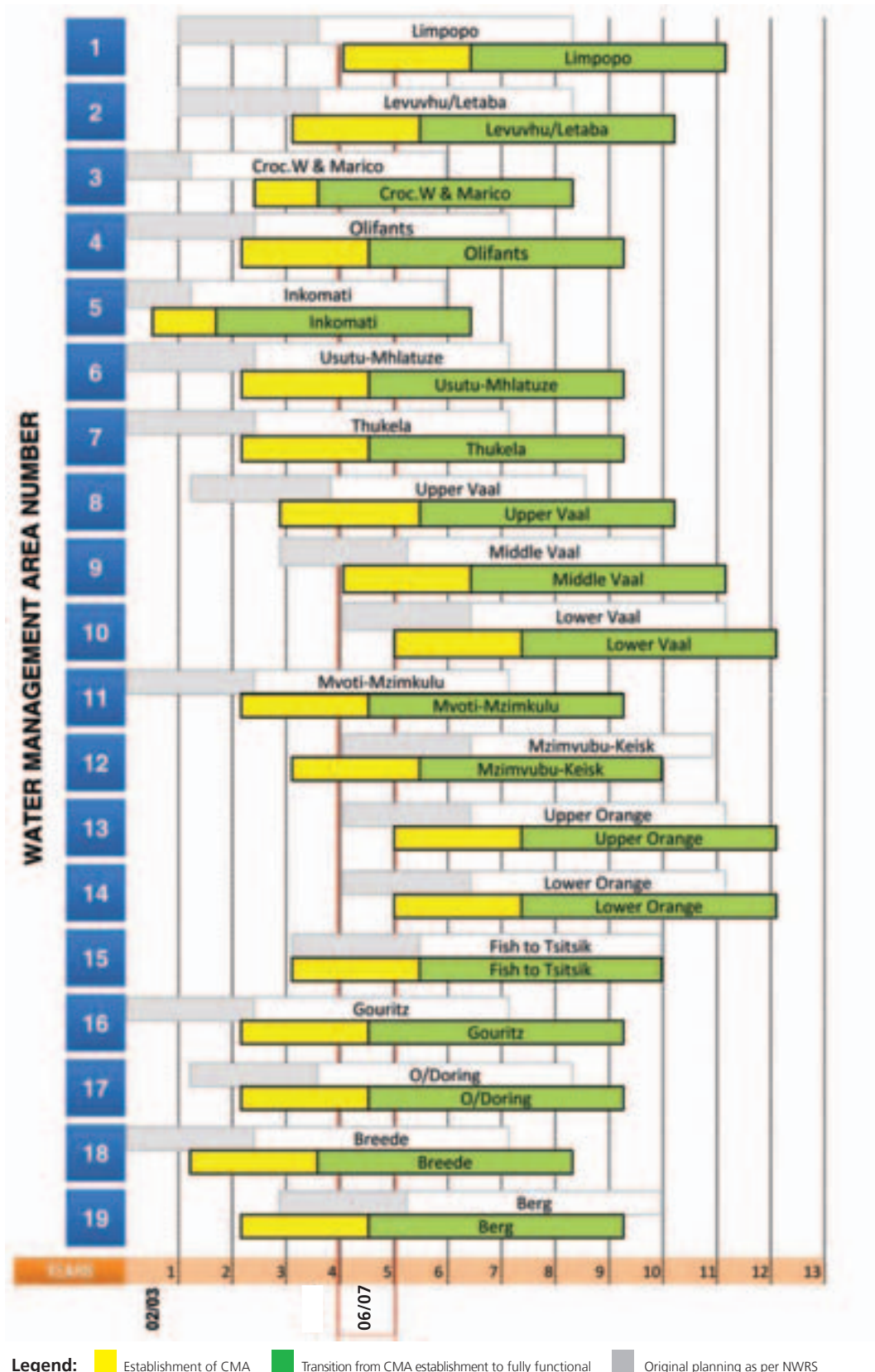


# Appendix 1

## Revised Programme for CMA establishment

This programme has been amended from that presented in the NWRS (2004)

### PROGRAMME FOR CMA ESTABLISHMENT (NOV 06)



## Appendix 2

### Legislation, policy, guidelines and useful documents relevant to Integrated Water Resource Management

#### A. Legislation

##### Water-related Legislation

Department of Water Affairs and Forestry  
National Water Act [No. 36 of 1998]  
Water Services Act [No. 108 of 1997]

##### Constitution-related Legislation

Intergovernmental Relations Framework Act [No. 13 of 2005]  
Promotion of Administrative Justice Act [No. 3 of 2000]  
Promotion of Access to Information Act [No. 2 of 2000]  
Constitution of the Republic of South Africa [No. 108 of 1996]  
Promotion of National Unity and Reconciliation Act [No. 34 of 1995]

##### Environment-related Legislation

###### *Department Environment and Tourism*

National Environment Management: Air Quality Act [No. 39 of 2004]  
National Environmental Management: Protected Areas Amendment Act [No. 31 of 2004]  
National Environmental Management: Biodiversity Act [No. 10 of 2004]  
National Environmental Management: Protected Areas Act [No. 57 of 2003]  
Environment Conservation Amendment Act [No. 50 of 2003]  
National Parks Amendment Act [No. 54 of 2001]  
South African Weather Service Act [No. 8 of 2001]  
National Environmental Management Act [No. 107 of 1998]  
Environment Conservation Act Extension Act [No. 100 of 1996]  
Environment Conservation Act [No. 73 of 1989]

###### *Department of Water Affairs and Forestry*

National Forest and Fire Laws Amendment Act [No. 12 of 2001]  
National Veld and Forest Act [No. 101 of 1998]  
National Forests Act [No. 84 of 1998]

##### Land-related Legislation

###### *Department of Land Affairs*

Communal Land Rights Act [No. 11 of 2004]  
Transformation of Certain Rural Areas Act [No. 94 of 1998]  
Extension of Security of Tenure Act [No. 62 of 1997]  
Land Survey Act [No. 8 of 1997]  
Interim Protection of Informal Land Rights Act [No. 31 of 1996]  
Communal Property Associations Act [No. 28 of 1996]  
Land Reform (Labour Tenants) Act [No. 3 of 1996]  
Development Facilitation Act [No. 67 of 1995]  
Land Administration Act [No. 2 of 1995]  
Restitution of Land Rights Act [No. 22 of 1994]

##### Public administration-related legislation

###### *Department of Finance*

Finance Act [No. 26 of 2004]  
Public Audit Act [No. 25 of 2004]  
Public Finance Management Act [No. 1 of 1999]

