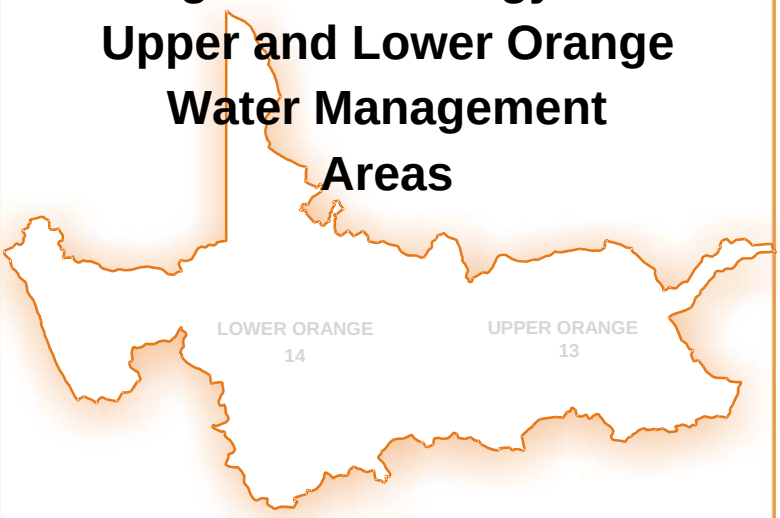
Water Resource Planning Systems

Water Quality Planning

Development of an Integrated Water Quality Management Strategy for the Upper and Lower Orange Water Management Areas



Catchment Visioning: Upper Orange Water Management Area (WMA 13)

Report No:. 4.1
(P RSA D000/00/7909/4)

February 2009

Edition 1

water & forestry
Department:
Water Affairs & Forestry
REPUBLIC OF SOUTH AFRICA

Published by

Department of Water Affairs and Forestry
Private Bag X313
PRETORIA, 0001
Republic of South Africa

Tel: (012) 336 7500/ +27 12 336 7500
Fax: (012) 336 6731

This report should be cited as:

Department of Water Affairs and Forestry, 2009. Catchment Visioning: Upper Orange Water Management Area. Water Resource Planning Systems: Water Quality Planning. Edition 1. Pretoria

DOCUMENT INDEX

Reports as part of this project:

REPORT NUMBER	REPORT TITLE
1*	Overview: Overarching Catchment Context: Upper and Lower Orange Water Management Areas (WMAs 13 and 14)
2.1*	Desktop Catchment Assessment Study: Upper Orange Water Management Area (WMA 13)
2.2*	Desktop Catchment Assessment Study: Lower Orange Water Management Area (WMA 14)
3**	Water Quality Monitoring and Status Quo: Upper and Lower Orange Water Management Areas (WMAs 13 and 14)
4.1*	Catchment Visioning: Upper Orange Water Management Area (WMA 13)
4.2*	Catchment Visioning: Lower Orange Water Management Area (WMA 14)
5**	Resource Water Quality Objectives (RWQOs): Upper and Lower Orange Water Management Areas (WMAs 13 and 14)
6**	Towards A Monitoring programme: Upper and Lower Orange Water Management Areas (WMAs 13 and 14)

* Reports produced by the Directorate, Water Resource Planning Systems, Sub-Directorate Water Quality Planning as part of the study titled *"Development of an Integrated Water Quality Management Strategy for the Upper and Lower Orange River Water Management Areas".*

** Reports produced by Zitholele Consulting on behalf of the Department of Water Affairs and Forestry as part of the study titled *"Assessment of Water Quality Data Requirements for Water Quality Planning Purposes in the Upper and Lower Orange Water Management Areas".*

APPROVAL

TITLE:	Catchment Visioning: Upper Orange Water Management Area
DATE:	February 2009
AUTHOR:	Retha Stassen
REVIEWER:	Jurgo van Wyk, Samantha Boshoff
FORMAT:	MSWord and Portable Document Format (pdf)

Approved for the Department of Water Affairs and Forestry by:

Mr Jurgo van Wyk
Assistant Director: Water Quality Planning: Central Planning Cluster

Mr Pieter Viljoen
Deputy Director: Water Resource Planning Systems: Water Quality Planning

Bongiwe Msane
Director: Water Regulation and Use
Free State Regional Office

'Vision without action constitutes a day dream. Action without vision constitutes a nightmare.'

EXECUTIVE SUMMARY

Introduction

The approach followed to determine visions for the Upper Orange Water Management Area (UOWMA) is described in this document. The visioning process that was followed is described in detail in documentation developed as part of the resource directed management of water quality series of approaches as developed by the Department of Water Affairs and Forestry (DWAF) during 2006.

The visioning process provides the opportunity for stakeholders to participate in developing a vision that will guide managers to ensure that the water resources of the UOWMA is managed to promote sustainability.

Visioning process

The visioning process aims to determine a desired future state of the water resources as well as the associated goods and services provided by the resource in a specific area by defining levels of protection and use. Three distinct phases, each consisting of a number of steps, are included in the process, namely (1) preparation, (2) generating a vision and (3) translating the vision into objectives.

Visioning workshops

The preparation phase for the visioning was done prior to the three visioning workshops that were held with identified stakeholders in the UOWMA during November 2008 and January 2009 to develop visions. The steps followed were:

1. **Select and prioritize geographical areas**: The UOWMA was divided into three smaller, homogeneous areas for the purpose of developing the visions based on ecological considerations, man-made divisions such as large dams and logistical practicalities. Three visioning areas were identified, namely (i) Orange River from Lesotho border to Gariep Dam, including the Kraai River, Sterkspruit, Kornetspruit and Stormbergespruit; (ii) Orange River from Gariep Dam to Marksdrift Weir, including the Seekoei River and (iii) Caledon River and its tributaries.

2. **Preparation of material**: Collection of available baseline material from previous study reports to get a general description of the catchment and its water resources, water users, interest groups and the goods and services provided by the water resources.

3. **Setting up of the visioning workshops**: A workshop per visioning area has been organized with the identified stakeholders and interested persons. These were mainly from DWAF regional offices, other national government departments, local and district municipalities, water user associations, irrigation boards, farmer associations, mining representatives and nature and conservation enthusiasts. The workshops were held per visioning area, namely (i) Aliwal North, (ii) Vanderkloof and (iii) Ficksburg.

4. **Find and consider an existing vision**: The purpose of this step is to find any existing vision that could be used during the visioning workshops. No applicable existing visions were available for the UOWMA. It was therefore proposed that the vision as developed for the Lower Orange Water Management Area be used as a start and modified during the visioning workshops.

The generation of the vision is done during the visioning workshops with the stakeholders, following steps 5 to 7.

5. **Agree on guiding principles**: These principles as identified during the visioning workshops will guide the planning, decision making and management of the water resources towards the desired state. The guiding principles per visioning area are:

Visioning Area 1:

- Protection of the aquatic ecosystems, especially the Kraai River
- Institutional efficiency through service delivery and institutional operation
- Engagement of stakeholders and active participation of all
- Supporting of initiatives to grow the tourism in the area

Visioning Area 2:

- Protection of the aquatic ecosystems
- Institutional efficiency through service delivery and institutional operation
- Beneficial use of water
- Awareness and appreciation of the scarce water resources

Visioning Area 3:

- Protection of the aquatic ecosystems, especially the Kraai River.
- Institutional efficiency through service delivery and institutional operation.
- Engagement of stakeholders and active participation of all
- Following best practices eco-tourism initiatives and water supply to other users
- Eco-tourism potential of this area
- International liaison

6. **Generation of a collective catchment context**: A shared understanding of the present state of the water resources as well as the societal values provides the context for the generation of the vision. Agriculture, mainly the planting of pastures, wheat and maize as well as stock farming, conservation, tourism and recreation are important in all three the visioning areas. The water quality in the UOWMA is good with only localized nutrient enrichment occurring.

7. **Formulate a vision**: The information collected, catchment context and guiding principles are used during the formulation of the vision. The visions for the three visioning areas are:

Visioning Area 1:

To strive to ensure good quality water that is fit for use to protect biodiversity and aquatic ecosystems to sustain economic development and should include:

- *Water resources used by local government and irrigators;*
- *Careful considerations given to the Reserve requirements, especially in ecological sensitive areas;*
- *Collaboration and cooperation through active participation of DWAF, local authorities, interest groups and across the border for efficient water resource management;*
- *Addressing the erosion and sedimentation problems; and*
- *Unlocking the eco-tourism potential of the region.*

Visioning Area 2:

To contribute to an awareness of the scarcity and value of water to use water sustainably and conservatively to the benefit of all users and the protection of the aquatic ecosystems through:

- *The maintenance of good quality water;*
- *Efficient operation of infrastructure and management of the water resources;*
- *Accountability amongst stakeholders, institutions and government sectors; and*
- *Consideration, integration and communication with downstream users.*

Visioning Area 3:

To promote the use of water by all users in the catchment according to best practices and adequate protection of the aquatic ecosystems for economic development, especially for the realization of the eco-tourism potential of the catchment through:

- *Active participation and stakeholder involvement;*
- *International liaison with representatives from Lesotho; and*
- *Institutional efficiency and service delivery.*

The final phase of the visioning process is to define objectives to ensure that the desired state of the water resources is obtained.

8. **Define the strengths of the system**: These are the positive characteristics of the system that should be managed to ensure that the desired stated is maintained and can be ecological, legal, socio-economic or scientific. The main strengths for the UOWMA are the drive for social upliftment and the beneficial use of water while promoting agriculture and eco-tourism in the area and to maintain the present state of the water resources.

9. **Evaluate strengths of the system**: The strengths of the system are evaluated by considering the constraints of the system as these are the main threats for not realizing the vision. The main constraints for the UOWMA are the lack of funds of the local and district municipalities for the upgrading of waste water treatment plants, operation of the existing infrastructure and enforcement of legal frameworks. Information availability on the water resources of the UOWMA is also a constraint.

10. **Determinants of the constraints and threats of the strengths**: These provide the necessary input to determine the objectives for the management of the system to realize the vision.

