

Table 5.9. Potential infrastructure augmentation options in the Breede catchment

Producing area	Water resource	Development type	Cost of water (R/m ³)	IRR%		Water demand (million m ³ /a)
				2000	2002	
Breede, Central	Le Chasseur Dam	Expansion				
Riviersonderend	Bromberg Dam	Expansion				22,0
Riviersonderend	Reenen Weir	Expansion	0,27	12,3	19,9	1,5
Riviersonderend	Kwartel River	Expansion	0,33	12,1	19,7	12,0
Breede, Goudini, Rawsonville	Raising of Stettynskloof Dam	Expansion	1,03	9,5	12,8	15,0
Breede, Goudini, Rawsonville	Worcester Irrigation Scheme	Expansion	1,40	*	12,6	44,2
Breede, Goudini, Rawsonville	Tierstel Dam	Expansion	2,05	8,0	11,2	3,3
Hex River Valley	Amandel River	Expansion	1,33	4,6	8,7	3,1
Suurbraak	Off-channel storage	New	0,84	4,2	7,4	2,5
Moordkuil, Robertson	Rooiberg Dam/pump	New	1,16	3,8	6,3	5,6
Ceres catchment	Titus River	New	0,59	4,0	6,0	7,6
Ceres catchment	Groundwater wellfield	New	0,83	2,6	4,5	0,8

When viewed in isolation, the yields and environmental impacts of these new water supply schemes are likely to be small compared to the yields and environmental impacts of the larger regional schemes. However, the development of increasing numbers of small water supply schemes will have a cumulative impact on the low flows as many of these schemes are based on run-of-river abstractions, which could place additional strain on the already depleted winter low flows in the system.

Transfer of water to the Berg WMA

Two water transfer schemes have been identified as potential water augmentation options to the Berg WMA, namely the Mitchell's Pass Diversion Scheme (in the Upper Breede), and further augmentation of Steenbras Dam from the Palmiet River (Western Overberg). Neither of these supply options will make additional water available to the Breede-Overberg WMA.

It is not anticipated that the proposed additional transfers from the Palmiet River to the Steenbras Dam transfer scheme will have any negative impact on the Palmiet River as the determination of available yield already makes allowance for the proposed environmental water requirements in the Palmiet River.

Decrease in Assurance of Supply

At present the agricultural water users from Brandvlei Dam experience an approximate 95% level of supply assurance (1 in 20 years) providing a yield of 251 million m³ (including the downstream contributions). A decrease in the level of supply assurance from the current 95% levels would make more water available which could be allocated to water resource poor farmers. Figure 5.15 indicates the additional yield available if the level of supply assurance to existing irrigated agriculture from Brandvlei dam were to decrease from historical firm yield (HFY), 98% and 95% to alternate supply assurances. This implies that an additional 5 million m³ of water would be available from Brandvlei if reductions in supply to irrigators in the Central Breede were accepted every 10 years rather than the current 20 year assurance. This increases dramatically to 20 million m³ if the assurance were to drop to 1 in 7 year (85% assurance).

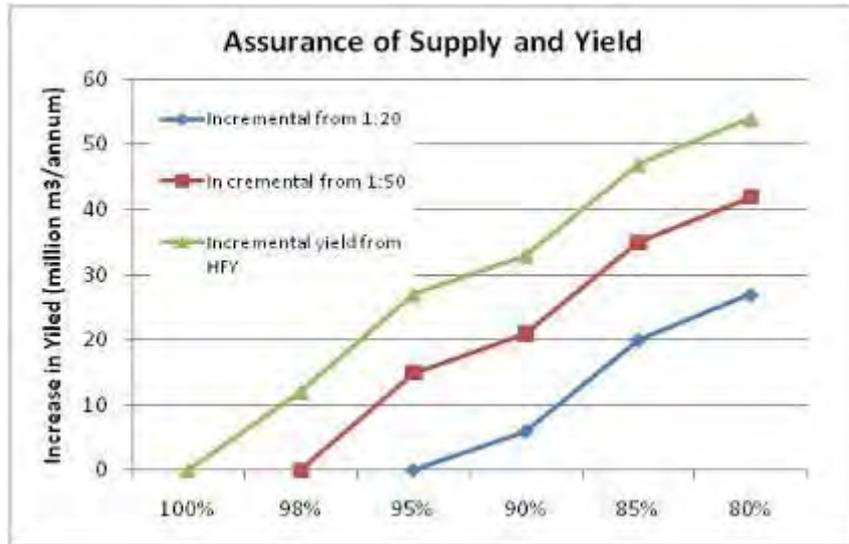


Figure 5.15. Increased yield from Brandvlei through reduction in the assurance of supply

Groundwater

Groundwater is a significant source of water in the Breede- Overberg WMA. The registered abstraction volume is 146 million m³/a (WARMS, 2010). There is considerable potential to increase the use of groundwater in certain areas of the WMA, but other areas are currently being overexploited. Future groundwater developments can be considered in the Overberg and the northern parts of the Central Breede Management Zone linked to the deep Table Mountain Group aquifer.

Figure 5.16 indicates the allocable groundwater in the WMA, highlighting that many quaternary catchments in the Breede are already over allocated, but that there remains some opportunity for local use of relatively shallow groundwater aquifers (less than 100m deep).

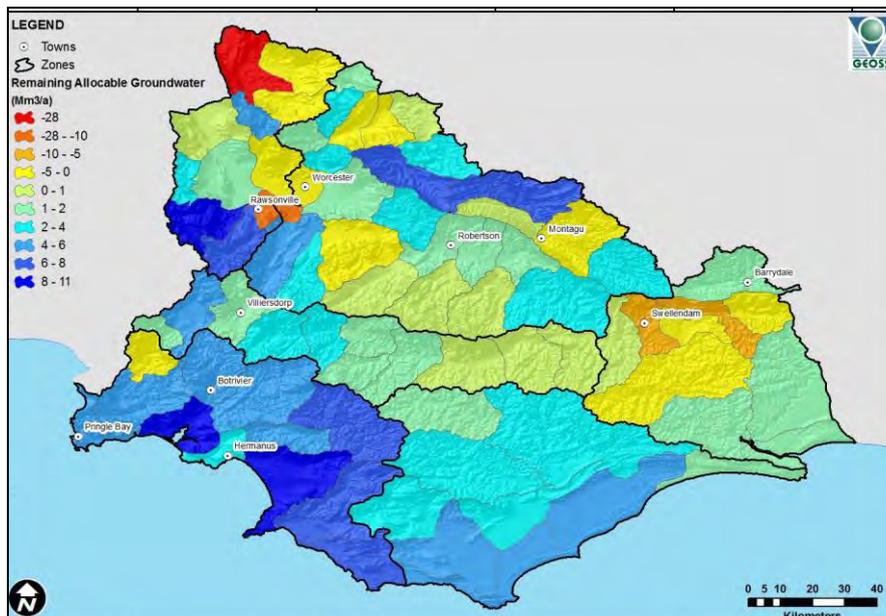


Figure 5.16. Allocable groundwater in the Breede-Overberg WMA

The over abstraction that is occurring in a number of catchments is a concern, and needs to be addressed by the CMA, particularly in the Upper Breede Management Zone. In spite of the high harvest

potential in the Hex River Valley, it has been established that the safe yield of the valley has been exceeded and that brackish water intrusion occurs. The high recharge rates in the mountains do not imply that all this water is available to groundwater users in the surrounding valleys, as the majority of this water enters mountain streams before the groundwater reaches the valley bottom. This recharge often takes place in inaccessible mountain areas, and is not available for exploitation.

Water Re-use

Treated effluent water can be re-used in a number of different ways. It is either: planned (reuse through an engineered system) or unplanned (discharged into a river); used directly (effluent returned to the system) or indirectly (through a receiving water body); potable (treated for drinking) or non-potable (for industry, irrigation, etc.).

Many water supply projects in the WMA actually fall into the unplanned indirect potable re-use category, since towns in the upper reaches of catchments discharge treated effluent into the river, and towns downstream abstract water from the river, treat it, and supply it as potable water. Water re-use has been studied as part of numerous different projects undertaken for the City of Cape Town and DWA over the years. Some of the main conclusions of these investigations are summarised below:

- Direct re-use of treated effluent for irrigation and some industrial applications was cost-effective, and it was recommended that this be actively pursued to maximise its potential.
- There is considerable scope for direct re-use for non-potable purposes if some form of tertiary treatment could be undertaken to improve the quality.
- Re-use for potable purposes was found to be too expensive still, but the recommendations were to continue with the necessary investigations to keep this as a potential future option.

More recently the All Towns Strategies undertaken for DWA also identified water re-use as a future supply option to augment water supply to the towns in the Breede-Overberg WMA.

Desalination

Desalination of sea water remains a supply alternative for towns situated along the Western and Eastern Overberg coastline. Desalination is a process that removes the excess salt and other minerals from water (in this case seawater) in order to obtain fresh water suitable for domestic consumption. The preferred technology to achieve this is Reverse Osmosis, during which the salts are separated from the eventual product water by forcing the sea water through a membrane under very high pressure. The salts and other minerals will stay behind on the one side of the membrane (brine) and the purified water will go through the membrane.

Desalination of sea water will be a possible augmentation option to implement where the potential for a surface water augmentation scheme, groundwater augmentation scheme, water re-use or removal of alien vegetation is limited. However, currently the energy needs of this technology are high, which increases the cost to above R3/m³.

Management Objectives

The Objective for Water Supply Augmentation is:

- ❑ *Ensure adequate availability of water at an agreed assurance of supply to supply existing and new allocations.*

Management Actions

The following activities should be done as strategic interventions for urban water allocations:

➤ *Action 2-C.1: Manage/operate system for reduced assurance of irrigation supply*

Milestone: By 2013

Roles: DWA in collaboration with BOCMA and WUAs

Investigation into the viability and agreement by key rolplayers of reduced asurance from a scheme allows some reallocation to other users. In the Cental Breede a reduction in assurance of supply has been proposed to make water available for emerging farmers. This must be done in consultation with with existing irrigation water users as operators of the schemes.

➤ *Action 2-C.2: Investigate conventional augmentation options*

Milestone: By 2015, following the Water Availability Assessment Study

Roles: DWA in collaboration with BOCMA

Upon completion of the proposed Water Availability Assessment Study, update the yields and costs of the interventions identified as part of the Breede River Basin Study or any other studies and formulate scenarios for reconciling future supplies and water requirements. Completion after the Water Availability Assessment Study within 4 years.

➤ *Action 2-C.3: Investigate non-conventional supply sources*

Milestone: Ongoing

Roles: DWA in collaboration with BOCMA and Local Government

Investigate conjunctive use of groundwater, re-use of treated effluent and desalination in localised situations (primarily for urban supplies).

5.6 MEASURE 2-D: WATER ALLOCATION REFORM

Background and Context

Redressing social inequities through water reallocation to emerging farmers is a central issue for the Breede-Overberg WMA. Water Allocation Reform (WAR) describes a range of processes aimed at equitable, productive, and sustainable allocation of water. The focus is on activities to promote applications that address race and gender reform, as well as those that support the establishment of viable water using enterprises. Water Allocation Reform also includes actions to facilitate the

authorisation of those water uses that represent the most beneficial use of our resources in the public interest. The strategic intent of water allocation reform is ultimately to achieve the following:

- Redress past imbalances both for race and gender
- Sustainable and efficient water use
- Support socio-economic initiatives
- Support of government programmes aimed at poverty eradication, job creation, economic development and rural development, i.e. broad government development objectives

National Principles for Water Allocation Reform:

- *The primary focus of water allocation processes will be to redress past imbalances in water allocations to Historically Disadvantaged Individuals (HDI).*
- *The water allocation process must be supported by capacity development programmes that support the use of water to improve livelihoods and to support the productive and responsible use of water by all users. These capacity development programmes should also help HDIs and the poor to participate equitably in the process of informing the allocation of water.*
- *The water allocation process will contribute to Broad-Based Black Economic Empowerment (BBBEE) and gender equity by facilitating access by black- and women-owned enterprises to water.*
- *The water allocation process will respond to local, provincial and national planning initiatives, as well as to South Africa's international obligations and regional SADC initiatives.*
- *The water allocation process will be undertaken in a fair, reasonable and consistent manner and existing lawful uses will not be arbitrarily curtailed.*
- *The water allocations process will give effect to the protection of water resources as outlined in the National Water Act by promoting the phased attainment of both developmental and environmental objectives.*
- *Innovative mechanisms that reduce the administrative burden of authorising water use, while still supporting its productive use, as well as the effective management and protection of water resources will be developed.*

DWA, together with stakeholders, developed national principles for water allocation reform which serve as the base for changing the way water is allocated in South Africa. The Breede-Overberg CMA should use the national principles as the base for allocating water fairly and equitably in its WMA, and for development of catchment specific water allocation principles. Most importantly, these principles must be developed together with all the affected stakeholders.

The national water allocation reform target is 30% by 2014. In the Breede-Overberg WMA challenges are introduced by constrained water resources and economic value of water used for different crops. The most critical economic consideration is that the highest value crops per unit of water require the greatest technical knowledge and infrastructure development. Water allocation reform in the context of agriculture in the Breede and Overberg will therefore need to explore innovative ways to provide financial support and managerial capacity to beneficiaries, so that economic development is maintained while fostering the social and political imperatives of water reallocation.

The catchment management strategy provides the intent and actions describing how water resources will be managed in the Breede WMA. One of the key priorities is water allocation reform. There are specific catchment management drivers that demand a need for water allocation reform in the Breede WMA. The drivers include:

- An existence of HDI communities who are existing or potential emerging farmers and require water for agricultural purposes;

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- The reserve for the Breede WMA is currently not met;
 - Existing lawful users who are using more than their authorised allocations;
 - The catchment is in some parts currently over-allocated with water uses; and
 - A certain volume of water needs to be made available in the catchment for freshening purposes to retain an acceptable water quality.

BOCMA supports the government objectives of achieving water allocation reform. However, it is important to understand the context and challenges within which this objective must be achieved in the Water Management Area. The context and challenges include the following:

- The Water Management Area produces high value agricultural products that are exported to overseas markets and local markets therefore contributing significantly to the country's economy. The cost of water that is used to produce is very expensive due to being situated in the winter rainfall zone where water needs to be stored at high cost for summer needs. There is high investment input towards water use efficiency. The implications are that, water allocated through reform processes should continue along the same vein of sustainable and beneficial use of water. The implications are that all stakeholders including public and private sector must play a dedicated role in supporting HDI agricultural activities.
- Access to agricultural water is linked to land availability. Additional land in this WMA is not available as most of it was land owned prior to the Natives Land Act of 1913. Therefore land to HDIs will mostly be through redistribution (not restitution) processes. It may therefore be difficult for government to buy significant blocks of the land. Added to this challenge are the difficulties currently experienced with land reform processes and the shifts in national policy.
- The current articulated water requirements by HDIs within the catchment seems to be restricted by challenges around access to land, infrastructure, finance and management support. Although there are pockets of areas where water requirements have been identified, there is however limited information, e.g. water requirements, hectares, agricultural activity and pathways.
- There is limited information available about water that is already in the HDI hands either through equity schemes, land reform processes or other government processes, although estimates range from 2% to 5% of agricultural water use.