### ***Department of Provincial and Local Government***

Disaster Management Act [No. 57 of 2002]

### ***Department of Trade and Industry***

Broad-Based Black Economic Empowerment Act [No. 53 of 2003]

## **Governance-related Legislation**

### ***Department of Provincial and Local Government***

Re-determination of the Boundaries of Cross-boundary Municipalities Act [No. 6 of 2005]

Traditional Leadership and Governance Framework Act [No. 41 of 2003]

Local Government: Municipal Systems Act [No. 32 of 2000]

Local Government: Cross-boundary Municipalities Act [No. 29 of 2000]

Local Government: Municipal Structures Act [No 117 of 1998]

Local Government: Municipal Demarcation Act [No. 27 of 1998]

National Council of Provinces Act [No. 17 of 1997]

Council of Traditional Leaders Act [No. 31 of 1994]

## **Sector-specific Legislation**

### ***Department of Agriculture***

Agricultural Laws Rationalisation Act [No. 72 of 1998]

Subdivision of Agricultural Land Act Repeal Act [No. 64 of 1998]

Conservation of Agricultural Resources Act [No. 43 of 1983]

### ***Department of Minerals and Energy***

Mineral and Petroleum Resources Development Act [No. 28 of 2002]

## **B. Policy**

### **White Papers**

**Department of Agriculture** - Agriculture White Paper, 1995

**Department of Environmental Affairs and Tourism** -Integrated Pollution and Waste Management White Paper, March 2000

**Department of Environmental Affairs and Tourism** -Environmental Management Policy White Paper, 15 May 1998

**Department of Environmental Affairs and Tourism** - Environmental Management Policy White Paper, 28 July 1997

**Department of Environmental Affairs and Tourism** - Conservation and sustainable use of South Africa's biological diversity White Paper, May 1997

**Department of Land Affairs** - South African Land Policy White Paper, June 1997

**Department of Minerals and Energy** - Promotion of Renewable Energy and Clean Energy Development White Paper: Part One: Promotion of Renewable Energy, 23 August 2002

**Department of Minerals and Energy** - Energy Policy White Paper, December 1998

**Department of Minerals and Energy** - Minerals and Mining Policy White Paper, October 1998

**Department of Provincial and Local Government** - Traditional Leadership and Governance Draft White Paper - 29 October 2002

**Department of Provincial and Local Government** - Spatial Planning and Land Use Management White Paper, July 2001

**Department of Provincial and Local Government** - Disaster Management White Paper, 15 January 1999

**Department of Provincial and Local Government** - Local Government White Paper, 9 March 1998

**Department of Water Affairs and Forestry** - Water Services Draft White Paper, October 2002

**Department of Water Affairs and Forestry** - National Water Policy White Paper, April 1997

**Department of Water Affairs and Forestry** - National Sanitation Policy White Paper, October 1996

**Department of Water Affairs and Forestry** - Sustainable Forest Development in South Africa White Paper, March 1996

**Department of Water Affairs and Forestry** - Water Supply and Sanitation White Paper, November 1994

### **Other Documents**

**Department of Agriculture Strategic Plan** 2003-2006, March 2003

**Department of Agriculture** - Land redistribution for agricultural development, June 2001

**Department of Agriculture** - Formulation of the Regulations on the Combating of Declared Weeds Invader Plants, November 1999

- Department of Agriculture** - Land Care programme implementation framework: Discussion document, February 1999
- Department of Environmental Affairs and Tourism** - Consolidated Environmental Implementation and Management Plan 2000, June 2000
- Department of Environmental Affairs and Tourism** -Water Conservation and Demand Management Strategy for the Forest Sector: Draft, May 2000
- Department of Environmental Affairs and Tourism** - Water Conservation and Water Demand Management Strategy for the Water Services Sector: Draft, 15 March 2000
- Department of Environmental Affairs and Tourism** - Water Conservation Strategy for the Industry, Mining and Power Generation User Sector: Draft, 11 February 2000
- Department of Environmental Affairs and Tourism** - Groundwater quality management in South Africa policy and strategy, 2000
- Department of Land Affairs** - Opportunities and obstacles to women's land access in South Africa (Land reform gender policy framework), February 2002
- Department of Water Affairs and Forestry Strategic plan 2003/4 - 2005/6**, 25 March 2003
- Department of Water Affairs and Forestry** - Using water for recreational purposes policy, March 2002
- Department of Water Affairs and Forestry** - Water conservation and demand management national strategic framework: Draft, May 1999
- Department of Water Affairs and Forestry** - Managing the water quality effects of settlements: The national strategy, April 1999
- Government of South Africa** - The New Partnership for Africa's Development (NEPAD), October 2001 - Department of Foreign Affairs
- Government of South Africa** - Women's Empowerment and Gender Equality: South Africa's National Policy Framework, December 2000
- Government of South Africa** - Integrated Sustainable Rural Poverty and Inequality in South Africa: Final Report, 13 May 1998
- Government of South Africa** - Growth, Employment and Redistribution: A Macroeconomic Strategy for South Africa (GEAR), 1996 Development Strategy, 17 November 2000

## C. Guidelines and useful documents

### Department of Water Affairs & Forestry

Guidelines and documents published by DWAF are listed according to topic. Additional guidelines and documents published by other departments and organisations are listed at the end.

### Catchment Management Agencies

- 2001. Implementation of Catchment Management in South Africa. The National Policy. August 2001.
- 2001. The CMA/WUA series. Guide 1: Establishing a Catchment Management Agency (CMA) August 2001.
- 2001. The CMA/WUA series. Guide 2: The Catchment Management Agency as an organisation. August 2001.
- 2001. The CMA/WUA series. Guide 4: Public participation for Catchment Management Agencies and Water User Associations. August 2001.
- 2002. Guideline on the Viability Study for the Establishment of a Catchment Management Agency, Carl Bro a/s, Pegasus Strategic Management, Feb. 2002.
- 2002. Guidelines on the organisational structure of Catchment Management Agencies. August 2002.
- 2002. Guidelines on the Transfer of Personnel from DWAF to other Institutions /Organisations. September 2002.
- An Overview of Water Management Institutions (undated).