11. **Define the objectives hierarchy**: The objectives hierarchy provides a systematic break down of the vision into key elements and goals to identify the main objectives to maintain the strengths of the system by overcoming the constraints and threats.

.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

DME	Department of Mineral and Energy Affairs
DTEEA	Department of Tourism, Environment, Economics and Agriculture
DWAF	Department of Water Affairs and Forestry
GIS	Geographic Information Systems
ISP	Internal Strategic Perspective
NWRP	National Water Resource Planning
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NWRS	National Water Resource Strategy
UOWMA	Upper Orange Water Management Area
WMA	Water Management Area
WQP	Water Quality Planning
WWTW	Waste Water Treatment Works
WRPS	Water Resource Planning Systems

1. INTRODUCTION

The constitution of the Republic of South Africa (1996) aims to promote sustainability where social, ecological and economic development are considered to be equally important. This provides the right for South Africans to be involved in issues regarding water resource management that affect them. The National Water Policy (1997) and National Water Act, 1998 (Act No. 36 of 1998) (NWA) were promulgated to ensure that the nations' water resources are protected, used, developed, conserved, managed and controlled in an equitable and efficient way to enable the sustainability.

Resource Directed Management of Water Quality is a specific approach that was developed by the Department of Water Affairs and Forestry to ensure the sustainable allocation of the water resources, and more specifically for water quality. Part of the approach includes the development of a process to undertake catchment visioning and to disaggregate the vision into specific measurable objectives (DWAF, 2006). Catchment visioning is an iterative process and provides a collective statement of the desired state of the catchment and a strategy how to realize the vision through the setting of Resource Water Quality Objectives.

The visioning process involves multiple stakeholders from the beginning in the strategic planning process of water resource management. It aims to achieve the following (DWAF, 2006):

- Generate a sense of cohesion and common purpose amongst stakeholders with diverse interests in the water resource. This includes providing a culture of co-operation and consensus-building.
- Direct activities towards a common purpose.
- Continuously improve water resource management practices and the state of the resource.
- Provide a chain of accountability, linking the vision to management objectives and management actions.
- Provide clusters of objectives that allow operational managers to strategically interpret license applications and to formulate and recommend license conditions.

2. THE VISIONING PROCESS

The visioning process provides stakeholders a means to voice their desired future state of the water resource as well as the associated goods and services provided by the resource. This involves defining the appropriate levels of protection and use that will provide these goods and services.

Notably, the visioning process is iterative as shown in **Figure 1**, which increases in confidence and acceptability as the degree of stakeholder engagement increases, as the strengths and weaknesses of a vision are refined, and as more data are collected.

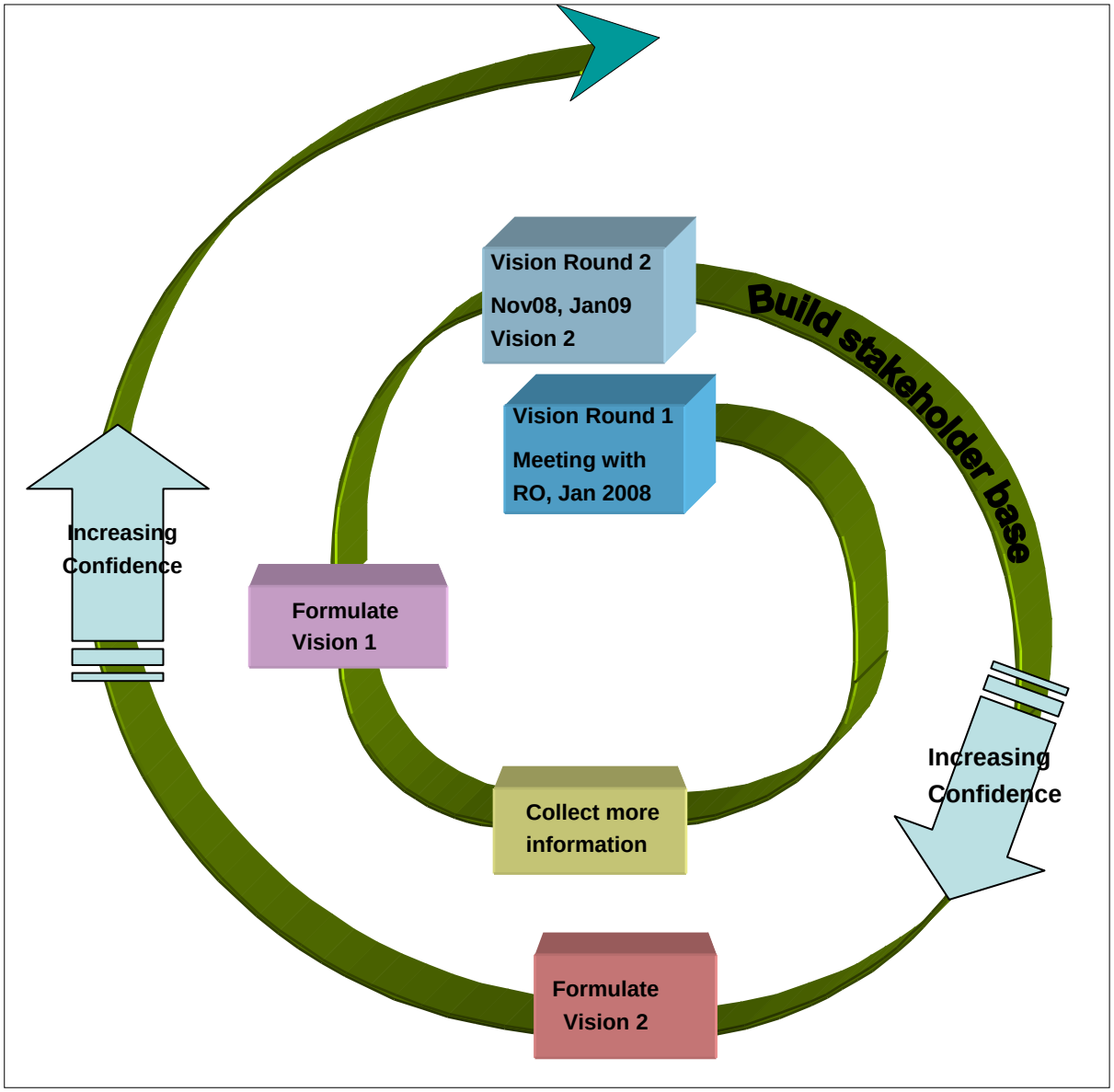


Figure 1: The relationship between different rounds of visioning. The degree of confidence and acceptability increases as more information becomes available

The visioning process includes three distinct phases, namely: (1) preparation, (2) generating a vision, and (3) translating the vision into objectives with a number of steps per phase as summarized in **Figure 2**. This process was followed for the Upper Orange WMA during workshops held with stakeholders in November 2008 and January 2009.

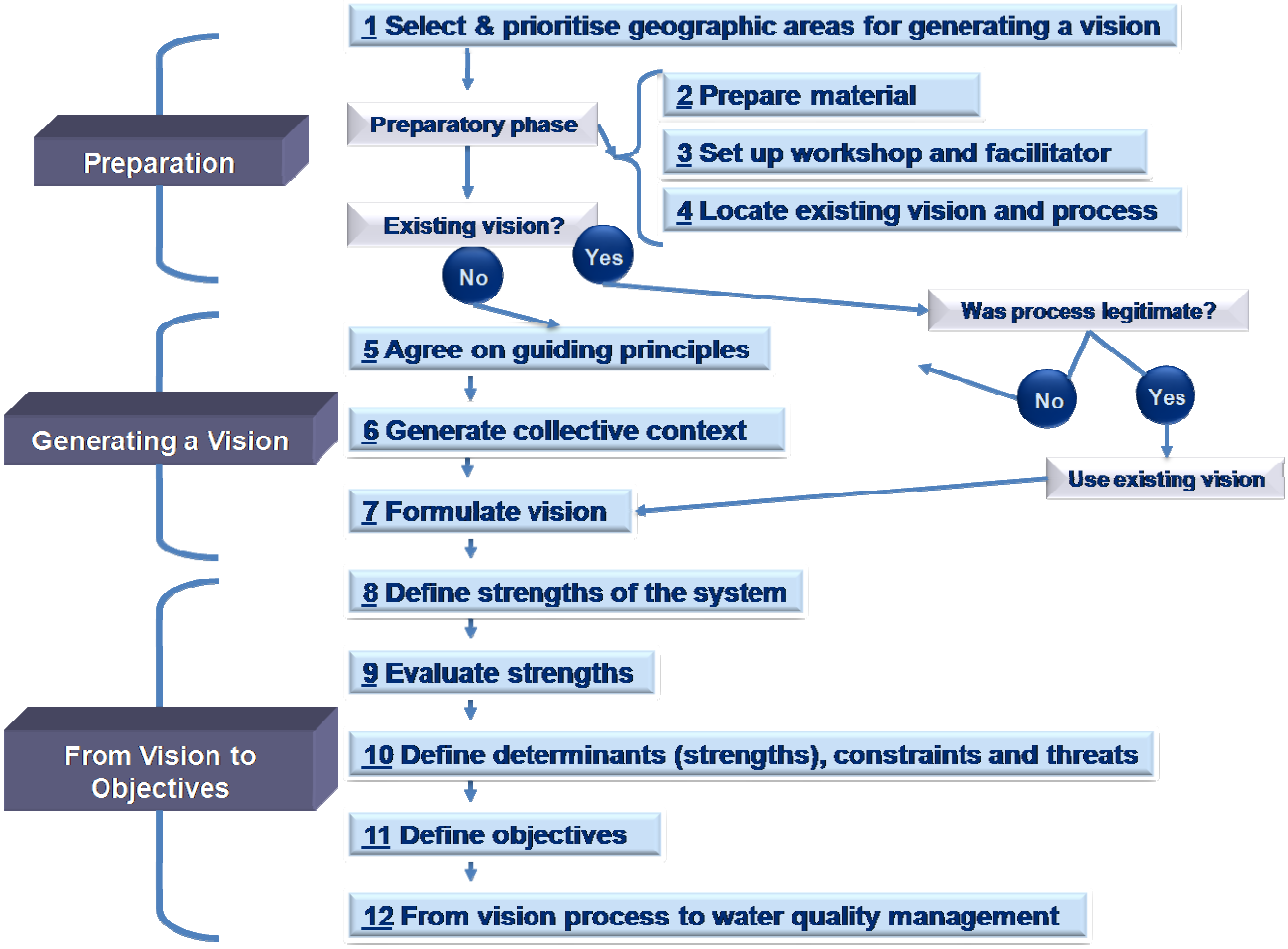


Figure 2: Twelve step process to conducting a visioning process

2.1 Select and prioritise geographical areas for generating visions

The purpose of this step was to divide the larger UOWMA into smaller, more homogeneous visioning areas. This is to ensure that the vision captures the diversity of interests of the stakeholders in a specific area that may not relate to the entire UOWMA, e.g. the conservation of the Kraai River.