Taking into account this context and the associated challenges, a phased approach is proposed to achieve water allocation reform. Within the first five years of the strategy, there are specific targets that will be achieved. Based on the gains made within the first five years, proposals will be made on the next cycle of the strategy. The first five years of the strategy involves a number of activities contributing to achieving the reallocation target.

Existing HDI ownership

The current indications are that, about 2-5% of water within the WMA is already used by HDIs. However this figure is only an estimate that must be confirmed through various processes, i.e. equity schemes and redistribution. WUAs have already been engaged to assist in quantifying this percentage. As an illustration, Groenland WUA indicated the following Black Economic Empowerment ownership, i.e. m³ of water in black hands

IRRIGATION FARMING m ³					
Own source	Eikenhof summer	Eikenhof Winter	Total		
38 414 143	21 701 000	10 748 000	70 863 143		
Black Economic Empowerment component				7 049 620	9.95%
AGRI-INDUSTRY m ³					
Own source	Eikenhof summer	Eikenhof Winter	Total		
738 000	857 000	6 51 000	2 246 000		
Black Economic Empowerment component				74 100	3.3%
TOTAL AGRICULTURAL USE					
Own source	Eikenhof summer	Eikenhof Winter	Total		
39 152 143	22 558 000	11 399 000	73 109 143		
Black Economic Empowerment component				7 123 720	9.74%

Ongoing Land Reform and Agriculture processes

The process of water allocation reform is closely linked to the land reform process in the area. Land received via any form of land reform programme is likely to have water implications in it. The land reform process is therefore likely to contribute to water allocation reform process. While there is this identified opportunity; there are currently no restitution claims that have been identified in the Breede WMA. The majority of the land has been released to HDI through redistribution programmes. As indicated earlier most of the land was taken prior to the Natives Land Act of 1913. Through land redistribution programme, the Land Redistribution for Agricultural Development (LRAD), Settlement and Production Land Acquisition Grant (SPLAG) and Proactive Land Acquisition Strategy (PLAS) projects have been identified in the WMA. Interaction with the Department of Rural Development and Land Reform (DRDLR) revealed that there are specific projects that have been identified through these programmes that may have water implications included. The water requirements within these projects could not, however, be identified or quantified at this stage.

The Department of Rural Development and Land Reform is currently undergoing a strategic change in focus. Most of the new proposed land reform programmes have been discontinued. All land reform projects will now be implemented under the Proactive Land Acquisition Strategy. Projects under various programmes, particularly Land Redistribution for Agricultural Development are now being migrated to the Proactive Land Acquisition Strategy. While the department has taken a decision to implement land reform projects under the Proactive Land Acquisition Strategy, it should be noted that these projects are on hold pending the availability of finance to implement them. It is currently not clear when these will be started again. Based on the current land reform status, the considerations for the CMS are the following:

- Further investigation of land reform projects that have water implications included needs to be done. The department could not yet identify or quantify land reform projects with water allocations. The Department of Rural Development and Land Reform should also consider an indication of when these projects are likely to be implemented to plan accordingly from a CMS perspective. Close cooperation with BOCMA is required. There is a need to investigate land reform project that has already been completed and have water allocation.

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- The current inactivity of project implementation within the Proactive Land Acquisition Strategy implies that BOCMA may consider water requirements for Proactive Land Acquisition Strategy projects in the next cycle of the strategy. Such considerations should be based on the continued joint discussions between the CMA and the department.

Initiatives under the CMS

The third element of achieving water allocation reform is through the WMA driven processes. The processes will be based on the ongoing work that is done by the CMA. This is the core of the CMS water allocation reform strategy.

Management Objectives

The Objective for Water Allocation Reform is:

- ❑ *Allocate 15% of agricultural water use to emerging farmers by 2015.*

This translates approximately to 12 000 ha or about 100 million m³ of water per year.

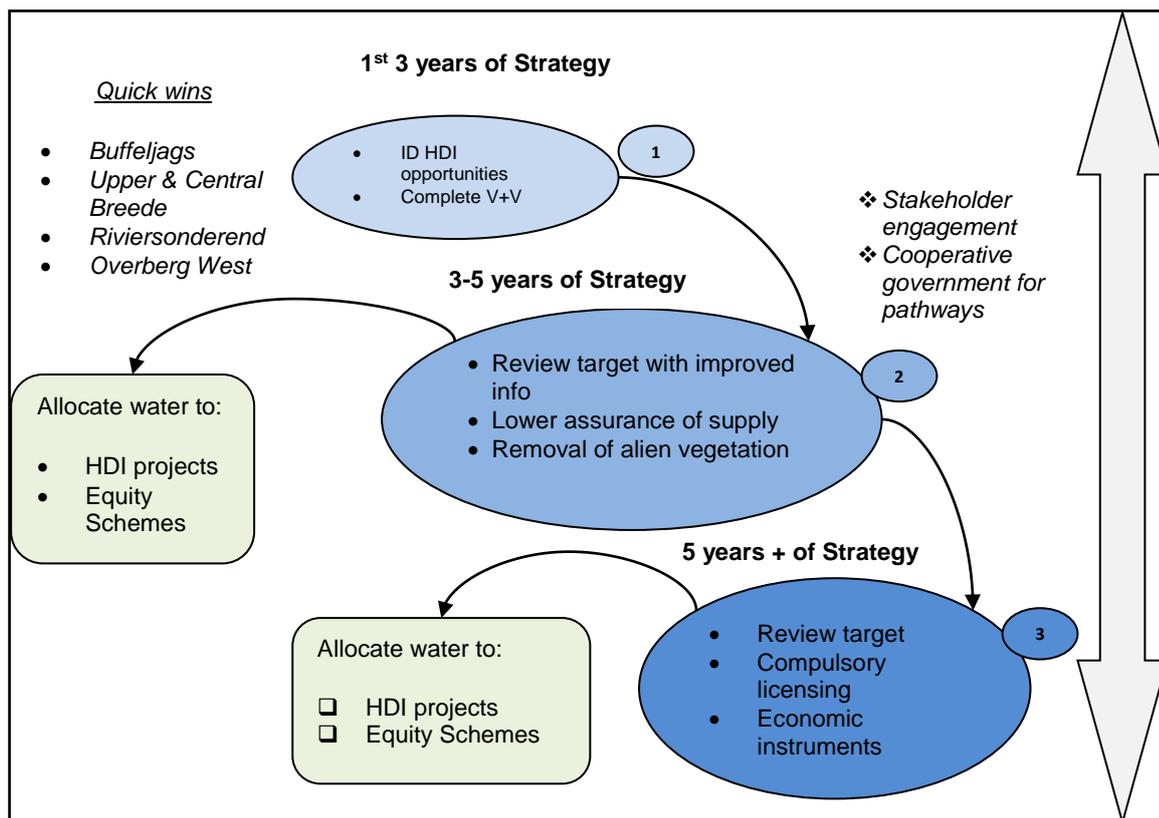
Management Actions

The WMA driven process entails the following steps.

- 1) Identify and support HDI user opportunities (First 3 years of the strategy)
- 2) Complete the verification and validation process in key areas (First 3 years of the strategy)
- 3) Revise the proposed WAR 15% target with improved information (3-5 years of the strategy)
- 4) Allocate water using lower assurance of supply and aliens removal (3-5 years of the strategy)
- 5) Revise target and Implement more comprehensive approaches to WAR (5 year + of strategy)

The activities within the five years of the strategy should be able to provide a clear indication of how much water is available, how much is required by HDIs and where there will be uptake by HDIs. Water made available would have already been allocated to the areas where there are requirements by HDIs. The outcomes should also be able to provide the base for reviewing targets after the first five years of the strategy. New targets will be set up moving forward.

Depending on the water requirements, HDI requirements should be partially addressed during this time; particularly where there are identified quick wins. Importantly, the CMS in this period will consider implementing much more comprehensive instruments for Water Allocation Reform, such as compulsory licensing and economic instruments. During the implementation of these instruments, the objective should not be focused only on addressing HDI water requirements, but should also consider other objectives particularly ecological water requirements (Reserve).



➤ **Action 2-D.1: Identify, develop and support HDI project opportunities**

Milestone: By 2012

Roles: BOCMA in collaboration with WUAs, DWA, DRDLR and Dept. of Agriculture.

Currently there are a number of HDI water users or opportunities that require access to water. During the CMS development process there are a number of opportunities that were identified. However it is proposed that these opportunities should be where there will be quick wins. Based on the current understanding the focus for the opportunities should be in the Upper and Central Breede, Riviersonderend, Buffeljags and Overberg West areas. Within these identified areas, there will be a need to assess and allocate water to deserving HDI applications, e.g. HDI projects and Equity Schemes. There may be a need to develop criteria for awarding licences taking into account that there will be competing needs. In order to achieve this, BOCMA will have to work closely with individuals in these opportunities for support to processes and pathways. Secondly work closely with DWA to process applications and ensure that the criteria encourage black economic empowerment.

➤ **Action 2-D.2: Authorise HDI applications from water made available**

Milestone: Ongoing

Roles: DWA in collaboration with BOCMA

In the 3-5 year period of the strategy, the objective would be to introduce other instruments of water allocation as a way of making more water available. The proposed instruments include lower levels of

assurance of supply. The process involves voluntary reallocation of water by existing lawful users. The process will require close cooperation between BOCMA and existing lawful users on how the process will be implemented. Currently there are technical investigations into how much water can be made available by the removal of alien vegetation and the areas where this can be implemented within the catchment. The outcome of the investigations should be implemented during this time.

While these instruments are implemented, there should be an ongoing process of consolidation of water requirements by the HDI, where water made available through these processes will be allocated. The process should also investigate the opportunities for beneficial use of water. Predominantly water should be allocated to equity schemes and HDI projects.

➤ **Action 2-D.3: Revise Breede Overberg WAR strategy once verification and validation is complete**

Milestone: By 2013

Roles: BOCMA in consultation with stakeholders

While providing water to deserving HDI opportunities, through quick wins projects, the first three years of the strategy will generate a wealth of information that will help influence and improve the 15% target for Water Allocation Reform. This will be enhanced through the verification and validation process and where necessary compulsory licensing will be considered.

5.7 MEASURE 2-E: WATER ALLOCATION

Background and Context

At the heart of the CMS is the allocation plan, which must outline the principles for allocating water between sectors and ultimately water users. For this 1st edition of the Breede Overberg CMS, too many uncertainties remain to allow the development of a clear and comprehensive allocation plan. Rather a more precautionary approach is needed, but on that enables redress through water allocation reform.

A more precautionary approach is rather needed, but that still enables redress through water allocation reform.

Allocation of water must promote the general growth and development of the agricultural and urban sectors whilst ensuring sustainability of water resources. General authorisations must be used as a tool to ensure small scale development but revised where it can lead to over utilization of resources. A cap on general authorisations for groundwater abstraction should for example be considered where properties are large due to adjacent mountain areas. License conditions should be used vigorously to ensure monitoring and efficiency.

Commercial irrigation must be supported and as a catalyst for growth and development in the area and enabler for water allocation reform.

Breede Overberg Water Allocation Principles

- Meet legal (holistic) requirements of the Reserve, based on the Resource Directed Measures' policy of achieving current status (with some improvement where below D-status), but recognising that this may be phased over time.
- Meet urban requirements in the Breede-Overberg towns from appropriate local sources, with requirements for vigorous water demand (efficiency) management.
- Reallocate water to Reserve and HDI farmers through various innovative regulatory, economic and technical mechanisms, following improved understanding of the water use and hydrology of the system.
- Authorise new agricultural irrigation with greater than 50% HDI component, while considering applications with greater than 30% HDI, requiring strict water use efficiency.
- Promote commercial agricultural development through improvement of efficiency, sharing in joint ventures and equity schemes with HDIs and transfer of validated lawful water use entitlements.
- Assess the impacts of any new infrastructure development and associated increased allocation on the downstream ecological impacts and opportunity costs on other users, with a focus on winter water.
- Integrated water quality management with allocation planning to achieve fitness for use by agriculture, tourism and the environment, while maximising available water and reducing dilution requirements.

Applications for water use by emerging farmer irrigation in the Overberg West, Upper Breede and Lower Breede should be considered, while restricting applications in the Central Breede and Riviersonderend to gains from invasive alien removal, water demand management gains, reduction in assurance of supply or additional storage.

Management Objectives

The Objective for Water Allocation is:

- *Authorisation of water use to meet legitimate requirements reflecting the specified allocation principles without exceeding the agreed assurance of supply or environmental flow requirements.*

Management Actions

The following activities should be done as strategic interventions for urban water allocations:

➤ **Action 2-E.1: Authorise water according to CMS allocation principles**

Milestone: Ongoing

Roles: DWA in consultation with BOCMA

The framework for authorising water is provided by the Allocation Principles, and new license applications should be evaluated against these.

➤ **Action 2-E.2: Plan and develop urban water supplies**

Milestone: Following All-Towns strategies

Roles: DWA in collaboration with Local Government and BOCMA

Groundwater, re-use and desalination are resources which could be considered. The conjunctive use of these resources in addition to surface water resources can provide more resilience to climate variation and changes.

➤ **Action 2-E.3: Review and establish general authorisations and license conditions in priority catchments**

Milestone: By 2014

Roles: BOCMA in collaboration with DWA

An understanding should be gained about the additional taking (extraction) of water through general authorisations and licenses to inform whether more stringent conditions are necessary. Conditions should be reformed accordingly.

5.8 MEASURE 2-F: CLIMATE CHANGE RESILIENCE

Background and Context

Impact of climate change and variability

Anticipated changes in climate introduce significant uncertainties that must be considered in the management of water resources in the Breede-Overberg WMA. Climate change will impact upon water availability primarily through changes in temperature and rainfall patterns, potentially leading to increased levels of evapotranspiration and changes in hydrology.

An increase in temperature may increase levels of evapotranspiration, thus affecting the amount of water available particularly for agriculture. Temperature increases are expected and have already been observed in the Western Cape, and farmers have begun shifting production to higher value and less water-intensive crops, such as table grapes, as a result.

Changes in rainfall patterns would lead to changes in hydrology by affecting the amount of water available from surface and groundwater sources. It is unclear whether the Breede-Overberg WMA will become wetter or drier overall, but is expected that changes in rainfall will differ by region. Coastal areas, for example, will likely become drier. This will cause further strain on the coastal tourism areas and surrounding agriculture. Orographic rainfall, on the other hand, is likely to increase and thus cause mountain areas to be wetter. Additionally, extreme events, including floods and droughts, will likely become more frequent, leading to challenges in supply and sanitation.

Building resilience

As explained above, though climate changes are expected, the exact nature and degree of change is unknown. Therefore, the best preparation for climate change will be to build physical resilience through natural resources and infrastructure, and to build institutional resilience. This will enable the Breede-Overberg WMA to respond to conditions that do result.