### Integrated Water Resource Planning - National Documents

- 1999. Resource Directed Measures for Protection of Water Resources, Vol. 2: Integrated manual.Vol. 3: River Ecosystems; Vol. 4: Wetland Ecosystems; Vol. 5: Estuarine Ecosystems; Vol. 6. Groundwater component. Pretoria, South Africa.
- 2000. Authorisation Process for Individual Applications for Water Use Licences, Revision 3, December 2000 .
- 2002. National Guidelines for Integrated Agriculture Water Use. July 2002.
- 2003. A Guide to Conduct Water Quality Catchment Assessment Studies: in support of the Water Quality Management Component of a Catchment Management Strategy. Sub-Series no. MS 8.3. Edition 1. March 2003.
- 2003. A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas Version: Final draft, February 2003.
- 2004. Financial Assistance to Resource Poor Irrigation Farmers, 29 September 2004.
- 2005. Wetland and Riparian Zone Delineation Guideline Document. Edition 1. September 2005 .
- 2006. Draft Guidelines on Catchment Visioning for the Resource Directed Management of Water.
- Quality Water Resource Planning Systems Series, Sub-Series No. WQP 1.7.1, Resource Directed
- Management of Water Quality: 2nd Edition Management Instruments Series. 2006.
- 2006. Using Water for Recreational Purposes. Recreational Water Use Manual, November 2006 (first release).
- A Guide to the National Water Act (No. 36 of 1998) (undated).

- Water use licensing (Draft): The Policy and Procedure for Licensing Stream Flow Reduction Activities (undated).
- Sanitation Services: A Water Services Act Interpretative Guide. A guide to the Water Services Act (Act No. 108 of 1997) from a sanitation services perspective (undated).

#### **Public participation, capacity building and communication**

- 2000. Public Participation for Catchment Management Agencies and Water User Associations: Guide 4 in the CMAWUA guide series. 2000.
- 2001. Generic Public Participation Guidelines, September 2001. Compiled by R. van Jaarsveld.
- 2001. Generic Communication Strategy for IWRM, DWAF/DANCED, December 2001.
- 2001. Capacity Building Overview Assessment Vol.1, Carl Bro a/s, IZNA Consortium, October 2001.
- 2001. Capacity Building Overview Assessment Vol.2, Specific Capacity Building Requirements of Role-Players, Carl Bro a/s, IZNA Consortium, October 2001.
- 2004. Guidelines for Stakeholder Participation in Integrated Water Resources Management in Water Management Areas In South Africa. March 2004.
- 2004. Managing Public Participation: A Toolkit for Planning, Designing, Implementing, Monitoring and Evaluating Public Participation Processes Related to the Implementation of Integrated Water Resources Management with Particular Emphasis Upon the Inclusion of Marginalized Groups. October 2004.

#### **Water Use & Conservation**

- 2000. Draft Water Conservation / Demand Management Strategy for the South African Forestry Sector. May 2000.
- 2000. Implementation Guidelines for Water Conservation and Water Demand Management for the Agriculture sector regarding the Development of Irrigation Water Development plans for the Agriculture Sector of South Africa, July 2000.
- 2001. Water Conservation and Demand Management National Strategy Framework. 2001.
- 2003. Volume 1: Water Conservation and Water Demand Management - a planning framework for Catchment Management Agencies. DRAFT, 2003.
- 2003. Volume 2: Guidelines for undertaking a Water Conservation and Water Demand Management situation assessment and development of a business plan within the water services sector. 2003.
- 2003. Volume 3: Guidelines for implementing Water Conservation and Water Demand Management within the water services sector. 2003.
- 2004. Clarification of the Department of Water Affairs and Forestry's Requirements for Regulating the Utilisation of Water for Aquaculture Purposes and Development of Relevant Protocol, June 2004 (Project number: 2003-325).
- 2004. National Water Conservation and Water Demand Management Strategy, August 2004.
- 2007. Artificial Recharge Strategy. Version 1.2. April 2007.

#### **Water Quality Management**

- 1996. South African Water Quality Guidelines, Second Edition, 1996 .
- 1998. Waste Management and the Minimum Requirements, Edition 1: Information Booklet, 1998.
- 1998. Waste Management Series: Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, Second Edition, 1998.
- 2000. Waste Discharge Charge System Framework Document, second Edition, May 2000.
- 2000. Policy and Strategy for Groundwater Quality Management in South Africa, 1st Edition, 2000.
- 2000. Guideline Document for the implementation of Regulations on use of water for Mining and related activities aimed at the protection of Water Resources, 2nd, May 2000.
- 2001. Guidelines for Catchment Management to Achieve Integrated Water Resource Management in South Africa : Part 1,2,3, 2001.
- 2004. Operational Policy for the disposal of land-derived water containing waste to the marine environment of South Africa (MS 13.2, 13.3, 13.4), Edition 1, 2004.
- 2005. Minimum Requirements for Hazardous Waste. Draft September 2005.
- 2005. Minimum Requirements for Waste Disposal by Landfill. Draft September 2005.
- 2005. Minimum Requirements for Water Monitoring at Waste Management Facilities. Draft September 2005.
- 2006. Waste Discharge Charge System: Implementation Strategy 2006.

#### **Proposals for the establishment of the Catchment Management Agencies**

- Proposals for the establishment of a Catchment Management Agency for each of the WMAs are available on the DWAF website: [www.dwaf.gov.za](http://www.dwaf.gov.za).

#### **Water Resources Situation Assessment reports**

- Water Resources Situation Assessment reports are available for each of the WMAs on the DWAF website: [www.dwaf.gov.za](http://www.dwaf.gov.za).

### Internal Strategic Perspectives

- 2004. Internal Strategic Perspective. Berg River WMA.
- 2004. Internal Strategic Perspective. Breede WMA.
- 2004. Internal Strategic Perspective. Crocodile West Marico WMA.
- 2004. Internal Strategic Perspective. Fish to Tsitsikamma WMA Tsitsikamma to Coega.
- 2004. Internal Strategic Perspective. Gouritz WMA.
- 2004. Internal Strategic Perspective. Inkomati WMA.
- 2004. Internal strategic perspective. Limpopo River WMA. Pretoria.
- 2004. Internal Strategic Perspective. Lower Orange WMA.
- 2004. Internal Strategic Perspective. Lower Vaal WMA.
- 2004. Internal strategic perspective. Luvuvhu / Letaba WMA.
- 2004. Internal Strategic Perspective. Middle Vaal WMA.
- 2004. Internal Strategic Perspective. Mvoti to Mzimkulu WMA.
- 2004. Internal Strategic Perspective. Mzimvubu to Keiskamma WMA Amatole to Kei.
- 2004. Internal Strategic Perspective. Olifants River WMA.
- 2004. Internal Strategic Perspective. Thukela WMA.
- 2004. Internal Strategic Perspective. Upper Orange WMA.
- 2004. Internal Strategic Perspective. Upper Vaal WMA.
- 2004. Internal Strategic Perspective. Vaal River System: Overarching.
- 2004. Internal Strategic Perspective. Orange River System: Overarching.