The Orange and Caledon Rivers form the main rivers in the Upper Orange WMA (UOWMA), with a number of smaller tributaries. The main tributaries of the upper Orange River are the Kraai, Sterkspruit, Kornetspruit, Stormberge and Seekoei. The Little Caledon, Grootspruit, Moperi, Meulspruit, Leeu and Skulpspruit are the main tributaries contributing to the flow in the Caledon River.

A number of large dams are situated in the catchment, namely Gariep and Vanderkloof dams on the Orange River and Welbedacht Dam on the Caledon River. Water is also transferred from the Caledon River to the off-channel Knellpoort Dam for domestic water supply to Bloemfontein. A number of towns in the catchment are dependant on water from the rivers, namely Clarens, Fouriesburg, Ficksburg, Ladybrand, Maseru, Hershell, Aliwal North, Burgersdorp and Vanderkloof to mention a few. Some of these towns' domestic requirements are also supplied from groundwater.

Agriculture is a major activity in the catchment and mostly concentrated within close proximity of the rivers. Leeuspruit Irrigation Board with Armenia, Newbury and Egmont dams is the only formal irrigation board in the catchment. A number of farmers associations have been formed in the various sub-catchments. Stock farming, mainly sheep and cattle are also a major activity throughout the UOWMA.

Recreational use of the water resources are mainly on the major dams and the main stem Orange River such as canoeing, fishing, birding and white water rafting.

The UOWMA was divided into three sub-catchments (visioning areas) for the purpose to formulate the visions during the visioning process. These proposed areas were discussed with the Free State Regional Office during a meeting in January 2008 as well as during the stakeholder workshops in November 2008 and January 2009. The following criteria were used as general guidelines for generating the visioning areas:

- Homogenous resource units
- **Ecological considerations**
- Resource users and uses
- **Man-made divisions, such as dams or weirs**
- Natural divisions, such as waterfalls
- The size of the sub-catchments
- **Logistical practicality**

The criteria in bold indicates the main considerations for the selection of the three visioning areas. The three visioning areas are:

[Area 1] Orange River from Lesotho border to Gariep Dam, including the Kraai River, Sterkspruit (Herschell) and Stormbergespruit and consist of tertiary catchments D12, D13, D14, D15 and D35.

[Area 2] Orange River from Gariep Dam to Marksdrift Weir, including the Seekoei River. The tertiary catchments are D31, D32, D33 and D34.

[Area 3] Caledon River and its tributaries, consisting of tertiary catchments D21, D22, D23 and D24.

Due to the good present ecological state of the Kraai River catchment (tertiary catchment D13), it was proposed that it should form a separate visioning area. However, for the purposes of the first round of visioning, it was included in Visioning Area 1, but it will be highlighted as a unique area within the larger visioning area.

The focus of the visioning areas is on the surface water resources of the UOWMA, but groundwater was taken into consideration, especially where specific towns or agricultural areas are dependant on groundwater.

Lesotho also forms part of the drainage area of the Orange and Caledon Rivers. It was however, decided to not include these drainage regions in Lesotho for the first round of visioning.

Quaternary catchments and rivers draining these areas were used to demarcate the provisional visioning areas with the aid of Geographic Information Systems (GIS) as shown in **Figure 3**.

2.2 Prepare material

This step entails collecting all available baseline material, such as previous catchment assessment reports, water resources situation assessment reports, Internal Strategic Perspectives (ISP), Reserve determination reports, State-of-Rivers reports and any other relevant documentation for the catchment. Information from other, overarching or higher level planning documents can also be used where applicable (Integrated Development Plans, Water Services Development Plans, Land Development Objectives and the National Spatial Development Perspective).

Information collated from these reports was summarized in terms of:

- General description of the catchment (vegetation types, topography, conservation areas);
- Description of the water resources (rivers, dams, weirs, major wetlands);
- Water users (agriculture, domestic, industrial);
- Interest groups (irrigation boards, municipalities, water user associations, tourism); and
- Water resource goods and services (recreation, state of the resource)

This information was presented as a baseline at the various visioning workshops and additional information were requested from the stakeholders. The stakeholders provided some specific information as to their needs of the water resource that is not always available in reports.

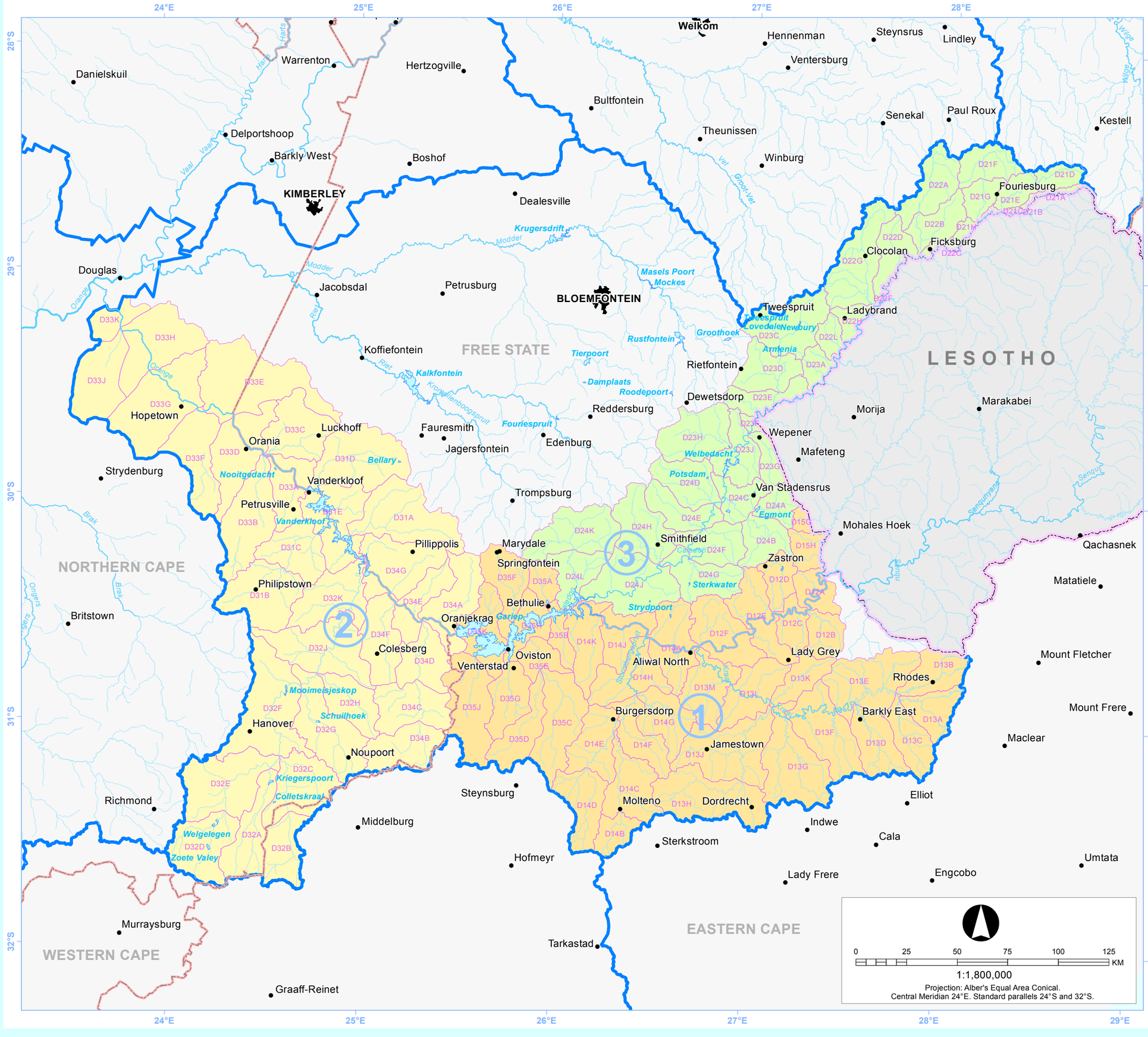
2.3 Set up workshop and facilitator

The purpose of this step is to set up a workshop, identify individuals to participate and to identify and involve an appropriate facilitator. Three workshops were held; one in each identified visioning area and was attended by representatives from various organizations and interest groups with DWAF facilitating the process. **Table 1** summarises the details of the workshop and the main interest groups that were invited. Signed registers of attendees are attached as **Appendix A**.

For each of the workshops, care was taken to avoid a bias towards one water use and to invite key stakeholders representing the diverse perspectives in the catchment. These included the DWAF regional offices, local and district municipalities, water user associations, water and/or irrigation boards, farmer associations/unions, mining representatives and nature and conservation enthusiasts. All attempts were made to include specific stakeholders from a particular area, e.g. water rafting groups, boat clubs, etc. **Figures 4 - 6** are photos taken at the visioning workshops.

