberg, where water is the lifeblood of the agricultural and tourist economy. This reality is brought home every year during the hot dry summers and in the last few years during winter floods.



In addition to the economic dimensions of water use, household livelihoods and social development are highly dependent upon the way in which water is allocated and shared in the Breede Overberg region. Responding to these challenges is at the heart of water management initiatives, particularly in addressing the country's historical inequities.

The Breede is a large river with a unique estuary by South African standards, while the Overberg catchments are relatively small but with large estuaries. The perception has been that while there is little additional surface water available during the low-flow summer season, there is plenty of additional water available during the wet winter runoff periods, if it can only be stored between seasons. It seems that this perception is not entirely correct and that the ecologically important estuaries and coastal wetlands of these rivers are threatened by reduced flow, deteriorating water quality and encroachment into riparian habitat.

Fortunately, these river systems still remain in fine balance, providing important resources to support economic development and social well-being, while maintaining important ecosystem goods and services for conservation, tourism, coastal fisheries and residential developments. Unfortunately, indications are that a continuation of the status quo will lead to further ecosystem deterioration and possibly social tensions around water. Existing agricultural production is also likely to face increasing climate and water related challenges, exacerbated by increasing water requirements from Cape Town.

The development of a CMS for the Breede-Overberg WMA is therefore extremely opportune. The time has passed when these precious water resources can be taken for granted or when entitlements are so jealously guarded that the fluid and interconnected nature, and socio-political importance of water is forgotten. The challenge is to safeguard our water resources to meet our aspirations, while considering the complexities that future generations will face in managing this increasingly precious resource.

This strategy is an attempt to meet these challenges, acknowledging the constraints and embracing the opportunities, and to weave them into a unifying vision for action in the Breede-Overberg WMA. The focus of previous water resources planning and management efforts has been quite uneven between

the various areas and water issues in this WMA. As a result, this strategy is inherently multi-faceted, with some aspects enabling detailed action and others requiring further study.

1.3 MANDATE OF THE BREEDE-OVERBERG CMA

The Breede-Overberg Catchment Management Agency (BOCMA) was established by the Minister of Water Affairs in July 2005, in terms of the National Water Act (36 of 1998). The Governing Board was appointed in October 2007 and the CMA became operational with the appointment of the CEO and staff over the past 2 years. In understanding the interconnectedness and importance of water to most aspects of the social economy, and as the lead agent for water resource management within the Breede water management area, BOCMA plays a key central role in protecting, using, developing, conserving, managing and controlling water resources. This requires that BOCMA plays a central and coordinating role with regards to water linking with national, provincial and local government as well as a host of sector partners and stakeholders. The importance of this can be understood against the initial functions that the National Water Act provides BOCMA through Section 80:

- a. Investigate, and advise interested persons on the protection, use, development, conservation, management and control of the water resources
- b. Develop a catchment management strategy
- c. Co-ordinate the related activities of water users, and of water management institutions
- d. Promote the co-ordination of the implementation of its catchment management strategy with implementation of applicable development plans
- e. Promote community participation in its functions

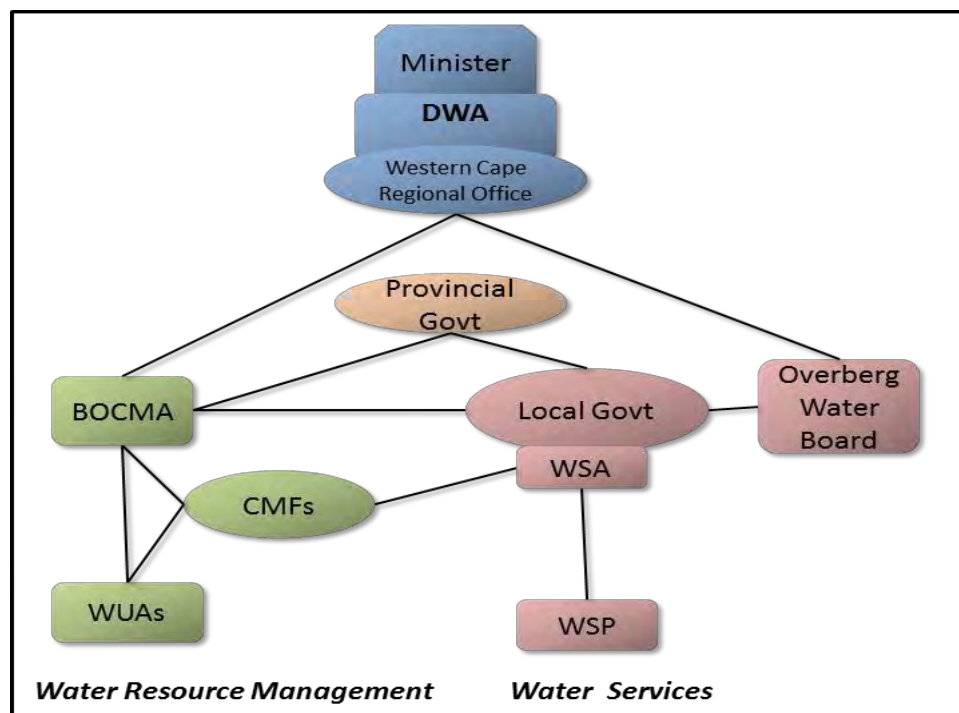


Figure 1.3. Institutional arrangements of the Breede-Overberg Water Management Area.

The CMA is accountable to the Minister, but reports through the Department of Water Affairs (DWA). In order to play that coordinating and regulatory role BOCMA has a close cooperative relationship with the DWA, largely through the DWA Regional Office, but also with key line functions at the National Office. As BOCMA develops its capacity the DWA Regional Office, will increasingly play an oversight and

regulatory role, and is in the process of withdrawing its operational presence in the WMA in support of BOCMA's development process.

It is clearly in the interests of DWA and the BOCMA that functions are delegated in a progressive manner. As the central hub for water resource management in its water management area, BOCMA is positioned to accept responsibility for performing these functions and must coordinate the implementation of this CMS. In effect BOCMA requires a number of delegated powers and duties to be able to do this. The intention is to delegate powers and duties in a phased and progressive manner as BOCMA develops the various aspects of capacity and as DWAs role shifts away from implementation towards one of oversight and regulation. In recognising this, DWA has now delegated a number of powers and duties to BOCMA to support the implementation of its initial functions, as well as to support its institutional development. Importantly, these delegations clearly support the implementation of this CMS and are structured around the broad functional areas of:

- Localised management activities in support of the CMS implementation including activities related to local management, conservation, protection and monitoring activities.
- Registration and water use verification in support of improved water use authorisation processes and improved understanding of water resource availability.
- Institutional development with emphasis on water user association establishment processes.

However, whilst we must understand that BOCMA is the lead agent for water resource management, it cannot do this alone and in fact is not responsible for implementation actions in a variety of key business areas. The CMS, in providing the strategic intent for water resource management in the water management area, must reflect this complexity and must be understood as incumbent upon DWA and BOCMA, as well as other key partners. Clearly, BOCMA has led the development of this CMS, but this CMS does not just belong to BOCMA. This is critically important to understand and is a key aspect of the governance model that the National Water Act provides.

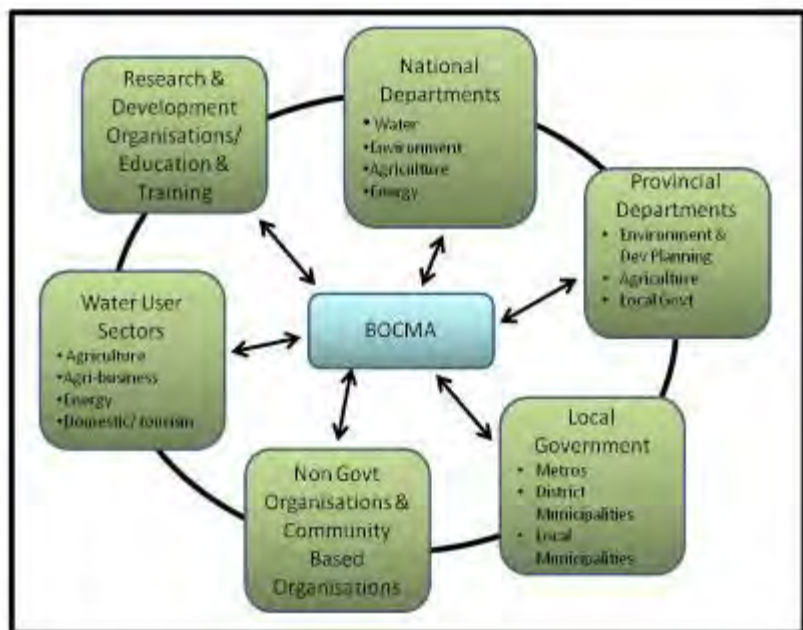


Figure 1.4. Relationship between the Breede-Overberg CMA and other institutions

The development of the CMS is therefore a cornerstone of the CMA's responsibility and will be gazetted as a statutory document that is binding on BOCMA and the Minister (including DWA). It also guides the actions of any other institution conducting water resources related activities in terms of the National Water Act (Act 36 of 1998) (NWA).

1.4 DEVELOPING THE CATCHMENT MANAGEMENT STRATEGY

In the process of developing the strategy, a CMA must seek co-operation and agreement on water related matters from the various stakeholders and interested persons. This provides the opportunity to advise upon and inform the strategy development process and product.

According to Section 9 of the National Water Act, the CMS must not be in conflict with the National Water Resource Strategy; it must be reviewed from time to time; take into account any national or regional plans prepared in terms of any other law, including the Water Services Act (No. 108 of 1997); it must include a water allocation plan and set the principles for allocating water to existing and prospective users.

DWA developed Guidelines for Catchment Management Strategies, shown in Figure 1.5. This guide was used to inform the development of the Breede-Overberg CMS, rather than as a blueprint to be followed. International guidelines and experience in river basin planning were also used to enrich the process, principles, content and structure of the catchment management strategy for the Breede-Overberg.

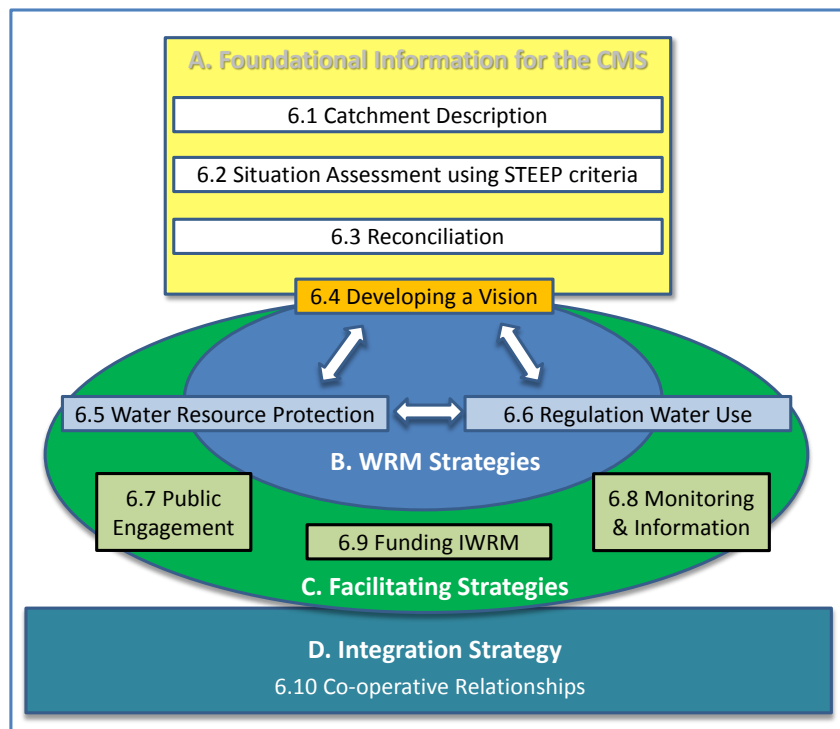


Figure 1.5. Department of Water Affairs Guidelines for Catchment Management Strategies

The agreed purpose of the CMS process is to bring together social, technical water, economic, environmental and political-institutional aspects and issues, in order to outline the management intent for water resources in the WMA of the next 5 years.

Purpose of the Breede-Overberg CMS Process:

To develop a catchment management strategy for the Breede-Overberg WMA that supports local, provincial and national development objectives and has the broad support of all stakeholders in making the Breede-Overberg Vision of “Quality Water for All Forever” a reality.

Principles guiding the CMS Development

While there are many claims for water and impacts on the water resource, each with different social, economic and/or ecological imperatives, the CMS development must not only be implemented as a process of allocating the limited resource between competing demands. Rather it must be seen as a process of articulating the way in which water can support the goal of sustainable social and economic development. Achieving this is only possible in an environment of cooperation, confidence and trust

between water management institutions, stakeholders and water users. However, this must recognise some important realities for the CMS development process, namely:

- There was no template or approved example of a South African CMS when the process began.
- The broader institutional context for catchment management agencies is being reviewed, so the CMS process and outcome may have profound consequences for future CMA establishment.
- The CMS process is a critically important opportunity to establish the profile and credibility of the Breede-Overberg CMA within the WMA, which will influence implementation.
- There are profound differences in characteristics and capacity between areas, groups and sectors within the WMA that must be recognised in the CMS development.

To contribute to the effective development of the CMS while considering these issues, the following principles were adopted to guide the CMS development process.

Principles guiding the CMS development:

- *Full stakeholder participation* in developing the objectives and strategic options for the development of the basin plan.
- *Transparency* in information sharing and decision making, with information in the public domain and made available by the river basin organisations.
- *Joint fact finding* between the basin organisation, other institutions and stakeholders builds credibility and trust between groups.
- *Integrated management* recognises the inter-related nature of hydrological, ecological, social and economic systems, in line with the national water policy and legislation.
- *Prioritising issues* to focus management attention on the most critical issues, considering the limited resources and capacity for management.
- *Decisions without full information* may be necessary, as requiring full information before every decision may endorse the status quo through undue delays or failure to act, or may cause paralysis through ongoing analysis.
- *Adaptive management* requires flexibility in approaches to respond to unforeseen circumstances or inadequate management decisions.
- *Causal understanding* of the underlying economic and social drivers, and the balance between equity, sustainability and efficiency is clearly motivated by the need for integrated and adaptive management.
- *Subsidiarity* to implement management at the lowest appropriate level, particularly through other institutions, where these have appropriate mandate and capacity.
- *Inter-sectoral (and intra-sectoral) focus* recognising their relationships (impact and influence) with water resource management.
- *Step-wise consensus building* to reach broad consensus beginning with small wins and areas of agreement at each step in the process.
- *Pragmatism* in selecting implementable options, considering capacity and resource availability in the short and medium term.
- *Clear accountability* by the basin organisation, government and stakeholders for implementing agreed elements of the strategy.
- *Joint commitment* to the strategy and its elements by key role-players, including formal endorsement where resources are required.
- *Institutionalise* the process by linking to existing structures, developing water sector participatory bodies and empowering stakeholders.

Process for CMS Development

The Breede-Overberg region is linked to the Western Cape System, and has been extensively studied over the past decade. Much of this has had specific focus around meeting supply side requirements not only within the Breede-Overberg WMA itself, but also within the broader Western Cape System. The key studies are highlighted in the following figure and represent the platform upon which the CMS was developed.

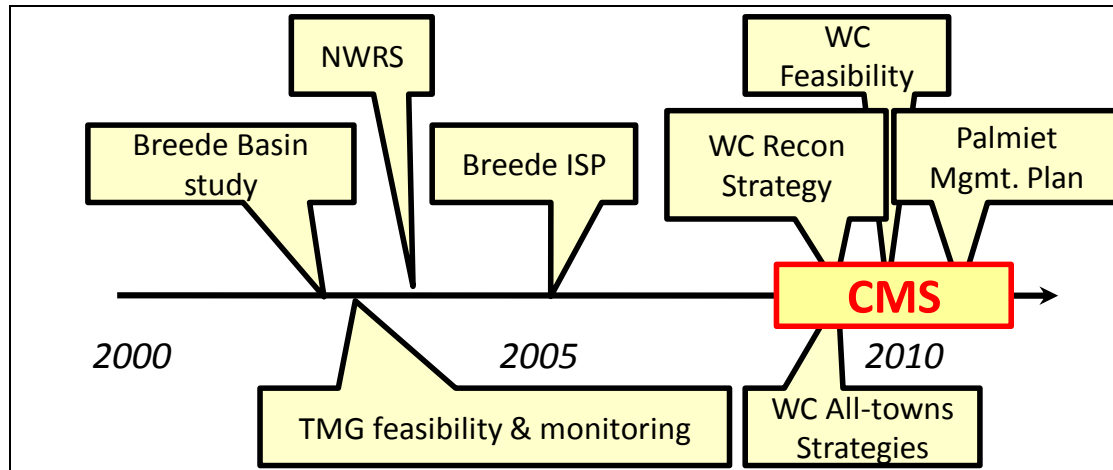


Figure 1.6. Timeline of previous studies related to the Breede-Overberg

The process that was adopted to achieve this outcome was built around the four typical phases of strategy development, namely:

- *Where are we now (Situation Assessment)?*
 - *Where do we want to be (Vision Formulation)?*
 - *How will we get there (Strategy Development)?*
 - *How will we know that we are getting there (Implementation)?*

For the CMS development, this was translated into the following steps reflecting key milestones and deliverables during the project, namely:

- ❑ **Inception:** involving an initial scoping of information and expectations, in order to outline the CMS development and stakeholder engagement process - culminating in the *Inception Report*.
- ❑ **Assessment:** involving review and analysis of water resources, environmental, institutional and economic concerns, opportunities and constraints, both current and future, in order to synthesise and consolidate an understanding of the issues, causes and impacts of water resources management issues in the WMA – culminating in the *Status Quo Report* and *Development Futures*.
- ❑ **Visioning:** involving the prioritisation of water resources management issues through the lens of water for growth, development and sustainability, leading to the formulation of a Catchment Vision and sub-visions – culminating in the *Catchment Vision*.
- ❑ **Strategy Development:** involving the iterative development of objectives to achieve the vision, the investigation of water resources management options to give effect to these objectives and the translation of these into protection, use and enabling strategic actions, with milestones, responsibilities and resource requirements – culminating in the *Catchment Management Strategy*.