ISP reports are available for each of the WMAs on the DWAF website: [www.dwaf.gov.za](http://www.dwaf.gov.za).

### Water Research Commission (WRC)

A list of WRC guidelines and publications follows below. Documents can be obtained directly from (012) 330 0340 or via the website: <http://www.wrc.org.za>.

### Catchment Management

- 2001. Development of a blueprint for urban catchment management in South Africa. WRC 2001/2 Reference No 864
- 2002. Protocols and models for ICM case studies. WRC 2001/2 Reference No. 1062
- 2003. Protocols and models for ICM case studies. WRC 2003/4 Reference Nos. 749 and 1212
- 2002. The management of water resources by the emerging catchment management agencies WRC, 2001/2, Reference No. 906
- 2004. Development of a Hydrological Decision Support Framework (HDSF) to support CMAs in the assessment of water resources and the allocation of water use licences
- WRC 2003/4 Reference No.1490 D20
- 2004. WRM functions delegation to WUA and CMAs (WRC 2003/4 Reference No 1140
- WRC 2003/4 Reference No 1140

### Governance

- 2004. Appropriate approaches and mechanisms to foster co-operative governance between WUAs, CMAs and local government. WRC 2003/4 Reference Nos.1140 and 1433
- 2004. Review and evaluation of all relevant governance elements (principles, policy, legislation, regulation and practice) in terms of the hydrological cycle. WRC 2003/4 Reference No. 1514

### Groundwater

- 2004. Groundwater supply in Local Authorities. WRC 2003/4 Reference No. 1254
- Groundwater–surface water interactions. WRC 2002/3 Reference No.1327 (in progress: 2004-2008)
- 2004. Groundwater–surface water interactions. WRC 2003/4 Reference Nos. 1093, 1117, 1168, 1234, 1488 (in progress: 2004-2008)
- In Prep. A multidisciplinary research project to promote co-operative governance and develop the industry standard for exploring, development and usage of groundwater supplies. WRC 2003/4 Reference No. 1510 (in progress: 2004-2006)

### Monitoring

- 2002. Development of a GIS-based modelling system (ACRU). WRC 2001/2 Reference No. 1155
- 2002. Development of a water information management database system aimed at linking MuniBase to the National Information System of DWAF. WRC 2001/2 Reference No 642

- 2004. Development of an interactive surface water quality information and evaluation system for South Africa (WQ 2000). WRC 2003/4 Reference No 950
- 2004. Development of an integrated information system specifically for water quality (WQIS) WRC 2003/4 Reference No 951
- 2004. DWAF's national water quality and microbial monitoring programs. WRC 2003/4 Reference No 1118
- 2004. Development and evaluation of the Guide to Non-Point Source Assessment. WRC 2003/4 Reference No 1279

#### **Participation**

- 2001. The Development And Co-Ordination of Catchment Forums Through the Empowerment of Rural Communities. WRC report no. 1014/1/01
- 2002. Group decision-support methods. WRC 2001/2, Reference No. 863
- Participatory WRM guidelines. WRC 2001/2, Reference No. 863, WRC Reference No. 1233
- 2003. Development of protocols for improving catchment management through enhanced stakeholder participation. WRC no. 1062/1/03
- 2003. Principles and Processes for Supporting Stakeholder Integrated River Management - Lessons from the Sabie-Sand Catchment. WRC report no. 1062/1/03. Pretoria.
- 2004. Identification of the critical steps in establishing and ensuring the sustainability and transferability of community participation in ICM. WRC 2001/2 Reference No 866; WRC 2003/4 Reference No 1157
- 2004. Establishment of a WUA in the Kat River valley, Eastern Cape WRC 2003/4 No 1233 WRC 2003/4 No 1233
- 2004. Development of appropriate tools to support meaningful participation of the public at different levels of decision-making. WRC 2003/4 Reference No 1434

#### **Quality and quantity**

- 2002. Development of models to integrate water quality and quantity. WRC 2001/2, Reference No 1043

#### **Water Conservation and Water Demand Management**

- 2002. Water demand forecasting. WRC 2001/2 Reference No. 905
- 2004. Water conservation and water demand management measures. WRC 2003/4 Reference No. 1273
- 2002. Trade-off between various water uses and associated socio-economic issues in allocation of a limited water resource and optimisation of land use. WRC 2001/2 Reference No. 749
- 2002. Models to optimise urban water consumption. WRC 2001/2, Reference No. 997; WRC Reference No 1205
- 2002. Physical interventions and education programs to improve conservation and promote payment for services. WRC 2001/2 Reference No 1143

#### **Guidelines and Documents from other Departments**

- Department of Environmental Affairs & Tourism. 1992. Integrated Environmental Management Guideline Series. Pretoria
- Department of Environmental Affairs & Tourism. 2000. Strategic Environmental Assessment in South Africa. Guideline document. Pretoria, South Africa
- Department of Agriculture. 2004. Water Conservation and Water Demand Management for the Agricultural Sector. Pretoria, South Africa.
- Manual in terms of Section 14 of the Promotion of Access to Information Act (Act 2 of 2000) (available on the Department of Public Services and Administration website: [www.DPSA.gov.za](http://www.DPSA.gov.za))

## Appendix 3

### Instruments for integration and co-operation

The table below contains a list of strategies, plans, frameworks and projects that have relevance to IWRM. The list cannot be considered comprehensive, especially with regard to international frameworks. However, these instruments provide the focus for co-operation and integration. Note that the instruments operate at different levels: national, provincial and local (after Pollard and Du Toit, 2004).