It was decided that representatives from Lesotho will be invited to the next round of visioning as this is the first time that any visioning process has been undertaken in the UOWMA. The output of this vision will provide specific issues that need to be discussed with water resource managers in Lesotho. However, one representative from Lesotho attended the Caledon visioning workshop and provided useful information on the water use of the tributaries of the Caledon River in Lesotho.

FIGURE 3
WMA 13 : UPPER ORANGE
Visioning Areas



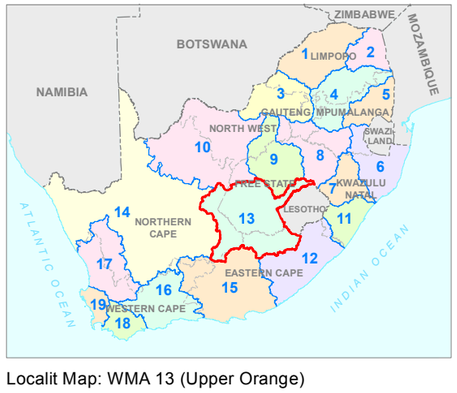
LEGEND

- Major City / Town
- Town
- Dam
- River
- Quaternary Drainage Region
- Water Management Areas
- Provincial Boundary
- International Boundary

Visioning Areas

1. Visioning Area 1 [Lesotho to Gariep]
2. Visioning Area 2 [Gariep to Vaal Confluence]
3. Visioning Area 3 [Caledon and tributaries]

Data sources:
Department: Land Affairs, Chief Directorate: Surveys and Mapping
(Towns, Rivers, Dams and International Boundaries)
Municipal Demarcation Board (Provincial Boundaries)
Department: Water Affairs & Forestry
(Water Management Areas and Drainage Boundaries)



Localit Map: WMA 13 (Upper Orange)

Map produced by:
Department: Water Affairs and Forestry,
Directorate: Spatial & Land Information Management
June 2009 (Ref: GM09_080)

Table 1: Summary of visioning workshops conducted

Visioning area	Place	Date	Organisations invited
1	Aliwal North	13 November 2008	• DWAF: WRPS • DWAF: NWRP • DWAF: Free State Regional Office • DWAF: Eastern Cape Regional Office • Breakaway Trials (rafting) • DTEEA • Maletswai, Senqu, Gariep Municipalities • Eskom • Bloemwater • Barkly Oos Agricultural Union • Barkly Oos Farmers Association • Bell River Farmers Association • Rhodes Agricultural Union
2	Vanderkloof	14 November 2008	• DWAF: WRPS • DWAF: NWRP • DWAF: Free State Regional Office • DWAF: Vanderkloof Dam • DTEEA: Environment • Eskom • Vanderkloof Boat Club • Bloemwater • University of Free State • Thembelihle, Letsemeng, Orania Municipalities • Vanderkloof Farmers Association
3	Ficksburg	20 January 2009	• DWAF: WRPS • DWAF: NWRP • DWAF: Free State Regional Office • DTEEA • Bloemwater • Dihlabeng, Setsoto, Mantsopa Municipalities • Lesotho – Letseng Diamonds • Leeuspruit Irrigation Board • Vrystaatse Watersake • Oewerbesproeiings kommittee

Figure 4: Visioning workshop in Area 1, hosted in Aliwal North on 13 November 2008

Figure 5: Visioning workshop in Area 2, hosted at Vanderkloof on 14 November 2008

Figure 6: Visioning workshop in Area 3, hosted in Ficksburg on 20 January 2009

2.4 Find and consider an existing vision

The purpose of this step is to locate any existing visions that are relevant to the water resources in the visioning area, including visions formulated at different levels of detail or slightly different focus within the catchment. This vision can then be used as a start and be modified by the workshop participants. However, care should be taken that the stakeholders don't use the existing vision without any changes to reflect their own needs and requirements of the water resources or that the use of an existing vision leads to no buy-in from the stakeholders.

No existing vision that would be applicable could be found for any of the visioning areas. This is mainly due to the fact that DWAF hasn't established any user forums in the catchment and the forming of the Catchment Management Agency for the UOWMA is only scheduled to start at a later stage. It was proposed that the vision as developed for the Lower Orange WMA be used as a start and then be modified to reflect the needs and requirements per visioning area in the UOWMA. The preliminary vision that was formulated and modified was:

"To ensure that the watercourse remains a reliable source of water of acceptable quality, and that it supports a healthy environment, through interactive stakeholder participation."

2.5 Agree on guiding principles

This is an important step in the visioning process as it identifies the principles that will guide planning, decision making and management towards the desired state of the water resources. The principles or core values of the stakeholders will be used at a later step in the visioning process to determine the main objectives for the area. These objectives will assist to ensure the desired state is realized.

The guiding principles as they were agreed upon by the stakeholders during the visioning workshops are described below:

AREA 1 WORKSHOP:
The main considerations to determine the guiding principles were the protection of the Kraai River as an unique system as well as other ecological sensitive hotspots, including the source of the Stormbergespruit by DTEEA; the potential growth in agriculture through changes to higher value crops; improved stakeholder involvement, including representatives from the Eastern Cape Province; tourism initiatives in the area, especially the Lake Gariep initiative of DTEEA and considerations of the water quality impacts from local municipalities with ineffective Waste Water Treatment Works (WWTW). The main principles for Visioning Area 1 are summarized in **Table 2**.

AREA 2 WORKSHOP:
Visioning Area 2 is a sparsely populated area with the impacts not as significant as in other areas. Localized impacts occur in the vicinity of towns and other developments. The main considerations for this area are to maintain the status quo in terms of the current protection of the water resources; to ensure that the users in the area are responsible and accountable when using the water resources by taking downstream users into account and to improve the water quality impacts from local municipalities. **Table 2** summarizes the main guiding principles.

AREA 3 WORKSHOP:
The Caledon River and its tributaries is a diverse catchment in terms of the various economic sectors and the sharing of the main river with Lesotho.

Thus, the main considerations for the guiding principles are the international liaison with Lesotho, especially in terms of land use and the sub-sequent erosion problems; protection of the water resources, specifically the wetlands in Lesotho; ensure best practices or beneficial use of water that takes development as well as eco-tourism and conservation into account; efficient service delivery and effective stakeholder participation. These are summarized in **Table 2**.

It should be noted that the order of steps in the proposed visioning process were changed in visioning areas 2 and 3. The following were changed:

- Step 5 (agree on guiding principles) were moved to after step 10 (define determinants of strengths, constraints and threats); and
- Step 7 (formulate vision) followed after the agreement on guiding principles.

It was found that the change in order of the steps gave a better flow to the visioning process as most of the information required for the guiding principles and formulation of the vision is generated during steps 6, 8, 9 and 10. This report follows the original sequence of the steps as in **Figure 2**.

Table 2: Guiding principles per visioning area

Visioning Area 1	Visioning Area 2	Visioning Area 3
Protection: Healthy aquatic ecosystems – improve and ensure no further degradation in the upper reaches of the tributaries and the riverine vegetation of the main stem Orange River	**Protection:** Healthy aquatic ecosystem – improve and ensure no further degradation	**Protection:** Healthy aquatic ecosystem – improve and ensure no further degradation, especially the wetlands in Lesotho
Institutional efficiency: Service delivery and institutional operation, sufficient skills base, integration and accountability are some of the main considerations	**Institutional efficiency:** Service delivery and institutional operation, sufficient skills base, integration and accountability are some of the main considerations	**Institutional efficiency:** Service delivery and institutional operation, sufficient skills base and accountability are some of the main considerations
Stakeholder engagement: Active participation, compulsory and legitimate representation of all stakeholders, including the Eastern Cape Province	**Beneficial use of water:** Eco-tourism and conservation initiatives are important for the area, and should be balanced with the power generation at Gariep and Vanderkloof Dams for the country.	**Stakeholder engagement:** Active participation and representation of all stakeholders, including Lesotho
Tourism growth: Support for the various initiatives by DTEEA to grow the tourism and conservation sectors in the area	**Awareness and appreciation:** Understanding that South Africa is water scarce and to use the water sustainable, conserve, educate from a young age	**Best practices:** Eco-tourism and conservation of the water resources and equitable water supply to agriculture and domestic users, including groundwater and surface water
		Eco-tourism: Southern part of the Free State is seen as key for tourism potential
		International liaison: Between South Africa and Lesotho

As can be seen from **Table 2**, protection and institutional efficiency are seen as key guiding principles for all three visioning areas. Tourism and conservation is also an important consideration for the UOWMA. This is specifically linked to the various initiatives that are currently being considered by the DTEEA. All of these above requires active stakeholder participation and liaison between the various government departments and ultimately with Lesotho.

2.6 Generate collective catchment context

This step generates a shared understanding of the present state of the catchment, its water resources and the goods and services delivered by the water resources. The understanding of the present state of the catchment as well as the societal values provides the context for the development of the vision.

The information as gathered in step 2 of the visioning process is used as a baseline for discussions with the stakeholders. Stakeholders are encouraged to add any additional information to describe the water resources, the impacts, specific issues related to the catchment to formulate the context of the catchment. Additional interest groups that should be approached for input should also be identified during this step.

Table 3 provides a short summary of the information available and gathered during the workshops per visioning area. The characteristics for the areas were sourced from the existing Internal Strategic Perspective documents as prepared by DWAF. The details on the land use activities were mostly obtained from the stakeholders at the workshops.