Building natural resources will contribute to a cost-effective way to build resilience. Natural resources help to mitigate variability, for example with functional wetlands contributing to the attenuation of floods or healthy ecosystems attenuating water quality issues. Without these natural resources, problems of changes in rainfall and water quality resulting from climate change become much more difficult to respond to.

Infrastructure resilience will include planning and building of water-related infrastructure in a way that accounts for potential changes in climate. This would include building in a way that does not foreclose water supply options that may become necessary in the future, and providing urban infrastructure that can accommodate increases in flooding events. Land use decisions should also be made with consideration of climate resilience in mind by, for example, avoiding the placement of large water users in areas that are likely to become more water-stressed.

A spectrum of tools and capabilities can contribute to building institutional resilience. First, monitoring capabilities will be important because the impacts of climate change are unknown, thus necessitating careful observation to discern patterns and inform adaptation planning. Additionally, legal, policy and regulatory tools will play a critical role in coordinating between government and stakeholders in the Breede-Overberg to communicate, build awareness, and respond, and to protect or build the natural resource and infrastructural capacity mentioned above. Finally, institutional capacity will be necessary for economic responses, such as encouraging economic sectors or agricultural products that are most appropriate for potential changes in climate.

Management Objectives

The uncertainty introduced by climate change means that exact solutions cannot be planned at this point. Therefore, building natural ecosystem, infrastructural, and institutional resilience will enable the best responses.

The Objective for Water Allocation is:

- Make robust water resources management decisions that build natural ecosystem, infrastructural and institutional resilience to climate variability and change.*

Management Actions

➤ **Action 2-F.1: Adapt existing climate change strategies to water resources resilience in the Breede-Overberg**

Milestone: By 2014

Roles: BOCMA in collaboration with WC Provincial Government and DWA

Monitoring changes and developing information to indicate expected changes is critical, and focused on Strategic Measure 3-F. As information is better understood, key natural ecosystems, infrastructure, and institutional developments should be identified, prioritised, and steps taken toward building resilience in the identified areas. While BOCMA will play a lead role in this action, collaboration with primarily with DWA and Provincial Government will be necessary for natural ecosystem and infrastructural resilience, and coordination with additional institutions will be required for building institutional

capacity.

6 Strategic Area 3: Cooperating for Compliance and Resilience

The table below summarises the strategic measures and associated actions that will be taken to help protect water for people and nature. The remainder of this section details the reasons and approaches.

Strategic Measures and Actions for Cooperating for Compliance and Resilience	
#	Action
Strategic Measure 3-A: Institutional Arrangements and Strategic Partnerships	
3.A.1	Foster cooperation between BOCMA and key government departments, supported by relevant delegations
3.A.2	Develop strategic water partnerships around Local Government in the WMA
3.A.3	Transform irrigation boards and establish water user associations
3.A.4	Strategically engage private sector with operations or supply chains in the WMA
3.A.5	Develop networks with other basin institutions in SA, Africa and globally
Strategic Measure 3-B: Stakeholder Engagement and Communication	
3.B.1	Develop participatory stakeholder platforms
3.B.2	Maintain, expand and report on stakeholder involvement
3.B.3	Provide multi-faceted water-related communication and awareness
3.B.4	Develop targeted and structured capacity building programmes
3.B.5	Support local water-related initiatives for empowerment and cooperation
Strategic Measure 3-C: Water Use Compliance (Control and Enforcement)	
3.C.1	Target enforcement of use of allocated water following the verification and validation analysis and management plan for municipal waste water treatment
3.C.2	Improve and publicise the authorisation information management system
3.C.3	Develop a BO WMA control and enforcement strategy
3.C.4	Develop agreements with relevant bodies to support control & enforcement
Strategic Measure 3-D: Financial and Economic Instruments	
3.D.1	Decentralise (and normalise) the setting and recovery of raw water tariffs
3.D.2	Investigate, strategise and establish a WMA water-initiative Trust Fund
3.D.3	Investigate economic instruments to assist water use management
Strategic Measure 3-E: Monitoring and Information	
3.E.1	Expand the water resources monitoring (and gauging) network in the Overberg
3.E.2	Align information management systems and governance for the WMA
Strategic Measure 3-F: Climate, Adaptation and Disaster Risk Management	
3.F.1	Strengthen information acquisition and assessment related to climate change and development (trends)
3.F.2	Build institutional flexibility for resilience
3.F.3	Mainstream water and cooperate with provincial and local disaster bodies

3.F.4	Assess water disaster risk and develop a WMA flood and drought strategy aligned to the national disaster management
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6.1 THE STATE AND CHALLENGE OF COOPERATION

The Motivation for Cooperation

The water resources of the Breede-Overberg cannot be managed sustainably, into the future, without cooperative approaches. Understanding that the future is uncertain, with the vagaries of economic, social, political and environmental shifts, cooperative and adaptive management will provide the resilience needed to sustain the economy, support livelihoods and maintain and improve the WMA's rich environmental heritage.

IWRM necessitates that the many related aspects of the water resource be considered in decision making processes, and this has impacts at a variety of levels and within different government departments and institutions. Integrated approaches will be required and based upon a cooperative environment that will be facilitated by BOCMA, and supported by Government, water users, civil society and other stakeholders. This cooperative environment is key to managing water resources today, and is even more critical to adaptive responses to managing water resources into an uncertain future.

This approach is clearly supported by the decentralised and multi-centred institutional model and participative approaches that the policy and legislation provides. However, due to the challenges that are presented by such a model, which includes challenges in coordination, increased transaction costs, issues of legitimacy, as well as institutional transformation and change management, there have been difficulties experienced. This, however, should not cause us to shy away from pursuing this change process and hence, a key role for BOCMA over the next five years will be to stabilise this institutional environment in support of IWRM.

The State of Cooperation

The BOCMA understands that it comes from a past of fragmentation. This existed at political levels, but also horizontally between sectors and government departments, as well as vertically between the various levels of government and local structures. This silo approach was not only inefficient, with some policies and processes working at cross-purposes, but most often ineffective. This did not support the current norms of equity, efficiency and sustainability.

The policy and legislation have created an enabling space within which we can build a more cooperative and participative water resource management approach.

As with many parts of the country, the Breede-Overberg region has had a chequered past with regards to cooperative approaches. The DWA Western Cape Regional Office has over the years been very supportive of the need to integrate and participate. This has been experienced in the Western Cape Water Reconciliation Strategy processes as well as in the process to actually establish the BOCMA. Multiple forums were established during the Breede River Basin Study project and the process to establish the BOCMA was run in tandem with this study. This process was interactive and participative, and staff were active and supportive. However, considerable uncertainty with regards to institutional arrangements over recent years, exacerbated by dwindling staff capacity, has seen these cooperative

structures disintegrate. The time taken to operationalise BOCMA, in this uncertain environment, was also problematic in this regard.

The development of this CMS has clearly provided BOCMA and stakeholders the opportunity to revitalise relationships and recreate this cooperative environment.

Institutional Development

Despite the considerable uncertainty with regard to institutional arrangements over the last three years, BOCMA has managed to become an operational entity during this period. Planning and reporting requirements have been met, baseline systems are in place, staff have been appointed and operational support funding has been provided by DWA as well as receiving some revenue that is collected. In addition, the BOCMA has, through the CMS development process, as well as through the active involvement in ongoing water resource management issues, developed considerable institutional legitimacy within the water management area. This has been well supported by the DWA Regional Office that has withdrawn most of its operational work from the area, in support of BOCMA's growing presence. This has now been further cemented with the delegation of powers and duties that will enable BOCMA to extend its functionality as well as give effect to this CMS.

Of these delegations, the power to establish water user associations is significant. The Breede-Overberg is endowed with more irrigation boards/water user associations than any other water management area in the country. This can be understood in terms of the complexity of water resource management in this area, the pressure on resources and the brevity of the agriculturally based economy. However, the transformation of irrigation boards into water user associations has not been without its problems. Of the 61 irrigation boards, 30 have transformed into 18 water user associations, leaving another 30 yet to transform. One new water user association has been established. Similarly, the process of business planning and reporting to the DWA has also not been without challenges and this requires considerable improvement.

Water user associations play a critical role in terms of operational water resource management. This includes planning, infrastructure operations and maintenance, cooperation and engagement, revenue collection, and compliance monitoring and enforcement. There will be a need for BOCMA, with its enhanced role regarding water user associations, to clarify and confirm roles and responsibilities between BOCMA and the water user associations to create an improved management of water resources.

This also means that BOCMA must, during the next five years, build up the necessary capacity to be able to perform this role. This means that organisational and staffing aspects must be carefully considered, further powers and duties will need to be delegated, financial aspects need to be secured and improved, and information management systems established. Without these BOCMA and its partner water user associations will not be able to perform the day-to-day duties that will support this CMS.

Stakeholder Engagement

Stakeholder engagement must be seen as a key part of the institutional process. Whilst some structures such forums may not be statutory in nature, they are still recognised as an important vehicle to support

water resource management. Over the years this has developed and the way that the DWA has engaged with stakeholders has shifted. Similarly, it is well recognised that the participative approach to water resource management over the last decade has been well received by stakeholders, in general.

During the CMA proposal development process some 14 forums were active at various stages. The CMA proposal proposed an establishment of 4 (four) catchment management committees (CMC); two in the Breede sub-catchment, i.e. upper and lower Breede and another two in the Overberg sub-catchment, i.e. east and west. Pragmatically it was suggested that initially BOCMA should begin with two CMCs, i.e. Breede and Overberg later subdividing into two.

The BOCMA governing board recognised that there had been a significant hiatus in engagement due to the lengthy administrative processes to appoint the governing board and operationalise the BOCMA. With this in mind, BOCMA recognised the need to recreate an engagement environment and hence, in its business planning process proposed the establishment of catchment forums as the base for stakeholder engagement, i.e. a Breede catchment management forum and an Overberg catchment management forum. The Board proposed that at a later stage the two forums will be transformed into catchment management committees.

Aligned to this, the CMS development process essentially established two forums, one in the Breede and one in the Overberg. For more technical discussions a Reference Group was utilised. In parallel, the Basin Planning Development Network was established to provide for linkage to government and related institutional planning. Therefore, this has re-established the stakeholder engagement milieu that was lost since the CMA establishment process. It is a therefore, a key part of this CMS to maintain and further improve this engagement.

Partner engagement

Fundamental to this CMS, is the concept of ownership and shared responsibility to manage the water resources in the Breede water management area. It is clear that whilst BOCMA must coordinate, integrate, and align processes there are a suite of partners that need to play an active role in the implementation of this CMS. BOCMA has recognised this in the establishment of the Basin Planning Development Network and it will be key to take this process forward, but it will be incumbent on BOCMA to further these partnerships through continued engagement with the Provincial Liaison Committee, to engage provincial government regarding environmental aspects, to engage with regional and local disaster management structures, to engage with national and provincial departments as well as local government on matters relating to land use, and engage key partners to create aligned approaches to compliance and enforcement, amongst a number of others.

6.2 MEASURE 3-A: INSTITUTIONAL ARRANGEMENTS AND STRATEGIC PARTNERSHIPS

Background and Context

Policy and legislation include institutional aspects to essentially decentralise water resource management to more regional and localised levels. Of the many processes initiated around the country to establish CMAs, up to this point only two were operationalised, namely the Inkomati and the Breede-

Overberg. In a sense, these CMAs find themselves as pathfinder institutions breaking new ground and this CMS is part of that process.

Unfortunately, in recent years there has been considerable uncertainty regarding institutional aspects. Whilst policy and legislation have remained fixed, the DWA has been unclear as to the route forward with the various institutional models. This has had a ripple effect through the sector causing much uncertainty as to the way forward for the various institutional processes.

Whilst there is still no official clarity as to the institutional road ahead, BOCMA has to chart a way forward with its own institutional development, in order to give effect to the CMS, and has to take a lead with regard to more localised institutions. However, the institutional challenges remain, and in order to deal with the increasing water resource challenges the institutional arrangements need to be stabilised as quickly and smoothly as possible.

Strategic Partnerships

There are a number of strategically important partnerships that BOCMA must maintain and support. These have the important aim to enable engagement in matters of policy, align planning instruments, support sustainable water use and development, as well as support coordinated implementation actions.

Typically these partners are seen as:

- Local government: Both local and district municipalities
- Provincial government departments: Most importantly the Department of Environment Affairs and Development Planning and the Department of Agriculture, as well as key associated entities such as CapeNature.
- National government: Department of Land Affairs and Rural Development

Local government has the responsibility to support local economic growth and development, and related to this various services such as water services. This is planned cyclically via the Integrated Development Plan which includes the Water Services Development Plan. Typically, water resource aspects have not been carefully considered in Integrated Development Plans such that one can end up with insufficient water resources to support the growth requirement. BOCMA will actively engage and partner with the municipalities in aligning these planning tools with the CMS and with the resources that are available.

BOCMA must also work with local government to address increasing concern regarding water quality within the water management area. Elevated nutrient levels have seen river stretches becoming eutrophic and the Klein River estuary has had major fish kills because of this. Export farmers in the Breede have been threatened that their export goods will not be accepted if water quality standards are not adhered to.

In terms of provincial government, BOCMA will need to engage in the development of estuarine management plans and this will involve working closely with associated entities such as CapeNature and SANBI. With regards to matters of land care as well as water use efficiencies, BOCMA will liaise and partner with the Department of Agriculture.

Stakeholders have noted the importance of not introducing multiple layers of forums and institutions, but recognised the development of the Basin Planning Development Network as an extremely useful structure to foster this engagement. Whilst this effectively creates a more operational alignment there will be a need for BOCMA to utilise other already established forums and committees.

Institutional arrangements

In effect, the key aspect of any institutional reform process is to find an appropriate balance between operational functionality, geographic area of jurisdiction and span of control, and the need for effective oversight and governance. This needs to be structured around the various aspects of institutional viability. The institutional realignment process aimed to resolve these challenges, but has for a variety of reasons been unable to do this. However, throughout the CMS development process stakeholders have emphasised the dire need to finalise and stabilise the institutional framework within the water management area.

During the next five years the BOCMA will move from a fledging institution with limited functionality, into a fully operational institution. In order to support and guide the implementation of this CMS, BOCMA will require further delegated powers and duties, capacity, resources and systems.

The importance of WUAs cannot be underestimated and are recognised as an essential element of the water resource management framework. However, challenges with regards to the transformation of irrigation boards, business planning and reporting regimes, and implementation and billing agent agreements still exist. BOCMA has already started to assist the irrigation boards with the transformation process and the completion of this task over the next five years will be a key milestone for this CMS.

Private Sector Engagement

Through undertakings such as the *United Nations CEO Mandate* large corporate businesses are starting to understand that they need to engage with water resource management issues and the related institutions. When business engages with public policy, water is often only one of a myriad of issues, and has typically been within the domain of advocacy and lobbying. There is an emerging shift to engage, in a broader way, with matters of policy, of shared risk, of engagement with stakeholders, as well as opportunities for advocacy. It will be key for BOCMA to engage with corporate business as a strategic partner.