<b>International</b>
<b><i>Millennium Development Goals (MDGs)</i></b>
In the year 2000, the United Nations and the international water community announced the Millennium Development Goals (MDGs) for human development over the next several decades. Two of these explicitly address water by (a) setting the goal of reducing by half the proportion of people unable to reach or afford safe drinking water by 2015, and (b) setting out needs for environmental sustainability.
<b>National</b>
<b><i>The National Water Resource Strategy (NWRS)</i></b>
The NWRS, called for in the NWA, guides institutions in the implementation of the National Water Policy. In terms of co-operative functions, the NWRS sets out interrelationships between institutions involved in water resources management and other water-related activities.
<b><i>The Integrated Rural Development Strategy (IRDS)</i></b>
The IRDS is a national plan of government to implement development plans that are integrated and sustainable for rural areas. The aim of the IRDS is to work cooperatively with all sectors to provide services and support development of rural areas by providing services and supporting economic growth. The Integrated Rural Development Strategy, whilst not dealing with water per se, talks to issues of sustainable rural livelihoods.
<b><i>Redistribution for Agricultural Development policy (LRAD)</i></b>
LRAD policy is designed to provide a framework for grants to previously disadvantaged South Africans to access land specifically for agricultural purposes or to improve current land uses. Links between spatial planning and resource allocation are critical especially where water needs to be 'freed up' to support new and emerging farmers (see links to Water Allocation Reform).
<b><i>Estuarine Management Plan</i></b>
Under the NEMA: Integrated Coastal Management Bill, the estuarine management plans will be developed. Alignment must be sought.
<b>Regional/Provincial</b>
<b><i>Catchment Management Strategies (CMS)</i></b>
The CMS must be in line with the NWRS of the DWAF. The CMS is based on participatory and integrated processes that should reflect the plans and visions of water users located in a particular WMA.
<b><i>Provincial Growth and Development Strategies (PGDS)</i></b>
PGDS are aimed at guiding provincial growth and development. These plans are important in that they place significant demands on water resources and will therefore need to be aligned with the CMS and take into account the processes of IWRM.
<b><i>Provincial Environmental Management Plan (EMP) and/or Environmental Implementation Plans (EIMPs)</i></b>
The NEMA calls for both National and Provincial Environmental Management Plans – sometimes called Environmental Implementation Plans. These plans ensure provincial activities are in line with sound environmental planning (see also SEMP in the glossary)

## **Local**

### ***Local government***

#### ***Integrated Development Plans (IDPs)***

An IDP is the main 'strategic planning' tool for planning and development within a municipality. It must link, integrate and co-ordinate plans and be compatible with national and provincial development plans.

#### ***Water Services Development Plans (WSDPs)***

Every Water Services Authority (usually a district municipality but sometimes a metropolitan or local municipality) is required by the Water Services Act to develop a Water Services Development Plan as part of the IDP. The WSDP must be consistent with the broader goals of IWRM and be informed by the CMS. The plan must also reflect an implementation programme for a five-year period.

#### ***Integrated Water Resource Management Plan (IWRMP)***

the Constitution and national environmental and local government legislation lays the foundation for Local Authorities to consider IWRM although there is not yet any specific legal requirement for the preparation of an IWRMP.

#### ***Integrated Waste Management Plans***

To integrate, improve and optimise waste management in order to maximise efficiency by providing an adequate service to residents and businesses and to minimise the associated environmental impacts and financial costs.

#### ***Spatial Development Frameworks (SDFs)***

The Municipal Systems Act calls for spatial development frameworks to be part of municipalities' IDPs. The SDF must associate development priorities with different geographic areas of the municipality. The SDF, CMS and WSDP need to be harmonised in terms of water allocation and provision.

#### ***Land Use Management Systems (LUMS)***

In terms of the Municipal Systems Act (2000) and the Local Government Municipal Demarcation Act (1998), land under Traditional Leadership has been incorporated into municipal boundaries. The MSA and the Land Use Management Bill requires that a single Land Use Management System (LUMS) be developed for the entire area. Land use management is closely interlinked with resource management and harmonization is needed between relevant resource management strategies/plans such as the CMS, EMPs and WSDPs.

#### ***Local Government Environmental Management Plans (EMP)***

Local Government need to prepare EMPs as part of the IDP planning process. These plans guide Local Government activities to be in line with sound environmental planning.

## Appendix 4

### Information and data for Situational Profiles

A summary of some of the sources of information and data available for technical, biophysical and socio-economic characteristics that can be drawn on to develop a situational profile of the WMA

Data source/ Issue	Detail
<b>Biophysical</b>	
National Water Resources Strategy (2004)	The information in the NWRS is a concise view of the best information and knowledge available at the time – that is until February 2003 (see Chapter 1)
Overview of Water Resources Availability & Utilisation	A set of 19 reports – one for each WMA – that provide the detailed information that is contained in the NWRS. These are also known as the “WMA Reports”.
Water Resource Situation Assessment Reports	Relevant characteristics of all quaternary catchments, totalling 1946, in South Africa. Resolution and detail is good. These reports – also one per WMA - contain a wealth of information on each WMA, but the figures on requirements, availability and reconciliation have been largely superseded by the WMA report and the NWRS.
Internal Strategic Perspectives	The ISPs for all WMAs used the information contained in the NWRS and the above WMA reports as the point of departure. However, an inevitable result of the ISP process has been that better information has emerged in some cases.
Water quality	The “Water Quality on Disc” package, developed by the CSIR (Environmentek), enables users to access the DWAF’s macro-chemical database directly on their PCs. This database, containing data dating back, in some cases, to the early 1970s, forms part of the Department’s National Water Quality Monitoring Network, maintained by the Directorate: Hydrology. <a href="http://dbn.csir.co.za/water/">http://dbn.csir.co.za/water/</a>
Data on registered water use	Each Regional Office has access to the Water Authorisation and Registration Management System (WARMS) where data on registered water use and users are kept. The WARMS will be extended to the offices of each CMA.
Water charges	Information on current water charges can be downloaded from DWAF’s website at <a href="http://www.dwaf.gov.za/Projects/WARMS/">http://www.dwaf.gov.za/Projects/WARMS/</a>
Flow data	Flow data can be downloaded from <a href="http://www.dwaf.gov.za/iwqs/report.htm#Aquatic Resource Data">http://www.dwaf.gov.za/iwqs/report.htm#Aquatic Resource Data</a>
State of the environment reports	The SOE report (1999) was the first comprehensive national state of the environment report. A 2005 report is now available. The report deals with biological resources, physical resources, and chemical processes. Some regional reports are available. The freshwater SOE reports are of particular pertinence.
Ecoregions	This first level delineation of ecoregions for South Africa was derived from terrain and vegetation, with some consideration of altitude, rainfall, runoff variability, air temperature, geology and soil. Note that this version has 12 new regions. The metadata and documentation are not yet ready for release. Please contact IWQS if you have specific questions. <a href="http://www.dwaf.gov.za/iwqs/gis_data/ecoregions">http://www.dwaf.gov.za/iwqs/gis_data/ecoregions</a>