Table 3: Visioning area information

Visioning Area 1	Visioning Area 2	Visioning Area 3
Catchment characteristics:		
Main rivers: Orange main stem, Kraai River, Stormbergespruit, Sterkspruit and Kornetspruit	**Main rivers:** Orange main stem and Seekoei River	**Main rivers:** Caledon River and its main tributaries, namely Little Caledon, Grootspruit, Meulspruit, Moperi, Leeuspruit, Sandspruit and Skulpspruit
This area lies within the Eastern Cape, Northern Cape and Free State provinces and borders with Lesotho	Lies mainly within the Free State and Northern Cape provinces	The Caledon River catchment falls within the Free State province and also forms the border with Lesotho

Visioning Area 1	Visioning Area 2	Visioning Area 3
Mean Annual Precipitation Ranges from 1 000mm in the Barkly East/Rhodes area to 500mm at Gariep Dam **Natural Mean Annual Runoff** 956 million m^3	**Mean Annual Precipitation** Ranges from 400mm at Gariep Dam to 200mm at the confluence with the Vaal River **Natural Mean Annual Runoff** 203 million m^3	**Mean Annual Precipitation** Ranges from well in excess of 800mm at Golden Gate National Park to 400mm upstream of Gariep Dam **Natural Mean Annual Runoff** 650 million m^3
Water requirements:		
Towns and rural Rhodes, Barkly East, Hershell, Aliwal North, Burgersdorp, Bethulie, Springfontein, Venterstad, Jamestown, Molteno **Irrigation** Maize, wheat, cabbage, potatoes, lucern, pastures **Other** Cattle, sheep and game farming Game bird hunting	**Towns and rural** Colesberg, Norvalspont, Philippolis, Hopetown, Vanderkloof, Petrusville, Hanover, Noupoort, Gariep, Orania, Koffiefontein, Jacobsdal, Luckhoff **Irrigation** Maize, wheat, lucern, pecan nuts, soya, vegetables **Other** Cattle and sheep farming Feedlots along Orange River (Dielande) Diamond mining at Koffiefontein, between Hopetown and Douglas along Orange River Proposed bio-diesel project using algae	**Towns and rural** Clarens, Fouriesburg, Ladybrand, Wepener, Maseru, Thaba Patchoa, Hobhouse, Smithfield, Ficksburg, Clocolan, Rouxville, Vanstadensrus **Irrigation** Asparagus, cherries, maize, wheat, lucern, other fruit and vegetables, pastures **Other** Mostly cattle farming
Major Dams, weirs, other schemes:		
Gariep Dam, Jozanna's Hoek Dam Gariep hydro power scheme	Vanderkloof Dam Vanderkloof hydro power scheme	Welbedacht, Egmont, Newbury, Armenia, Meulspruit and Moperi dams
Transfers:		
From Gariep Dam to Fish River at Oviston	From Orange River to Riet River at Marksdrift	From Welbedacht Dam to Knellpoort Dam From Lesotho tunnel at Clarens into Little Caledon
Conservation areas:		
Tussen-2-Riviere, Gariep	Yellow fish hatchery	Golden Gate National Park,

Visioning Area 1	Visioning Area 2	Visioning Area 3
Conservation Area, Gariep Transfrontier Venture	downstream Gariep Dam, Rolfontein and Doringkloof Nature Reserves, Huntersmoon (Seekoei River), Orania "Bewaararea"	conservation of wetlands (mostly Lesotho)
Recreation and tourism:		
Water sport, rafting, fishing, birding, guest houses, Tiffendell ski resort, game farms	Canoeing, rafting, fishing, birding, guest houses, emerging eco-farms at Orania, game farms	Guest houses, festivals, golf courses, community based tourism (Awemawe Holiday Resort), water sport at dams
Water quality:		
Increased turbidity in the Orange River and Hershell area Increased nutrients (Sterkspruit at Hershell), Stormbergespruit at Burgersdorp Algal Blooms in Gariep Dam	Possible increase in nutrients Algal blooms, including blue-green algae at Luckhoff, Oppermans, Jacobsdal, Koffiefontein, Vanderkloof and Hopetown	Incresed turbidity in the Caledon River Sesbania investation – seeds toxic to animals Localised nutrient loading Manganese in Grootspruit and Welbedacht Dam – might be due to geology

Note: The natural Mean Annual Runoff for the visioning areas comprises only of the incremental catchments within South Africa and excludes the runoff from the Lesotho Rivers.

The mean annual precipitation varies considerable within each visioning area and also within the UOWMA from higher than 1 000mm to as low as 200mm at the confluence of the Orange and Vaal Rivers.

The domestic water supply of the towns in the areas is mostly from local rivers and storage dams, supplemented by groundwater. The following towns are dependent on groundwater for additional water supply:

Area 1:
Bethulie, Springfontein, Greater Hershell area, Zastron, Lady Grey, Barkly East, Jamestown, Molteno, Burgersdorp

Area 2:
Philippolis, Colesberg, Petrusville, Philipstown, Hanover, Noupoort, Waterkloof

Area 3:
Fouriesburg, Ladybrand, Tweespruit, Thaba Patchoa, Smithfield, Rosendal, Clocolan, Vanstadensrus, Rouxville

Agricultural activities, mainly the planting of pastures, wheat and maize and stock farming are common to all three visioning areas. A large area, especially in the higher rainfall areas are rain-fed irrigation, supplemented by irrigation. The irrigation in the lower rainfall areas are irrigated either directly from the rivers or dams. The Gariep and Vanderkloof Dams are situated in visioning areas 1 and 2 respectively with the associated hydro power schemes. These schemes specifically provide a challenge for the protection of the instream aquatic ecosystems due to the variable release patterns to supplement the power supply in the country.

Conservation, tourism and recreation forms an important focus in all the visioning areas with water sport, eco-tourism and community based initiatives the main developments.

The water quality in all the visioning areas is good, with some localized nutrient enrichment due to WWTW discharges of the towns. Algal blooms occur on Gariep Dam (area 1) and further down the Orange River in area 3. Sedimentation due to erosion is a major problem, especially in the Upper Orange River (area 1) and the Caledon River (area 3).

The water quality in the upper reaches of the Seekoei River is different to the lower reaches due to geology and should be considered during the determination of the Resource Water Quality Objectives.

Additional stakeholders/ interest groups identified and the key economic sectors per visioning area are summarized in **Table 4**.

Table 4: Additional identified stakeholders and economic sectors per visioning area

Visioning Area 1	Visioning Area 2	Visioning Area 3
Additional stakeholders/ interest groups identified		
10 Farmers associations, only Barkly Oos, Bell and Rhodes associations were invited Kraai (Bell)River – Trout association Game Farmer Association Tiffendell ski resort Communal farmers in Hershell/	Rolfontein, Doornkloof and Huntersmoon nature reserves DME (diamond mining) Game Farmers Association Department of Agriculture	District municipalities Farmers Unions Department of Agriculture

Sterkspruit area (National African Farmers Union) Transvaal Agriculture AGRI Eastern Cape Free State University (water quality) Department of Agriculture DTEEA: Tourism		
Main economic sectors:		
Agriculture Stock farming Tourism Game farming Game Bird hunting	Agriculture Aquaculture Stock farming Tourism Game farming Diamond mining Hydro power generation	Agriculture Stock farming Tourism Textile and plastics industries in Maseru)
Subsistence livelihoods:		
Resource poor farmers (stock farming) in Barkley East area	Subsistence irrigation in the Hopetown and Oppermans area	Subsistence farming (irrigation and stock) in Leeuspruit area Community based tourism

Interest groups or stakeholders common to all the visioning areas include the Free State Regional Office, DTEEA, Bloemwater, farmers associations and municipalities.

2.7 Formulate a vision

The information collated, discussions on the catchment context and identification of the guiding principles are used in this step to generate a common understanding of the issues and problems in the catchment. This will assist the stakeholders to formulate a vision.

No previous formal visioning was undertaken for any of the visioning areas. However, discussions were held with the Free State Regional Office with regards to the proposed vision for the UOWMA. A corporate vision for the UOWMA and separate visions as formulated per visioning area at the workshops are provided in the text boxes below.

Corporate vision for the Upper Orange Water Management Area

It is the vision of all stakeholders in South Africa having an interest in the larger UOWMA to:

- Promote cooperative water resource governance, including cooperation between South Africa and Lesotho; and
- Have water resources sufficiently protected, allowing for sustainable water use for the benefit of the sub-region.

Visioning Area 1: Orange River from Lesotho to Gariep Dam

It is the vision of all interested and affected parties within Visioning Area 1 to strive to ensure good quality water that is fit for use to protect biodiversity and aquatic ecosystems to sustain economic development and should include:

- Water resources used by local government and irrigators;
- Careful considerations given to the Reserve requirements, especially in ecological sensitive areas;
- Collaboration and cooperation through active participation of DWAF, local authorities, interest groups and across the border for efficient water resource management;
- Addressing the erosion and sedimentation problems; and
- Unlocking the eco-tourism potential of the region.

Visioning Area 2: Orange River from Gariep Dam to confluence with Vaal River

It is the vision of all interested and affected parties within Visioning Area 2 to contribute to an awareness of the scarcity and value of water to use water sustainably and conservatively to the benefit of all users and the protection of the aquatic ecosystems through:

- The maintenance of good quality water;
- Efficient operation of infrastructure and management of the water resources;
- Accountability amongst stakeholders, institutions and government sectors; and
- Consideration, integration and communication with downstream users.

Visioning Area 3: Caledon River and its tributaries

It is the vision of all interested and affected parties within Visioning Area 3 to promote the use of water by all users in the catchment according to best practices and adequate protection of the aquatic ecosystems for economic development, especially for the realization of the eco-tourism potential of the catchment through:

- Active participation and stakeholder involvement;
- International liaison with representatives from Lesotho; and
- Institutional efficiency and service delivery.

2.8 Define strengths of the system

Strengths are defined as positive characteristics of a system that should be managed to ensure it is maintained. The strengths of a system can be amongst others ecological, legal, socio-economic and/or scientific in nature. In order to translate the vision into objectives, the strengths and constraints of a system are defined. This will assist the water resource managers to manage the system according to the strengths to overcome the constraints.

The identification of the system strengths is done by listing the preferred focus areas for management in the catchment according to 'strongly agree, agree, disagree and strongly disagree'. The focus areas are informed by the guiding principles as identified in step 5 and only those that are either strongly agree and agree are seen as strengths of the system.

Tables 5 – 7 provide the identified focus areas by the stakeholders at the visioning workshops and provide the strengths and constraints of the systems.