- *Approval*: involving the evaluation and approval of the CMS by the Minister (through DWA), together with the consultation of the CMS with stakeholders – culminating in a *gazetted CMS*.

These steps lead to the implementation of the CMS over the next 5 years before it is reviewed and revised in its second edition. This will involve the incorporation and resourcing of relevant CMS actions into the BOCMA business plan.

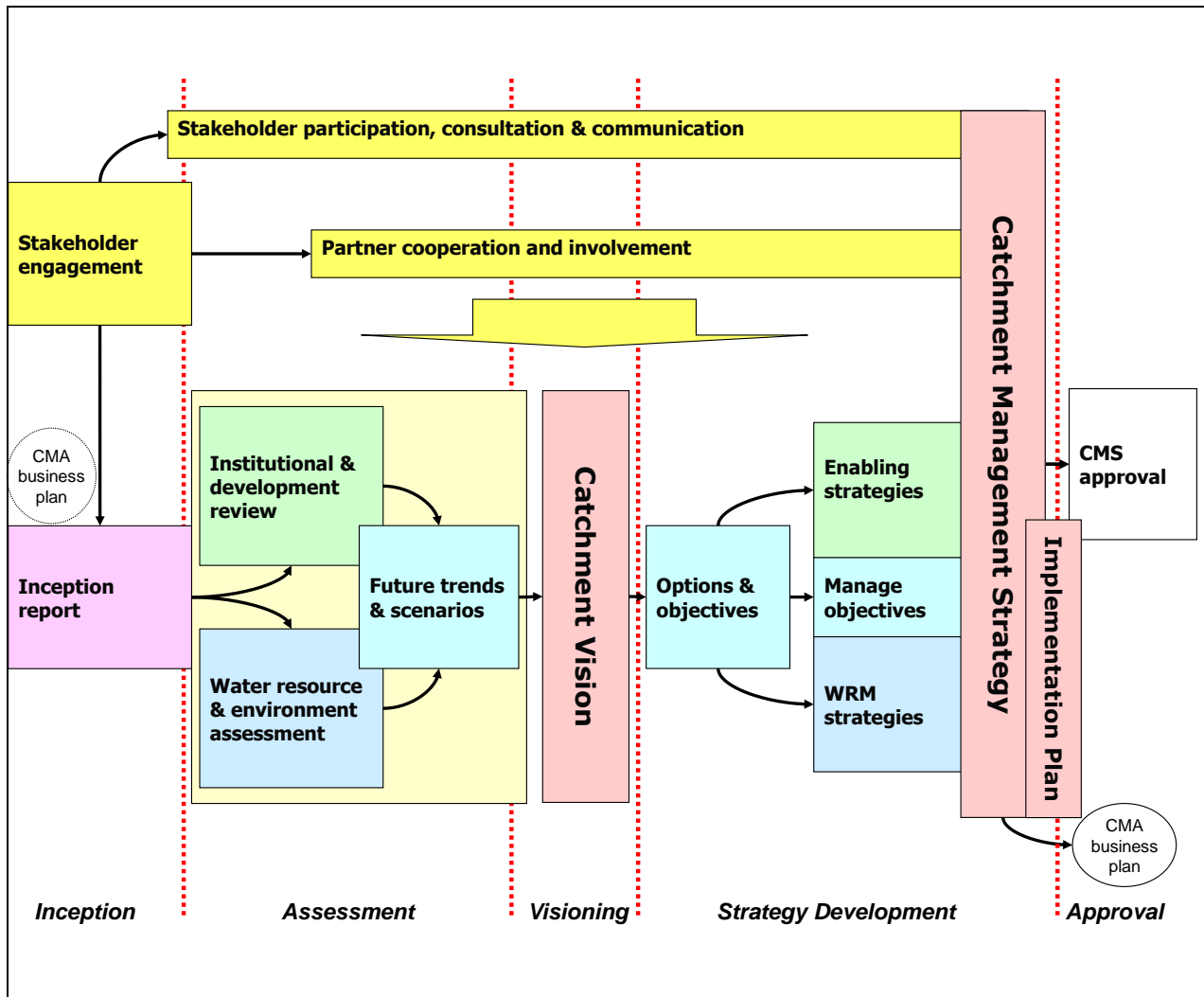


Figure 1.7. CMS Development Process

The CMS needed to be developed in a participative manner to obtain the rich local knowledge and insights as well as to create a sense of ownership for a strategy that would require the coordinated and concerted efforts of various actors in order to implement. Therefore, the key process steps were reflected in the stakeholder consultation process. This was initiated through a broad consultation of stakeholders (Steps 1 & 2) which firstly mobilised stakeholders, but then secondly enabled them to analyse the current situation and identify the issues and challenges that require redress. This then provided the technical backdrop for stakeholders to develop a vision (Step 3) for the water management area.

Stakeholder consultation, hereafter became quite technical in nature and so the development of options (Step 4), sub-strategies (Step 5) and the complete CMS (Step 6) was done in consultation with a

Reference Group that was nominated by the larger group of stakeholders. The final strategy was then taken back to the broader stakeholder group at a “launch” workshop (Step 7) prior to the CMS being gazette for public comment.

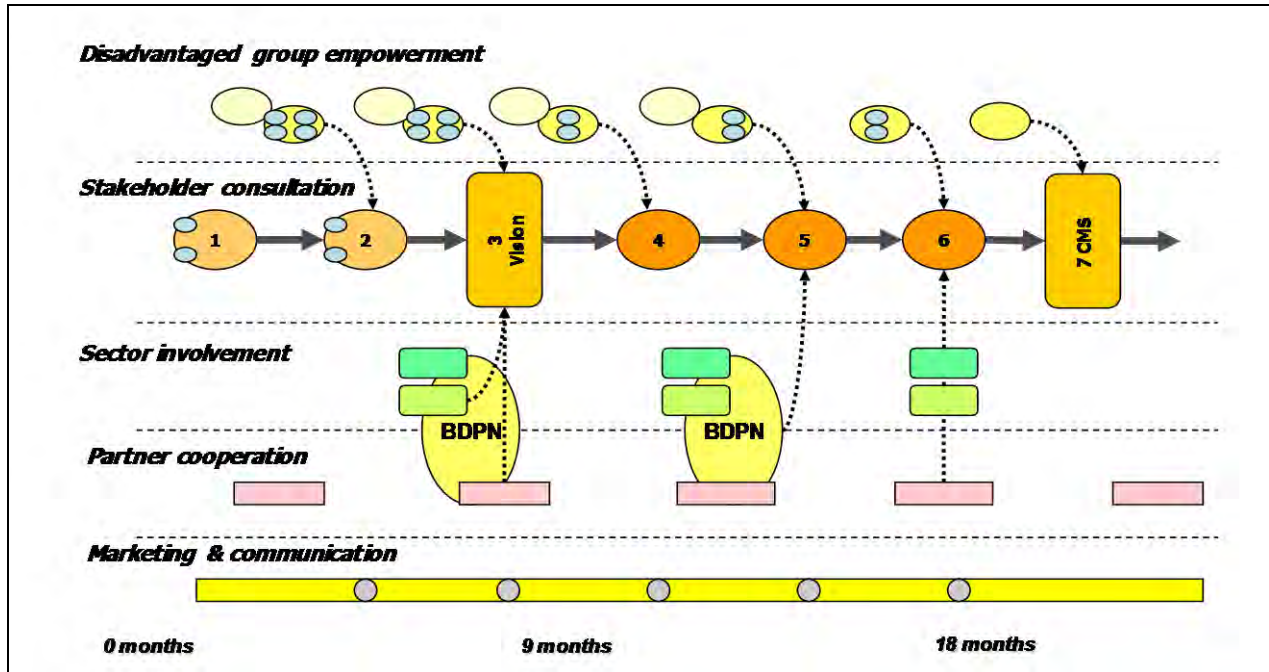


Figure 1.8. CMS Stakeholder Engagement Process

The central stakeholder engagement was partnered with other support streams that provided an important robustness to the engagement process. Support was provided to stakeholders in assisting them to prepare for meetings by explaining technical concepts, the objectives for meetings and re-enforcing stakeholder roles and responsibilities. This was aimed at disadvantaged groups but was not exclusive to them.

It was recognised that there were key sector groups that would require specific engagement such as agricultural and environmental groups. Similarly, that there would be a need to engage with key partners such as provincial and local government. Whilst there were specific meeting and discussions with some sectors and partners, on aspects of the CMS, these were largely engaged with through the development of the Basin Planning Development Network. These meetings were held prior to the visioning process, to ensure alignment to the various governmental planning tools, and prior to the sub-strategies Reference Group meeting to ensure that these sub-strategies were aligned with government and sector plans and strategies.

Ongoing communications provided a foundational stream of work to ensure that stakeholders were generally aware of the CMS development process as well as the findings and developments during the process. This was largely achieved through the development and circulation of a suite of newsletters that was produced in both English and Afrikaans, as well as the ongoing development and maintenance of the BOCMA web-site, where documentation was readily available.

1.5 STRUCTURE AND USE OF THIS STRATEGY

The Breede-Overberg CMS presents a unified framework for addressing existing and emerging water resources management issues in the area. It brings social and economic considerations, together with water and environmental issues, and explores the required institutional responses. It sets the direction for management decision making and strategy development over the next 20 years, but only provides management objectives and actions for the next 5 years until the first legally required review.

As the first CMS in the Breede-Overberg with a new CMA, much work has been done and progress made in developing the CMS. Still, uncertainties remain and further information is required before definitive water management recommendations can be made. Institutional relationships must be strengthened before cooperative-participatory management will be enabled. Finally, institutional arrangements must be clarified and further delegations made to the CMA before effective regulatory management is possible. Therefore the CMS focuses strongly on institutional and information aspects, as well as the water resources protection and use.

The strategy document continues with **Chapter 2:- The Imperative to Act**, where the need and approach for the CMS is motivated. **Chapter 3:- The Vision of the Breede-Overberg** outlines the desired state for water resources management in achieving social, economic and environmental imperatives. The strategic objectives and actions providing the core of the CMS are presented against the three strategic areas adopted for the CMS, namely **Chapter 4:- Protecting for People and Nature**, **Chapter 5:- Sharing for Equity and Development**, and **Chapter 6:- Cooperating for Compliance and Resilience**. Finally **Chapter 7:- Implementation Plan** outlines the actions, timeframes and responsibilities for giving effect to the CMS.

2 The Imperative to Act

There is a clear policy and legal requirement for the development of a CMS in the Breede-Overberg, as outlined above. However, there is also a compelling social, economic, environmental and water resources motivation for a catchment management strategy in the Breede-Overberg at this time, given the convergence of historical developments, future uncertainties and the changing environment for water resources management in this area. While there are numerous challenges, there are also opportunities that may be leveraged from a proactive and holistic approach to the planning and management of water resources in this region.



2.1 A WATER-DEPENDENT ECONOMY

The Breede-Overberg is a predominantly rural region with social, economic and environmental systems that are dependent upon water.

A Diverse Region

The Breede-Overberg is a region of contrasts. It consists of the large wide Breede River and its tributaries flowing into the nationally important Breede estuary, as well as a number of small coastal rivers flowing into large estuaries or coastal wetland systems. The region is flanked by mountain ranges in the north and west, through wide river valleys, down to the rolling hills of the Overberg in the south east and the southern-most tip of Africa.

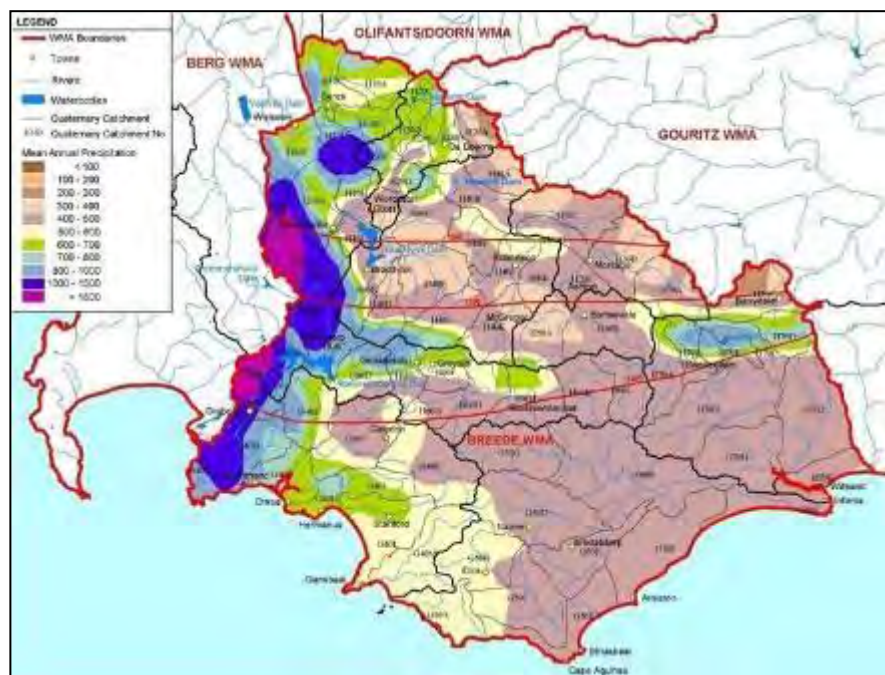


Figure 2.1. Rainfall in the Breede-Overberg WMA

The winters are typically wet and cold (17 °C average) with occasional frost and snow, while the summers are very hot and dry (37 °C average daily maximum). The far southeast is the exception with year round rainfall. Rainfall patterns also differ markedly from up to 3000 mm per year in the western mountains, to as low as 150 mm/a in the southern-central valleys.

Agricultural and urban land use patterns have developed to reflect this variation in surface water and rainfall. Irrigated fruit and vegetables dominate in the north and west, changing to rain fed grains in the



center and south. Agricultural towns are scattered throughout the inland regions, while coastal residential-tourism towns are dotted along the south-western coast. Protected mountain areas transition to highly developed agricultural lands in the valleys and plains, and then back to conservation areas along the south western

coast.

Water-dependent Growth

The economy of the Breede-Overberg region is primarily agricultural, supported by localised tourism mainly along the coastal strip. Most of the manufacturing, construction, trade and services economies of the various small towns in the region fundamentally support agriculture and the associated agro-processing industries.

This region is thus largely dependent upon its agricultural economy, which itself is predominantly based on high-value fruit cultivation supported by grains and livestock. About a third of the current R17 billion economic output is directly linked to agriculture. When the associated manufacturing, construction and services are considered, a total of about three quarters of the economy is dependent upon agriculture. The remainder of the economy is related to coastal residential retirement and tourism.

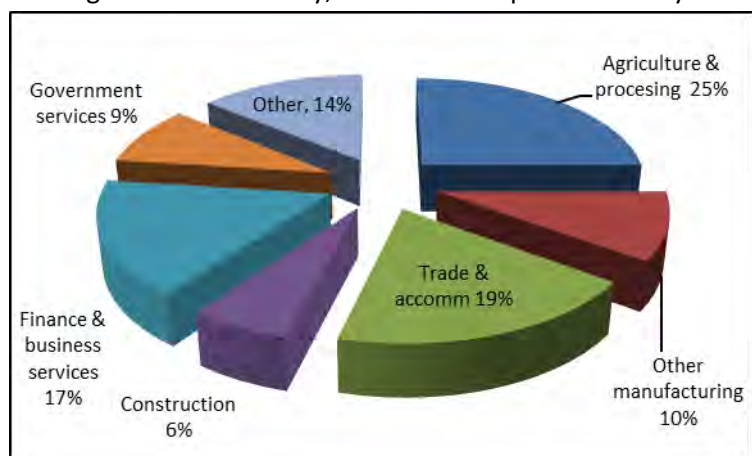


Figure 2.2. Economic Sector Contribution to GDP

Agriculture is very strongly dependent upon water, whether irrigation from surface and ground water or rain fed cultivation. Water constraints imply economic growth through technically more efficient use of the available water resources, as well as allocation to more economically beneficial/productive uses. On the other hand, the coastal residential and tourist economy is largely built on the natural resource quality of the area, which itself is closely linked to the health of water resource ecosystems. It is therefore clear that the economy of the Breede-Overberg is closely dependent upon the availability and health of water resources in the Water Management Area. As a reflection of this, growth in the agricultural, forestry, and fisheries in the Western Cape economy has been 2.7% per year over the past decade, while the residential-tourism economy has grown at a more brisk 3.4%.