Historical climate data	Historical climate data is any data that has passed first level quality control checks and which is stored on the central database at the South African Weather Service. <a href="http://www.weathersa.co.za/Climate/">http://www.weathersa.co.za/Climate/</a>
Land-Cover	<ol style="list-style-type: none"> <li>1. The National Land-Cover Database Project (CSIR/ ARC/ SANDF, DWAF, DEAT, DA) has produced land-cover data for all of South Africa, Swaziland and Lesotho derived from 1:250 000 LAN DSAT TM satellite imagery. Data collected over the period 1994-1996.</li> <li>2. Secondary drainage region land cover. PDF files of South African landcover from the CSIR ARC national 1:250 000 land cover data set segmented by secondary drainage region. Resource Quality Services</li> <li>3. National land cover grid with roads (NLC_grid) from South African National Biodiversity Institute. Created for the National Biodiversity Assessment (part of the National Biodiversity Strategy and Action Plan) to identify transformed areas for terrestrial biodiversity in South Africa. <a href="http://www.sanbi.org">http://www.sanbi.org</a></li> <li>4. South African Estuaries: Catchment land cover <a href="http://www.environment.gov.za/soer/estuary/approach.html">http://www.environment.gov.za/soer/estuary/approach.html</a></li> </ol>
Soils and land type data	<ol style="list-style-type: none"> <li>1. Soil data for South Africa from the WR90 project <a href="http://www.dwaf.gov.za/bi/">http://www.dwaf.gov.za/bi/</a></li> <li>2. Soil and land type data for South Africa. <a href="http://www.agis.agric.za/agisweb/agis.html">http://www.agis.agric.za/agisweb/agis.html</a></li> </ol>
Vegetation	Various sources: maps, Landsat images, and Acocks Veld Types (1975) (1:250 000 - 1:1000 000) compiled by SANBI. Low and Rebello (1996) Vegetation of South Africa, Lesotho and Swaziland (DEAT).
River health	Geomorphology, river signatures; <a href="http://www.deat.gov.za/">http://www.deat.gov.za/</a>
Groundwater	The National Groundwater Database (NGDB) presently populated with in excess of 225 000 borehole records across the country. The spatial distribution of borehole records and some metadata on this database are also available. Basic data from Eastern Cape is available for download. A map has been prepared from borehole records, the bulk of which were obtained from State drilled boreholes. The map does not depict all existing boreholes nor does it reflect the groundwater potential of any area. <a href="http://www.dwaf.gov.za/">http://www.dwaf.gov.za/</a>
Prime agricultural land	Percentage of prime agricultural land other than irrigated per magisterial district. (1: 250 000). Based on land type map. Institute of Soil Climate and water
<b>Socio-economic</b>	
Municipal demographic and services data	SA Explorer: easy-to-use tool that brings municipal, demographic and services data together as spatial overlays. Contains information on wards, municipalities, demographics, employment, income, water sources, services (water and sanitation, electricity). <a href="http://www.demarcation.org.za">www.demarcation.org.za</a>
Demographics, socio-economic data	Central Statistical Services
Demographics, socio-economic and health	See SA Health Systems Trust <a href="http://www.hst.org.za/sahr">http://www.hst.org.za/sahr</a>
Land tenure	Latest title deed information (list of title deeds) can be obtained from either the Deeds Office or DWAF's Directorate of Spatial and Land Information Management.

## Appendix 5

### Proposed water resources Management Classes (NWRS 2004; DWAF (in prep))

#### Class I Natural

- Human activity has caused no or minimal changes to the historical natural structure and functioning of biological communities (animals and plants), hydrological characteristics or the bed, banks and channel of the resource (ecological category A);
- chemical concentrations are not significantly different from background concentration levels or ranges for naturally occurring substances;
- safe for contact recreation and most water uses, including sensitive uses;
- can be used for basic human needs with minimum treatment; and
- the resource should be:
  - » situated in a national or international heritage site or wilderness area;
  - » of compelling biodiversity importance;
  - » a protected site under the Ramsar Wetlands Convention;
  - » situated in an area that has economic importance for tourism or the harvesting of medicinal plants;
  - » have social and/or cultural significance; and
  - » an area designated as Natural under other legislation.
- Other classes will be defined in terms of the degree of deviation from the Natural Class.

#### Class II Moderately used/impacted

- Resources that are slightly to moderately altered from their natural condition due to the impacts of human activity and water use;
- retain a high degree of ecological function and integrity (ecological category B to high C);
- safe for some recreation and non-sensitive water uses; and
- can be used for basic human needs with conventional treatment.

#### Class III Heavily used/impacted

- Resources that are significantly changed from the Natural class reference conditions due to the impacts of human activity and water use but are nevertheless ecologically sustainable;
- where there are pressing social and economic reasons to permit uses that will cause limited, short-term and reversible degradation of the resource, cases will be considered on their merits within the framework of long-term sustainability;
- retain at least some ecological function, but probably highly modified from Natural (ecological category D);
- safe for some non-contact recreation and some non-sensitive water uses; and
- may require advanced treatment to meet basic human needs requirements.

#### Class IV Unacceptably degraded resources

- Unacceptably degraded resources as a result of over-exploitation; and
- MC set at one class up with the aim to rehabilitate this resource to at least one higher class.

## Appendix 6

### Water resources augmentation options

The approach to meeting increasing water demands by only considering the development of new infrastructure such as dams, has come under severe criticism, particularly given the associated environmental, social and economic costs (see World Commission on Dams 2001). This reflects the realization that (a) current water use can be improved through using the water we have more wisely and efficiently and, (b) a suite of alternative options for augmenting water availability exist and need to be considered. There are a number of possible solutions to balance or reconcile water requirements with water availability in each surface and groundwater area. The main tools for doing so are outlined in Box 1 (see also GL 6.5 and 6.6). An analysis of the ISPs has placed particular emphasis on the development and management of groundwater resources, and recognition of the value of rainwater collection and desalination has grown.

Augmentation refers to a collection of strategic plans that aim to enhance the availability of resources through means that do not place the resource under further stress. The SDC strategy should provide a general orientation to the augmentation approaches to be adopted within the WMA.

#### Identified Options

#### Box 1

##### Options identified by the NWRS and ISP review to achieve a balance between water availability and demand

The main options that are available to achieve a balance between the water available and requirements are listed below (see also Appendix 7).

- a) water demand management, which in most cases should receive priority;
- b) improved resource management and conservation (surface and groundwater);
- c) the considered use of groundwater;
- d) the re-use of water;
- e) the management of invasive alien vegetation;
- f) the re-allocation of water (through compulsory licensing and water trading);
- g) rainwater collection;
- h) the development of surface water resources and the inter-catchment transfer of water; and
- i) desalination.

#### a. Development, management and wise use of groundwater

Until recently, South Africa's focus for meeting water demand was almost exclusively on surface water. However, in many areas surface water availability and sustainability is severely stressed and it is now recognised that the role of groundwater must be considered. In many areas groundwater is one of the only realistic and significant sources of additional water which can ameliorate stress on existing resources. The lack of attention to groundwater has also resulted in its mismanagement and abuse, primarily because neither use nor the state of the aquifer are rarely, if ever, monitored (see DWAF, internal report).