Exchange Networks

At the local level, BOCMA rapidly found common ground with the Inkomati CMA and their relationship proved fruitful in working together on issues of common concern, as well as sharing ideas and approaches. This relationship will continue and will expand as other CMAs are operationalised.

As far back as 2004 international cooperation with the Breede water management area had been made with the Dutch Friesland Water Alliance. This was continued into a twinning arrangement with the Wetterskip Fryslan, the Fresian Regional Water Authority. Such twinning arrangements proved valuable in providing Governing Board members and staff members opportunities to expand their understanding of key concepts of governance, water resource management, and institutional development. Similar relations will be struck with other similar institutions within Africa, as many African countries move towards a similar model of catchment based agencies.

These exchanges are extremely useful in developing best practice in the various aspects of CMA business as well as providing opportunities for staff to expand their understanding. This will be a step towards innovation and improvement.

Management Objectives

The overarching management objective for institutional arrangements and strategic partnerships is to stabilise the institutional arrangements in order to effectively and efficiently manage water resources, to create alignment between the various strategies and management planning tools between key partners, and to support coordinated action with key government and institutional partners.

The Objective for institutional arrangements and strategic partnerships is to:

- ❑ *Stabilise the institutional arrangements, create alignment between the various strategies and management planning tools, and to support coordinated action.*

Management Actions

<p>➤ Action 3-A.1: Foster cooperation between BOCMA and key government departments, supported by relevant delegations</p>
<p><i>Milestone: By 2013</i></p> <p><i>Roles: BOCMA in cooperation with DWA and relevant National and Provincial Government Departments</i></p> <p>BOCMA will formalise and maintain the Basin Planning Development Network and as ongoing vehicle to support integrated and aligned actions. Furthermore, BOCMA will with the support of the various Provincial departments, engage with the various planning committees and working groups to foster alignment in strategies and plans.</p>
<p>➤ Action 3-A.2: Develop strategic water partnerships around Local Government in the WMA</p>
<p><i>Milestone: Mechanisms agreed and in place by 2012</i></p> <p><i>Roles: BOCMA and District Municipalities together with Local Municipalities</i></p> <p>BOCMA has indeed initiated these processes and will continue to build on these together with the District and Local Municipalities to ensure continued engagement, so that the urgent aspects of water quality, urban development and land use planning can be addressed.</p>
<p>➤ Action 3-A.3: Transform Irrigation Boards and establish water user associations</p>
<p><i>Milestone: By 2013</i></p>

Roles: BOCMA and DWA, in collaboration with WUAs

Some 30 irrigation boards are yet to transform into WUAs. This will be finalised within the next two years. Wherever possible the configuration of the institutions needs to be considered and rationalised. Due to the fact that some applications are currently with DWA, and that the BOCMA has been delegated the authority to transform irrigation boards within specific criteria, there is a need for an agreed plan to address this action.

Within the next three years all planning and reporting regimes will be stabilised and operational.

➤ **Action 3-A.4: Strategically engage private sector with operations or supply chains in the WMA**

Milestone: By 2012

Roles: BOCMA in collaboration with identified private sector companies

BOCMA will initiate engagement with large businesses to constructively advance responsible management of water resources within the operations and supply chain, aligned to policy and legal instruments as well as the CMS. BOCMA in understanding the role that large business plays in the social economy will explore shared risk and how to cooperatively prevent or respond to crises resulting from inadequate availability, supply, or quality of water or water-dependent inputs, as well as encourage the concept of stewardship through responsible operations and management.

➤ **Action 3-A.5: Develop networks with other basin institutions in SA, Africa, and globally**

Milestone: Ongoing

Roles: BOCMA with relevant institutions

BOCMA will maintain current networks as well as develop new partnerships and networks for exchange of experience with other basin management authorities within South Africa, Africa and globally. This will provide a basis for developing and improving aspects of governance as well as operational water resource management. The current relationship with Inkomati CMA and the Wetterkip Fryslan will be maintained.

6.3 ACTION 3-B: STAKEHOLDER ENGAGEMENT AND COMMUNICATION

Background and Context

Stakeholder processes are often utilised where there is a need for systemic, sustainable, and inclusive approaches. The management of scarce natural resources such as water require such inclusive processes, and as pressure on our water resources increase, the need for increasingly intense

engagement will grow. It is in this light that stakeholder engagement has become recognised as a central theme to IWRM, both on the international stage as well nationally.

Whilst undoubtedly complex, stakeholder processes can require large amounts of financial and human resources. Many will argue that stakeholder based processes are actually more efficient and effective because they result in faster ownership and less conflicting implementation of the policies or projects. Within the current context of South Africa, it has become imperative to ensure sufficient engagement for this very reason.

At the same time, the core theme in establishing the CMA has been to encourage more localised ownership of water resource management with the resultant localised solutions to localised problems. This is to be done via local participative structures and forums, with their engagement in planning and implementation, as well as to act in supporting the oversight role.

Appropriate Engagement

Whilst stakeholder engagement is recognised as a key support to water resource management, it must be noted that stakeholders need to be engaged in appropriately. Engagement should not be overdone as this will only result in stakeholder fatigue and less robust processes. Hence, the International Association for Public Participation¹ provides a useful framework for engagement and the revised model will be used as a basis for stakeholder engagement into the future.

The spectrum of Public Participation (adapted from the International Assoc. for Public Participation)			
Increasing level of public  engagement			
INFORM	CONSULT	INVOLVE	COLLABORATE
Public participation goal			
Provides the public with balanced information to assist them in understanding the problem, opportunities, solutions and alternatives	Obtains public feedback on analysis, alternatives and decisions	Works directly with the public throughout the process to ensure that public concerns are consistently understood and considered	Partners with the public in each aspect of the decision-making process including the development of alternatives and the identification of preferred solutions

Figure 6.1. Spectrum of public participation.

Whilst it is understood that each type of participation has its place, processes of more active involvement (or collaboration) with key stakeholder groups provide for more sustainable and more productive projects. By informing and consulting, there are only limited opportunities to identify public values and priorities, let alone opportunities to solicit and incorporate stakeholder expertise and local knowledge. BOCMA will work with their stakeholders to establish this approach such that stakeholders understand the types of engagement they can expect.

¹ <http://www.IAP2.org/spectrum.html>

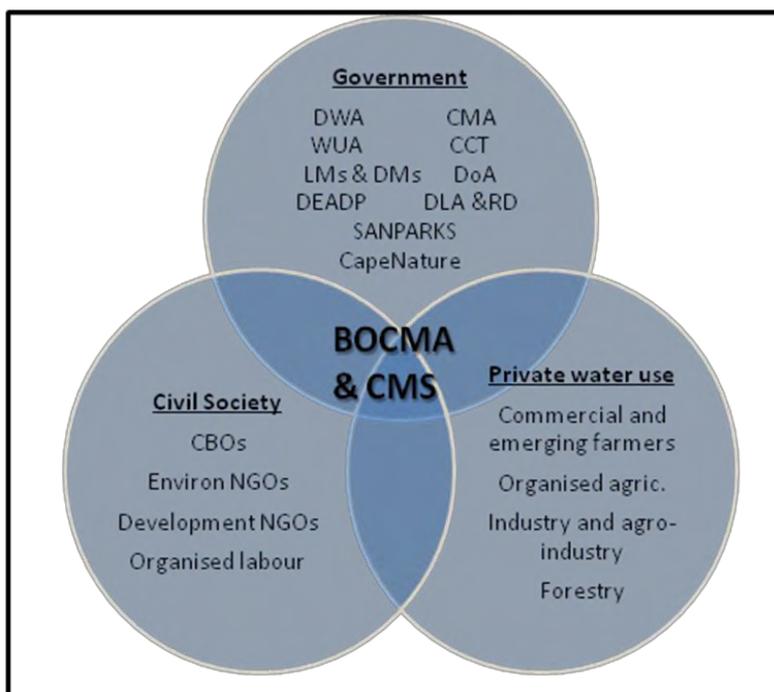
Key considerations for continued and active engagement

Emerging from the various participative processes are a number of considerations that will provide a solid foundation for engagement.

- **Capacity Differentials:** Part of the value and richness of any participative process is the diversity of views and opinions obtained. Certain stakeholder groupings are indeed well capacitated whilst other not. This is exacerbated by language and /or cultural differences. These issues will be dealt with through extra capacity building sessions, or through careful facilitation. BOCMA must create a participative environment where stakeholders support and assist those less empowered.
- **Maintaining an Active process:** BOCMA will keep stakeholder processes active and vibrant. One has to carefully consider the role of stakeholders; when their inputs are most needed and how often meetings, newsletters and other “activities” are really needed. An important consideration is how the process needs to develop over time.
- **Financial issues:** Participative processes are time consuming and cost intensive. The costs involved can become quite considerable and could include travel, venues, accommodation, meals, documentation, distribution of documentation, and in some instances secretarial costs as well.
- **Issues of Scale and Representivity:** The modality of participation must consider the institutional arrangements, the stakeholder environment and the geographic size of the water management area. The larger the catchment or basin, the greater the challenge to structure this appropriately. This must consider that not all stakeholders have the time or the resources to travel great distances to attend meetings and this can impact upon meaningful representivity.

Stakeholder analysis

The stakeholders within the Breede-Overberg WMA differ in terms of their relationship with, and perspective of the water resource. This relationship to the resource underpins how the stakeholders



relate to the CMA, and how they impact on the CMA’s strategy and its functions. This will ultimately influence the level of engagement required, as described above.

Through the development of the CMS stakeholders have been added to a comprehensive database. This not only helps to structure how stakeholders need to engage in issues, but also assists in managing communications and monitoring actual engagement in processes.

Figure 6.2. Stakeholders involved in the Breede-Overberg CMS.

Structures for engagement

During the very active processes of engagement in the Breede River Basin Study and the development of the proposal for the establishment of the CMA, there were some 14 participative forums active, and it was envisaged that these would be developed in 4 catchment management committees. As statutory bodies it was seen that these committees whilst supporting participation would also have an executive role. These aspirations were lost after the stakeholder engagement momentum was lost whilst the CMA was operationalised. Through the CMS development stakeholders have taken a pragmatic stance as to the structures needed and felt that this would develop with time. Therefore, building on the momentum of the CMS development two forums will be maintained and at a later stage, as appropriate, more localised structures will be developed.

Communications and awareness

There is a real need to create a deeper understanding of the various challenges and issues related to managing water resources. An important aspect of this CMS focuses upon creating an improved awareness and understanding of water resource management and the gravity of the challenges that will be faced in the future. Through communications and awareness drives BOCMA will aim to create the urgently required societal understanding and awareness. This will be done considering the various differences within society.

Interactive training and capacity building

Ongoing, contextually relevant and focused capacity building is needed to secure informed public engagement around specific goals and objectives. Key training and capacity building steps are as follows.

Survey people's needs: Survey sheets were handed out and collected during the CMS process and provides some insights into identified capacity building needs. This must be ongoing and the information captured into the stakeholder database.

Pre-meeting support: Pre-meeting support sessions are extremely useful in helping people to prepare for meetings. The agenda and aim of a meeting are discussed with community based stakeholders who had not been part of water resource management or strategic processes before, but are also open to all who feel they need support in grappling with concepts.

Build on current programmes: There are various ongoing programmes that need to be continued, such as the BOCMA-WWF training that was held during the CMS development. The training was focused upon IWRM and could be taken to a wider audience.

Develop BOCMA owned courses: As the need arises, and within a specific context, stakeholders will require capacity building and training. BOCMA will play a key role in putting together these sessions. They could be informal or formal in nature, and could be presented by a BOCMA staff member or another expert from another institution.

Empowerment projects

The need to support emerging farmers and community groups has been clearly articulated with the CMS and BOCMA will play a key role in supporting these undertakings, together with actors from the Department of Agriculture as well as Land Affairs and Rural Development. This will support the development of rural livelihoods as well as introduce communities to key aspects of water management. Similarly, projects around aspects such as estuarine management plans will potentially see BOCMA working with the Department of Environmental Affairs and Development Planning, with local government and civil society. Such projects not only empower stakeholders but also provide a platform for cooperative approaches that serve to strengthen institutional relations.

Management Objectives (stakeholder engagement)

Understanding the importance of this task in terms of ensuring sustainable development, three key management objectives can be defined:

- Engage stakeholders appropriately in key water resource management functions via stakeholder platforms
- Develop a deeper societal awareness of the water resource challenges through communications and awareness campaigns
- Develop capacity through structured training and capacity building initiatives
- Empower communities and improve cooperation through local initiatives

The Objective for stakeholder engagement to:

- ❑ *Support the capacity building and empowerment of stakeholders through communications, training, projects and the active engagement in water resource management through appropriately structured platforms*

Management Actions

➤ **Action 3-B.1: Develop participatory stakeholder platforms**

Milestone: By 2011

Roles: BOCMA

Although not in name, two forums were essentially established during the CMS development. The process to formalise the forums for the Breede and the Overberg will need to be engaged early in 2011 and will articulate the structure of the forum, the number of meetings per year, a broad plan for areas of interface and interaction for the forum, reporting processes, as well as financial matters.

➤ **Action 3-B.2: Maintain, expand and report on stakeholder involvement**

Milestone: Ongoing

Roles: BOCMA

To ensure that stakeholder engagement is appropriate and inclusive there will be ongoing capturing of information so that BOCMA can report on who and how stakeholders were engaged, the areas where inputs were provided as well as wherever possible, the inputs themselves.

BOCMA will establish a protocol of providing and capturing of inputs, for reporting and for providing regular feedback. A large stakeholder database was developed through the process of developing the CMS. This database will be maintained and improved to include new stakeholders as well as additional information fields as appropriate.

➤ **Action 3-B.3: Provide multi-faceted water-related communication and awareness**

Milestone: Ongoing

Roles: BOCMA

BOCMA will develop a communications and awareness strategy that utilises multiple channels of communication to provide water-related information and raise awareness. The website will be maintained and updated regularly, newsletters will be published on a quarterly basis, and BOCMA will utilise local media including newspapers and radio to make stakeholders aware of particular issues.

➤ **Action 3-B.4: Develop targeted and structured capacity building programmes**

Milestone: Ongoing

Roles: BOCMA in collaboration with DWA, Provincial Departments, Academic institutions, NGOs

Pre-meeting support is seen as imperative and will be provided on an ongoing basis to support those attending forum meetings as well as other meetings arranged by BOCMA. These will be provided in the appropriate language and will consider the various special needs articulated above.

The WRM management training provided by BOCMA and WWF proved successful and enabled stakeholders to develop their capacity in tandem with the CMS development process. BOCMA will investigate the possibility of providing this training on a more regular basis. In order to support key initiatives BOCMA will develop appropriate training courses, in conjunction with various key and appropriate partners.