Linkage to the Regional Economy

The Breede-Overberg WMA is also closely linked to the Western Cape regional economy, and must be understood in this wider context when considering water resources and economic growth. The Breede-Overberg WMA is directly linked to the Berg WMA through the transfer of approximately 250 million m³ of water per annum to the Berg WMA, the requirement for which is largely driven by the urban Cape Town area. In one regard, this transfer of water limits the water directly available for agricultural and other developments in the Breede-Overberg WMA. Viewed in the larger context, however, economic growth in Cape Town and other areas in the region feedback and fuel growth in the Breede-Overberg WMA by creating demand for products in nearby markets, increasing tourism, and injecting more money into the economy.



Therefore, though the growth rate in the Breede-Overberg WMA is lower than that in Cape Town and the Western Cape as a whole, the Breede-Overberg WMA's economic growth rate still outstrips the average population growth of 1% per year. This reflects a combination of internal increase and immigration.

Uneven Development

The variation in natural and water resource availability is mirrored in the unevenness of economic production between areas. The relatively water abundant upper and central Breede valley dominates economic production, whereas the water constrained lower Breede and Overberg East are economically relatively insignificant. Uneven development is entrenched in that the areas that have developed less, such as the Buffeljags Dam area near Swellendam in the Lower Breede, transfer water to areas that are more developed. This transfer of water constrains the degree of growth that might otherwise be possible in the less developed areas.

An additional factor introducing regionally uneven development is the transfer of water to the Cape Town area, mainly from the Riviersonderend area. Even though Riviersonderend is well endowed with water and natural resources, two thirds of the water resource is transferred to supply Cape Town and Berg River agriculture, introducing constraints on the economy in this area.

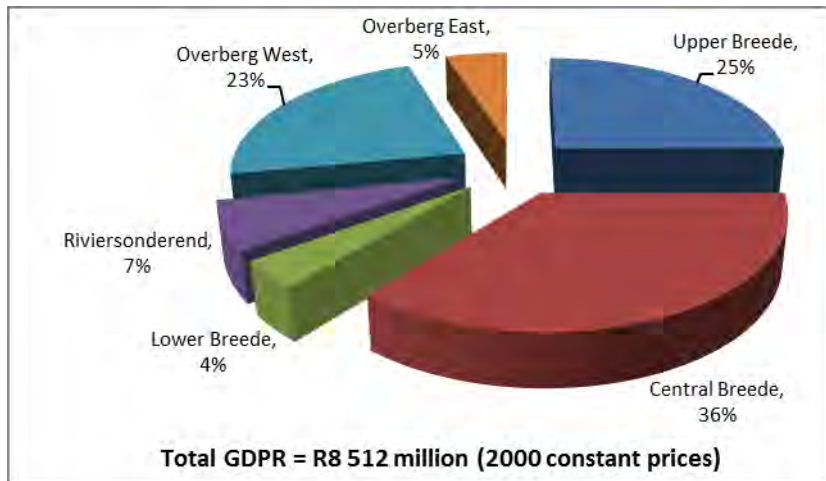


Figure 2.3. Locational Contribution to GDP

Variations in economic development between urban and rural areas also exist, with urban areas at the centre of trade, accommodation, and other business activities and rural areas focused on agriculture. Urban areas are generally more economically developed while using less water, though the urban areas are inextricably linked to the less economically developed rural areas because agriculture underlies so much of the region's economy.

As would be expected, the population distribution of the approximately 500 000 residents of the Breede-Overberg WMA broadly reflects the intensity of economic activity between regions, and urban and rural placement. Average per capita economic production is relatively constant between areas, at about R16 500 per year. Despite being an agriculturally dominated area, two thirds of the population resides in urban areas.

Household inequalities

Significant inequalities between households also exist, and are linked to differences in employment and historical inequities.

While only about half the working age population is employed, the formal unemployment rate in the Breede-Overberg WMA is between 13% and 17%, which is lower than the national average of 22% to 25%. Extensive casual and seasonal employment pattern contributes to the skewed income distribution, with three quarters of households earning less than the average income. Although about half of the population earns less than US \$2 per day, social grants have relieved some challenges.

As with the economic production, employment is closely linked to water resources through agriculture and tourism. It cannot be stressed enough that the management of water resources directly impacts on the level and distribution of social and economic development in the Breede-Overberg WMA.

Significant variation between households also exists as a result of historical inequities. Despite the pressing need and policy intent for redress of historical inequities through the allocation of water to emerging black farmers for productive use, there has been slow progress in South Africa. In the Breede-Overberg region, this is complicated by hydrological variability and economic value of water. Water allocation reform provides an important, but challenging vehicle to reduce inequalities in this region.

2.2 A CRITICAL TIME

Water managers and stakeholders have recognised that the Breede-Overberg region is at a watershed moment. For many years, it has been generally assumed that there is adequate water of acceptable quality to meet the farming, tourism, urban and industrial water requirements of the region (and Cape Town), while not adversely impacting upon the important wetland, river and estuary ecosystems. However, this perception was based on outdated water use information and more recent evidence indicates that the catchment water resources are stressed and the aquatic ecosystem health in many parts of the system is deteriorating.

Development needs

Encouraging economic growth and improving social livelihoods are at the centre of the Breede-Overberg WMA's development future, and therefore must be at the centre of the CMS. The role of water in supporting development is especially critical in the Breede-Overberg WMA because the economy and population are inextricably linked to agriculture and the water resources available are limited.

Water allocation options provide an opportunity to support higher levels of economic growth and employment, as well as an opportunity to influence the direction of this growth to align with community preferences. Difficult decisions, however, must be made with respect to the economic sectors competing for water resources. Agricultural, industrial, and commercial and urban development lead to differing levels of economic contribution and employment opportunities created per unit of water used. These sectors compete for water resources in the Breede-Overberg WMA, so the prioritisation of water use among these sectors will shape which can grow most quickly, and the type of economy and employment created.

Additionally, water resource decisions can support redress of historical social inequities and improve social livelihoods through allocation to emerging black farmers, and allocation that encourages the creation of more stable and higher income employment opportunities. Significant steps must be taken, and therefore significant water allocated, to increase the percent of agricultural land owned by Historically Disadvantaged Individuals from the current estimates of 2% to 5% ownership to the five year goal of 15% ownership. Creation of stable and higher income employment through industry and commercial development is also possible, but may compete for use of these same water resources.

Stressed water resources

The current requirements on the catchment of Breede-Overberg WMA are approaching and in some cases exceeding the average available water resources. This is exacerbated by being located in a predominantly winter rainfall region, where the availability of water during winter storms does not

coincide with the needs for summer irrigation and supply to the tourist influx to coastal towns. This significant seasonal variability implies that only about half of the total average annual stream flow can reliably be used. Abstraction during summer low flow periods already exceeds what is available in many of these catchments, while winter requirements **also exceeds what is available during** drier years.

The fundamental challenge in these stressed catchments is to support the desperately needed economic development (growth) and social redress (equity), while maintaining the environmental functioning (sustainability) of the nationally important aquatic ecosystems found in this region. The recent extreme droughts experienced in the neighbouring catchments of the Southern Cape around Mossel Bay and George dramatically illustrate the risk associated with natural variability in stressed systems.

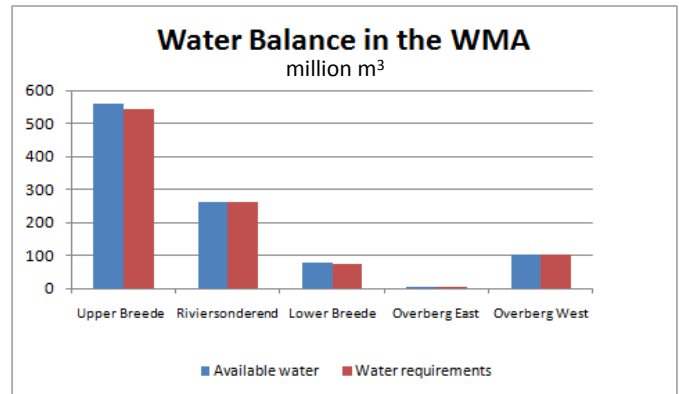


Figure 2.4. Water Balance in Breede-Overberg WMA

Costly infrastructure

Assured supply is provided by a number of publicly owned dams, as well as private farm dams, which in total can store a little over half the average annual streamflow in the system. Opportunities to expand this storage infrastructure have been proposed, particularly the raising of some of the existing dams, the building of a couple of new schemes, or the construction of small on-farm off-channel impoundments. However, this additional water comes at a high cost, because it requires storage of only larger winter floods for use in late summer and there are a limited number of feasible dam sites. These supply



constraints, costs and the value of water are reflected in the range in trading prices for agricultural water (typically R15 000 to R100 000 per hectare, which is 10 times the national average).

Meeting the ever increasing water requirements in Cape Town also includes potential additional transfers from the Breede or Palmiet rivers. In some situations, improvements to existing infrastructure will also require the release of environmental flows that are not currently catered for, with

the associated reduction in currently available water.

Alternative (non-conventional) augmentation possibilities are being explored. The tapping of groundwater from the deep Table Mountain Group aquifer will require improved drilling technologies and is limited geographically. The desalination of sea water is an expensive option with high energy and

carbon requirements, and is limited to the coastal areas and thus urban supply. Important decisions will need to be made about the development of infrastructure. Over the next decade, some important decisions will need to be made about these potential augmentation possibilities.

Declining ecosystems

Over the past decade there has been a decline in ecosystem health in many parts of the Breede and Overberg rivers, indicated by comparative river health surveys in 1999 and 2010. Smaller tributaries seem to have been the most negatively impacted, although there has been some deterioration on the upper Breede River itself. The causes of this decline are varied and complex, being a combination



of mechanical disturbance of these rivers, over-abstraction with on-farm storage, and in some cases water quality deterioration. Importantly, there have also been some successes in the Wit and Molenaars, where invasive alien vegetation clearing has actually improved the ecosystem functioning of the upper portions of these rivers.

The estuaries have also been under general pressure from development encroachment, water quality deterioration and reduced flows. These estuaries are of national conservation importance and have local tourism-residential value, with the Breede estuary being one of the few remaining permanently open estuaries in the country and having tidal effects many kilometers upstream. The brackish water mixing zone in the Breede estuary has been shrinking over the past decade, which has profound implications for breeding of marine fish species. If further losses in ecosystem health are to be prevented, proactive intervention will have to be taken over the next decade.

Threatened water quality

As with many parts of South Africa, elevated pathogen pollution of rivers and estuaries is caused by inadequate treatment of waste water discharge and urban washoff from small towns. The potential health, reputational and market impacts for irrigated fruit and vegetables are significant, with warnings already having been sent to the farming community by representatives of the European export market. The consequences of not addressing this challenge are profound, given that about half of the deciduous fruit and table grapes cultivated in the Breede are exported from South Africa and about a quarter goes into the higher end domestic market. Pathogen pollution also poses significant risk for recreational use, health and tourism, so there are clear local political, social and economic consequences of continued non-compliance by municipal waste water treatment works. Urgent management attention is required.

Increased threats of eutrophication of the lower river reaches and estuaries during summer low flows is also caused by nutrient enrichment from municipal waste water and agricultural runoff. Increased salinity concentrations during summer low flows also pose challenges and have had to be carefully managed in the middle Breede River over the past couple of decades. This is not possible in the lower Breede River, where natural geological and tidal impacts make the low summer flows unfit for irrigation.



Figure 2.5. Water Quality Status in the Breede

Increased Flooding

In each of the three years prior to 2010, major (estimated 1-in-100 year) floods occurred in the coastal areas of the Breede and Overberg. These caused significant infrastructure damage and had profound impacts on the morphology of these river and estuary systems. It is unclear whether this reflects an unlikely confluence of events or the beginning of increased climate variability. Unfortunately, flood defence is generally limited and riparian encroachment into flood zones is widespread. Possible increased likelihood of extreme flood events will continue to pose a significant risk in this region, and will need to be addressed by holistic and cooperative disaster risk management.



Inadequate Information

The water management challenges outlined above are difficult enough by themselves, but in the Breede-Overberg these are exacerbated by outdated and uneven information. Hydrological modelling in much of the Breede has not included the past 20 years of monitoring and has not been done for much of the Overberg. Water use information is 10 years out of date during which there has been significant expansion of irrigation, while verification of the legality of water use has not been conducted. Sound management decisions require reliable information, particularly in a system that is as stressed as the Breede-Overberg. This issue must urgently be addressed.

Transitional Institutions

The establishment of the Breede-Overberg CMA has presented the opportunity to strengthen water resources management in the Water Management Area. Over the past decade, institutional uncertainty related to the slow implementation of the National Water Act, together with declining capacity in DWA and local government, has contributed to wide spread non-compliance with water resources regulations. Despite some cohesion at the water user association scale, the challenge is to provide a common vision at the catchment scale and to create the institutional arrangements and stakeholder engagement necessary to develop cooperative and participatory management of water resources balancing local needs and national interest.

2.3 A CHANGING WORLD

In addition to the trends in the local situation, there are broader shifts in the Western Cape, South African and global economy and society that may directly affect water management in the Breede-Overberg. Even though the dimensions of these changes are often uncertain, as is the nature of their impacts on water management, they must be considered to create a resilient catchment management strategy.

Evolving policy

While the intensive period of post-1994 policy development has past, there continue to be shifts and lack of clarity in national policy. This ranges from the macro-economic policy level with the New Growth Path, through climate, energy and carbon related policy, to land, agricultural and water policy. Each of these may shift dramatically in the next 20 years, which in turn may affect water resources protection, regulation and use in the Breede-Overberg. In the water arena, the ongoing debate around policy implementation related to CMA establishment, water allocation reform and resource protection will have profound impacts on the enabling environment of water management.

Unstable economy

The past couple of years have highlighted the uncertainty around global economic conditions and markets. During 2008, food prices spiked due to increasing demand, global shortages and speculation, followed by financial collapse, with the result and drop in agricultural, tourism and economic activity. The long-term trend seems to be for increasing real crop prices, which should benefit the Breede, but conversely the constraints of a low carbon economy may hurt fruit export to Europe. Over a 20-year period, it is unclear how the global (and national) economy will impact on the Breede.



Figure 2.6. Food Price Index

Expanding Cape Town

Cape Town represents about two thirds of the Western Cape economy and has been growing consistently over the past decade. Indications are that the economy will continue to grow at 3% to 5%, with a population increase of about 1% per year. The Cape Town functional region will continue to expand and have greater impact on the towns and settlements in the western part of the Breede and Overberg. The growth in satellite towns is particularly likely along the N1 corridor through Worcester, the N2 corridor through Grabouw / Elgin and the coastal routes through Betty's Bay and Onrus. Similarly, weekend tourism and second or retirement homes will increase.

Evolving technology

Whatever happens, the technology of the future will be different and new possibilities will arise. This may range from possible agricultural technologies that enable greater yields with less water in a more variable climate, through cost-effective renewable energy that enables desalination of sea water and pumping it inland, to improved drilling technologies to access deep groundwater resources, to communications technology that supports decentralised rural "life-style" towns that are entirely connected to the region and global economy. While it is unclear what technology will produce, the water pressures on the Breede-Overberg may change for the better and/or worse, as will the opportunities to address them.

Uncertain climate

There is broad scientific consensus that global temperature is increasing and expectations are that the Western Cape will be particularly affected by these changes. This will have an impact on the water dependent Breede-Overberg by reducing soil moisture and increasing the severity of wildfires during dry periods, as well as changing the suitability of growing conditions, pests and yields for different crops. It is also expected that the frequency and severity of extreme floods and droughts will increase. It is less clear what the impact on rainfall and water resources will be, except that rainfall in the mountains may increase, while winter rainfall in the valleys and plains may decrease and occur at different times during the growing season.

Transforming/adapting agriculture

Agriculture in the Breede-Overberg is facing pressure by economic, climatic, and social factors, which will result in shifts in the nature and even the magnitude of agricultural production over the next couple of decades. Market and technological opportunities will also influence this change, but the precise impacts remain uncertain. However, there are already signs of crop changes from deciduous fruit to grapes in the north-east and concerns about the continued production of hops and certain grains in the Overberg, resulting in the inclusion of extensive livestock. The way in which land and water allocation reform is implemented will also have profound impacts on the nature of agriculture.

Tenuous social cohesion

Underlying all of these shifts and uncertainties is the nature of the South African political economy and the degree to which the poorest communities are included in (or marginalised from) the economy. While government policy focuses on addressing inequality and job creation, implementation and real impacts continue to be difficult. The outcome of this process will determine the degree to which the social compact between government, private sector and civil society is strengthened or crumbles. The implications are either a cooperative future with stability, pragmatism and greater participation, or a

more conflictual future marred by instability, rhetoric, polarisation and limited investment. If the catchment moves down the second path, it will severely impair opportunities for effective water resources management.