Table 5: Strengths identified for Visioning Area 1

	Strongly Agree	Agree	Disagree	Strongly Disagree	Comment
Strengths					
Economic and social objectives					
Economic empowerment	X				
Maximise job creation		X			
Maximise capital growth		X			
Social upliftment	X				
Beneficial use of water resources	X				
Promote the following sectors to achieve the above					
Agriculture		X			
Eco-tourism	X				
Game farming		X			
Ecological Water Requirement of the water resource					
Maintain overall present status	X				
Improve present status		X			
Allow deterioration of present status				X	
Allow deterioration of selected water resources in the short term				X	

Table 6: Strengths identified for Visioning Area 2

Strengths	Strongly Agree	Agree	Disagree	Strongly Disagree	Comment
Economic and social objectives					
Economic empowerment		X			

Maximise job creation		X			
Maximise capital growth		X			
Social upliftment	X				
Beneficial use of water resources	X				
Promote the following sectors to achieve the above					
Agriculture	X				
Eco-tourism	X				
Game farming	X				
Diamond mining		X			
Ecological Water Requirement of the water resource					
Maintain overall present status	X				
Improve present status	X				
Allow deterioration of present status				X	
Allow deterioration of selected water resources in the short term				X	

Table 7: Strengths identified for Visioning Area 3

Strengths	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Comment**
Economic and social objectives					
Economic empowerment		X			
Maximise job creation	X				
Maximise capital growth		X			
Social upliftment	X				
Beneficial use of water resources	X				
Promote the following sectors to achieve the above					
Agiculture	X				
Eco-tourism	X				
Sub-sistence farming	X				
Ecological Water Requirement of the water resource					
Maintain overall present status	X				
Improve present status		X			
Allow deterioration of present status			X		
Allow deterioration of selected water resources in the short term		X			

2.9 Evaluate strengths of the system

The strengths as identified in the previous step (strongly agree) are evaluated by the stakeholders in this step. The constraints (strongly disagree) are also considered as these are the main threats for not realizing the vision.

In summary, the following are strengths and constraints for each of the three visioning areas:

Visioning Area 1:
The main strengths identified are the ecological integrity of the system, existing legal frameworks, conservation and eco-tourism initiatives and good water quality of the water resources in Visioning Area 1. The constraints that need to be addressed are the lack of funds of district and local municipalities to upgrade or maintain the Waste Water Treatment Works (WWTW), operation of the infrastructure, enforcement of the existing legal frameworks and the availability of information on the water resources in the area.

Visioning Area 2:
Ecological integrity, societal values, existing legal frameworks, conservation and eco-tourism initiatives and good water quality of the water resources were identified as the main strengths of this area. Although a fair amount of data and information are available for the water resources of this area, more data need to be obtained to ensure that information availability is a strength. The main constraints are the enforcement of the legal frameworks and the operation of WWTW.

Visioning Area 3:
The main strengths (strongly agree) as identified by the stakeholders are ecological integrity, eco-tourism and conservation initiatives and existing legal frameworks. Strengths (agreed) are water quality, subsistence farming and social values. Constraints are the lack of information, enforcement of the legal frameworks and the operation of the WWTW.

Ecological integrity of the water resources, eco-tourism and conservation and existing legal frameworks have been identified as overall strengths for the UOWMA. The overall constraints for the UOWMA are the enforcement of the legal frameworks and the operation of the WWTW by the local and district municipalities.

2.10 Determinants of and constraints and threats to strengths

In this step the determinants of the strengths of the system, as identified and evaluated by the stakeholders in the previous steps, are described. The possible threats and constraints for the determinants are also listed. All of these provide the necessary input to determine the objectives for the management of the system to realize the vision. A table is used to list all of these and a summary from the three visioning workshops are provided in **Tables 8 – 10**.

Table 8: Determinants, threats and constraints for the strengths for Visioning Area 1

Strength	Determinant	Threat	Constraint
Ecology	Less populated areas in the upper reaches of the Orange River and the tributaries Undisturbed and pristine rivers Number of wildlife areas exists	Building of dams, especially in the Kraai River catchment Deterioration of water quality Increased agricultural and industrial activities Sedimentation issues due to erosion	No high confidence Reserve determination study Lack of information on the water resources
Legal frameworks	Existing legislation, e.g. NWA, NWRS, ISP	Lack of implementation	Lack of inter-governmental cooperation Lack of funding and skills to operate the WWTW
Eco-tourism/ conservation	Good natural environments Conservation initiatives from DTEEA	Deteriorating water quality	Lack of infrastructure
Water quality	Pristine rivers, especially upper reaches of the tributaries Key water quality variables to be identified and monitored	Effluent discharges Poor operation of the WWTW	Lack of upgrading of infrastructure Lack op expertise

Table 9: Determinants, threats and constraints for the strengths for Visioning Area 2

Strength	Determinant	Threat	Constraint
Ecology	Sparsely populated areas Number of wildlife areas exists	Operation of Gariep and Vanderkloof Dams Deterioration of water quality due to agricultural and industrial activities	No high confidence Reserve determination study
Legal frameworks	Existing legislation, e.g. NWA, NWRS, ISP	Lack of implementation and enforcement	Lack of inter-governmental cooperation Lack of funding
Eco-tourism/ conservation	Good natural environments Conservation initiatives from DTEEA	Deteriorating water quality	Lack of infrastructure
Water quality	Good water quality in the Orange River Key water quality variables to be identified and monitored	Poor operation of the WWTW Irrigation return flows	Lack of upgrading of infrastructure Lack op expertise
Societal values	Stakeholders are passionate about the water resources Recreational use of the river	Over-development of the resources Lack of knowledge on the system Rural-urban migration	Lack of funding for social upliftment Sparsely populated areas

Table 10: Determinants, threats and constraints for the strengths for Visioning Area 3

Strength	Determinant	Threat	Constraint
Ecology	Golden Gate National Park Natural areas Less populated areas	Developments, e.g. golf courses Deterioration of water quality due to agricultural and industrial activities	No high confidence Reserve determination study Implementation of rapid Reserve requirements
Legal frameworks	Existing legislation, e.g. NWA, NWRS, ISP	Lack of implementation and enforcement	Lack of cooperation and capacity
Eco-tourism/ conservation	Good natural environments Conservation initiatives from DTEEA	Deteriorating water quality	Lack of infrastructure, funding and education
Water quality	Good water quality in most of the tributaries Key water quality variables	Poor operation of the WWTW Irrigation return flows Sedimentation due to erosion	Lack of upgrading of infrastructure Lack op expertise
Societal values	Stakeholders are passionate about the water resources Recreational use of the river	Over-development of the resources Lack of knowledge on the system	Lack of funding for social upliftment Sparsely populated areas
Subsistence initiatives	Establishment of subsistence farmers and community based tourism	Bad debt Management of the established tourism initiatives	Lack of governmental support, training and expertise

2.11 Define objectives hierarchy

The purpose of this step is to define management objectives to maintain the strengths by overcoming the threats and constraints to the system. **Figure 7** graphically represents the relationship between maintaining strengths, overcoming constraints and threats through the determination of management objectives.

An objective hierarchy approach is used to identify the different levels of management objectives required to achieve the vision. The aim is to link the catchment vision with different and supporting Resource Water Quality Objectives (RWQOs). The proposed objectives hierarchies for the three visioning areas are provided in **Figures 8 – 10**.

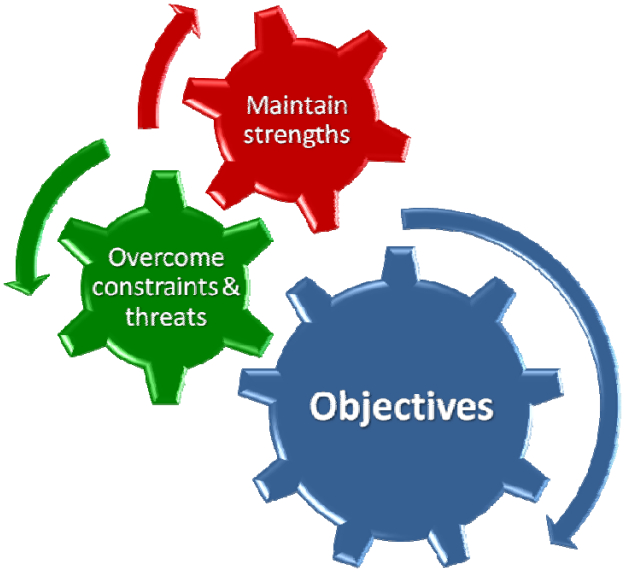


Figure 7: Graphical representation of the inter-connectedness of maintaining strengths, overcoming constraints and threats, and the setting of objectives

