



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

List of Acronyms

AEC	Acute Effects Value
AGES	Africa Geo-Environmental Services
AEC	Alternative Ecological Category
ASPT	Average Score Per Taxon
BAS	Best Attainable State
BID	Background Information Document
BHNR	Basic Human Needs Reserve
CD: RDM	Chief Directorate: Resource Directed Measures
CEV	Chronic Effects Value
CMA	Catchment Management Agency
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
D: NWRP	Directorate: National Water Resources Planning
DM	District Municipality
D: RQS	Directorate: Resource Quality Studies
DRM	Desktop Reserve Model
D: RR	Directorate: Reserve Requirements
D:RDM	Directorate: Resource Directed Measures
DEA	Department of Environmental Affairs
DM	District Municipality
DSC	Dam Storage Capacity
DSS	Decision Support System
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EC	Ecological Category
EcoSpecs	Ecological Specifications
EFR	Estuarine Flow Requirements
EGSAs	Ecosystem Goods, Services and Attributes
EHI	Estuarine Health Index
EI	Environmental Importance

EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ERM	Ecological Reserve Methodology
ES	Ecological Sensitivity
EWR	Ecological Water Requirement
FMP	Flow Management Plan
FRAI	Fish Response Assessment Index
FROC	Frequency of Occurrence
FSC	Full Supply Capacity
GAI	Geomorphological Assessment Index
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GPS	Global Positioning System
GRDS	Gouritz Reserve Determination Study
Groundwater RDM/GRD	Groundwater Reserve Determination Methodology
GRU(s)	Groundwater Resource Unit(s)
GSM	Gravel, Mud and Sand
GYMR	Groundwater Yield Model for the Reserve
ha	hectare
HFSR	Habitat Flow Stressor Response
HGM	HydroGeomorphic
ICMA	Integrated Coastal Management Act
IHI	Index of Habitat Integrity
1-0	Input-Output (model)
IAP	Invasive Alien Plants
IFR	Instream Flow Requirement
ISP	Internal Strategic Perspective
IWRM	Integrated Water Resource Management
MAMSL	Metres above Mean Sea Level
MAE	Mean Annual Evapo-transpiration
MAR	Mean Annual Runoff
MBDL	Meter Below Datum Level (i.e. below borehole collar)
MBGL	Meter Below Ground Level (i.e. depth)

MCM	Million cubic metres (Mm ³)
MCM/a	Million cubic metres per annum
MIRAI	Macroinvertebrate Response Assessment Index
MAP	Mean Annual Precipitation
MPA	Marine Protected Area
MSL	Mean sea level
NFEPA	National Freshwater Ecosystem priority areas
NGDB	National Groundwater Database
nMAR	Natural Mean Annual Runoff
NWA	National Water Act
ORDS	Outeniqua Reserve Determination Study
PAI	Physico-chemical Assessment Index
PD	Present Day
pdMAR	Present day Mean Annual Runoff
PES	Present Ecological State
PM	Project Manager
PMC	Project Management Committee
PSC	Project Steering Committee
PSP	Professional Service Provider
RC	Reference Condition
RD	Reserve Determination
RDM	Resource Directed Measures
RDRM	Revised Desktop Reserve Model
REC	Recommended Ecological Category
RFA	Rivers for Africa
RHP	River Health Programme
RO	Regional Office
RQO(s)	Resource Quality Objective(s)
RU	Resource Unit
SAIAB	South African Institute for Aquatic Biodiversity
SAM	Social Accounting Matrix
SANBI	South African National Botanical Institute
SAWQG	South African Water Quality Guidelines

Sc	Scenario
SCI	Socio-Cultural Importance
SIC	Stones in Current
SOOC	Stones out of Current
SQ	Sub-quatarnary
SPATSIM	Spatial and Time Series Information Modelling (software)
SPI	Specific Pollution Intolerance
SSA	Statistics South Africa
Stats SA	Statistics South Africa
TDS	Total Dissolved Solids
TEACHA	Tool for Ecological Aquatic Chemical Habitat Assessment
TIN	Total Inorganic Nitrogen
TMG	Table Mountain Group
TPC	Thresholds of Potential Concern
TWQR	Target Water Quality Range
VEGRAI	Vegetation Response Assessment Index
vMAR	Virgin Mean Annual Runoff
WIM	Water Impact Model
WHI	Wetland Health Index
WMA	Water Management Area
WPM	Wetland Probability Map
WQSU	Water Quality Sub-Unit
WR2000	Surface Water Resource of South Africa, 2000 (hydrology data)
WRC	Water Research Commission
WReMP	Water Resources Modelling Platform
WRPM	Water Resources Planning Model
WRUs	Wetland Resource Units
WRUI	Water Resource Use Importance
WRYM	Water Resources Yield model
WUA	Water User Association
WULA	Water Use License Application
WWTW	Wastewater Treatment Works

List of Key Definitions

Ecological Water Requirements (EWR): The flow patterns (magnitude, timing and duration) and water quality needed to maintain a riverine ecosystem in a particular condition. This term is used to refer to both the quantity and quality components. The EWRs as determined by the Comprehensive Reserve study of 2001 will be applied in this study.