2.4 A NEW PARADIGM

Actions in the Breede-Overberg will have little impact on the national and global trends, but the degree to which they are considered in the development of a more resilient/adaptable catchment management strategy will determine the robustness of these actions to different possible futures. Fortunately, many of the important dimensions of resilience have already been enabled or implemented in the South African water resources management environment, through the National Water Act and policy.

This was built around the concept of the three pillars of integrated water resources management (IWRM), namely sustainability, equity and efficiency. This was further supported by institutional approaches that are particularly relevant for South Africa, namely participatory management, transformation of society, and redress of historical disadvantages. Together these provide a new and more resilient paradigm for water resources management in the Breede-Overberg, of which the catchment management strategy represents one element.

Holistic transformation

Since 1994, government has outlined the three broad dimensions of transformation that underpin the concept of a developmental state. Firstly, *social justice* requires that the poorest and most marginalised communities and individuals receive particular attention and consideration in the formulation and implementation of any strategy. Secondly, *service delivery* requires that state organisations provide effective and efficient services to their customers and stakeholders, in a timeous and administratively fair manner. Thirdly, *representivity (employment equity)* requires that all demographic groups are represented in processes and diversity is embraced. These aspects of transformation were foundational to the process of developing the strategy and need to be mainstreamed into its implementation.

Participatory decentralisation

The establishment of the Breede-Overberg CMA represents an important aspect of this transformation agenda in the water resources sector. This has the core purpose of decentralising management and enabling stakeholder participation at a catchment scale. The outcome is decision-making that reflects local understanding and needs, within the context of the national water resources strategy. Historical disadvantages are addressed through empowerment processes. Together this provides an important shift in



South African water management, with the CMA having to balance the policy imperatives required by the Minister with the requirements for legitimacy from local institutions, water users and stakeholders.

Improved service delivery

It is clear that the desired impacts in terms of improving the lives of all South Africans, have not been attained to the extent that Government and citizens would have hoped. Whilst Government and its various sector partners have made considerable efforts, often increasing expenditure and actions, there is still much to achieve. In recognizing this, the Governmental prioritization of 12 key Outcomes provides an opportunity to clarify what is expected in terms of achievements, to outline how this will be undertaken, as well as to provide key measures to indicate progress. This will require the active involvement of role players such as the Breede Overberg CMA and its key stakeholders, working in partnership with DWA.

Cooperative management

Building legitimacy for the Breede-Overberg CMA requires the adoption of a cooperative management approach, with local and provincial government, as well as water user associations. If introduced effectively, this cooperative spirit could permeate all stakeholder engagement and the way in which resource management decision making is done in the region. This is a fundamental aspect of effective catchment management, because it is only through stakeholder buy-in that the individual actions required to protect and share water will be done. Control and enforcement alone will not be adequate to manage the challenges in the Breede-Overberg. Similarly, an important cooperative relationship is emerging between the Breede-Overberg CMA and the regional office of DWA, as the two institutions tasked with managing water in the area.

Increased awareness

Public, media and business awareness of water related issues has increased exponentially since the turn of the millennium, linked to the increasing attention to climate change. This interest provides a significant opportunity to target communication, mobilise stakeholders, foster cooperation and spur action around water resources management. The converse is that people in the region are more informed and have higher expectations of the catchment management agency and the possibilities provided by the catchment management strategy to address many of the concerns that have arisen during the past decade.

Corporate engagement

Following this public awareness, as well as increased investor interest in water related risk, business is becoming more engaged in water management issues to manage their physical, reputational and regulatory risk. Internationally, this ranges from improving internal operations, influencing water-thirsty agricultural supply chains and cooperating with communities and government around local water resources concerns. Some of the large food & beverage and retail companies with a presence of footprint in the Breede-Overberg are beginning to think about this type of engagement, while the possibilities of water stewardship standards and accreditation are also being explored. This brings great potential for cooperative management and resource mobilisation to water management.

Water for growth and development

DWA has formulated the Water for Growth and Development Framework, following the recognition that water could be both a catalyst to development and a constraint to growth. This is a very important perspective in a water quantity and quality stressed country and highlights the need for improved technical efficiency in the use of water, as well as economic efficiency in the allocation of water

between productive activities. This perspective of “water in the economy and society” requires improved alignment and cooperation between water resources and other spatial, development and environmental planning processes, in other words, taking water outside of the “water box”.

Water footprint

A different economic perspective on water use it provided by the water footprint concept, which describes the embedded water in a product (commodity) and the way it is consumed, benefited or exported from the catchment economy. A catchment water footprint indicates the value added and jobs created per unit of water required to cultivate and manufacture various goods (from the catchment), distinguishing between the water obtained from rainfall (green water) and the water required for irrigation (blue water).

Scenario planning

With the increased future uncertainty, traditional ways of planning based on projecting future trends to identify the best management actions are being replaced by scenario planning to identify actions that are robust under different possible outcomes. This is increasingly being supported by adaptive management to monitor and refine these actions as future conditions change. While this is particularly appropriate for areas undergoing rapid change, it is also relevant for longer-term visioning in catchments such as the Breede-Overberg with more gradually shifting economic conditions and climate variability.

2.5 DEVELOPMENT FUTURES/SCENARIOS

Various scenario planning processes have been conducted in the past 15 years in South Africa, and it is against this backdrop and an analysis of uncertainties that three narratives/perspectives (scenarios) of the future for the Breede-Overberg are described. Actions related to the CMS cannot directly determine the outcome, but will need to consider the implications of these scenarios on the effectiveness of the action. The three scenarios are:

I. All in it together

This reflects a cooperative future, supported by sustained development, growth and institutional strengthening. This provides the most favorable environment for balanced and effective water resources protection, development, sharing and efficient use. It is also characterised by the highest requirements for water associated with economic development and urban population growth, together with the needs that will result through the establishment of viable commercial farms by emerging farmers supported by organised agriculture. However, the importance of environmental functioning to support ecosystems, tourism and residential areas ensures a balance with environmental requirements and strongly drives efficiency in water use. Regulatory initiatives are supported by the cooperative outlook, self/peer regulation and institutional resources.

II. Race to the bottom

While maintaining some growth, this is characterised by ongoing inequality and limited cooperation. Inadequate institutional capacity results in limited regulation of water use or waste discharge, which is exacerbated by the limited cooperation. The dominance of established individual interests tends to trump the common interest and those of the more

marginal voices. The management environment prioritises growth and focuses on providing the necessary inputs to this growth (such as water), while neglecting environmental and social requirements. Requirements for commercial and municipal use of water increases with the growing production and population, but with deterioration of environmental resources and limited reallocation of water to emerging farmers.

III. Things fall apart

This is characterised by social disintegration and stagnant economic growth, together with limited institutional capacity and ineffective policy. Limited growth and investment implies little significant increases in water requirements from agricultural or urban users, although the existing use may become less efficient. Some redistribution of water may take place, but with limited support to ensure its long-term viability. Environmental quality is not prioritised and regulatory control cannot be maintained, but potentially less pressure on the water resources may indicate a lower level of degradation that may otherwise be expected.

The first scenario clearly suits the new paradigm of water management in the Breede-Overberg, but the question is what the other two scenarios imply for the CMS and the Breede-Overberg CMA. The second scenario would require a stronger regulatory authority to address gross violations, but would require a greater prioritisation of attention to the really critical water resources management issues. The third scenario would require empowerment and support to water users and institutions that may not have adequate resources to act appropriately.

In summary, the three scenarios require a slightly different while complementary focus for the Breede-Overberg catchment management strategy lead by a strong CMA. These are **participatory-cooperative** management as a priority for the first, **control-regulatory** management as a priority for the second, and **empowering-supportive** management as a priority for the third. Together these reflect the spirit of the new paradigm and provide the pillars for a robust strategy and a resilient institution that must be maintained under any future conditions. Obviously this needs to be supported by adequate information about national and global shifts and emerging challenges in the area.

3 The Vision of the Breede-Overberg

3.1 WHY HAVE A UNIFYING CATCHMENT VISION

The purpose of the Breede-Overberg catchment vision is to provide a collective medium-to-long term perspective of the desired state for the Water Management Area. This will guide the definition of management objectives and the development of water related strategies and actions, in order to generate a sense of cohesion and common purpose between the diverse stakeholders in the area.

The Breede-Overberg catchment vision was developed through a series of work sessions with a broad and diverse range of stakeholders. The process entailed the identification of key issues and priorities, translation of these into core elements of the vision for each of the six management zones, and then synthesis of these into a coherent vision for the entire Water Management Area.

3.2 THE BREEDE-OVERBERG CATCHMENT VISION

The catchment vision was formulated in the context of a broader development vision for the region, reflecting government development planning imperatives and intent at provincial and local levels.

A Developmental Vision

We understand that water will shape the growth and development of the Breede Valley and Overberg region, and that our future is linked to that of Cape Town, the Western Cape and the country as a whole. We also recognise that the way we respond to the challenges and opportunities of change in our natural and social environment, will determine how we live and work together. Then, considering the nature and possibilities of this area, as government and residents we aspire:

- ❑ To protect the environment that keeps our catchments clean and healthy for people's quality of life, biodiversity and business opportunities;
- ❑ To develop agriculture and tourism that creates wealth and jobs for our communities, and meet the aspirations of disadvantaged rural people;
- ❑ To create opportunities for people and businesses to adapt to our changing world through innovation and technology; and
- ❑ To ensure that as our towns and communities grow, our people continue to enjoy improved quality of life and services.

This vision implies a balance between environmental protection and agricultural, tourism and urban development with a focus on the needs and aspirations of the catchment's residents. It highlights the need for adaptation and the possibilities of diversifying the economy through innovative energy and information technologies. This was translated into a water-related catchment vision.

The Catchment Vision

The Vision for the Breede-Overberg Water Management Area is captured by:

“Quality water for all forever”

Stakeholders expanded this into the following three vision statements reflecting the balance between protection and development achieved through joint action.

-
- ❖ ***Protecting** our rivers, groundwater, wetlands and estuaries in a healthy and functioning state for nature, people and the economy.*
 - ❖ ***Sharing** our available water equitably and efficiently to maintain existing activities, support new development and ensure redress, while adapting to a changing climate and world.*
 - ❖ ***Cooperating** to jointly nurture, take responsibility and comply, so that our water resources are well managed, under the leadership of a strong Breede-Overberg CMA.*

Sub-visions for the Management Zones

The catchment vision was built from and is reinterpreted through the sub-visions for each of the six management zones. These recognise the inherent differences between the zones and reflect the priority water resources management challenges.

Upper Breede

Healthy and flowing source rivers and wetlands providing water for equitable and efficient agriculture, including downstream in the Breede River.

Central Breede

Healthy rivers and groundwater used efficiently and equitably in the agricultural and economic heartland of the Breede region.

Riviersonderend

Healthy alien invasive vegetation-free rivers and dams used to support regional economic development, agriculture and equity.

Lower Breede

Healthy functioning estuary to sustain local development through responsible use and protection of water resources within the entire Breede catchment area.

Overberg East

Healthy wetlands and estuaries dependent upon flowing and functioning rivers and aquifers under changing climate and shifting economic conditions.

Overberg West

Healthy estuaries, rivers and aquifers that are sustainably used to balance the needs of job creation, residents, agriculture, tourism and conservation.

3.3 GOALS THAT REFLECT THE CATCHMENT VISION

The catchment vision is intentionally aspirational and while it implies tradeoffs, it does not indicate the desired state for which these catchments should be managed. In order to clarify possible interpretations of the vision statement, three distinct alternatives were formulated, reflecting different water resources management assumptions and principles.

- ❑ **Business as Usual – “A developed landscape”** follows a traditional technical planning approach to water management, using existing information (as the best available) to plan water use development projects (regionally and locally), while ecological and water quality impacts are mitigated through local management plans.

-
- ❑ **Middle ground – “A balanced environment”** follows a more precautionary economic developmental approach, acknowledging that current information may be outdated and our understanding of the system is limited, with sustainable water resource protection, development and use being balanced to meet local and national imperatives.
 - ❑ **Eco-restoration – “A greener pasture”** prioritises the improvement of riverine and estuary functioning, with sustainable local development where possible, acknowledging that current information and understanding is likely to be outdated and detailed monitoring will be required.

These alternatives and their development implications were tested with stakeholders, in order to determine the underlying philosophy around the balance between environmental protection and water resource development-use that should drive the development of the catchment management strategy. This led to the adoption of the middle ground scenario as the basis for developing strategic objectives and actions for the strategy, because:

- On the one hand, the Breede and Overberg rivers are already stressed and the ecological status of some of these ecosystems has deteriorated over the past decade. Further ecosystem deterioration does not reflect national government policy, nor does it give effect to the intent of the catchment vision and the demand of stakeholders for an improved management shift by the CMA. Therefore, “business as usual” should not be adopted as a guide to achieving the catchment vision.
- On the other hand, the imperatives for development and redress restrict the possibility for ecological improvement in the short-to-medium term. Therefore, “eco-restoration” should not be adopted until improved (updated) water use, hydrological and ecological information is gained and the current decline is halted.

The three inter-related vision statements were used as the basis for translating this “middle ground” interpretation into more concrete outcomes. The purpose of defining outcomes is to capture two fundamental issues for each vision statement that reflect the essence of that statement. These are intended to be representative of the intent of the vision statement (rather than comprehensive) and thus to guide the development and implementation of the CMS against the associated strategic areas.

Vision Statement I: *Protecting our rivers, groundwater, wetlands and estuaries in a healthy and functioning state for nature, people and the economy*

Protection of water resources includes the range of aquatic ecological and water quality issues that affect the habitat and biota of the water resources (i.e. rivers, wetlands and estuaries).

- ✚ **Goal:** The majority of the Breede and Overberg estuaries and wetland systems are *protected* in a slightly modified state.

From an ecosystem perspective, the estuaries of the Breede-Overberg have a relatively high desired protection status and are the most threatened. The estuaries therefore represent a key indicator of general river health, related to flow, quality and habitat disturbance.

- ✚ **Goal:** Riverine *water quality* is maintained at an acceptable level for the irrigation of fruit and vegetables, as well as contact recreation.

On the other hand, the quality of water for irrigation is the greatest concern, linked to pathogen contamination from urban areas and the requirements of international markets. As such it is a reasonable proxy for other water quality concerns in the Breede-Overberg.

Vision Statement II: *Sharing our available water equitably and efficiently to maintain existing activities, support new development and ensure redress, while adapting to a changing climate and world.*

Sharing of water resources includes the range of water use and infrastructure development issues that relate directly to social development and economic growth imperatives.

✚ Goal: Adequate water of good quality is allocated to meet the social objectives of service delivery and equity/redress.

Water allocation reform to support redress of historical inequities is fundamental to sharing water equitably for productive agricultural and domestic household use.

✚ Goal: Economic returns from water used in productive activities are continually improved, together with the *efficiency* of municipal water use.

In a water stressed catchment, it is critical to use water more smartly (efficiently allocated) to expand economic production and beneficiation (for example crop value per unit water), as well as to ensure urban and domestic water supply is operationally efficiently.

Vision Statement III: *Cooperating to jointly nurture, take responsibility and comply, so that our water resources are well managed, under the leadership of a strong Breede-Overberg CMA.*

Cooperating around water resources management includes the range of regulatory and participatory mechanisms that promote the implementation of actions by relevant institutions and stakeholders.

✚ Goal: *Compliance* with water use authorisation conditions is improved every year.

Levels of compliance indicate the degree to which the water manager are able to control and enforce licence requirements, together with the degree to which individual users and associations are cooperating by self-regulation and control of water use.

✚ Goal: Full *implementation* of the Breede-Overberg CMS by those responsible.

Ultimately at the current early stage of CMA establishment, the degree to which the CMS is implemented by all relevant and responsible parties represents the most effective indicator of cooperation based on CMA institutional leadership and legitimacy.

3.4 GUIDING PRINCIPLES FOR THE CMS

These guiding principles should be considered when developing or implementing any actions associated with this CMS. They are built on the broad IWRM principles of sustainability, equity and efficiency, and reflect the imperatives for transformation and participatory management in South Africa.