Figure 8: Objectives Hierarchy – Visioning Area 1

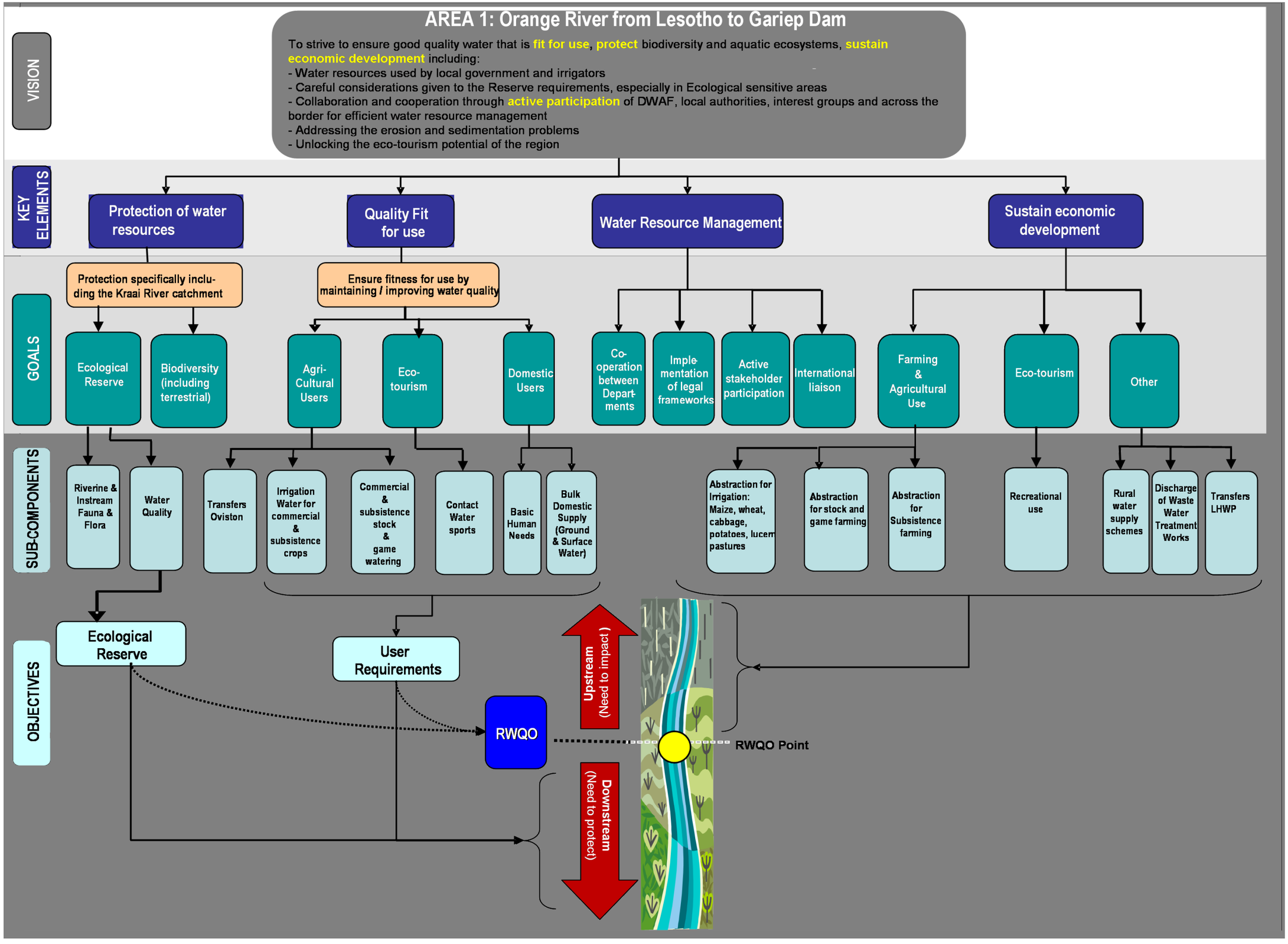


Figure 9: Objectives Hierarchy – Visioning Area 2

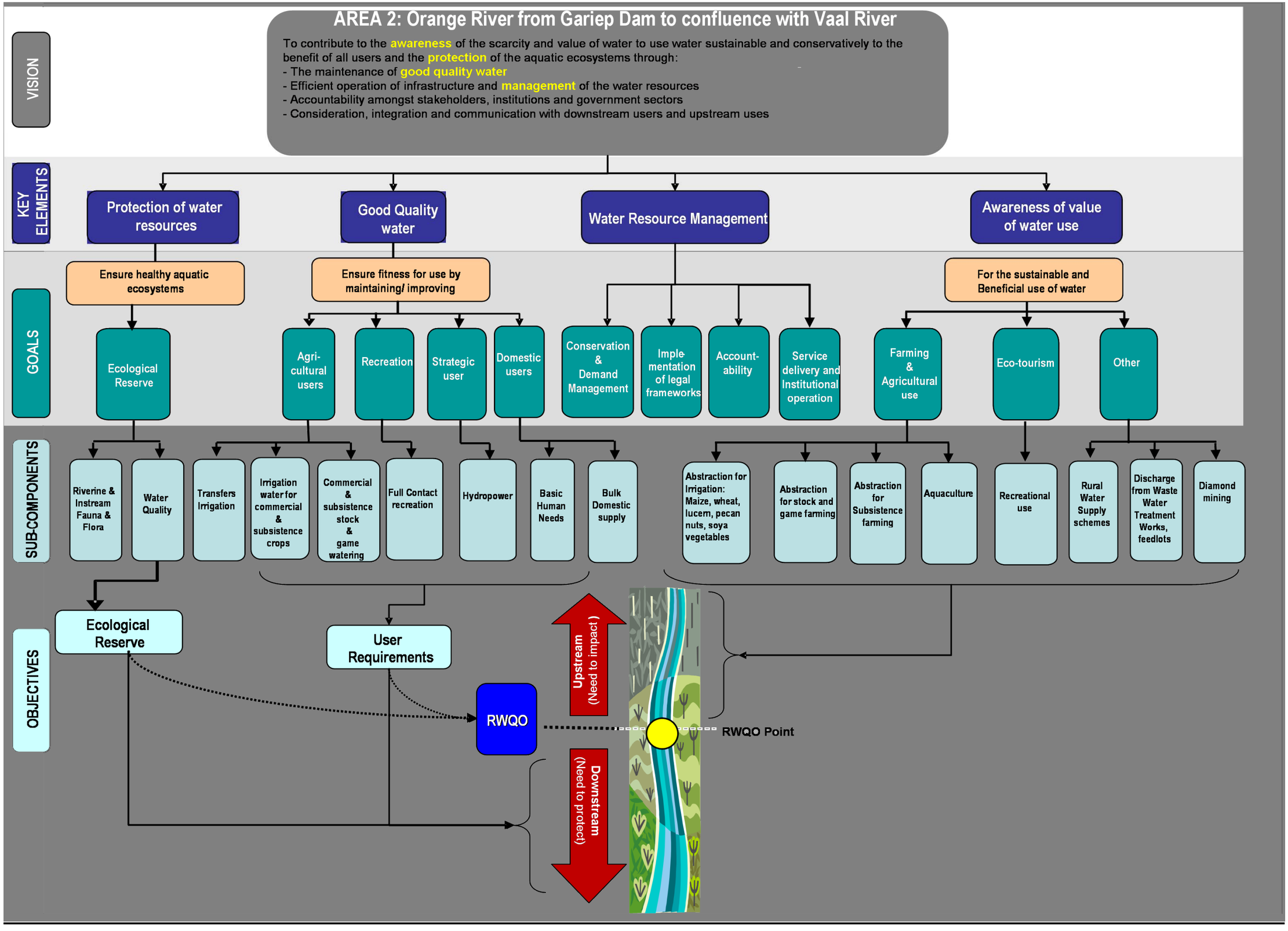
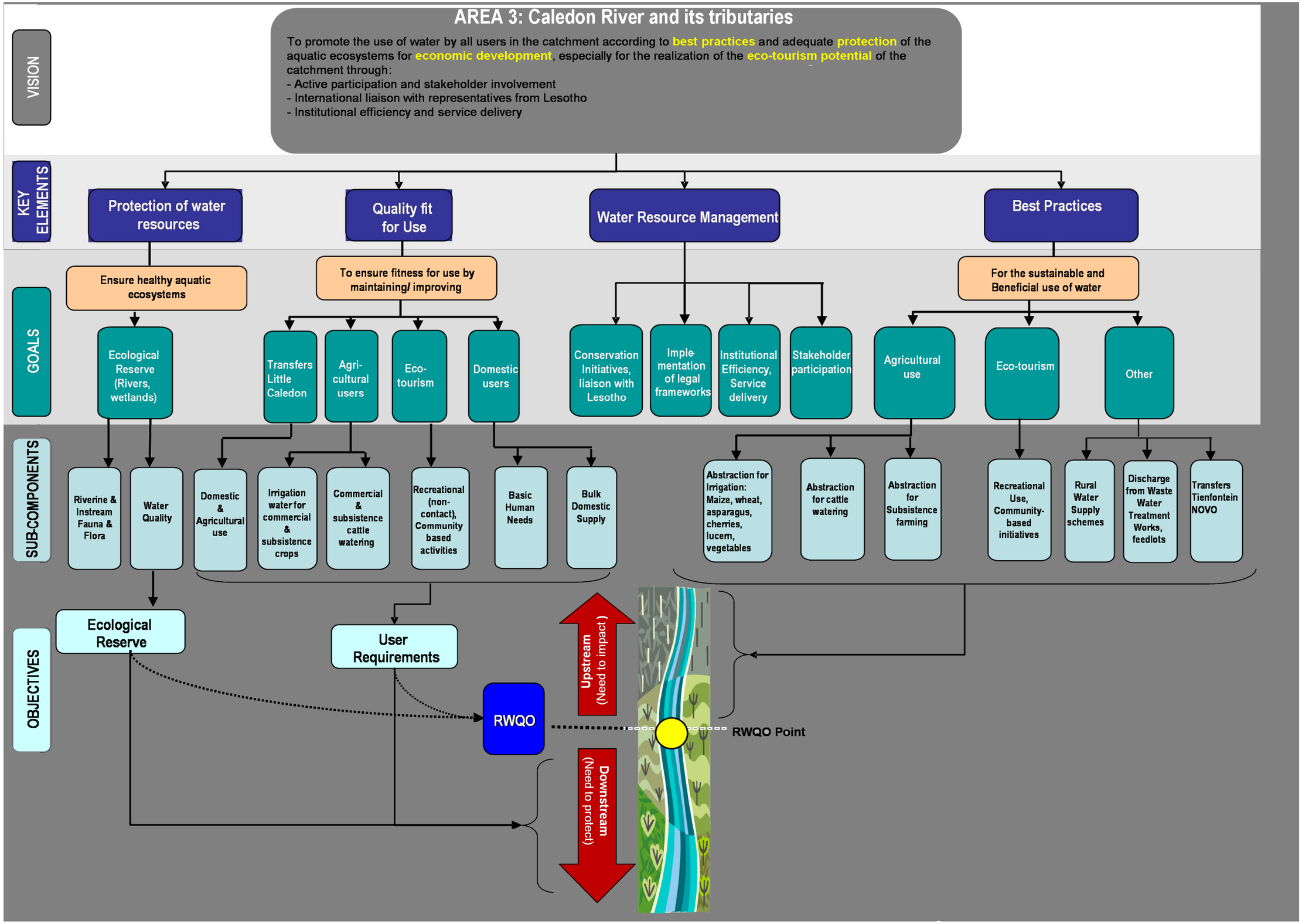


Figure 10: Objectives Hierarchy – Visioning Area 3



3. REFERENCES

Department of Water Affairs and Forestry (DWAF), 2004. Internal Strategic Perspective: Upper Orange Water Management Area. Prepared by PDNA, WRP Consulting Engineers (Pty) Ltd, WMB and Kwezi-V3 on behalf of the Directorate: National Water Resource Planning. DWAF Report No P WMA 13/000/00/0203.