Ecological Water Requirement Sites: Ecological Water Requirement sites are set at specific points on the river. These sites provide sufficient indicators for the specialists to assess environmental flows and information about the variety of conditions in a river reach. An EWR site consists of a length of river which may consist of various cross-sections for both hydraulic and ecological purposes. EWRs for 16 sites were recommended for preliminary Reserve as part of the Comprehensive Reserve study and 3 additional sites on smaller tributaries were recommended for lower confidence preliminary Reserves in 2007.

Ecosystem Services (ESS): previously known as Ecosystem Goods and Services Attributes (EGSA). ESS are the goods and services provided by the river (and associated ecological systems) that result in a

value being produced for consumers. Provisioning services are the most familiar category of benefit, often referred to as ecosystem 'goods', such as foods, fuels, fibres, medicine, etc., that are in many cases directly consumed. Other services include cultural services (ritual use of rivers, aesthetic or historical importance), regulating services (e.g. water quality inputs), and supporting services (e.g. nutrient formation).

Hotspots: The hotspot represents a river reach with a high Integrated Environmental Importance which could be under threat due to its importance for water resource use. The hotspots are therefore an indication of areas where detailed investigations would be required if development was being considered. These hotspots usually represent areas which are already stressed or will be stressed in future.

Integrated unit of analysis (IUAs): The basic unit of assessment for the classification of water resources. The IUAs incorporates socio-economic zones and is defined by catchment area boundaries.

Nodes: These are modelling or evaluation points in the river system, representative of an upstream reach or area of an aquatic eco-system (rivers, wetlands, estuaries and groundwater) for which a suite of relationships apply. A node is typically set at the outlet of a tributary where the flow and water quality needed to be met for a particular scenario are set. The flows set to be present at the node are based on the relevant ecological categories defined at that point in the river.

Present Ecological State (PES): represents the ecological status quo of the water resources, it is undertaken as part of the EcoClassification process. The PES of a river is expressed in terms of various components, i.e. **drivers** (physico-chemical variables, geomorphology, hydrology) and **biological responses** (fish, riparian vegetation and aquatic macroinvertebrates), as well as in terms of an integrated state, the **EcoStatus**. Different processes are followed for each component to assign a category from A→F (where A is natural, and F is critically modified). Ecological evaluation against the expected reference conditions, followed by integration of the categories of each component, provides a description of the Ecological Status or EcoStatus of a river. Thus, the **EcoStatus** can be defined as the totality of the features and characteristics of the river (instream and riparian zones) that influence its ability to support an appropriate natural flora and fauna. This ability relates directly to the capacity of the system to provide a variety of goods and services

Reserve: The quantity and quality of water needed in a water resource (e.g. estuaries, rivers, lakes, groundwater and wetlands) to sustain basic human needs and protect aquatic ecosystems to ensure ecologically sustainable development and utilisation of a water resource.

Resource Quality Objectives (RQOs): Numeric or descriptive (narrative) goals for resource quality (includes all aspects of water quantity, water quality and aquatic ecosystem quality, the latter including the quality of in-stream and riparian habitats and aquatic biota) within which a water resource must be managed. These are given legal status by being published in a Government Gazette.

Resource Water Quality Objectives (RWQOs): RWQOs are numeric or descriptive in-stream water quality objectives set to provide detail upon which to base the management of water quality. RWQOs integrate ecological water quality requirements that and user fitness for use requirements.

Significant Water Resources: Water resources that are deemed to be significant from a water resource use perspective, and/or for which sufficient data exist to enable an evaluation of changes in their ecological condition in response to changes in their quality and quantity of water. Water resources are deemed to be significant based on factors such as, but not limited to, aquatic importance, aquatic ecosystems to protect and socio-economic value.

Target Ecological Category: Each Integrated Unit of Analysis (IUA) is allocated a Water Resource Class and a catchment configuration. The catchment configuration consist of biophysical nodes (which can be estuaries) and thier Ecological Categories (ECs). These ECs, could be the Present Ecological State (PES), the Recommended Ecological Category (REC) of any other category and is referred to as the Target Ecological Category (TEC). As a starting point, the TEC will strive to be equal to the REC; but classification is a balance between protection and use and therefore the TEC may be different than the REC depending on the implications of meeting the REC.