➤ **Action 3-B.5: Support local water-related initiatives for empowerment and cooperation**

Milestone: Ongoing

Roles: BOCMA in collaboration with DWA, Department of Agriculture, Department of Environmental

BOCMA supported by key partners will develop a programme of community based projects that involve water, and provide an opportunity to provide for empowerment and upliftment as well as foster cooperative approaches between the various lead agents. This programme will be reviewed and revised on an annual basis.

6.4 MEASURE 3-C: WATER USE COMPLIANCE

Background and Context

Under circumstances of relative water resource abundance it can be argued that the need for firm regulatory responses is diminished, however we must understand that there are in fact complexities in ensuring that water is available in sufficient quantity, of adequate quality, at the right place and at the correct time. As the pressure on our water resources increase the ability to ensure that we can meet these requirements with an agreed level of reliability becomes increasingly difficult. In the Breede-Overberg WMA where the social economy is deeply rooted in agriculture, and agro-processing, these water resource requirements are facing increasing pressure, whilst recognising the need to protect the environment and ensuring sustainability.

This is indeed complex and there is a need for a pragmatic and structured approach to establishing a regulatory framework within the water management area. Through this process the BOCMA can establish a regulatory framework that key actors and stakeholders will understand and support with time.

Through previous studies such as the Breede River Basin Study (2004) and the Internal Strategic Perspective (2004) some identified challenges in the Breede-Overberg WMA include:

- Scheduled lists of irrigable areas may contain entitlements not used prior to 1998, as well may include over use by some, because of a lack of verification.
- Some farmers appear to have over-registered and this requires verification.
- Groundwater use, being private water prior to 1998 is considered an existing lawful use and additional is use is generally authorised.
- Unauthorised use in municipalities is estimated at 10%, due to expansion of use since 1998.
- Stakeholders have throughout the strategy development process have complained about unlawful water use and some estimates indicate this to be in the order of 5-10% of total use.
- Stakeholders have indicated concerns regarding nutrient loads due to non-compliance with discharge standards at waste water treatment plants. These growing concerns are underlined by the fact that the European Union has cautioned export farmers regarding their concerns as to adherence with water quality standards. In addition, the Klein River estuary is often eutrophic and the fish kills have been significant.

Regulatory instruments

There is a wide range of regulatory instruments that can be utilised to ensure that policy and legislative requirements are met. Six key instruments are listed below, which can be understood in a variety of different ways depending upon context.

-
- **Command and control:** Typically the compliance monitoring & enforcement approach based upon adherence to suites of standards and licence conditions.
 - **Economic instruments:** Provide financial incentives to adhere to certain entitlement conditions and most typically includes water pricing. This requires a well-defined regulatory framework in order to send out signals to change behaviour.
 - **Market Mechanisms:** Based upon trading of water allocations between parties as well as between uses. While there may well be some limitations to such trade, arising from issues of physical availability and location, trading nevertheless provides an important regulatory tool, particularly in relation to driving water use efficiency and moving water to higher value uses to ensure maximum beneficial use.
 - **Participatory planning:** By involving stakeholder and water users in planning initiatives they start to understand water resource challenges, hence promoting a regulatory response.
 - **Voluntary regulation:** Requires a well-structured regulatory framework that provides clarity as to roles and relationships, and supports the concept of self-regulation. This places the emphasis on effective reporting mechanisms.
 - **Information:** Through the sharing/ provision of information and increasingly this can provide an important instrument as it encourages disclosure and self-regulation. New regulations on water use monitoring will be also useful in setting up a more appropriate monitoring network and an improved understanding of actual water use.

The challenge for the Breede water management area is that water resources are already under pressure. Through participation processes stakeholders often voiced concerns that there are users who are not adhering to licence conditions, be these either abstraction or discharge related. It is clear that there is a need to act swiftly in some cases and the BOCMA will prioritise these actions, but most obviously economic instruments and market mechanisms are seen as having longer term impacts. Hence, the primary focus is very much on using participatory planning, supported by voluntary regulation and information, and completed with typical command and control compliance monitoring & enforcement approaches.

Prioritised Enforcement

Due to the fact that stakeholders have repeatedly complained about unlawful activities, as well as the fact that certain areas are facing extreme water resource pressures, there is a clear need for BOCMA to prioritise areas and work towards targeted enforcement. This will need to be underpinned by a process of verification and validation to better understand who is using water, how much they are using, for what purposes, and where they are using it. Priority areas at this juncture are largely in the Breede and Riviersonderend due to the high levels of water use. The process of verification and validation is lengthy, however, once completed BOCMA will take decisive actions against clearly unlawful activities. This will be supported by a communications and awareness drive to ensure that water users and stakeholders are informed.

Disclosure to support Compliance Monitoring

Experience internationally has indicated the importance of making information available to stakeholders in support of compliance monitoring. In order for BOCMA to effectively manage water use within the WMA, the necessary information management systems are required. The WARMS system captures water use authorisation and registration and as such the volumes of water use then provide the basis for planning, compliance monitoring as well as for billing for water use. Also, the Water Management System supports water resource management with specific reference to water and environmental quality and will support BOCMA to understand non-compliance with regards to discharges. BOCMA will set up to publicise appropriate water use information. This needs to then be backed up by a complaints system so that citizens can register complaints and investigators can deal with these complaints in a structured manner.

BOCMA and DWA have made considerable progress in addressing the licence backlogs through Project Letsema. However, there will be the need for BOCMA and DWA to continue to push together to ensure that this process is completed by BOCMA/DWA and stakeholders. BOCMA working with stakeholder will consider a more open process of licence applications, where stakeholders can comment on and object to licence applications. This would need to be done in structured manner, and within certain timeframes.

A Strategic Approach

It will be critical for BOCMA to establish a compliance monitoring and enforcement strategy, in support of a structured and phased approach. This strategy will consider:

- **Internal Capacity:** Internal capacity within BOCMA will need to be fast-tracked. This involves creating the internal structures and filling posts, and the provision of the necessary equipment and tools. It will require that powers and duties are delegated to the BOCMA and the staff, and most importantly that staff have the powers of ‘Environmental Management Investigators’ as officers of the court. Standardised protocols and procedures for investigators will be required and staff will need to be trained.
- **Improved monitoring:** This will in the first instance be expected from institutions such as municipalities, water user associations and irrigation boards, but with time and new regulations, this will be expanded to a broader group of water users. This will be backed-up with spot-checks and compliance audits.
- **Awareness creation:** An essential step towards achieving compliance. Whilst there may well be users who are well aware that they are acting unlawfully, it is assumed that many do not. Hence, it is imperative to create an understanding amongst water users of the need to comply with the various authorisation conditions.
- **Improved Reporting:** BOCMA will establish a reporting framework and will ask municipalities, irrigation boards and WUAs, as well as individual users to report regularly.
- **Enforcement actions:** Against standardised procedures unlawful activities will be stopped and effective action will be publicised.

Develop Agreements

Due to the multijurisdictional nature of environmental compliance it will be important to have agreements that set out how these various Departments and agencies will work together in a more consolidated enforcement framework. This must include agreements with the South African Police Service (SAPS) and the National Prosecuting Authority (NPA).

Management Objectives

During the 5 year timeframe of this CMS, BOCMA will place itself at the centre of a process to establish firmer regulatory environment within the Breede water management area. This will be done in a structured and phased manner.

Therefore, the three key objectives are:

- To initially deal with unlawful activities in priority catchments.
- To create an improved awareness of unlawful activities and create a culture of compliance.
- To develop a longer term cooperative and strategic approach to enforcement.

The Objective for water use compliance is to:

- ❑ *Develop in a phased and structured manner a strategic approach to water use compliance that inculcates a culture of compliance amongst water users.*

Management Actions

In essence these actions aim to take action in priority catchments where water use pressure are significant whilst in the longer term BOCMA develops a cooperative and strategic approach to compliance monitoring and enforcement.

➤ *Action 3-C.1: Target enforcement of use of allocated water following the verification and validation analysis and management plan for municipal waste water treatment*

Milestone: By 2015

Roles: BOCMA and DWA Regional Office, supported by National Director: Compliance Monitoring & Enforcement (National D: CME)

BOCMA will undertake a verification and validation process in the Upper Breede. Analysis of the information obtain will be followed with enforcement actions within this area. This will be underpinned by a communications and awareness campaign driven by BOCMA. BOCMA will in this phase take up the current DWA reporting structures to capture process and progress.

➤ *Action 3-C.2: Improve and publicise the authorisation information management system*

Milestone: By 2015

Roles: BOCMA and DWA

Based on the verification and validation processes as well as by addressing the various licence backlogs, together with DWA, BOCMA will be able to update and improve the water use authorisation information. Thereafter, BOCMA will establish a system to publicise appropriate water use information.

➤ **Action 3-C.3: Develop a BO WMA control and enforcement strategy**

Milestone: By 2013

Roles: BOCMA supported by DWA Regional Office and DWA National Director: Compliance Monitoring & Enforcement

BOCMA will develop and establish a phased and structured strategic approach to water use compliance and enforcement. This strategy will look to develop the necessary internal capacities, improve monitoring, create awareness, stabilise reporting and prioritise enforcement actions.

➤ **Action 3-C.4: Develop agreements with relevant bodies to support control and enforcement**

Milestone: By 2013

Roles: BOCMA in cooperation with DWA, Provincial Depts, Cape-Nature, SAPS, NPA

Due to the multifaceted nature of compliance and enforcement, it will be critical for BOCMA to work with various departments and agencies. These relationships will be stabilised through the development of a suite of agreements that will clearly articulate the various roles and responsibilities.

6.5 MEASURE 3-D: FINANCIAL AND ECONOMIC MECHANISMS

Background and Context

The implementation of many of the aspects of this CMS requires adequate resources, including financing of initiatives or the institutions that are responsible for implementing functions. Business planning of government departments, agencies, companies and other institutions is the mechanism through which these resources are mobilised and allocated. Therefore alignment between the CMS and these business plans is critical, particularly for BOCMA as the lead agent on many of the actions.

The financial strategy for the CMS needs to blend fiscal support, revenue from water use charges and other sources of finance. It must distinguish between ongoing operational costs and once-off interventions, and provide appropriate mechanisms to obtain and in some cases ring-fence these funds.

Finally, there are opportunities for adopting economic instruments that change individuals' behavior with respect to water resources management. These may be in the form of levies (such as the waste discharge charge system) or incentives (such as matching funds for initiatives).

Management Objectives

The Objective for water use compliance is to:

- ❑ *Develop sustained and innovative financing of the CMA implementation.*

Management Actions

➤ *Action 3-D.1: Decentralise (and normalise) the setting and recovery of raw water tariffs*

Milestone: By 2013

Roles: BOCMA, in collaboration with DWA

The setting and collection of water use charges is an important aspect to obtain resources to implement the CMS, which should reside with BOCMA as the lead water institution in the WMA. This requires appropriate delegations from DWA and the building of capacity within the CMA. It should however be noted that continued fiscal support should be available to perform certain ongoing strategic functions by the CMA on behalf of DWA.

➤ *Action 3-D.2: Investigate, strategise and establish a WMA water-initiative Trust Fund*

Milestone: By 2012

Roles: BOCMA

The development of a business case for a CMA trust fund may lead to the establishment of such a mechanism to enable the collection and disbursement of project / programme related finance. This may enable donor, NGO or private sector contributors to dedicate funds for a particular aspect of the CMS, and may provide a mechanism to disburse funds to other institutions that are implementing initiatives (including the possibility for providing matching funds). The governance and strategy of this type of fund is critical to its sustainability, as is its relationships with the CMA and other institutions, so this must be a focus of the business case and implementation.

➤ *Action 3-D.3: Investigate economic instruments to assist water use management*

Milestone: By 2015

Roles: BOCMA, in collaboration with DWA

A range of economic mechanisms and instruments have been proposed to assist water management in South Africa, ranging from the waste discharge charge system, economic charges for water efficiency, and water banking to assist trading of water. All of these require policy and legal enablers by DWA, which may be informed and prompted by a coherent investigation of the needs and possible economic solutions at the CMA level. This investigation would provide this motivation and business case, while considering the strategic and revenue collection aspects of these instruments.

6.6 MEASURE 3-E: MONITORING AND INFORMATION

Background and Context

In order to be able to manage the water resources of the Breede-Overberg WMA, various datasets, information and related systems are required as a basis to understanding the status of the resource and, from historical and systems understanding, to predict future impacts.

This undertaking varies over space and time and is made more complex due to the variety of institutional roles and relationships, challenges related to systems as well as financial dimensions. The complex nature of water resource management requires that data and information will be used and transformed, and used again. Therefore, information is in a sense not static, and hence the need for standards, systems and protocols.

The DWA has already established a number of monitoring and information systems and much effort has been put into trying to integrate these systems into a coherent structure, with sufficient interfaces. As some of these systems have been developed in complete isolation or in order to meet very specific needs, there have been considerable challenges in working towards this coherent structure. This is further exacerbated by a shifting institutional model that involves DWA Head Office line functionaries, the DWA Regional Office, CMAs and WUAs. Of course, some of the monitoring and information requirements necessitate the involvement of other players such Provincial and Local Government, NGOs, public entities, and so forth.

Understanding that there are clear objectives that need to be achieved through the implementation of this CMS, it is critical to put in place a suite of steps that enable the further improvement of current monitoring networks and the development of information management systems, within DWA and BOCMA. Due to the fact that the National Water Act calls for the establishment of a National Information Management System, a third key consideration will relate to matters of governance and BOCMA will support and be part of the national system.

Status of Monitoring

There are a considerable number of rain-gauges in the WMA; however, it appears that the network requires some improvement. This is most notably in the Upper Breede and Rivieronderend where the terrain is mountainous and rainfall patterns shift very rapidly. There is also room for improvement in the Overberg where gauges are clearly insufficient to understand rainfall patterns.

The hydrological flow monitoring in the WMA also requires some additional monitoring points, as well as some sites that require some refurbishment, in order to improve the understanding of the hydrology. In the Breede and Rivieronderend mid-to-lower reaches there are very long stretches of river without monitoring. In the upper reaches of these rivers there are a number of sites that require refurbishment and maintenance to bring them in to the network. However, most significantly there is insufficient monitoring in the Overberg to have a complete understanding of the hydrology of the Overberg systems. As these are largely estuarine dominated systems, that require high flows, monitoring in the estuarine stretches is also key.

Groundwater monitoring has been largely “project-based” and there is a need to develop a more comprehensive network. River Health has been monitored in both the Breede and Overberg areas, and

whilst DWA is a lead agent for this, it appears that BOCMA has an increasingly important role to play in monitoring river health.

Information systems

The NWA requires the establishment of information systems that include:

- a hydrological information system;
- a water resource quality information system;
- a groundwater information system; and
- a register of water use authorisations.

These are imperative for BOCMA to implement this CMS.

At the same time BOCMA must support a national information system:

- to store and provide data and information for the protection, sustainable use and management of water resources;
- provide information for the development and implementation of the national water resource strategy; and
- to provide information to water management institutions, water users and the public - for research and development;
 - i. for planning and environment impact assessments;
 - ii. for public safety and disaster management; and
 - iii. on the status of water resources.