The strategic importance of groundwater places an imperative on the CMA to outline measures for groundwater development as a realistic source of supply within a WMA. However, this requires that particular attention must be given to outlining protocols for its management, use and monitoring. A common strategic approach towards the utilisation of groundwater is now being developed by the Department. In the absence of a national framework, this should be developed at the scale of the WMA and revised once the national framework is available.

#### b. Re-use of water

A clear strategy for re-use of water is promoted in stressed catchments. The CMA may wish to outline processes and procedures for the use of waste water and grey water as well as a plan to purify and re-use water.

#### c. Re-allocation of water between sectors

The re-allocation of water between user sectors is an obvious and powerful option for realising the greatest overall benefit for the country from a social, economic and environmental perspective. However, to avoid unnecessary disruption, the NWA provides for the gradual re-allocation of water as the need arises. The main enabling mechanisms are compulsory licensing, supported by water demand management and the trading of water use authorisations (see glossary).

#### **d. Rainwater collection**

The requirements for water need not necessarily be met via piped supplies or using water abstracted from rivers. Rainwater harvesting from roofs or other hardened surfaces, using tanks, small check dams or catchpits can supplement more conventional sources of supply (NWRS 2004). Although this did not receive significant attention during the development of the NWRS, an increased interest and commitment to this as a strategy to secure supplementary water supply is witnessed through several ongoing research and pilot projects. Moreover the Department of Agriculture is considering a subsidy to assist the indigent in the construction of rainwater harvesting structures. Again, the issue of inter-departmental co-operation, and co-operation with other institutions and structures becomes important here.

Soil moisture can be retained on cultivated land and infiltration can be increased by contouring or constructing other micro water retaining structures, which have limited effects on water resources or downstream users.

#### **e. Development of surface water resources and the inter-catchment transfers**

Potential for further development of surface water resources still exists in some parts of the country. Possible resource developments are listed in the NWRS<sup>1</sup> (Chp. 3, Part 8), and are further elaborated in the ISPs.

The departmental perspective is that due to the spatial imbalances in the availability of and requirements for water in the country, inter-catchment transfer of water is a necessary reality in South Africa.

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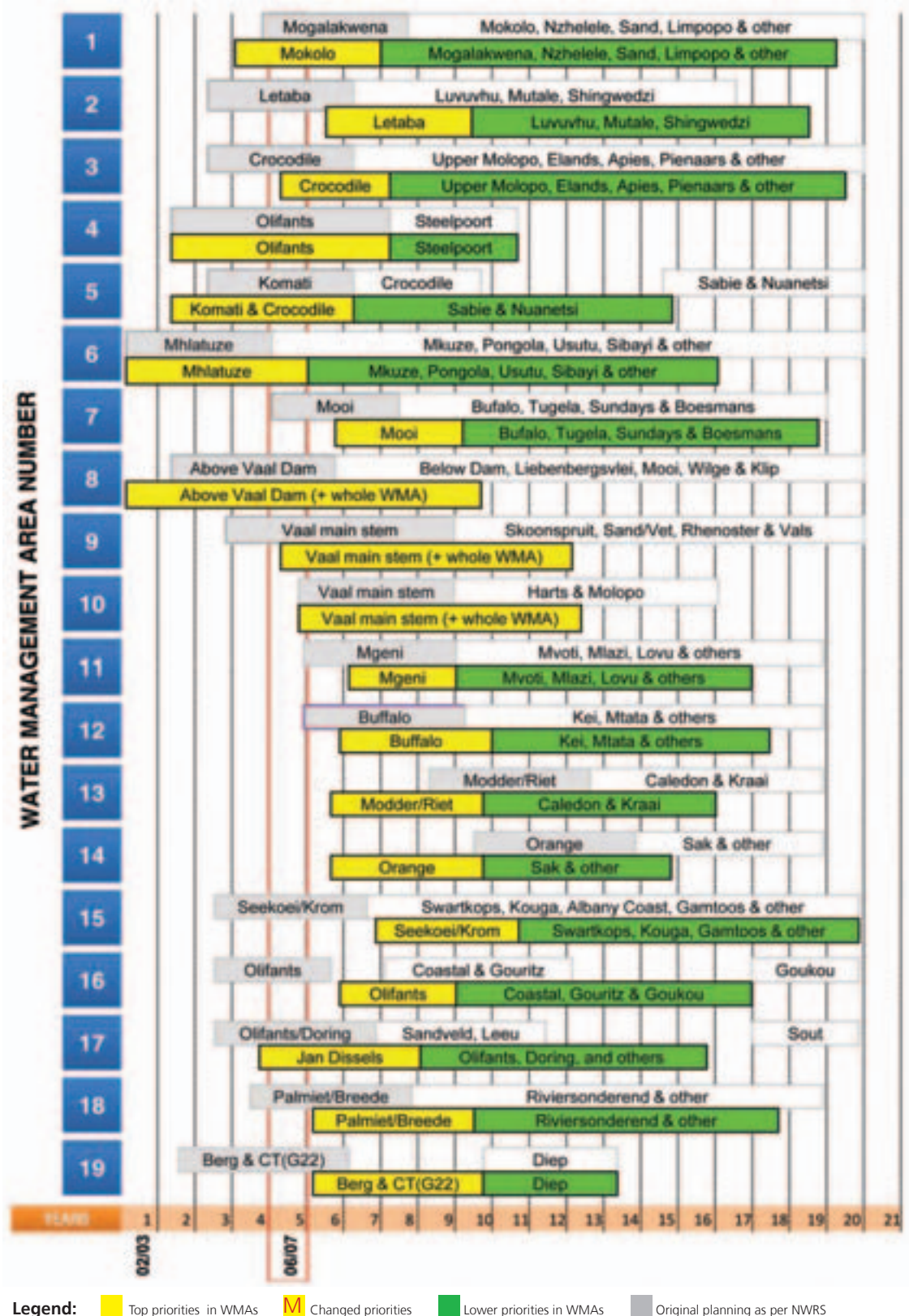
<sup>1</sup> As noted in the NWRS (p. 45): "A factor that reduces the feasibility of new capital-intensive water resource infrastructure developments is the current projection of smaller growth rates than previously used in water requirements in many parts of the country. This would result in longer pay-back periods for the redemption of capital and lead to a reduction in the economic viability of investments. It may reduce the options for new resource development in favour of inducing changes in water use patterns and re-allocation among users". Note that the information given in the NWRS is intended to identify areas where there are imbalances in availability and requirements, and to serve as background for the formulation of more detailed, nationally-consistent strategies to reconcile the two in each WMA. The data is not sufficiently accurate to consider the water balance in smaller geographic areas.