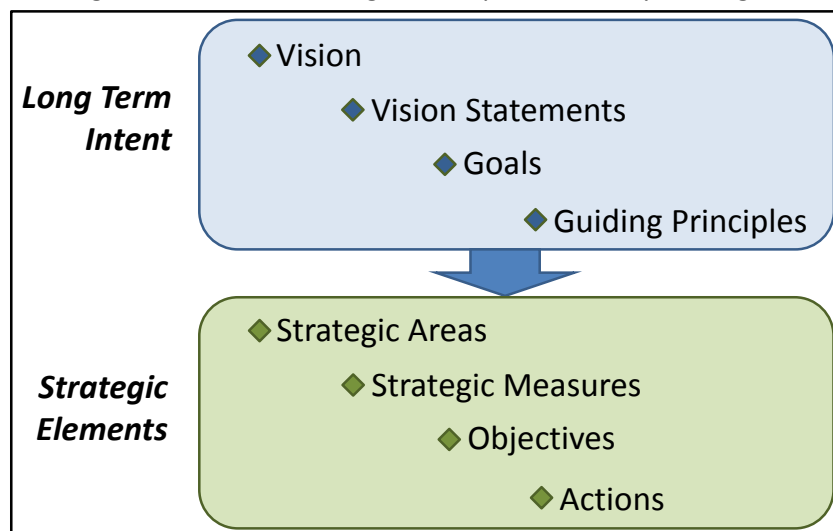
Guiding Principles for the Breede-Overberg CMS

- 1 *Recognise that water is the engine of development in the Breede-Overberg area.*
- 2 *Understand that the future is uncertain and there is a need to build multi-faceted institutional, infrastructural and natural resilience to adapt to change.*
- 3 *Prevent aquatic ecosystems from deteriorating further by focusing simultaneously on flow, quality and habitat preservation.*
- 4 *Be precautionary in decision making for stressed catchments, particularly where this is exacerbated by limited information.*
- 5 *Enable opportunities for redress of historical inequities in allocation and then urgently address potential physical, political, social and economic consequences through other means.*
- 6 *Act unambiguously against unauthorised or illegal use, while ensuring administrative justice for all users.*
- 7 *Drive continual improvement in efficiency around the productive use of water and increase technical efficiency of municipal water use.*
- 8 *Reduce waste discharge at point and non-point sources to avoid water quality problems.*
- 9 *Engage catchment and land management roleplayers and ensure alignment of these spatial and development planning process with water strategies.*
- 10 *Acknowledge existing policies and laws as the framework for management decisions, recognising distinct mandates, jurisdictions, and capacities of other institutions.*
- 11 *Build the Breede-Overberg CMA as the primary credible institution for water management in the Breede-Overberg and ensure that it obtains the appropriate authority (delegations).*
- 12 *Involve stakeholders in water resources decision making to ensure diversity, promote ownership, and build capacity in the implementation of the strategy.*

3.5 STRUCTURE OF THE CATCHMENT MANAGEMENT STRATEGY

The vision and in particular the vision statements around protecting, sharing and cooperating, provide the unifying framework for the CMS. For the remainder of this strategy document, the three vision statements are represented as Strategic Areas. These Strategic Areas provide the system against which to unpack the catchment vision into Strategic Measures, Objectives, and Actions.

Importantly, this is broadly consistent with the resource protection, regulation of water use and facilitating / cooperating strategies propose in the DWA guidelines for catchment

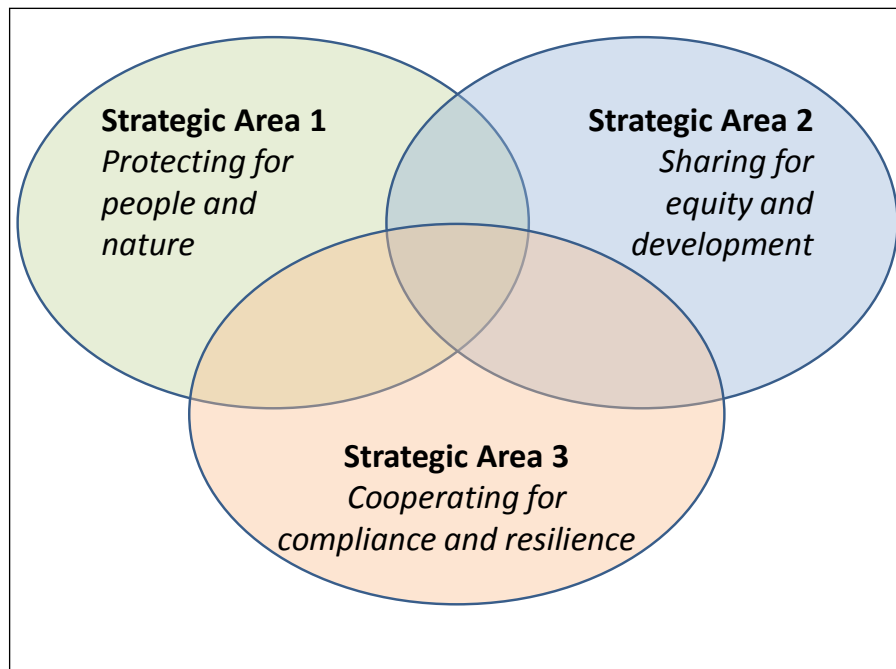


management strategies.

The three Strategic Areas for the CMS are:

- **Strategic Area 1: Protecting for People and Nature**
This primarily focuses the management of streamflow, water quality, habitat and riparian zones related to riverine, wetland, estuarine and groundwater resources, to maintain important ecosystem goods and services and biodiversity.
- **Strategic Area 2: Sharing for Equity and Development**
This primarily focuses on the management of water use from surface and groundwater resources through the operation of infrastructure, in order to provide water for productive and social purposes within and outside of the WMA.
- **Strategic Area 3: Cooperating for Compliance and Resilience**
This primarily focuses on the management of institutional aspects to enable and facilitate the protection and sharing of water, including the more cooperative stakeholder, partnership, information, disaster risk and adaptation elements of the strategy.

Each of these strategic areas is dealt with separately in the following chapters. There is some overlap between these strategic areas, so linkages are highlighted where relevant. The contributions of the strategic actions to multiple objectives are cross referenced in the implementation plan at the end of the document.



4 Strategic Area 1: Protecting for People and Nature

This strategic area focuses on the sustainability aspects of the CMS and the judicious management of the water resources and freshwater ecosystems, to ensure that these resources continue to provide the goods and services upon which society and the economy depend. The six strategic measures and associated priority actions for this first edition CMS are summarised in the following table, and are motivated and expanded upon below.

Strategic Measures and Actions for <i>Protecting People and Nature</i>	
#	Action
Strategic Measure 1-A: Preliminary Water Resource Management Class	
1.A.1	Conduct comprehensive water resources classification for the Overberg rivers
1.A.2	Conduct comprehensive water resources classification for the Breede River
Strategic Measure 1-B: Environmental Flow Requirements	
1.B.1	Establish environmental flow Reserves for the Overberg rivers and estuaries
1.B.2	Develop and implement scheme operations that meet the Reserve in the Breede River
Strategic Measure 1-C: Water Quality Management	
1.C.1	Develop a management plan to support improved compliance in municipal waste water treatment works and systems
1.C.2	Develop a prioritisation plan for industrial and agricultural sources of pollution
Strategic Measure 1-D: Groundwater (Vulnerability) Protection	
1.D.1	Develop conjunctive ground water management plans for priority Breede catchments
1.D.2	Develop a groundwater management plan
Strategic Measure 1-E: Natural Asset Conservation	
1.E.1	Develop and implement estuary management plans
1.E.2	Develop and implement management plans for priority wetlands
1.E.3	Plan & enforce instream and riparian habitat protection for priority rivers
1.E.4	Align alien invasive vegetation clearing plans with the Breede-Overberg priorities
1.E.5	Prioritise and maintain endemic fish sanctuaries and alien fish plan
Strategic Measure 1-F: Catchment and Land Use Management	
1.F.1	Adopt a mechanism to consider WMA-specific water resources impacts in land development
1.F.2	Investigate the economics of water and recommend on development priorities

4.1 THE CURRENT STATE OF WATER RESOURCES

The water resources in the Breede-Overberg WMA typically flow from pristine mountain headwaters, through heavily utilised foothill streams, wetlands systems and main-stem rivers, down to large healthy coastal wetlands and estuaries. In protecting these water resources for use and conservation, the ecosystem health, the streamflow, the water quality and the groundwater need to be considered.

Aquatic ecological health

The aquatic health of the Breede-Overberg water resources follows the same pattern in most of the rivers, going from:

- reasonably good health in the mountain sources, where limited access and conservation prevent much impact, except for alien vegetation;
- rapidly deteriorating health in the foothill streams and tributaries, with impacts from farm dams, irrigation abstraction, riparian zone encroachment, mechanical disturbance of the stream channel and saline or nutrient enriched agricultural return flows;
- gradually improving health along the mainstem rivers, although water quality typically deteriorates due to urban waste discharge/runoff and irrigation return flows;
- reasonably good estuary and coastal wetland health, except in a couple of the estuaries with riparian encroachment, reducing flows and deteriorating water quality.

The current state of the Breede and Overberg rivers is indicated on Figure 4.1 (a) and (b), based on a synthesis of expert opinion and information from the River Health Programme over the past five years. This illustrates the above trends, with blue lines representing slightly modified rivers, yellow representing modified, brown representing highly modified and red indicating unacceptable rivers.

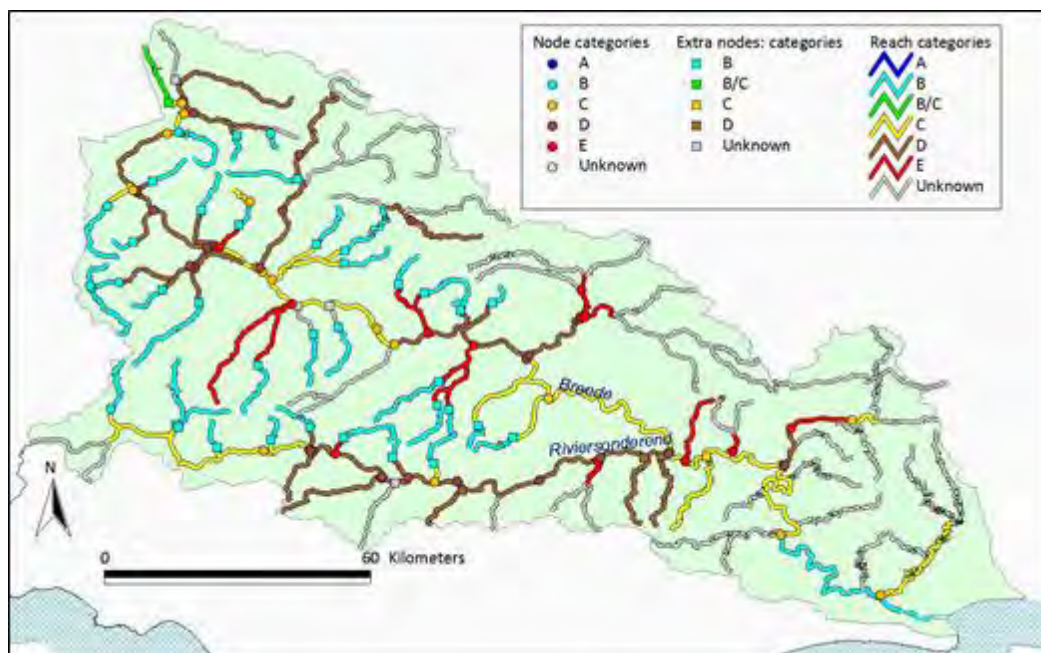


Figure 4.1(a). Current ecological state of Breede rivers

While this situation in itself is cause for concern, it is a result of a gradual deterioration in the health of many of the central Breede tributaries over the past decade, while a number of estuaries seem to be under pressure. On a positive note though, alien vegetation clearing in the upper streams has improved the health of these important water sources.

The main ecosystem protection challenge for the Breede-Overberg CMS is to maintain healthy estuaries at the end of highly utilised and ecologically modified river systems.



Figure 4.1(b). Current ecological state of Overberg rivers

Streamflow and Connectivity

Streamflow in the Breede-Overberg is highly variable, both between seasons and between years. The aquatic ecosystems in this region have therefore become resilient to change, but it is critical to recognise that while these systems can cope with changes, they need variability to recover from extreme drought and flood conditions.

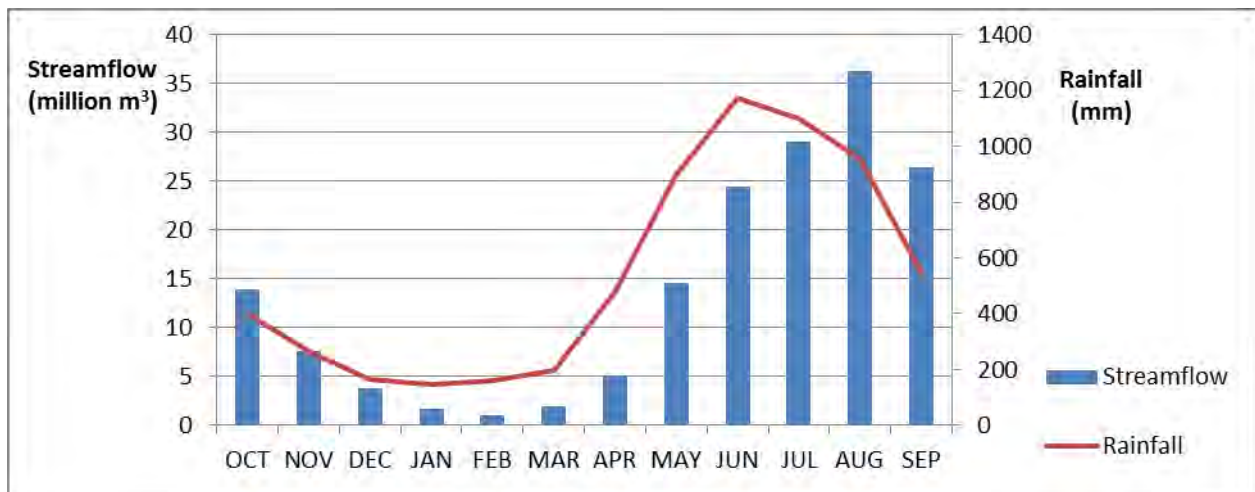


Figure 4.2. Monthly variation in streamflow and rainfall in the upper Breede River (H1H006)

There are few large dams on the main-stem rivers, except for Theewaterskloof in the upper Riviersonderend, which means that these are relatively unregulated rivers for much of their length. As a result, migrating eels have been observed in the upper reaches of the Breede River.

Although there are limited large on-channel storage dams, a number of significant off-channel storage, smaller schemes and dispersed farm dam capacity in the system have enabled the extensive use of water resources. This has also led to the change in summer streamflow patterns in some river sections

such as the central Breede and Riviersonderend as winter runoff is released for downstream irrigation purposes from Brandvlei and Theewaterskloof Dams, respectively, resulting in higher summer flows.

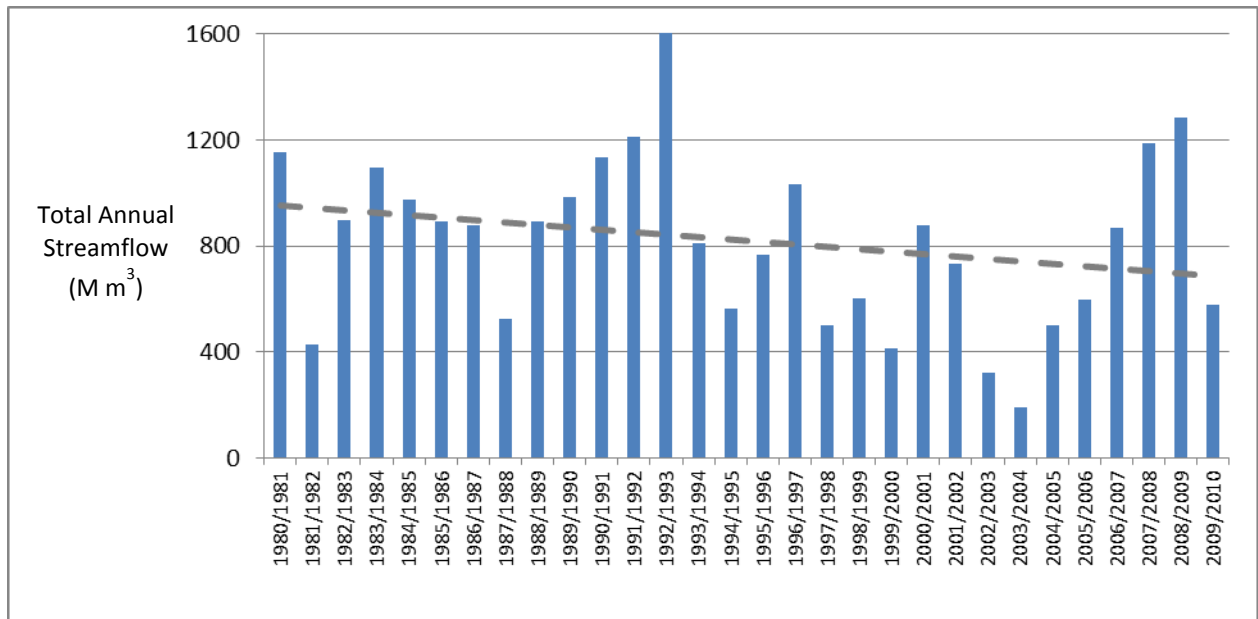


Figure 4.3. Annual variation in streamflow in the central Breede River upstream of Riviersonderend (H5H004)

Groundwater

Groundwater is an important water resource for the Breede-Overberg, both in terms of the baseflow component and in supporting direct abstraction for agricultural and municipal use.