Access to Information

The Minister may request data and information (amongst others) from any person (or institution) in order to support such information systems or in order to manage resources. Similarly, the Minister must make information available, especially with specific regards to disasters such as floods, drought and water related risks.

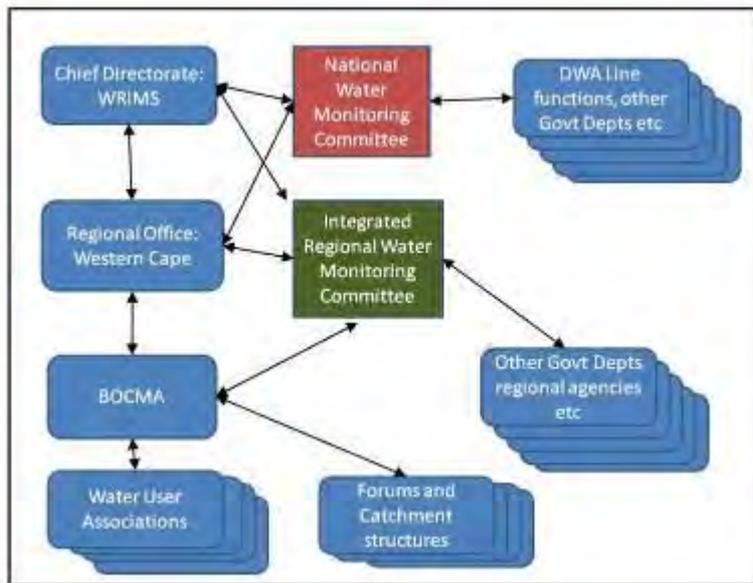
Furthermore, the Promotion of Access to Information Act (Act 2 of 2000) also gives effect to the constitutional right of the public to have access to information that is held by the State. Understandably, there is particular emphasis upon information relating to emergencies and disasters.

Key Systems

Despite the broad need to support the development of monitoring networks and frameworks, there is a clear need to ensure that BOCMA has access to key information management systems. These systems include:

- Hydstra - A commercial, off-the-shelf Hydrological Information System for the storage, editing, retrieval, manipulation and analysis of surface water, water quality and groundwater time series data and related hydrological information in support of water resources management.
- NGIS -The National Groundwater Information System is a groundwater based portfolio of applications and projects which provides data storage, web-enabled capturing (capturing released in Oct 2008) and data dissemination capabilities for groundwater related data, tools for data and information representation as well as reporting.

- WARMS - The Water Use Authorisation Registration Management System (WARMS) application solution supports the business environment with the management and administration of water use related activities and authorisations.
- WMS - The Water Management System is a computer system designed to support the water resource management function of the department with emphasis on water and environmental quality and assisting in the assessment of impacts and compliance.



The systems have different operating environments and will need to be operationalised within the CMA through differing systems and platforms. However, it is essential that DWA supports BOCMA to gain access to these systems as soon as possible.

Institutional Roles and Relationships

Over and above the legislative backdrop, it is critically important for the CMA to have a clear understanding of the institutional roles and relationships with regards to monitoring and information management, bearing in mind that this will indeed be dynamic.

Two key structures are central to this governance model, namely, the National Water Monitoring Committee and the Integrated Regional Water Monitoring Committee.

The National Water Monitoring Committee is established by DWA in order to enhance coordination and collaboration in national water monitoring.

Whilst the National Water Monitoring Committee will establish the broader frameworks and oversee implementation, for the BOCMA and the purposes of the CMS, the establishment of the Integrated Regional Water Monitoring Committee will prove more critical in terms of providing an operational interface. The purpose of this committee is to provide guidance and to ensure coordination and collaboration in the design, implementation and operation of water monitoring programs in the region and to improve effectiveness and efficiency through integration of the respective programs.

Figure 6.3. Institutional roles and relationships in the Breede-Overberg WMA

Management Objectives

With this in mind the management objectives can be described as:

- Provide sufficient data and information to improve our understanding of the hydrology and ecological functioning of the water management area.
- Develop and improve the various systems needs to be able to store and share data and information.
- Support the monitoring and information governance systems to ensure that the requirements of the water management area are met.

The Objective for monitoring and information is to:

- ❑ *Support the development and improvement of monitoring and information management networks and systems in the water management area as part of a national information management system.*

Management Actions

These actions will provide sufficient data and information to improve our understanding of the hydrology and ecological functioning of the WMA.

➤ *Action 3-E.1: Expand the water resources monitoring (and gauging) network in the Overberg*

Milestone: By 2015

Roles: DWA Hydrometry, motivated and guided by BOCMA

Steps will be taken to improve the current monitoring networks including climatic, hydrological, estuarine and river health monitoring. This will have to be done in conjunction with the DWA hydrometry team and will be linked to their business plans. Whilst sites have been identified in the Breede, initial priorities will focus upon improving monitoring in the Overberg. This will include improvement and refurbishing of current gauging as well as supplementing current networks with new monitoring sites. Importantly, estuarine monitoring will need to be prioritised and structured considering the estuarine management plans that are being developed.

➤ *Action 3-E.2: Align information management systems and governance for the WMA*

Milestone: By 2013

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

Data and information management systems will be established so that BOCMA has access to the necessary data and information it requires, and that BOCMA can support the development of national information management systems. In the first instance, the priority is to gain access to HYDSTRA, the National Groundwater Information System, and direct access to the WARMS and Water Management System systems that enable BOCMA to establish improved regulatory responses.

Action will also be taken to improve the governance of these systems by engaging with DWA and other Departments and role-players to create an aligned approach. This will mean that BOCMA will engage the current monitoring and information governance structures, as well as coordinate with the various Departments and role-players to create an aligned and coordinated approach.

6.7 ACTION 3-F: ADAPTATION AND DISASTER RISK MANAGEMENT

Background and Context

South Africa has an extremely variable climate, characterised by strong seasonal and inter-annual variability. The Breede water management area is no different and in recent years has suffered from a number of flash floods that have caused considerable damage. Prior to this the Western Cape had suffered lower than average rainfall and water resources were under considerable pressure. In addition, various studies have indicated that climate change impacts will cause the Breede water management area, over the next 30 years, to become warmer and drier, with more extreme events. For a strongly water based social economy, as is the Breede WMA, there is real need to look at how we can respond and adapt to these changing conditions. In order to do this one has to look at current adaptive capacity and then put in place mechanisms to build that capacity over time.

As the lead agent for water resource management in the Breede, BOCMA will play a central role in supporting the development of adaptive capacity and risk management strategies.

With climate variability a number of challenges emerge:

- *Rural and domestic livelihoods:* Rural communities as part of their livelihoods require access to water resources for domestic supply as well as for watering of food gardens and livestock.
- *Urban supply:* Water resource pressures impact upon the delivery of urban supplies both within already established large centres as well as the improvement of services to smaller towns and marginalised groups.
- *Water resources to support growth and development:* Increasing water stress places future developments at risk by not being able to meet assurance of supply or suitable water quality for the required use. Within this strongly agricultural economy this threat is significant. The possibly large volume of unlawful water use further that places this growth at risk. The need to improve water use efficiencies across the water management area will become imperative.

-
- *Environmental protection and sustainable use:* With increased levels of water stress the demand upon the resource will place aquatic ecosystems and key conservation sites at serious risk. Continued growth in the upper areas of the catchment will impact upon downstream sites of environmental importance and of particular concern will be the array of estuaries.

Our resilience to climate variability is essentially structured around adequate policy, legislation and strategies, institutional capacity, infrastructure development operations and maintenance, monitoring data and information availability, and the socio-economic development trajectory.

Monitoring and Trends

Whilst there have been a number of studies which portray possible climate futures, there is a need to improve the understanding of climate variability and development trends within the Breede water management area. The climatic and hydrological monitoring clearly requires improvement. In terms of response to disasters there are real time monitoring points but this network requires extension into a number of key urban areas.

In getting to grips with climate variability it is also key to understand the various development futures and trends. BOCMA will liaise with key partners including provincial and local governments, as well as the Western Cape Investment and Trade Promotion Agency (WESGRO) and organised agricultural groups.

Institutional Resilience

The policy and legislation allows for robust institutional arrangements at the local level. With forums that BOCMA will formally establish and the large number of water user associations, there is a strong local water resource management presence. These structures will be provided with information and training, on a regular basis. They will engage on operational aspects, including control and enforcement, as well aspects of planning.

Cooperative Structures

BOCMA will be well placed to coordinate with the provincial disaster management structures. The provincial Disaster Management Steering Committee provides a platform for national, provincial and local government to consult and engage on matters relating to disaster management. This committee endeavours to create alignment in approach and, through the Disaster Management Centre, response to incidents is coordinated. The BOCMA has the delegated responsibility to coordinate responses to pollution and emergency incidents (sections 19 and 20 of the National Water Act, Act 36 of 1998) within the Breede water management area and in performing this task it would have to work with national, provincial and local government departments.

Recent efforts have seen the Cape Agulhas municipality, in collaboration with the Western Cape Province, establishing an emergency contingency plan for the Overberg region. Stakeholders have been identified, including DWA and BOCMA, and their various roles in preventing disasters has formed the core of the envisaged plan. The plan will have key features, such as control, enforcement and monitoring provisions, penalties will be prescribed in cases of drought and water restriction times. The plan will also focus on developing an awareness campaign.

Management Objectives

The objectives for this sub-strategy are:

- Provide the longer term datasets and information to support our understanding of hydrological variability and adaptation responses.
- Develop adaptive capacity within our institutions.
- Create a water disaster and risk management framework for the Breede Water Management Area that supports provincial and intergovernmental structures, but enables rapid response within the Water Management Area.
- Reduce the vulnerability of communities, especially disadvantaged communities, to disasters.

The Objective for climate, adaptation and disaster risk management is to:

- ❑ *Develop and improve resilience to hydrological variability and disaster risk through an improved understanding of trends and events, their impacts upon the social economy and the necessary strategic responses.*

Management Actions

These actions will create a water disaster and risk management framework for the Breede Water Management Area that supports provincial and intergovernmental structures, but enables rapid response within the water management.

➤ **Action 3-F.1: Strengthen information acquisition and assessment related to hydrological and development (trends)**

Milestone: By 2015

Roles: BOCMA in cooperation with DWA and Provincial Government, supported by research organisations

In the first instance there is a clear need to improve climatic and hydrologic monitoring within the water management area. BOCMA in partnership with DWA Hydrometry and South African Weather Service (SAWS) will strengthen these monitoring systems. A number of real time monitoring sites exist, and this network will be improved. BOCMA will work with key partners such as Provincial and Local Government, WESGRO and others, to obtain improved information on development and growth trends. BOCMA will partner with various experts, lead agents and academic institutions to develop an informed picture of climate change trends.

➤ **Action 3-F.2: Build institutional flexibility for resilience**

Milestone: By 2014

Roles: BOCMA with DWA, Provincial Government, Local Government, WUAs

Institutional flexibility is a key part of developing resilience to climate change, and extreme events such as droughts and floods. BOCMA will build capacity in the forums, water user associations and other cooperative structures this will be done through the regular sharing of data and information, through the development of climate risk as a standard business item, and the integration of these groups and structures into the various planning regimes.

➤ **Action 3-F.3: Mainstream water and cooperate with provincial and local disaster bodies**

Milestone: By 2012

Roles: BOCMA with Provincial Government and Municipalities

Disaster management structures exist and it will be imperative for BOCMA will become an active member of these structures, including the provincial disaster management committee. From a more operational perspective BOCMA will work closely with the Disaster Management Centre in Bredasdorp.

➤ **Action 3-F.4: Assess water disaster risk and develop a WMA flood and drought strategy aligned to the national disaster management**

Milestone: By 2014

Roles: BOCMA in cooperation with DWA, Provincial Government and Local Government.

BOCMA will undertake, together with key line functions within the DWA as well as Provincial and Local Government, a disaster risk assessment. This assessment must include floods, dam safety, droughts, and pollution events, and provide special attention to vulnerable communities, as well as key environmental sites.

Following the assessment, a disaster risk reduction strategy to be developed that includes land use practices, mitigation of drought, infrastructure operations and dam safety, as well as pollution incident emergency response. An awareness and capacity building programme will underpin this.

7 Implementation Plan

7.1 IMPLEMENTING THE CATCHMENT MANAGEMENT STRATEGY

The implementation plan guides the way forward for achieving the vision of this strategy, putting forth the actions to be taken over the next five years. The implementation plan is not intended to cover all of BOCMA's day-to-day functions, but rather highlights new strategic functions, responsibilities, and initiatives for the water sector in the Breede-Overberg catchment. BOCMA's business plan describes its existing functions and initiatives, and will integrate the actions described in this strategy.

As the first strategy for the Breede-Overberg catchment, one of the critical steps that must be accomplished is the gathering of information. Many actions, particularly in the half of this strategy, focus on information gathering and assessment. This enables more action involving decision-making and water-resource management in the latter half of the strategy. It also provides the necessary foundation which will enable the second strategy to focus on water resource management for economic development and social equity, including operational improvements, progress with allocation, and beneficial use of water resources.

7.2 MATRIX OF IMPLEMENTATION ACTIVITIES

The implementation matrix below draws together the agreed upon measures, objectives, and corresponding actions that will contribute to reaching the objectives. The numbers assigned to each action are for the purposes of convenience and reference, and do not imply a priority.

Also included in the matrix is an indication of actions that link together. Many actions are closely related, or dependent on the completion of another, so these linkages must be kept in mind through the implementation process.

Milestones representing the target date for completion of each action are also provided. Meeting these milestones depends on institutional prioritization and resource availability, so the target dates may change.

Finally, the roles of responsible parties are indicated. The institutions involved include BOCMA, National, Provincial, and Local Government, and a host of other key organisations in the Breede-Overberg catchment. This strategy is for the catchment area as a whole, rather than just for BOCMA, and the success of implementation therefore relies upon the participation of a spectrum of players. Roles will be discussed in detail below the implementation matrix.

This matrix is also presented in a Gantt chart format to show the critical path forward in terms of timeframes and linkages between actions.