# Appendix 7

## Revised Programme for Compulsory Licencing

This programme has been amended from that presented in the NWRS (2004)

### PROGRAMME FOR COMPULSORY LICENSING (NOV 06)



## Appendix 8

### Waste Discharge Charge System (WDCS)

#### An extract from the WDCS implementation strategy (DWAf 2006 c)

The WDCS provides an economic instrument to support the management of water quality, where problems have been identified through the processes of classifying the water resource (the Classification process) and developing a Catchment Management Strategy (CMS). The WDCS represents an economically efficient tool for waste minimisation and water conservation: the benefits of the WDCS to society-at-large must exceed the total costs, incorporating the sum of costs to individual dischargers and to society.

The WDCS is premised on resource quality objectives (RQOs) as the measure of acceptable risk, and seeks to achieve RQOs at lowest total cost to the catchment. Where RQOs are exceeded or are threatened, impact on the resource is unacceptable and the WDCS may be deployed to achieve RQOs. Where RQOs are achieved, the level of impact experienced by society is assumed to be acceptable and the WDCS is not implemented. Accordingly, the class and the RQOs should be set at optimal levels, to balance the need to protect and sustain water resources with the need to develop and use them. Resource Quality Objectives (RQOs) are established in terms of Section 13 of the NWA to achieve the specified class of water resource. In the absence of a classification system, a preliminary class or RQO may be determined in terms of Section 14 of the NWA.

The WDCS will be applied at a catchment scale. The catchment area will be defined as those areas that have a significant impact on water quality, or are impacted by the specific water quality problem. This may, therefore, be an entire catchment in which a widespread water quality problem exists or may be a sub-catchment within a larger basin, which is bounded by large reservoirs and/or reaches in which RQO are being met.

The following variables, representing the dominant water quality problems in South Africa, are included in the current version of the WDCS: nutrients<sup>1</sup>, salinity<sup>2</sup>, pH, heavy metals<sup>3</sup> and organic material<sup>4</sup>. Further variables may be added, where this is found to be necessary. Selection of a particular indicator variable will consider the type of waste discharge sources in the catchment, the nature of the waste typically discharged, the variable/s responsible for the dominant impacts, and the cost-effectiveness of monitoring different variables.

#### The following considerations apply to implementation of the WDCS.

- The WDCS applies to registered water use only, as defined in Section 21 of the National Water Act (NWA).
- The WDCS is applied to both surface water and groundwater resources, where RQOs have been defined for the receiving resource.
- The charge rate will not vary against concentration. The charge to a waste discharger will be based on a linear relationship against load, using a constant charge rate for a specific variable.
- The load or concentration associated with the intake of water supplied to the discharger may be subtracted from the load liable for a discharge charge, differentiating between processes that concentrate or dilute effluent.
- Minimum load thresholds for charging may be identified on the basis of cost considerations.
- Where downstream RQOs are more stringent than upstream RQOs and downstream RQOs are exceeded or threatened, the WDCS may be applied in the upstream catchment even if the upstream RQOs are met.

Non point sources (NPS) that are registered under Section 21 of the NWA are also included in the WDCS. The approach to estimating load is based on management practices and systems. For each sector and source type, three levels of management practice may be identified, namely those that do not comply with minimum standards, those that achieve minimum standards and those that can demonstrate that they have zero impact and should therefore pay no charge. In determining the load contribution to the resource from NPS, poor practice is deemed to contribute the highest proportional load to the resource. Load contribution to the resource is calculated as a defined proportion of waste load applied to the land or facilities generating the NPS, with the proportion depending on the management practice category.

#### The WDCS consists of two distinct water use charges, either or both of which may be applied in a specific catchment:

1. Charges that provide a disincentive or deterrent to the discharge of waste, based on the use of the resource as a means of disposing waste (Incentive Charge)
2. Charges to cover the quantifiable costs of administratively implemented measures for the mitigation of waste discharge related impacts (Mitigation Charge).

1 phosphate, nitrate and ammonium.

2 total dissolved solids, electrical conductivity, chloride, sodium and sulphate.

3 arsenic, cadmium, chromium, copper, mercury, lead, nickel and zinc.

4 COD.

The Incentive Charge and Mitigation Charge are used in an integrated fashion - the Incentive Charge is applied in every catchment where the WDCS is implemented, while the Mitigation Charge is only deployed where a mitigation measure in the resource offers an economically efficient measure to reducing the pollution load within the resource. In some circumstances, the Mitigation Charge alone is sufficient to achieve the RQOs. Under these circumstances, the Incentive Charge will necessarily be set at zero.

### **Incentive Charge**

The incentive charge is the basis of the WDCS and is applied to influence those dischargers that can reduce their load most cost effectively, thereby improving water quality towards achieving the RQOs. It is not based on the recovery of costs, but rather represents an economic charge to promote the reduction of waste discharge in order to meet specified RQOs. The Incentive Charge, therefore, seeks to change discharge behaviour.

### **Mitigation Charge**

The mitigation charge is a user charge established in terms of the pricing strategy to recover the costs of mitigating the impacts of waste discharge on the resources. It is intended for application where a mitigation measure provides an economically efficient option to support the achievement of RQO in a catchment, in comparison to the costs of waste discharge reduction at source. As such it provides an administrative mechanism for collaboration between dischargers and therefore may have significant institutional requirements. It must be planned, developed and implemented in terms of the catchment management strategy, and the specific water quality management plan developed to address a water quality problem in a catchment.

### **Four categories of the mitigation charge can be identified:**

#### *1. Mitigation through removal of load from the resource*

This category includes regional mitigation scheme or infrastructure developed to remove load from the resource or mitigate the impact on the resource, as well as regional mitigation projects which also remove load / mitigate impact but without the development of significant infrastructure (i.e. limited capital costs).

#### *2. Water resource system operation for water quality management*

This approach enables the recovery of costs associated with the management of river-reservoir systems designed to reduce the impact of water quality problems. This may include dilution, blending or purging of poor quality water to achieve specific targets / objectives, which may result in a reduction of the yield of the system or use of a more expensive source for consumptive use.

#### *3. Mitigation to downstream users through downstream treatment costs*

This approach allows for the recovery of costs incurred in developing and operating additional treatment requirements for downstream users (for water quality that does not meet specified resource quality objectives), such as processes required for the treatment of water abstracted from a eutrophic water resource.

#### *4. Treatment at source*

This last approach enables collective treatment of a single source, or a limited number of sources. Instead of requiring all dischargers to further reduce their discharge, this approach would propose the most cost-effective treatment options on a limited number of dischargers to meet the objectives. The cost for these options would be borne by all dischargers, as they would all be benefiting. This option is analogous to an administrative waste load trading approach.