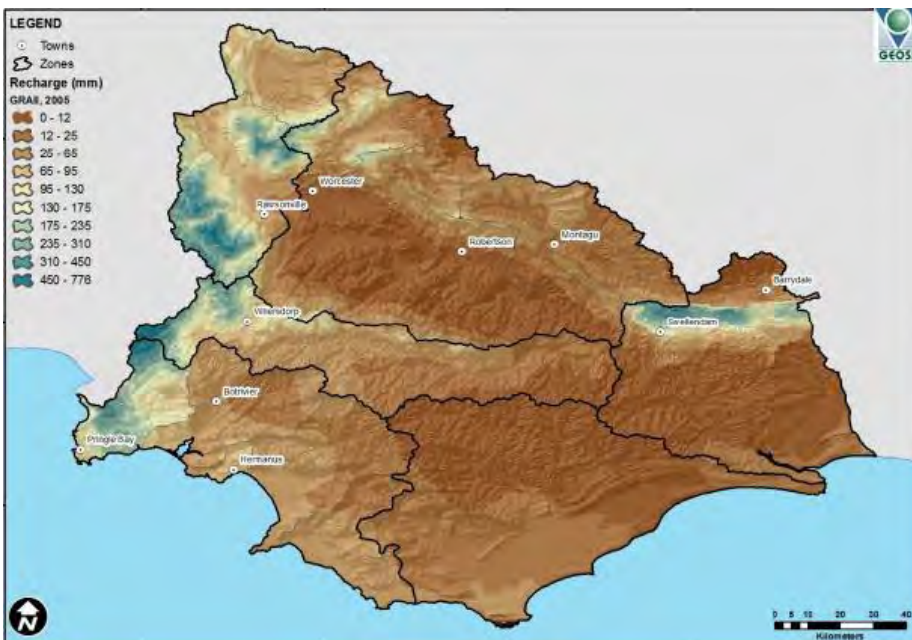


Figure 4.4 presents the groundwater recharge pattern, which as expected reflects rainfall patterns. This also broadly translates into the general contribution to baseflow from different parts of the basin. Currently abstraction does not exceed recharge in most of the basin, although there are areas in the Upper Breede where groundwater is stressed.

Figure 4.4. Groundwater recharge pattern

The Table Mountain Group aquifer occurs predominantly in the Upper Breede and along the coastal zone. In some cases groundwater occurs to great depth and dependent upon geological structure, may potentially be considered an independent resource at some localities.

Figure 4.5 indicates the salinity distribution pattern throughout the Water Management Areas. This reflects a combination of the geology (with saline geology in the south east plains) and the climate associated with recharge rates.

Together the recharge and salinity map illustrate why the major groundwater abstraction is in the northern and western parts of the area.

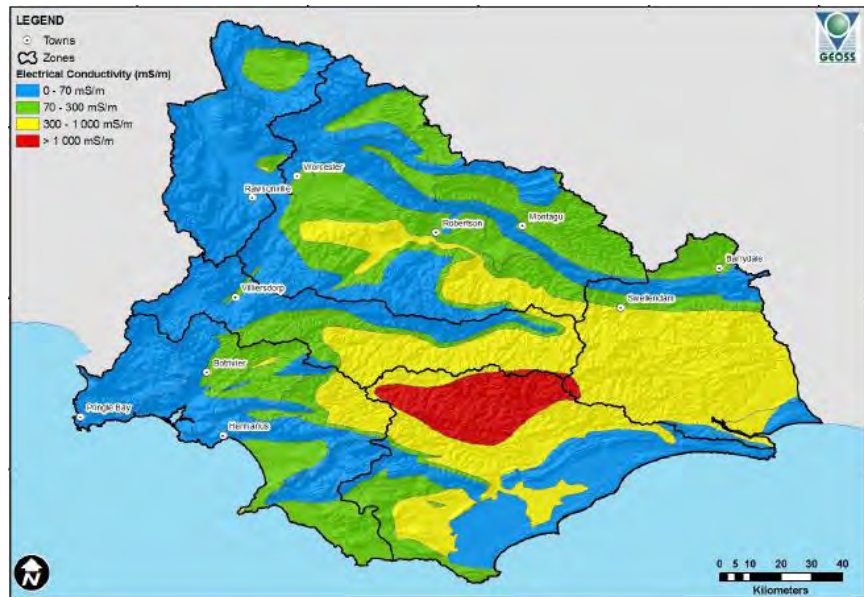


Figure 4.5. Groundwater salinity distribution

Surface water quality

As expected, the surface water salinity reflects the groundwater salinity, but is compounded by irrigation return flows in the Central and Lower Breede. This is the priority areas for salinity management. This makes it clear why the salinity in the Overberg East is so high.

Of greatest concern though is the contamination of water resources by municipal waste water and urban runoff, contributing high pathogen and nutrient loads to the system. The impact on fruit and vegetable irrigation and on recreational contact with rivers and estuaries is significant.

4.2 MEASURE 1-A: INTERIM WATER RESOURCE CLASS

Background and Context

In order to give effect to the notion of sustainability, it is imperative to understand the nature and requirements of aquatic ecosystems under present conditions, the pressures being placed upon resources, how the resources are being used, the water resources management intent, and finally the objectives which provide a statement (in terms of biota, habitat, flow and water quality) of the conditions that need to be met.

The Reserve is the quantity and quality of water required for basic human needs as well as to maintain ecosystems (biota and habitat). All Reserve determinations to date are recognised as preliminary until such time that a Management Class is set. Reserve determinations have produced a recommended Ecological Category, and this can be used as a surrogate for the interim Management Class for a given resource. In order to ensure some levels of sustainability the current approach employed by the Department has been to manage towards maintenance of current status or for resource improvement.

The National Water Act requires that all significant water resources in South Africa be classified via a Water Resource Classification System to determine the hydrological and water quality conditions

required for ecosystem functioning, so as to ensure that these resources are maintained in a minimum state of health related to an acceptable level of functioning. The Water Resource Classification System is currently being piloted in other parts of the country, but it must be noted that the process used to establish the Management Class closely mirrors the gazetted seven-step process and hence, provides a useful interim management class. . Therefore, interim management classes have been set based upon the high confidence reserve determination performed for the Breede, the reserve determination performed on the Palmiet, as well as expert opinion on the estuarine requirements of the Overberg.

Management Objectives

The Vision Statement for the Catchment, the present day ecological condition of the rivers and estuaries, and the conservation targets proposed in the draft SANBI Conservation Plan were used as the basis for this process.

Most of the groups in the WMA share a common pattern with respect to the Ecological Category of the rivers, in that they tend to be in good condition in the upper reaches and headwaters (typically B status), deteriorating to poorer condition in the middle reaches (typically C and D status), and then returning to reasonable condition in the lower reaches and estuaries (typically B and C status).

Following the implicit classification and ecological condition patterns above, interim classification of the rivers and estuaries in the Breede-Overberg WMA leads to the following objectives:

- ❑ **Interim Management Class 1** in the tributary headwaters of the Upper Breede, Central Breede and Riviersonderend, and Palmiet (and possibly other Overberg Rivers); this implies that the water resource is minimally altered from its predevelopment condition and that 60% of these freshwater ecosystems are at least in a B eco-category.
- ❑ **Interim Management Class 1** for the estuaries (and coastal wetlands) of the Breede and Overberg, with at least a B eco-category for Breede, Palmiet, Bot, Uilkraals and Heuninges Rivers and for the Sout (De Hoop) Wetland system, and at least C/D eco-category for the other estuaries in the Overberg catchments (Onrus, Klein and Ratels).
- ❑ **Interim Management Class 3** in the remainder of the rivers (tributaries and main-stems) throughout the WMA; this implies that the water resources is significantly altered and poses no requirements for a B eco-category.

The Objective for Classification is to maintain:

- ❑ *Interim management class 1 for the mountain headwater streams and the estuaries of the Breede and Overberg rivers and interim management class 3 for the remainder of the rivers.*

The proposed ecological categories and associated environmental water requirements can be derived from these classes and the present ecological condition, and represent the preliminary resource management objectives for the rivers in the Breede-Overberg WMA. Importantly, this is consistent with the Breede ISP (2004) which states that the *Lower Breede River and the estuary should be managed according to their current ecological status.*

Management Actions

This interim class has guided the development of this CMS. However, it is only an interim class and a comprehensive classification process is needed before the next CMS is developed by 2015. It is important to note that while this classification will be for the entire catchment, in these systems the estuary and coastal wetland areas are likely to be the primary focus because these are small rivers supporting large estuaries.

➤ **Action 1-A.1: Conduct comprehensive water resources classification for the Overberg rivers**

Milestone: Complete by 2014 before the 2nd CMS

Roles: DWA in cooperation with BOCMA

The classification of the Overberg rivers should be completed together, so that tradeoffs can be made between significant water resources in an integrated manner, given the similarity in conservation importance and socio-economic development priorities between these water resources. This should be completed by end 2014, before the CMS revision begins, and should be used to drive the determination of Reserves requirements in the Overberg catchments. This should link strongly with and support the implementation of the SANBI Freshwater Ecological Priority Areas and Support Areas.

➤ **Action 1-A.2: Conduct comprehensive water resources classification for the Breede River**

Milestone: By 2016 with the 2nd CMS

Roles: DWA in cooperation with BOCMA

The Reserve determination has been completed for the Breede River, and a preliminary management class has been determined. However, depending upon the outcome of the proposed Water Availability Assessment Study for the Breede, there may be a need to classify the Breede River according to the Water Resources Classification System. This would focus on the inter-relationships between the different parts of the basin and their required contributions to the estuary flow. Currently some of the lower catchment areas provide a disproportionate quantity of the water required. If this is to be completed, this should coincide with the next revision of the CMS in 2015.

4.3 MEASURE 1-B: ENVIRONMENTAL FLOW REQUIREMENTS

Background and Context

The determination and consideration of environment flows requirements is mandated through national policy and legislation and is in effect multi-jurisdictional in nature with national and provincial departments, water users and other stakeholders having key roles. It is critical to highlight that environmental flows are not recognised as a use, but more foundationally as a “right”, as part of the Reserve, and determined prior to allocations for use are set. This then needs to be included in license conditions as well as in dam operating rules, and whilst it is challenging to retro-fit this to existing license conditions, all new license applications require a “Reserve determination”.

It is key to note that the Reserve provides the quantity and quality of water required to meet the management class. Resource quality objectives are set so as to be able to monitor whether the management class is actually maintained.

Updates in planning processes are taking into consideration these environmental flow requirements. However, full implementation including operationalising of the flow requirements, and monitoring to see if objectives are met, has taken place in few instances. The Palmiet system certainly has a long history in this regard and the monitoring programme in this system has provided many lessons for environmental flow studies around the country.

The water resources of the Breede River are intensively utilised. As a result, an initial intermediate reserve determination has recently been upgraded to a high confidence reserve with the addition of nodal points and a wider applicability of the findings. Figure 4.6 presents exceedance curves for winter and summer flow in the lower Breede River upstream of the estuary, distinguishing between the natural situation (without abstraction) and the current day (status quo). The environmental water requirements associated with different categories are also presented. What is of importance is that for over 80% of the time during summer and 40% for the time during winter, the environmental flows are not met at the present B/C ecological state. It seems that the Overberg rivers are not in the same situation as the Breede River.

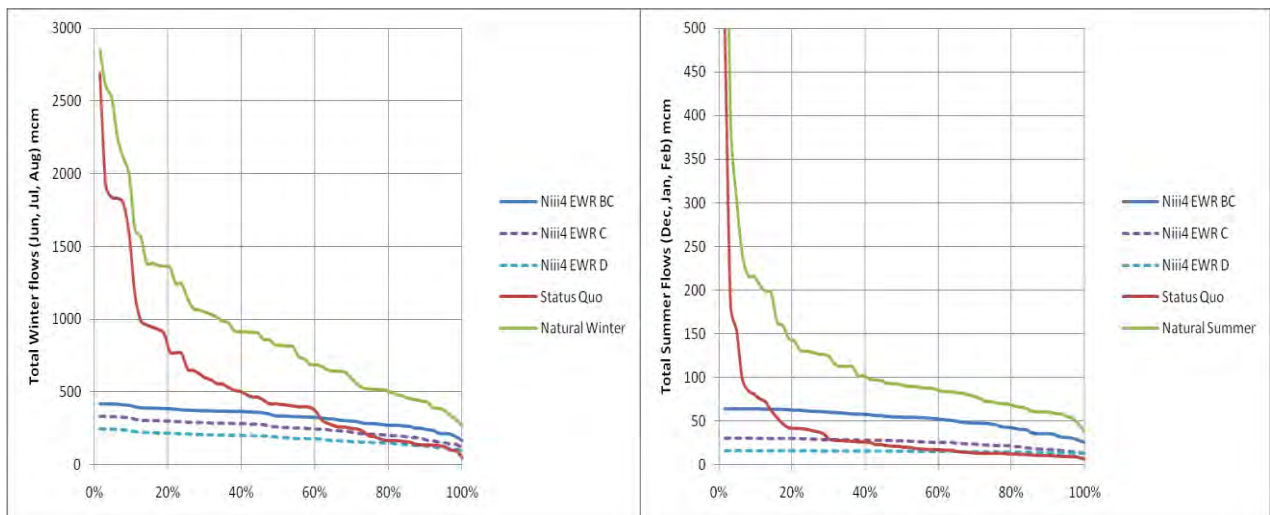


Figure 4.6. Exceedance curves for winter and summer flows in the Breede River upstream of the estuary

Management Objectives

There is a significant quantity of information available about the environmental flow requirements in the Breede and Palmiet rivers, and Reserves have been determined at a number of reference points in both of these systems. In most cases this has been defined in terms of the current ecological status, but where the ecosystem has been degraded beyond a sustainable level (i.e. E eco-category), an improvement has been set. The ecological Reserve has been determined and established by DWA at the intermediate level of confidence in the Breede and Palmiet rivers and their estuaries. However, only preliminary estimates are available for the other Overberg rivers and estuaries.

Table 4.1 summarises the environmental flow requirements at selected points in the WMA. It is clear that the desired state of the estuaries drives the environmental flow requirements of the entire system

in these Breede and Overberg Rivers. It is important to note that the estuary requirements include the infrequent floods with return periods in excess of 2 years, but because this is a relatively unregulated system, these are not included in the river Reserve estimates.

Table 4.1. Reserve (with environmental flow requirement objectives) against natural MAR.

Node	River	Recommended Ecological Category	Natural MAR (million m ³)	Reserve (million m ³)	% MAR
	Mountain streams	B	-	-	45% - 50%
Nviii1	Upper Breede	D	469	117	25%
	Central Breede tributaries	D	-	-	10% - 20%
Nvii8	Central Breede	C/D	1082	415	38%
Ni2	Breede u/s RSE	C	1188	314	26%
Ni3	Riviersonderend	D	450	111	25%
Nv2	Breede d/s RSE	C	1817	480	26%
Nv13	Buffeljags	C	88	31	35%
Niii4	Breede u/s estuary	B/C	1842	671	36%
Niii5	Breede Estuary	B	1785	954	53%*
	Overberg rivers	C	-	Tbd	30% - 40%
	Palmiet Estuary	B	97	62	64%
	Overberg estuaries	B	-	Tbd	70% - 80%
	Overberg estuaries	C	-	Tbd	60% - 70%

* Includes inter-year infrequent flood events.

These estimates vary during the year, as illustrated in Figure 4.7 for the Palmiet estuary.

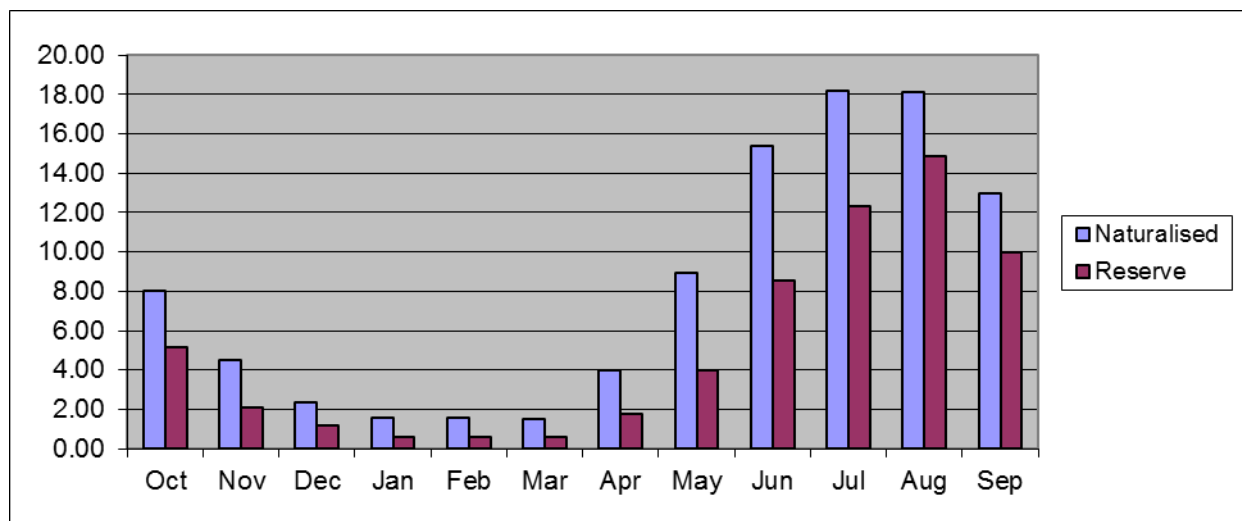


Figure 4.7. Average monthly naturalised flow versus Reserve requirements (million m³/year)

Preliminary objectives have been identified for the Overberg estuaries, based on the National Biodiversity Assessment.