Strategic Area 1: Protecting for People and Nature

#	Action	Supports Action	Milestone	Implementing Party	BOCMA's Role
Strategic Measure 1-A: Preliminary Water Resource Management Class					
<i>Objectives: Preliminary management class 1 for the mountain headwater streams and the estuaries of the Breede and Overberg rivers and preliminary management class 3 for the remainder of the rivers.</i>					
1.A.1	Conduct comprehensive water resources classification for the Overberg rivers	1.B.1	By 2014 before the 2 nd CMS	DWA	Cooperative support
1.A.2	Conduct comprehensive water resources classification for the Breede River		By 2016 with the 2 nd CMS	DWA	Cooperative support
Strategic Measure 1-B: Environmental Flow Requirements					
<i>Objectives: Meet the established environmental flow requirements in rivers and estuaries.</i>					
1.B.1	Establish environmental flows Reserves for the Overberg rivers and estuaries	1.A.1	By 2014	DWA in collaboration with BOCMA, Provincial Govt, Cape Nature, and Local Govt.	Cooperative support
1.B.2	Develop and implement scheme operations that meet the Reserve in the Breede River	1.B.1	By 2016 after WAAS	DWA, in cooperation with BOCMA and WUAs	Cooperative support
Strategic Measure 1-C: Water Quality Management					
<i>Objectives: Satisfy the established limits for pathogen, nutrient, and salinity content.</i>					
1.C.1	Develop a management plan to support improved compliance in municipal waste water treatment works and systems	3.C.1	By 2012	Collaboration between BOCMA, Municipalities, Province , and DWA	Facilitate

1.C.2	Develop a prioritisation plan for industrial and agricultural sources of pollution		By 2015	BOCMA, in collaboration with DWA, WUAs, Provincial and Local Govt	Lead
Strategic Measure 1-D: Groundwater (Vulnerability) Protection					
<i>Objectives: Groundwater stress index below 65% (not highly stressed) in all quaternary catchments.</i>					
1.D.1	Develop conjunctive ground water management plans for priority Breede catchments		By 2013	BOCMA, in collaboration with DWA and WUAs	Lead
1.D.2	Develop a groundwater management plan		By 2015	BOCMA, in collaboration with DWA , WUAs and Local Govt	Lead
Strategic Measure 1-E: Natural Asset Conservation					
<i>Objectives: Priority estuaries, wetlands, instream & riparian zones and endemic fish sanctuaries are conserved (protected) in at least their present of desired ecological state.</i>					
1.E.1	Develop and implement estuary management plans	1.A.1, 1.A.2	2011 – 2015	Lead by Provincial Govt (DEADP), Cape Nature, Local and District Municipalities, supported by BOCMA and other roleplayers	Cooperate
1.E.2	Develop and implement management plans for priority wetlands	1.A.1, 1.A.2	By 2013	Cooperatively between BOCMA, Provincial Govt (Agric. & Env.), CapeNature, Land Care and conservancies	Facilitate
1.E.3	Plan & enforce instream and riparian habitat protection for priority rivers	1.A.1, 1.A.2	2015 / ongoing	BOCMA and DWA (ito NWA), in collaboration Provincial Govt (ito other legislation)	Co-Lead
1.E.4	Align alien invasive vegetation clearing plans with the Breede-Overberg priorities	1.A.1, 1.A.2, 2.B.3	2012 / ongoing	Working for Water, in cooperation with private &	Support

				landowner initiatives, supported by BOCMA, Land Care, and Municipalities	
1.E.5	Prioritise and maintain endemic fish sanctuaries and alien fish plan	1.A.1, 1.A.2	By 2013 (links to classification)	Provincial Government (DEADP and Dept. of Agric.) with CapeNature and SANBI, supported by DWA and BOCMA	Support
Strategic Measure 1-F: Catchment and Land Use Management					
<i>Objectives: Water resources considerations are mainstreamed into local land use, sector and catchment development decisions.</i>					
1.F.1	Adopt a mechanism to consider WMA-specific water resources impacts in land development		By 2013	BOCMA, in collaboration with Local Govt, supported by DWA and Provincial Govt	Lead
1.F.2	Investigate the economics of water and recommend on development priorities	1.A.2	By 2015	BOCMA through Basin Planning Development Forum	Lead

Strategic Area 2: Sharing for Equity and Development

#	Action	Supports Action	Milestone	Implementing Party	BOCMA's Role
Strategic Measure 2-A: Water Resources Assessment					
<i>Objectives: Provide updated and reliable water resources management information to support decision making and the development of the 2nd Breede-Overberg catchment management strategy.</i>					
2.A.1	Conduct verification and validation studies	1.A.1, 3.C.1, 3.C.4	Priority catchments by 2013	BOCMA, in collaboration with DWA and WUAs	Lead
2.A.2	Conduct Water Availability and Assessment Study	1.A.2, 2.C.3	Complete by 2014	DWA	Collaborator
Strategic Measure 2-B: Water Conservation and Water Demand Management					
<i>Objectives: Improve the technical efficiency of urban water use and the economic efficiency of agricultural water use (continually over the next 5 years).</i>					
2.B.1	Demand management practices as authorisation condition	2.A.2	By 2011, linked to national WC/WDM	DWA	Consultation
2.B.2	Investigate scheme / system operation for water resource conservation	2.A.2	By 2015, linked to WAAS study	DWA, in collaboration with WUAs	Collaboration
2.B.3	Implement priority alien vegetation clearing projects for water conservation		Ongoing	WFW and other implementing agents, supported by DWA	Support
2.B.4	Implement stringent urban demand management plans (through Water Services Development Plans /	2.E.2	By 2014	Local Govts, supported by DWA	Support

	Integrated Development Plans)				
Strategic Measure 2-C: Water (Supply) Availability Augmentation					
<i>Objectives: Ensure adequate availability of water at an agreed assurance of supply to supply existing and new allocations.</i>					
2.C.1	Manage / operate selected schemes for reduced assurance of irrigation supply		By 2013	DWA, in collaboration with WUA	Collaborator
2.C.2	Investigate conventional augmentation options		By 2015, following WAAS	DWA	Collaborator
2.C.3	Investigate non-conventional supply sources	2.E.2	Ongoing	DWA, in collaboration with Local Govt	Collaborator
Strategic Measure 2-D: Water Allocation Reform					
<i>Objectives: Allocate 15% of agricultural water use to emerging farmers by 2015.</i>					
2.D.1	Identify, develop and support HDI project opportunities		By 2012	BOCMA in collaboration with WUAs, DWA, DRDLR and Dept of Agriculture	Lead
2.D.2	Authorise HDI applications from water made available		Ongoing	DWA	Collaborator
2.D.3	Revise Breede Overberg WAR strategy once V&V complete		By 2013	BOCMA, in consultation with stakeholders	Lead
Strategic Measure 2-E: Water Allocation					
<i>Objectives: Authorisation of water use to meet legitimate requirements reflecting the specified allocation principles without exceeding the agreed assurance of supply or environmental flow requirements.</i>					
2.E.1	Authorise water according to CMS allocation principles		Ongoing	DWA	Collaborator

2.E.2	Plan and develop urban water supplies	2.B.4, 2.C.3	Following all towns study	DWA, in collaboration with Local Govt	Collaborator
2.E.3	Review and establish general authorisations and licence conditions in priority catchments		By 2014	BOCMA, in collaboration with DWA	Co-Lead
Strategic Measure 2-F: Climate Change Resilience					
<i>Objectives: Make robust water resources management decisions that build natural ecosystem, infrastructural and institutional resilience to climate variability and change.</i>					
2.F.1	Adapt existing climate change strategies to water resources resilience in the Breede-Overberg	3.F.1, 3.F.2, 3.F.4	By 2014	BOCMA in collaboration with WC Provincial Govt and DWA	Lead

Strategic Area 3: Cooperating for Compliance and Resilience

#	Action	Supports Action	Milestone	Implementing Party	BOCMA's Role
Strategic Measure 3-A: Institutional Arrangements and Strategic Partnerships					
<i>Objectives: Stabilise the institutional arrangements, create alignment between the various strategies and management planning tools, and to support coordinated action.</i>					
3.A.1	Foster cooperation between BOCMA and key government departments, supported by relevant delegations		By 2013	BOCMA, in cooperation with DWA and relevant National and Provincial Govt depts.	Lead
3.A.2	Develop strategic water partnerships around Local Government in the WMA		Mechanisms agreed and in place by 2012	BOCMA and District Municipalities, with Local Municipalities	Co-Lead
3.A.3	Transform irrigation boards and establish water user associations		By 2013	BOCMA and DWA, in collaboration with WUAs	Co-Lead
3.A.4	Strategically engage private sector with operations or supply chains in the WMA		By 2012	BOCMA, in collaboration with private sector	Facilitate
3.A.5	Develop networks with other basin institutions in SA, Africa and globally		Ongoing	BOCMA, with relevant institutions	Lead
Strategic Measure 3-B: Stakeholder Engagement and Communication					
<i>Objectives: Support the capacity building and empowerment of stakeholders through communications, training, projects and the active engagement in water resource management through appropriately structured platforms.</i>					
3.B.1	Develop participatory stakeholder platforms		By 2011	BOCMA	Lead

3.B.2	Maintain, expand and report on stakeholder involvement		Ongoing	BOCMA	Lead
3.B.3	Provide multi-faceted water-related communication and awareness		Ongoing	BOCMA	Lead
3.B.4	Develop targeted and structured capacity building programmes		Ongoing	BOCMA, in collaboration with DWA, Provincial Depts., Academia, NGOs	Lead
3.B.5	Support local water-related initiatives for empowerment and cooperation		Ongoing	BOCMA, in collaboration with DWA, Dept of Agric., DEADP, NGOs and CBOs	Lead

Strategic Measure 3-C: Water Use Compliance (Control and Enforcement)

Objectives: Develop in a phased and structured manner a strategic approach to water use compliance that inculcates a culture of compliance amongst water users.

3.C.1	Target enforcement of use of allocated water following the V&V analysis and management plan for municipal waste water treatment		By 2015	BOCMA and DWA Regional Office, supported by National D: CME	Lead
3.C.2	Improve and publicise the authorisation information management system		By 2015	BOCMA and DWA	Co-Lead
3.C.3	Develop a BO WMA control and enforcement strategy		By 2013	BOCMA, supported by DWA Regional Office and National D: CME	Lead
3.C.4	Develop agreements with relevant bodies to support C&E		By 2013	BOCMA, in cooperation with DWA, Provincial Depts, Cape Nature, SAPS, NPA	Lead

Strategic Measure 3-D: Financial and Economic Instruments

Objectives: Sustained and innovative financing of the CMA implementation.

3.D.1	Decentralise (and normalise) the setting and recovery of raw water tariffs		By 2013	BOCMA, in collaboration with DWA	Lead
3.D.2	Investigate, strategise and establish a WMA water-initiative Trust Fund		By 2012	BOCMA	Lead
3.D.3	Investigate economic instruments to assist water use management		By 2015	BOCMA, in collaboration with DWA	Lead

Strategic Measure 3-E: Monitoring and Information

Objectives: Support the development and improvement of monitoring and information management networks and systems in the water management area as part of a national information management system.

3.E.1	Expand the water resources monitoring (and gauging) network in the Overberg	3.F.1	By 2015	DWA Hydrometry, motivated and guided by BOCMA	Motivate
3.E.2	Align information management systems and governance for the WMA	3.F.1	By 2013	BOCMA, in collaboration with DWA, Provincial and Local Govt	Lead

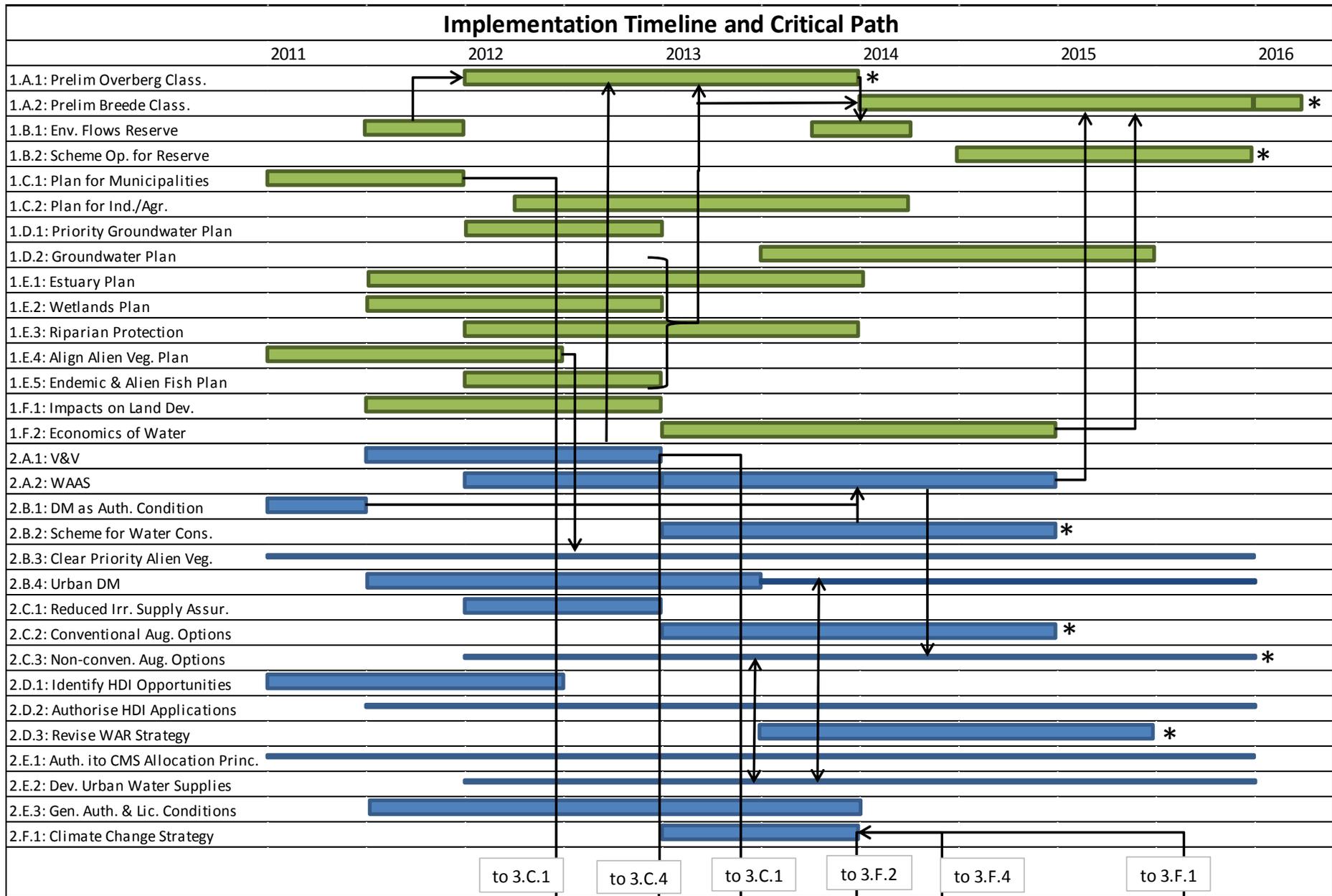
Strategic Measure 3-F: Adaptation and Disaster Risk Management