Department of Water Affairs and Forestry (DWAF), 2006. Resource Directed Management of Water Quality: Management Instruments. Volume 4.1: Guidelines for Catchment Visioning for the Resource Directed Management of Water Quality. Edition 2. Water Resource Planning Systems Series, Sub-Series No. WQP 1.7.1. ISBN No. 0-621-36792-3. Pretoria, South Africa.

NSDP (National Spatial Development Plan) 2006. Publication of The Presidency of South Africa. Accessed at http://www.thepresidency.gov.za/main.asp?include=docs/pcsa/planning/nsdp/main.html on 29 July 2008.

APPENDIX A.1: Attendance register, Visioning Area 1 workshop, 13 November 2008, Aliwal North

DEPARTMENT: WATER AFFAIRS AND FORESTRY

Directorate: Water Resource Planning Systems
Sub-directorate: Water Quality Planning

UPPER ORANGE RIVER: VISIONING WORKSHOPS

ATTENDANCE LIST

COMMITTEE MEMBER	AFFILIATION	CONTACT DETAILS				ATTENDANCE
		Address	Telephone no.	Cell. no	Email address	
Jurgo Van Wyk	DWAF: WQP	P/Bag X313 PTA, 0001	012 336 8401	082 809 5440	jurgo@dwaf.gov.za	[signature]
M.N. Mbikwana	DWAF: Resource Protection	P.O. Box 7019 East-London	0437010351	0829405474	mbikwanam@dwaf.gov.za	
CJK Lombaard	Barkly-Oos Boerevereniging	Bus 56 Barkly Oos	0459710084	082 5695477	—	
Bernie Erasmus	DTEEA	P/Box 20801 Bfn 9302	(051) 4004781	082 455 8867	erasmusc@dteea.fs.gov.za	[signature]
Pat Vorster	Barkly East Farmers Union	Box 45 Barkly-East 9786	0459312223 0825618842		patvorster@gmail.com	[signature]
Willem Grobler	DWAF: Free State Water Regulation	P/Bag 528 Bloemfontein	0514059000	0828085584	groblerw@dwaf.gov.za	[signature]
Seef Rademeyer	DWAF: NWRP	P/Bag X313 Pretoria 0001	(012) 336-8358	0828092338	seef@dwaf.gov.za	[signature]
Zanele Sishuba	DWAF: Regulation & Use	~~P/Bag X7~~ PO Box 7019	043 7010374	0829078003	sishubaz@dwaf.gov.za	[signature]
Samantha Boshoff	DWAF: WQP	P/Bag X313, PTA, 0001	012-336-7443	082 904-0611	Boshoffs@dwaf.gov.za	[signature]
Retha Stassen	DWAF: WQP	PO Box 25923 Mon. Park 0105	–	0823718109	rethas@lantic.net	[signature]
G. Venter	Maletswai Muni.	P/Bag X1011 Aliwal North	051-6333391	0823393153	topia@telkomsa.net	[signature]

COMMITTEE MEMBER	AFFILIATION	CONTACT DETAILS				ATTENDANCE
		Address	Telephone no.	Cell. no	Email address	
NTSIKA MATANA	DWAF	P.O. BOX 7019 Terrace	043 701 0375	0730229332	MatanaN@dwaf.gov.za	
LWAZI MOHAMED	DWAF	P.O BOX 7019 EAST LONDON 5219	043 701 0269	0836036404	mohamedlw@dwaf.gov.za	

APPENDIX A.2: Attendance register, Visioning Area 2 workshop, 14 November 2008, Vanderkloof

DEPARTMENT: WATER AFFAIRS AND FORESTRY
Directorate: Water Resource Planning Systems
Sub-directorate: Water Quality Planning

UPPER ORANGE RIVER: VISIONING WORKSHOPS

ATTENDANCE LIST

COMMITTEE MEMBER	AFFILIATION	CONTACT DETAILS				ATTENDANCE
		Address	Telephone no.	Cell. no	Email address	
Samantha Basheff	DWAF: WQP	P/BAG X313, Pretoria, 0001	012-336-7403	082 240 566	Basheffs@dwaf.gov.za	
SEEF RABEMEYER	DWAF: NWRP	P/BAG X313 PRETORIA 0001	(012) 336-8358	0828092338	seef@dwaf.gov.za	
Louis van Oudtshoorn	Bloem Water	Posbus 30121 Pellissier 9322	RSI 40308800	082-892-3910	louis@bloemwater.co.za	
Marie Watson	UFS Centre for Env.	P.O. Box 339 BFN (Internal Box 47)	051 401 3857	072 175 1724	watsonm.sci@ufs.ac.za	
Marindo Averant	Centre for Env. Management, UFS	Postbus 339 BFN 9300	051-4018939/ 2863	083 273 4758	averantmf.sci@ufs.ac.za	
Caroline Mogalie	Thaba Nchu Municipality	Private Bag X3 Hopetown 8750	053-2030442	0836149767	tanicrg@lantic.org.za	
Tascha Vos	Centre for Env. Manage., UFS	P.Box 339 Bfn, 9300	051-4015939/ 2863	072 348 5342	VosAT.sci@ufs.ac.za	
Francois de Vos	ORANIA	Posbus 15 Orania 8752	053-207 0063	082 953 9353		
L van Wyk	Thaba Nchu Mun.	P/B X3 Hopetown 8750	053-2030 450	0832650932	xolisvan@lantic.org.za	
S.J. Montshiwa	ORWUA	Box 208 Jacobsdal 8710	053-5919207	0829483361	sydney@orangefruit.co.za	
Albert van Vuuren	AQUA VAN.	Box 285 Vanderkloof	0536640018	0824428175 0824428175	aquavan@vodamail.co.za	

COMMITTEE MEMBER	AFFILIATION	CONTACT DETAILS				ATTENDANCE
		Address	Telephone no.	Cell. no	Email address	
J J RAUTENBACH	Letsemeng Municipality	P/Bag x 3 Koffiefontein	053 2059200	0835647304	jaque01@mweb.co.za	[signature]
M TSOTETSI	ESKOM	P/Bag X06 GARIEPDAM	051 754 0400	0823393791	TsotetP@eskom.co.za	[signature]
A Steenkamp	Eskom	15 Pasita Rd Rosenpark Bellville 7530	021 941 5869	084 6R5 2836	andries.steenkamp@eskom.co.za	[signature]
W. Strauss	Vander Kloof Boerevereniging	Bus 111 Luckhoff 9982	053 2077021	072 364 3077	willestrauss@araanzi.co.za	[signature]
D.J.T [illegible]	Renosterberg Mun	Bu 112. Petrusville	053 6630041 078 9154996	078 9154996	-	[signature]
WN NKUNA	NCDTEC	Box 23 Vanderkloof 8771	0536640170	0823084371	Tolgontein@gmail.com	[signature]
T.D Matnebula	DTEC	Box 23 Vanderkloof 8771	053 6640170	0724625929	tmatnebula@vodamail.co.za	[signature]
GA COETZEE	DWAF VANDERKLOOF	P BAG X 1 VANDERKLOOF 8771	053 6649600	0828055915	coetzeea@dwaf.gov.za	[signature]

APPENDIX A.3: Attendance register, Visioning Area 3 workshop, 20 January 2009, Ficksburg

2011

DEPARTMENT: WATER AFFAIRS AND FORESTRY

Directorate: Water Resource Planning Systems
Sub-directorate: Water Quality Planning

UPPER ORANGE RIVER: VISIONING WORKSHOPS

ATTENDANCE LIST

COMMITTEE MEMBER	AFFILIATION	CONTACT DETAILS				ATTENDANCE
		Address	Telephone no.	Cell. no	Email address	
Samantha Boshoff	DWAF : WQP	✓	012-336-7443	082804-0611	Boshoffs@dwaf.gov.za	[illegible]
Retha Stassen	DWAF : WQP			0823718 109	rethas@lantic.net	[illegible]
TENDAYI MAKOMBE	DWAF : NWRP	✓		083 662 1414	makombet@dwaf.gov.za	[illegible]
THEMBA NGUBENI	BLOEM WATER	P.O.BOX 30121 PELLISIER 9322	051 4030 800	0748910 497	ThembaN@bloemwater.co.za	[illegible]
Willem GROBLER	DWAF : Free State	P/Bag 528 Bfn.	051 405 9000	082 - 808 5584	GROBLERW@DWAF.GOV.ZA	[illegible]
ANNE STABBERT	LEEUWRIVER IRRIGATION BOARD	P.O.BOX 13 HOBHOUSE	0827855006 051-9830042	0827855006	FAX: 051-9830042	[illegible]
Jackie v Bosch	DWAF : FS	P/Bag 528 Bfn. 9300	051-4059258	0828076158	jackie@dwaf.gov.za	[illegible]
Hendrik Coetzer	Setsoto Municipality	Box 116 Ficksburg	051-9339352	0833902248	technical@setsoto.co.za	[illegible]
Peter Pictors	Free State Agriculture	Posmet Suite 69 P/Bag x62 Beth.	058 661 0080	082 544 1587	pieterpicte@webmail.co.za	[illegible]
Mack LEBOELA	LESOTHO LETSENG DIAMONDS	P.O.Box 12508 MASERU, LS. 100	0026 22221212	0026 62844992	leboelam@letseng.co.ls	[illegible]