Table 4.2. National priority estuaries in the Overberg for biodiversity and conservation.

Estuary	Recommended Ecological Category	MAR (million m ³)	% MAR remaining	Predicted environmental water requirements (% MAR)
Palmiet	B	256.3	67	67
Bot / Kleinmond	B	47	75	75 – 80
Onrus	D	5	40	40
Klein	B	38	75	75 – 80
Uilkraals	C	18	75	70 – 90
Ratel	C	7.05	60	60
Heuningnes	A or BAS	38	60	70 – 80
Klipdriffontein	A	0.51	95	95

The Objective for Environmental Flows is to:

- Meet the established environmental flow requirements in rivers and estuaries.*

Management Actions

The implementation of the Reserve is primarily through a combination of the management of water use, which is detailed under **Strategic Area 2:- Sharing for Equity and Development**, and the management of water quality and habitat encroachment, which are detailed in the remainder of this Strategic Area. Improved acquisition and use of monitoring information is also required, particularly related to the River Health Programme, as well as streamflow and water quality in the Overberg Rivers, which is detailed in **Strategic Area 3:- Cooperating for Compliance and Resilience**.

In addition though, Reserve determination is required for the Overberg Rivers (excluding the Palmiet) to provide assurance to the proposed figures.

➤ **Action 1-B.1: Establish environmental flows Reserves for the Overberg rivers and estuaries**

Milestone: By 2014

Roles: DWA in collaboration with BOCMA, Provincial Government, CapeNature, and Local Government

Reserve determinations have been identified for a number of key systems within the Overberg by DWA and will be initiated in 2012. These studies will provide the supporting information for the Classification process which should be completed by 2015 before the CMS revision.

➤ **Action 1-B.2: Develop and implement scheme operations that meet the Reserve in the Breede River**

Milestone: By 2016

Roles: DWA in cooperation with BOCMA and WUAs

A monitoring programme will be established to assess whether the preliminary Resource Quality Objectives are achieved at individual nodes. An interventions procedure based up levels of compliance to preliminary objectives will be established and implemented as necessary. This will be supported by awareness and communications campaigns to develop an understanding of the necessity to achieve the objectives.

4.4 MEASURE 1-C: WATER QUALITY MANAGEMENT

Background and Context

Figure 4.8 provides an overview of the chemical quality of surface water in the Breede-Overberg rivers. It indicates that salinity and nutrient water quality tends to be ideal in the headwaters of the Breede and Overberg, but progressively deteriorate to unacceptable levels towards the estuaries. While pathogen concentrations are not presented, observations are that there are localised problems around many of the small towns in the region.

Management Objectives

Instream water quality objectives reflect the requirements of water users and the desired ecological state. Objectives have only been set for the priority water quality problems of pathogen contamination around municipal areas, nutrient enrichment in lower river reaches and estuaries, and salinity in the Central Breede.

GlobalGAP and EuroGAP standards for imported agricultural products require that the quality of water used for irrigation purposes meet the requirements set by local authorities for that purpose. These standards are as follows.

Pathogen quality objectives

Pathogen objectives levels need to consider fruit irrigation, as well as the less stringent intermediate contact recreation (from the DWA Bi-annual Report on Breede WMA and South African Water Quality Guidelines):

Irrigated fruit:

E. coli: 0 - 1000 #/100ml (high risk >4000 #/100ml)

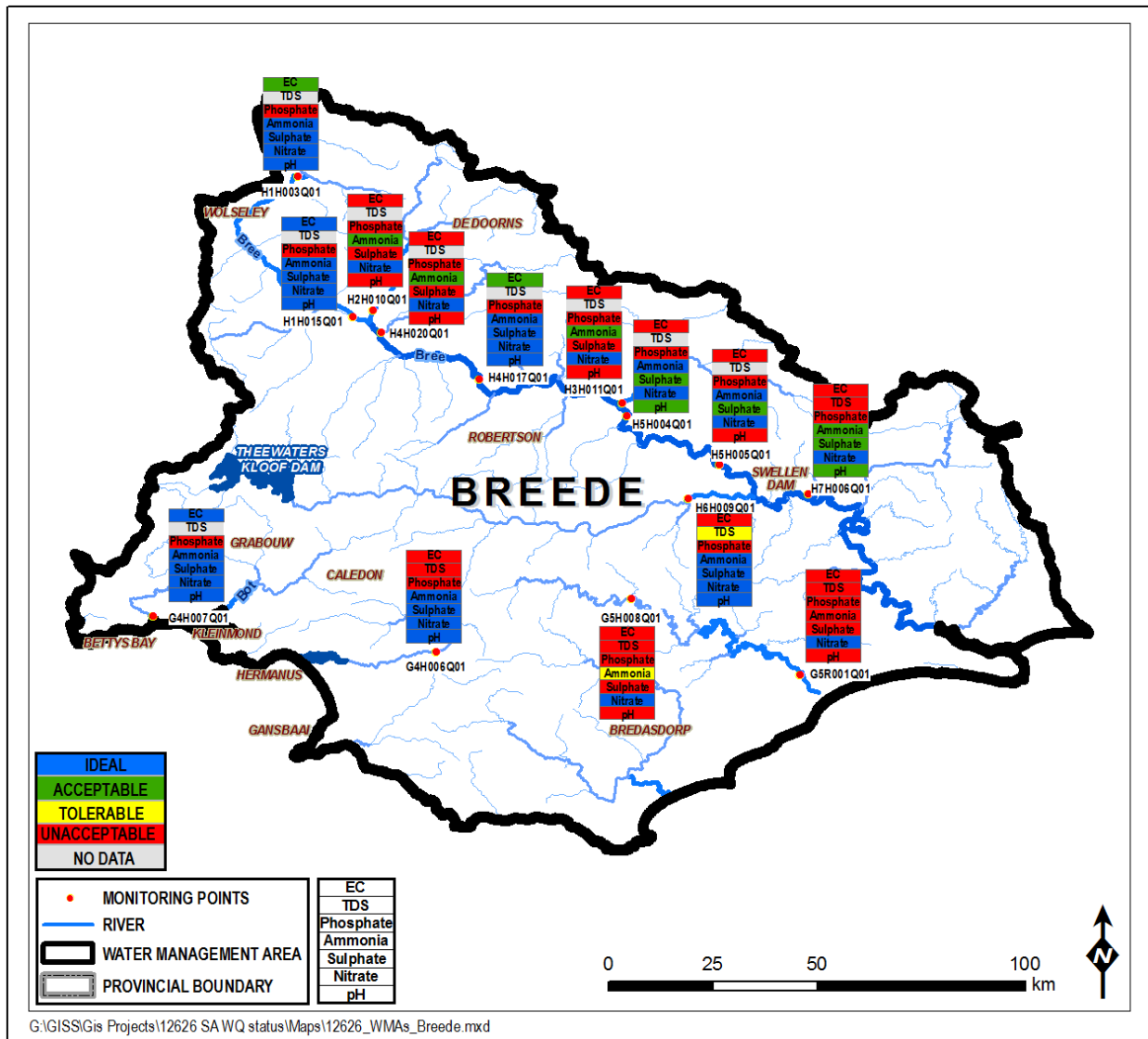


Figure 4.8. Observed water quality conditions in the Breede and Overberg Rivers

Nutrient quality objectives

Nutrient objectives should be determined to avoid eutrophic conditions in the rivers and estuaries of the Breede and Overberg according to their desired state:

B category system (estuaries):

orthophosphate < 0.015 mg/l; *total nitrogen* < 0.63 mg/l

C category system (rivers):

orthophosphate < 0.043 mg/l; *total nitrogen* < 1.59 mg/l

Salinity quality objectives

Salinity objectives are relevant in the Central Breede River upstream of the Zanddrif canal and reflect irrigation requirements, as indicated in the existing rule:

50% of the volume of irrigation water supplied to irrigators should have an electrical conductivity (EC) not exceeding 70 mS/m. For up to 30 % of the volume (time) supplied, EC would be allowed to fluctuate between 70 and 120 mS/m. The remaining 20% of the volume (time) should have an EC not exceeding 120 mS/m.

The Objectives for Water Quality Management is to:

- Satisfy the established limits for pathogen, nutrient, and salinity content.

Management Actions

Water quality management in the Breede-Overberg must prioritise the threats to human health and the economy, followed by threats to ecological functioning of important natural assets.

➤ **Action 1-C.1: Develop a management plan to support improved compliance in municipal waste water treatment works and systems**

Milestone: Plan developed by 2012

Roles: Collaboration between BOCMA, Municipalities, Provincial Government, and DWA

This will require a comprehensive assessment of the nature of non-compliance and the management plan must address the various dimensions of attaining compliance over an agreed time frame.

➤ **Action 1-C.2: Develop a prioritisation plan for industrial and agricultural sources of pollution**

Milestone: By 2015

Roles: BOCMA in collaboration with DWA, WUAs, and Provincial and Local Government

An assessment of industrial and agricultural sources of water pollution will be undertaken to identify the non-compliant and top impacting entities. These entities will be prioritised for purposes of monitoring control & enforcement.

4.5 MEASURE 1-D: GROUNDWATER (VULNERABILITY) PROTECTION

Background and Context

A key indicator of groundwater stress is the ratio of abstraction to recharge, with areas above 65% being highly stressed and above 95% being critically stressed. As can be seen in Figure 4.9, many of the

quaternary catchments in the Upper and Central Breede are currently highly or critically stressed. It is also important to recognise that many of these stressed catchments also have significant contributions to baseflow in the river systems and are therefore required for ecological and irrigation use.

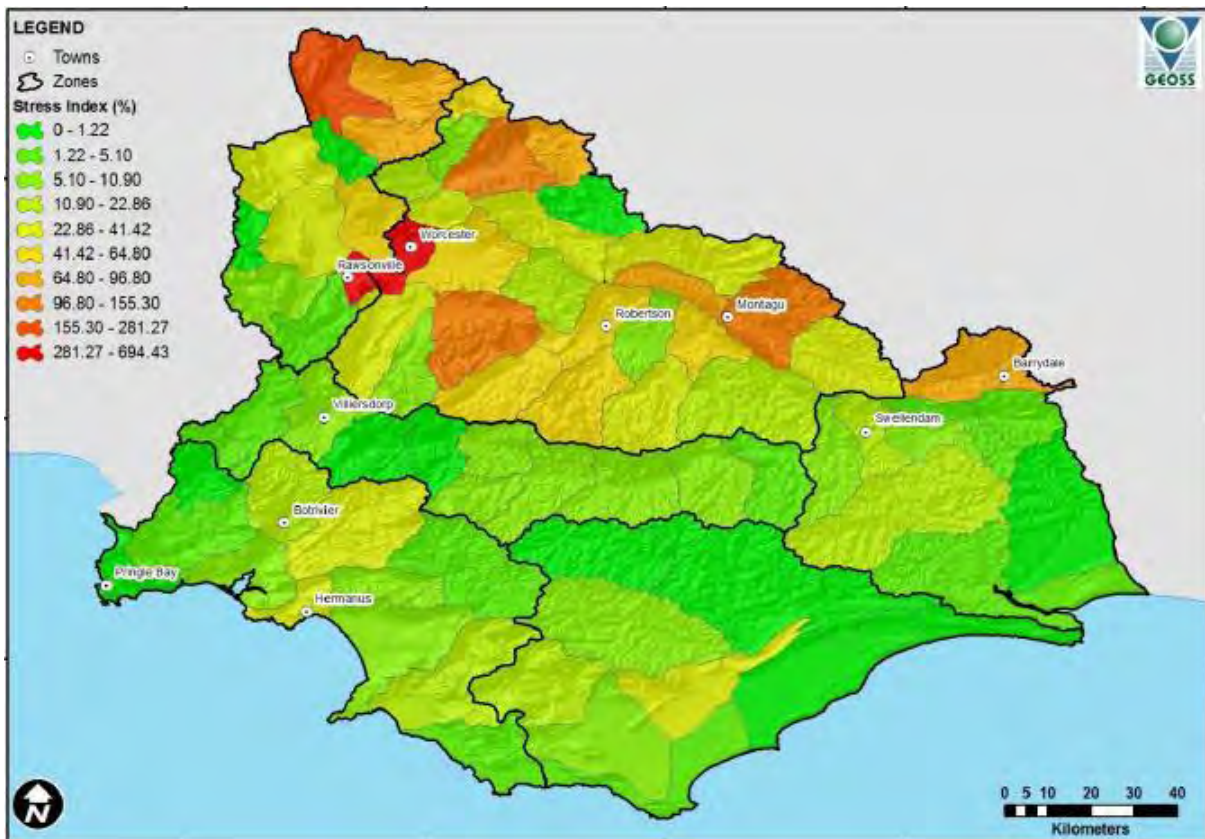


Figure 4.9. Groundwater stress index for quaternary catchments in the Breede and Overberg

Management Objectives

Water resources management requires sustainable abstraction of groundwater, so the key objective must be to ensure that groundwater abstraction does not exceed recharge. This must also consider the requirements for river baseflow.

The Objective for Groundwater Protection is:

- Groundwater stress index below 65% (highly stressed) in all quaternary catchments.

Management Actions

Groundwater management requires effective monitoring, authorisation and enforcement of abstraction. These must be addressed through the relevant water use regulation and information management strategic actions in **Strategic Area 2:- Sharing for Equity and Development**, and **Strategic Area 3:- Cooperating for Compliance and Resilience**.

➤ **Action 1-D.1: Develop conjunctive groundwater management plans for priority Breede catchments**

Milestone: Linked to verification and validation process, by 2013

Roles: BOCMA in collaboration with DWA and WUAs

Following verification and validation processes, it would be appropriate to develop a simple clear management plan for conjunctive use of ground and surface water resources in the most stressed quaternary catchments of the Breede management zones, focusing initially around Ceres, Worcester, Hex River, Montagu and Barrydale.

➤ **Action 1-D.2: Develop a groundwater management plan**

Milestone: By 2015

Roles: BOCMA in collaboration with DWA, WUAs and Local Government

Following the development of a plan for the most stressed areas, a comprehensive groundwater management plan will monitor and manage the key groundwater considerations to ensure sustainable abstraction and acceptable water quality. Groundwater availability, recharge, and abstraction levels are informed by the geohydrological study conducted as part of the CMS. Additional information on abstraction levels must be gathered to maintain a balance between recharge, abstraction and ecosystem support.

Specific attention will be provided to the management of abstraction from artesian boreholes.

Regarding groundwater quality, current anthropogenic impacts are not adequately studied. The most vulnerable aquifers are in the Upper Breede around Worcester and along developed coastal area of the Overberg West and Agulhas plain. Particular attention should be paid to waste disposal, development and land use in these areas.

The comprehensive groundwater plan should be completed by 2015 before the next CMS, and should inform land use and development decisions.

4.6 MEASURE 1-E: NATURAL ASSET CONSERVATION

Background and Context

Aquatic ecosystem protection is not just about protecting freshwater plants and animals but should rather be regarded as a comprehensive approach to sustainable and equitable development of the catchment's scarce water resources. Keeping some aquatic ecosystems in a good condition serves a dual purpose of promoting the sustainable use of water resources in the catchment, while conserving its associated biodiversity.

A healthy ecosystem supports functional communities of plants and animals that are able to remove nutrients and toxic substances from water, keeping it cleaner for drinking, irrigation and recreation. Healthy rivers, wetlands and groundwater systems also maintain water supply and buffer the effects of storms, reducing the loss of life and property in the event of floods. Healthy riparian zones help trap sediments, stabilise river banks and break down pollutants draining from the surrounding land. Estuaries provide nursery areas for marine and estuarine animals, and supply fresh water and nutrients to the sea, which drive marine food webs and maintain important fisheries. A certain amount of water is also required to scour the mouth of most estuaries – without this scouring effect, sediments build up at the mouth and the risk of back-flooding during storms increases.

Aquatic ecosystem protection is therefore an essential component to meeting government objectives legal requirements for both sustainable water resources development and freshwater biodiversity conservation. For the purposes of this strategy, three distinct and inter-connected aquatic ecosystems are addressed, namely estuaries, wetlands and rivers.

Estuaries

The estuaries of the Breede-Overberg are of exceptional biodiversity importance. They also have a high subsistence, recreational and nursery value of the Breede-Overberg estuaries, which was conservatively estimated at around R280 million per year, excluding their tourism and property value. There are 11 estuaries that fall under the Breede-Overberg CMA: Rooiels, Buffeljags, Palmiet, Bot, Onrus, Klein, Uilkraals, Ratel, Heuningnes, Klipdriffontein and Breede.

The first ten fall under the West- and East-Overberg management zones, while the Breede estuary receives its water from the Breede and Rivieronderend management zones. Eight of the Breede-Overberg estuaries have been identified as priorities for achieving national biodiversity goals in SANBI's recent National Biodiversity Assessment 2010. This constitutes almost 80% of the Breede-Overberg estuaries, which is an exceptionally high proportion of the country's priority estuaries (nationally, 40% of the country's estuaries are priority estuaries). The Klein, Bot/Kleinmond, Breede and Heuningnes are in the top 25 most important in the country, while the Heuningnes estuary at De Mond has been declared a RAMSAR site.