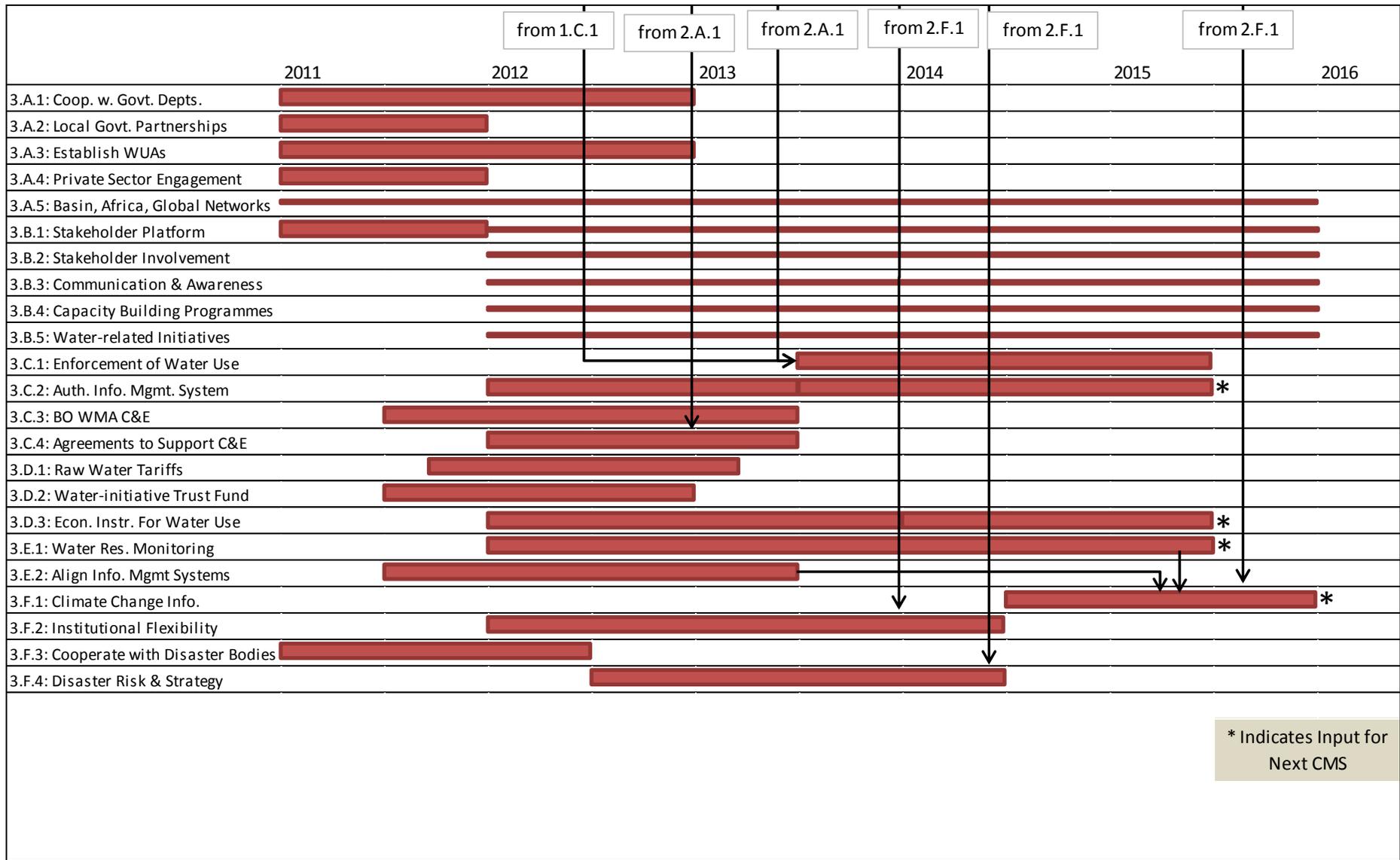
Objectives: Develop and improve resilience to hydrological variability and disaster risk through an improved understanding of these events, their impacts upon the social economy and the necessary strategic responses.

3.F.1	Strengthen information acquisition and assessment related to hydrological and development (trends)	2.F.1	By 2015	BOCMA in cooperation with DWA and Provincial Govt, supported by research orgs	Lead
3.F.2	Build institutional flexibility for resilience		By 2014	BOCMA with DWA, Provincial and Local Govt, WUAs	Co-Lead
3.F.3	Mainstream water and cooperate with provincial and local disaster bodies		By 2012	BOCMA with Provincial Govt and Municipalities	Co-Lead

3.F.4	Assess water disaster risk and develop a WMA flood and drought strategy aligned to the national disaster management		By 2014	BOCMA, in cooperation with DWA, Provincial and Local Govt	Co-Lead
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Implementation Timeline and Critical Path







7.3 TIME TO ACT

Roles and responsibilities

This CMS provides a way forward in terms of ensuring that we manage water resources in a sustainable manner to support growth and development. It recognizes that water is fundamental to growth and development. It also emphasises the interconnectedness of the various plans and actions needed to support the implementation of this strategy. Therefore, understanding roles and responsibilities becomes critical and whilst these may be obvious in some instances, there will be cases where these will develop and become clearer with time and action.

It must be noted that this strategy is a water management area strategy, and as such we are all in this together.

Breede-Overberg CMA: As the lead agent for water resource management within the Breede-Overberg WMA, BOCMA will take the lead in a number of key water resource management activities. In a number of these DWA will be a key partner. However, in a number of instances, whilst not leading actions, BOCMA will champion water resource issues within these actions. Hence, BOCMA will play a key coordination and communication role.

Moving forward some key actions include:

- Maintain ongoing participation and establish catchment forums to support coordination
- Improve the level of understanding of the water resources and water use in the water management area
- Improvement of monitoring and information management systems with DWA
- Lead the implementation of compliance monitoring and enforcement
- Champion water issue in the various and associated planning instruments to support integration

In support of these actions BOCMA must layout resource requirements in its business plans, as well as encourage and support other lead agents to find resources within their own planning processes.

Department of Water Affairs: As the custodian of the nation's water resources, DWA has a key role in supporting the progressive implementation of this strategy. As BOCMA does not have a full suite of delegated powers and duties, there are key actions that DWA must lead. There is, therefore, a requirement for DWA and BOCMA to work in a concerted manner to give effect to this strategy.

Key actions include:

- Implementation of the classification system within the Breede and Overberg
- Guide in implementing environmental flow requirements
- Completion of a water availability and assessment study
- Lead in developing possible augmentation options
- Provide guidance with aspects of water conservation and water demand management
- Give effect to water allocation and water allocation reform principles in water use authorisations
- Support the improvement of monitoring and information management systems
- Support with the various aspects of compliance monitoring and enforcement

Clearly, a number of these actions have significant resource implications and it will be critical for DWA and BOCMA to rapidly align business plans and ensure the necessary steps are taken to secure resources.

Provincial Government: Provincial Government provides the regional planning and policy domains that support sustainable growth and development. In addition, whilst supporting implementation they have a clear oversight mandate. For this strategy there is strong emphasis on BOCMA collaborating with the Departments of Environment Affairs and Planning and Agriculture with regards to various aspects of resource and natural asset conservation. Cape Nature and the Land Care programme are essential actors in this.

However, there will be a need to develop relations with the Department of Local Government in terms of supporting Local Municipalities to improve water quality management and water conservation aspects. Similarly, BOCMA and the Departments of Economic Development and Tourism, and the Premier will, with an improved understanding of the water resources, need to work more closely in ensuring that water resources in the water management area can continue to support growth and development.

Key actions in this strategy include:

- Lead and guide the development of estuarine management plans, with the support of Local Municipalities, BOCMA and other parties
- Collaboratively work with BOCMA, Cape Nature, the Land Care Programme and the various conservancies to develop and implement management plans for priority wetlands
- Support BOCMA and DWA in protecting instream and riparian habitat protection
- Prioritise and maintain endemic fish sanctuaries and alien fish management plans, supported by Cape Nature, SANBI and BOCMA.
- Collaborate with BOCMA with regards to disaster management planning and response.

Alignment of business plans and strategies in support of these actions is essential.

Local Government: Local government have a clear mandate to support local economic growth and development, and do this through their Integrated Development Planning, currently led by the District Municipalities, and the provision of a spectrum of services through Local Municipalities. Within these Local Municipalities there are various water resource impacts that need to be addressed. It is therefore, important for BOCMA to engage with these differing aspects appropriately.

A number of actions include:

- Collaborate with Provincial Government, BOCMA and DWA to develop a management plan to support improved compliance in municipal waste water treatment works and systems
- Collaborate with BOCMA and DWA to develop a prioritisation plan for industrial and agricultural sources of pollution
- Support BOCMA in the development of groundwater management plans
- Implement water demand management plans.

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- Collaborate with BOCMA and Provincial Government to construct more integrated process for land use management.
 - Implement water demand management plans

Research and Academic Institutions: Noting that water resource management and our social economy faces an uncertain future, we will need to build our capacity in order to adapt to these futures. Academic and research institutions can play a meaningful role in terms of understanding technical issues, in building capacity and providing innovative responses. Within a reasonable distance of this water management area there is access to a number of highly recognized tertiary educational institutions with associated research institutes. As this strategy is implemented these institutions must be engaged.

Private Sector: Corporate business and industry have a real interest in terms of ensuring that sound water resource management supports their ongoing development and investments in the Breede-Overberg WMA. They have a role to play in mitigating impacts and through stewardship programmes highlight the need for responsible water resource management as well as innovation. As these businesses are key components of the social economy it will be key for them and BOCMA to have constructive engagements to ensure impacts are mitigated and water resource requirements, as per authorisation, are ensured.

Non-profit organizations: These include various Non-governmental organisations and community-based organisations and have a meaningful role in ongoing water resource management. Their roles vary according to circumstance, but ranges from research and development, through to action and implementation and often includes an important communication channel and link into the societal conscience. The organizations are key partners and must play a supporting role in many aspects of this strategy.

Individuals and stakeholders: As a cornerstone of the policy and legislation, stakeholder engagement has enabled citizens to become involved in water resource management in a way that was just not previously possible. The empowerment that has taken place has resulted in a far richer and more sustainable water resource management regime. Individuals and stakeholders need to be engaged in the implementation of this strategy and whilst BOCMA will champion this, it is also incumbent on stakeholders to step up and continue to be involved. Therefore:

- Continue to participate in regional and local decision-making and governance processes through forums and other structures
- Engage with actions and projects as well as assist in monitoring , assessing , protecting , and restoring
- Build and share your understanding remembering that actions speak louder than words
- Play a leadership role in your community and champion local resource protection

Measuring and refining implementation

BOCMA will take lead responsibility in monitoring implementation. It will develop a CMS implementation scorecard every year to measure the progress of implementation, including whether

each implementing party is completing actions within the given timeframe and whether appropriate resources have been allocated.

BOCMA will determine a suitable indicator and method for monitoring progress on each action. The methods of monitoring for some actions, such as for managing water quality, are technical in nature and can be monitored through a specific measurement. BOCMA will work with the appropriate institutions to track these measures. Progress on other actions, including the collection of information or the formation of further strategies and partnerships, must be monitored through the completion of the action or evidence of progress against the action.

BOCMA will provide reporting on implementation progress to ensure that responsible parties and stakeholders are kept abreast of progress and developments. In its coordination role, BOCMA will motivate the responsible parties, assist in removing roadblocks preventing implementation and will refine the actions, timeframes, and implementing parties as appropriate.

Finally, monitoring and refining the implementation plan will naturally feed into the development of the second CMS in five years' time by informing next action, key implementing parties and necessary collaboration, and resources required.

Appendix A: Participants in the Process

<p>BOCMA Board Members</p> <p>Neil Hamman (<i>Chairperson of the Board</i>) Bongani Mnisi (<i>Deputy Chairperson of the Board</i>) Thys Delpont (<i>Chairperson: Audit and Finance Committee</i>) Odette Curtis (<i>Chairperson: Technical Committee</i>) Trevor Abrahams (<i>Chairperson: HR and Remuneration Committee</i>) Marais Roussouw (<i>Commercial Agriculture: Groundwater</i>) Cornie Swart (<i>Commercial Agriculture: Surface Water Scheme</i>) Estella Palmer (<i>Potential Agricultural Water use by emerging farmers</i>) Thabo Motshepe (<i>Access to water by the poor/Rural settlements</i>) Bulelwa Damane (<i>Civil Society</i>) Anthony Barnes (<i>Provincial Government of the Western Cape: IEM</i>) John Roberts (<i>DWA Regional Office</i>)</p> <p>Steering Committee Members</p> <p>Phakamani Buthelezi (<i>BOCMA CEO</i>) Neil Hamman (<i>Governing Board: CEO</i>) Bongani Mnisi (<i>Governing Board</i>) Jannie van Staden (<i>BOCMA Water Resource Management</i>) Thys Delpont (<i>Governing Board</i>) Trevor Abrahams (<i>Governing Board</i>) Cornie Swart (<i>Governing Board</i>) Marais Roussouw (<i>Governing Board</i>) Odette Curtis (<i>Governing Board</i>) Eustathia Bofilatos (<i>DWA: Institutional Oversight</i>) Elmarie van Rooyen (<i>DWA: Institutional Oversight</i>) Ashia Petersen (<i>DWA: Western Cape</i>) Isa Thompson (<i>DWA National Water Resource Planning</i>) Gerrit van Zyl (<i>DWA National Water Resource Planning-PSP Support</i>) Matho Gwala (<i>DWA: Policy and Strategy Coordination</i>) Tandi Zokufa (<i>DWA Information Systems</i>) Guy Pegram (<i>Project Team</i>) Marcia Gouws (<i>Project Team</i>)</p>	<p>BOCMA Team</p> <p>Phakamani Buthelezi Jan van Staden Elkerine Roussouw Samantha Adey Khuthala Sizani</p> <p>Consultant Project Team</p> <p>Pegasys</p> <p>Guy Pegram Derek Weston Constantin von der Heyden Marcia Gouws Ross Esson Gugu Mazibuko Elizabeth Hastings</p> <p>Aurecon</p> <p>Mike Killick Karen Versfeld Nico Rossouw Louise Dobinson</p> <p>Wateright</p> <p>Willie Enright</p> <p>Informage</p> <p>Nic Wullschleger Gisela Wullschleger Gisela Simpson</p> <p>Milkwood</p> <p>Bea Whittaker</p> <p>Southern Waters</p> <p>Cate Brown</p>
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Appendix B: References

This CMS has been based upon various sources of information some of which are unpublished internal Department of Water Affairs documents, as well as documents from various studies that are still in development and are being finalised.

Key sources of information that are readily available include:

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Department of Water Affairs and Forestry. 2003. Breede River Basin Study. *Ecological Reserve Determination for Six Representative Sites Using the Building Block Methodology*. Prepared by C A Brown and D Louw. DWAF Report No. PH 00/00/1302

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River Health Programme. 2006. Ecological State of Rivers of the Overberg Region. Supported by Department of Water Affairs and Forestry, Department of Environment and Tourism, Cape Nature, CSIR and the Water Research Commission.

Important information was also obtained from three Department of Water Affairs projects that were in progress. These were:

- The All-Town Study for the Western Cape
- Upgraded Comprehensive Reserve Determination for the Breede River
- Western Cape Water Supply Reconciliation Strategy

A number of working papers and internal studies were performed during the course of the CMS development. These documents will be finalised so that the final strategy contains a complete list of these studies.