These estuary systems vary from small (Klipdriffontein, Ratel and Onrus) to very large (Bot/Kleinmond, Klein and Breede), see Table 4.3. Nearly all the South African estuarine types are also represented in the region, from temporarily closed, through estuarine lake to permanently open. Two of these estuaries have had a type change, with the Heuningnes being modified from temporarily closed to permanently open, and the Uilkraals recently changing from a permanently open system to a temporarily closed estuary.

The estuaries of the Overberg management zone are particularly sensitive to human development pressures owing to their small size, which makes them more prone to pollution from the surrounding land and associated catchment, as well as closure from flow alteration.

Table 4.3. Characteristics of the Breede and Overberg Estuaries

Name	Type	Importance	Openwater (ha)	Floodplain (ha)	Size
Palmiet	Temporarily closed	62.8	13.4	26.7	Medium
Bot/Kleinmond	Estuarine lake	96.6	1254.6	2018.8	Large
Onrus	Temporarily closed	58.9	2.8	15.1	Medium
Klein	Estuarine lake	97.0	1153.0	1777.6	Large
Uilkraals	Temporarily closed	76.0	48.9	855.3	Large
Ratel	Temporarily closed	32.5	1.3	8.6	Small
Heuningnes	Permanently open	83.1	1475.0	14123.0	Large
Klipdrifsfontein	Temporarily closed	18.4	0.4	2.2	Small
Breede	Permanently open	86.8	1171.1	2060.2	Large

Wetlands

There are a number of important wetlands in the Breede-Overberg, but unfortunately many have already been damaged or destroyed through encroachment and development. In particular, riparian wetlands have suffered in this regard and attention needs to be given in protecting such systems. Identified priorities for management attention include the Papenkuils wetland near Rawsonville, the wetland system near Betty’s Bay and the wetlands of the Overberg East,. Initiatives have been undertaken in this regard and these need to be sustained.

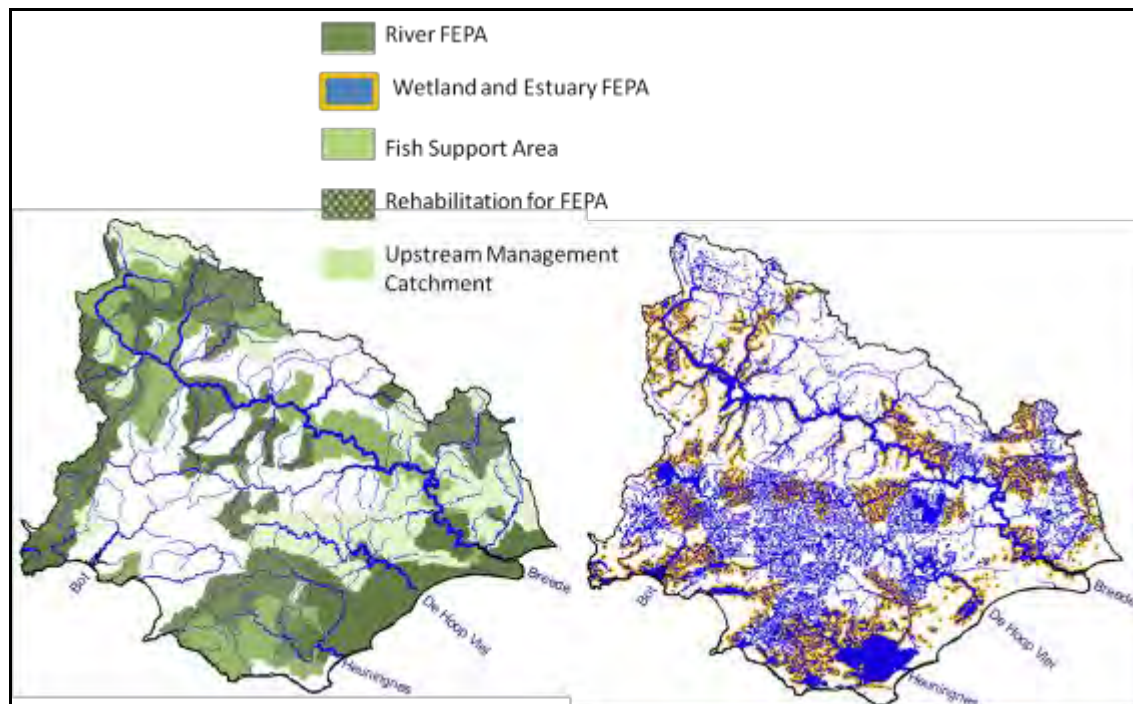


Figure 4.10. Freshwater ecosystem priority areas for river, estuary and wetland ecosystems

Rivers

The mountain streams in the Breede and Overberg catchment are of particular conservation and water resources importance and thus require particular attention related to alien vegetation encroachment. Other river reaches are important for fish migration and supporting downstream estuary functioning. Finally, the highly disturbed rivers of the Central Breede and Overberg East require particular management attention to return them to an improved functional state.

Alien Vegetation

Invasive alien plants are significant water users in several rivers in the Breede-Overberg WMA, consuming water that could be used for other social and economic growth or environmental purposes. Mountain headwaters, the eastern tributaries of the Breede and the Sout River feeding the De Hoop estuary are among the areas deemed the highest priority for rehabilitation programmes to remove alien vegetation. Programmes such as Working for Water and WWF's water neutral scheme have begun alien clearing projects. Rehabilitation programmes are complicated, however, by the need for alien species to be cleared from private as well as public land and by the need for extensive follow-up treatments.

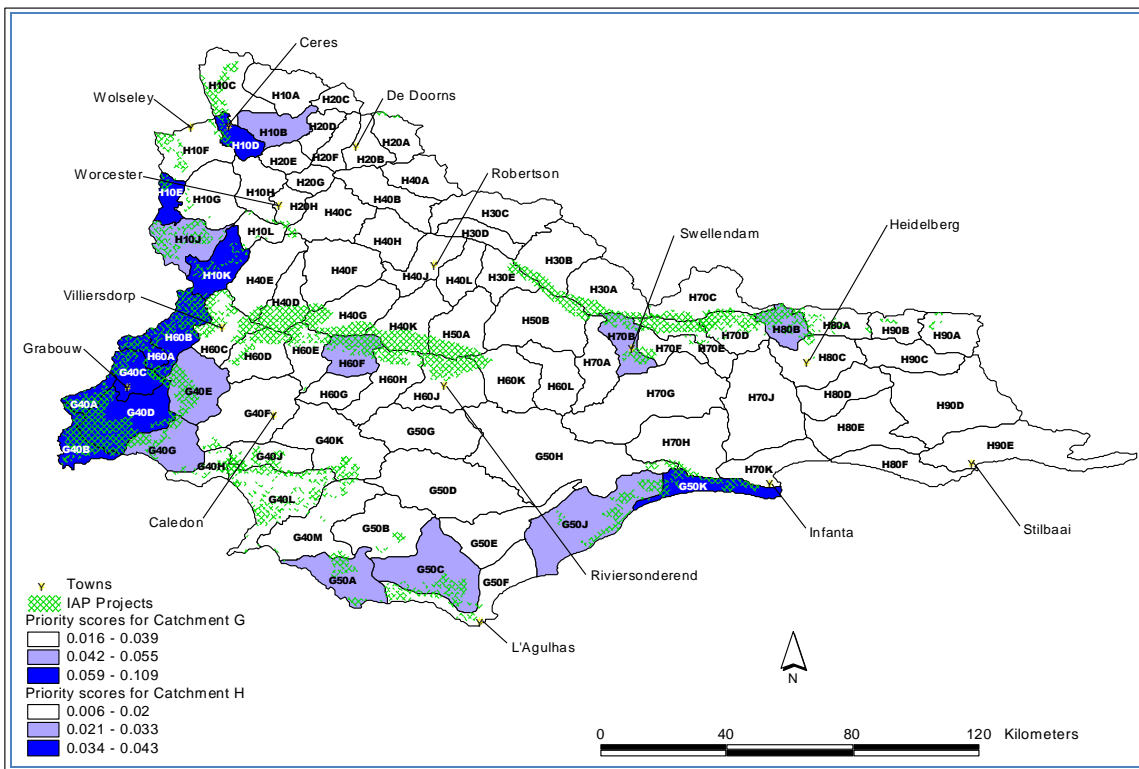


Figure 4.11. WfW priority areas for alien vegetation removal

Endemic Fish Sanctuaries

The Breede-Overberg WMA is home to 10 threatened and indigenous fish, many of which are endemic to the area. Endemic fish species contribute to the ecologically important and sensitive aquatic ecosystems, and are being threatened by estuary conditions, human development pressures, and stocking practices that lead to the spread of invasive fish species. Supporting the persistence of the threatened fish species will require interventions including the management of water abstraction and water quality, and the control of invasive fish species.

Management Objectives

The management objectives for these natural freshwater assets relate directly to the recommended ecological state (or preliminary Reserve). This has been broadly outlined by the preliminary management class and is detailed in the environmental flow strategic action. Wetland objectives have not yet been developed and should be done through the priority wetland plans.

Protection of natural assets requires the initial step of identifying which the key natural assets are. The table below lists the priority estuaries, wetlands, riparian zones and endemic fish sanctuaries in the Breede-Overberg WMA.

Table 4.4. Priority estuary, wetland, riparian zones and endemic fish sanctuaries

Type	Priority Areas
Estuaries	Palmiet, Bot, Klein, Uilkraals, Ratel, Heuningnes, Klipdrifsfontein, and Breede
Wetlands	Papenkuils, the Overberg east and Betty's Bay
Riparian Zones	Mechanically impacted tributaries in the Central Breede and Overberg East Alien vegetation encroachment in the mountain headwaters
Endemic Fish Sanctuaries	Upper tributaries of the Breede (Spek, Amandel, Witels, Wit, Krom, Molenaars, Elands) Lower mainstem of the Breede from the confluence of the Napkei to the estuary Short coastal Overberg rivers (Palmiet, Rooiels and Buffels) Upper tributaries of the Riviersonderend (Du Toits, Waterkloof and the Riviersonderend upstream of Theewaterskloof Dam)

The Objective for Natural Asset Conservation is to:

- Priority estuaries, wetlands, instream & riparian zones and endemic fish sanctuaries are conserved (protected) in at least their present ecological state.*

Management Actions

Conservation of natural riverine, wetland and estuarine assets involves cooperation between water managers (as represented by the CMA) and other government authorities in municipalities, conservation / environment and agriculture.

➤ **Action 1-E.1: Develop and implement estuary management plans**

Milestone: 2011 to 2015

Roles: Led by Provincial Government (DEADP), CapeNature, Local and District Municipalities, supported by BOCMA and other roleplayers

- Support the development and implementation of estuary management plans under the Integrated Coastal Management Act
- Assist in the establishment of estuary management forums required to implement these plans
- Clarify roles and responsibilities of the different implementing agencies in estuary management, particularly between the CMA, DWA, CapeNature and local municipalities
- Include estuary management forum representatives in CMA planning and decision-making processes
- Promote the policy of no new development in the estuarine functional zone (defined largely according to the 5 m contour line)

➤ **Action 1-E.2: Develop and implement management plans for priority wetlands**

Milestone: By 2013

Roles: Cooperatively between BOCMA, Provincial Government (Agriculture & Environment), CapeNature, Land Care and conservancies

- Identify which wetlands need most urgent attention using wetland Freshwater Ecosystem Priority Areas as a starting point – focus initially on the priority wetlands of the Papenkuils, the Overberg east and Betty's Bay
- Delineate the extent of these wetlands and the management buffers that will be required for their protection
- Form a collaboration with relevant implementing agencies to support the development and implementation of management plans for these wetlands
- Engage with the relevant land owners to ensure that they comply with the protection of these priority wetlands (e.g. through working with the Department of Agriculture, LandCare and the Biodiversity Stewardship Programmes)

➤ **Action 1-E.3: Plan and enforce instream and riparian habitat protection for priority rivers**

Milestone: By 2015 (ongoing)

Roles: BOCMA and DWA (in terms of the National Water Act), in collaboration with Provincial Government (in terms of other legislation)

For this CMS, the priority areas are rehabilitation of the mechanically impacted tributaries in the Central Breede and Overberg East, as well as alien vegetation encroachment in the mountain headwaters.

- Prioritise the development of management plans for Freshwater Ecosystem Priority Areas
- Identify the smaller streams and habitats within the river Freshwater Ecosystem Priority Area that require protection and delineate management buffers that will be required for their protection
- Form a collaboration with relevant implementing agencies to support the development and implementation of management plans for these river habitats
- Engage with water user associations to support the protection of these priority river habitats
- Engage with the relevant land owners to ensure that they comply with the protection of these priority river habitats (e.g. through working with Department of Agriculture, LandCare and the Biodiversity Stewardship Programmes)

➤ **Action 1-E.4: Align alien invasive vegetation clearing plans with the Breede-Overberg priorities**

Milestone: By 2012 (ongoing)

Roles: Working for Water, in cooperation with private & landowner initiatives, supported by BOCMA, Land Care, and Municipalities

This links with the alien vegetation clearing for water augmentation.

- Identify priority areas for re-establishment of the riparian zone
- Assist existing extension services (e.g. Department of Agriculture and Biodiversity and Wine Initiative extension officers) to prevent further ploughing in riparian zones
- The principle of no ploughing in riparian zones should be adopted and the rehabilitation/re-establishment of riparian zones should be supported
- Identify priority areas for clearing of alien invasive vegetation
- Assist in the development of contractual mechanisms for clearing on private land that include stringent mechanisms to ensure follow-up treatment
- Coordinate clearing of alien plants in priority sites on private land with Working for Water, SANParks and CapeNature
- Help capacitate local landowners and contractors in clearing of alien invasive vegetation

➤ **Action 1-E.5: Prioritise and maintain endemic fish sanctuaries and alien fish plan**

Milestone: By 2013 (linked to classification)

Roles: Lead by Provincial Government (DEADP and Dept. of Agric.) with CapeNature and SANBI, supported by DWA and BOCMA

- Develop fish management plans for threatened fish species, using the Freshwater Ecological Priority Area's threatened fish sanctuaries as a starting point and aligning with CapeNature development plans
- Avoid stocking of invasive alien fish, whether for aquaculture or recreational fishing, in Freshwater Ecological Priority Areas (e.g. by partnering with CapeNature's permitting processes for stocking of alien invasive fish species on private land)
- Produce a clear policy statement for the CMA on freshwater and estuarine aquaculture, aligned to CapeNature's policies on utilisation of indigenous, utilisation of alien invasive fish, and the use of rotenone in the eradication of alien invasive fish

4.7 MEASURE 1-F: CATCHMENT AND LAND USE MANAGEMENT

Background and Context

Land use has a dramatic impact on the hydrological cycle and so the management of land use change is an important aspect of catchment management. Water managers (such as the CMA) have little mandate over land use, but this does not change the old adage that "we all live downstream" (of someone else).

Despite the intent for consolidation adopted by the Provincial Spatial Development Framework, there has been expansion of urban areas and developments over the past decade, often with the rezoning of agricultural land (rather than natural vegetation). This has been driven by the residential-tourism development, but often with the complicit support of municipalities in exchange for much needed capital infrastructure in cash-strapped towns with expanding populations looking for jobs. These developments are often water intensive and require supply from already water stressed municipalities, which highlights the very real and difficult tradeoffs between development and protection.

Similarly, while the expansion of agricultural land is relatively constrained by water availability, good management practices are not always adopted by commercial or emerging farmers. Land care and related initiatives are attempting to address land use practices in agricultural areas, including the impact on water resources.

Management Objectives

It needs to be recognised that land use management is outside the mandate of water resources management sector, but that catchment management obliges the CMS to highlight the linkages between water and land use. The underlying objective is therefore for local decision makers to adopt existing policy, regulatory and practice requirements of other sectors, particularly land development, agriculture and environment. Furthermore, water related issues need to be seriously considered in land use decisions.

The Objective for Catchment and Land use Management is:

- Water resources considerations are mainstreamed into local land use, sector and catchment development decisions.*

Management Actions

The implementation of this strategic action is fundamentally through mechanisms fostering cooperative government between water managers and land use / environmental managers. This includes commenting on proposals, participating in joint decision making forums and ensuring the alignment of planning processes and strategies.

➤ **Action 1-F.1: Adopt mechanisms to consider WMA-specific water resources impacts in land development**

Milestone: By 2013

Roles: BOCMA in collaboration with Local Government, supported by DWA and Provincial Government

BOCMA will establish key strategic partnerships that will through appropriate planning forums and working groups develop consolidated and integrated land use, environmental and water related decision making processes. BOCMA together with key partners will look to establish consolidated and aligned approaches to ensure effective compliance with various regulatory requirements.

BOCMA will ensure that water aspects are considered in the relevant Integrated Development Plans and Provincial Growth and Development Strategies.

➤ **Action 1-F.2: Investigate the economics of water and recommend on development priorities**

Milestone: By 2015

Roles: BOCMA through Basin Planning Development Forum