

## Appendix 4.1: and acronyms

The NWA, and its supporting policies and procedures, generated a host of new terms and acronyms, which describe specific activities and their outcomes, and which, at times, can become confusing. For instance, terms such as category and class have specific, and different, meanings in the context of the NWA, and should not be used interchangeably. The most commonly encountered of these are listed here.

Resource Directed Measures (RDM) is the collective name that was given to the procedures to be followed in implementing the provisions of Chapter 3 of the NWA.

### **Terms used in the NWA**

#### ***The Reserve***

The collective term used for the combined Basic Human Needs Reserve and the Ecological Reserve. The Reserve forms part of the RQOs.

#### ***Basic Human Needs Reserve (BHNR)***

Provides for the essential needs of individuals served by a water resource, and includes water for drinking, food preparation and personal hygiene (Chapter 5).

#### ***Ecological Reserve***

Refers to the quantity, quality and timing of the water legally set aside for the water resource, and is equivalent to the Ecological Water Requirements required for maintenance of a water resource in the officially-designated Ecological Category.

#### ***Resource Quality Objectives (RQOs)***

RQOs are targets that can be measured/audited. These encompass the objectives for both resource protection and users requirements, for instance, the water quality required for a processing plant. RQOs will be set for every significant river, wetland, estuary and aquifer. Typically RQOs comprise an indicator or descriptor, and a description of the threshold beyond which change would constitute a deviation from the agreed objective for that descriptor, the so called Threshold of Potential Concern (TPCs). The Reserve quantity requirements also form part of the RQOs, and are usually in the form of exceedance curves, although monthly low flow requirements are also often provided for monitoring.

#### ***(Water Resources) Classification System***

The technical guidelines and procedures used to provide the information used in a consultative process, the Classification Process, to recommend a Management Class. This was originally referred to in the NWA as the Classification System but is now referred to as the Water Resources Classification System to distinguish it from other classification systems, such as ecoclassification.

#### ***Classification (Process)***

The consultative process within which the Classification System is used to obtain input from stakeholders on the Management Class of water resources. It was referred to as Classification in the NWA, but later changed to the Classification Process to avoid confusion with the Classification System. Although stakeholders are consulted, the final decision on a Management Class lies with the Minister of Water and Environment Affairs or his/her delegated authority.

<sup>a</sup> Ecological RQOs are referred to as EcoSpecs.

### **Management Class (MC)**

Refers to a legally enforceable condition for water resources within a basin or sub-basin that arises out of the Classification Process. The MC outlines a set of quantity and quality attributes that DWA decides on for that water resource after public consultation. For each MC, the Ecological Categories of the water resources within basin or sub-basin, and the Ecological Reserves allocated to maintain them, are characterized at a finer scale. This was originally referred to as the 'Class' in the NWA but later changed to Management Class to prevent confusion with other classifications that do not take account of social and economic considerations, such as ecoclassification.

### **Preliminary Class and RQOs**

A Management Class and RQOS set in the absence of a Classification Process having been conducted.

### **Preliminary Reserve**

A Reserve set in the absence of a Classification Process having been conducted.

### **Wetland**

The National Water Act distinguishes between rivers and wetlands, the latter referring to inland surface, non-riverine water resources. Under the Act, wetlands are defined as lands that are "transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil".

## **Other commonly-used RDM terminology**

### **Ecological Water Requirement (EWR)**

The term used for water required for maintenance of a given Ecological Category. In a Reserve Determination study, Ecological Water Requirements are determined to maintain a range of ecological conditions for an aquatic ecosystem. Once a future ecological condition has been officially sanctioned, the EWR attached thereto becomes the Ecological Reserve. For rivers, the term is synonymous with inter alia, Environmental Flow Requirements, EFlows and Instream Flow Requirements. Ecological Water Requirements was chosen above those terms for use in South Africa because it refers to the requirements of all aquatic ecosystems as for some of them the term 'flow' may be misleading.

### **EcoClassification**

Refers to the ecological classification of the system into (1) Ecological Categories and (2) Ecological Importance and Sensitivity classes. It also includes the setting of Ecological Specifications (EcoSpecs), which should be monitored. The core part of the process is the determination and categorisation of the Present Ecological State (PES; health or integrity) of various biophysical attributes of aquatic ecosystems relative to their natural or Reference Condition. (Kleynhans and Louw 2007).

EcoClassification should not be confused with the system for classifying water resources in Section 12 of the NWA, which considers a range of different issues in the process of determining the Management Class of a basin or sub-basin, within which there may be a suite of ecological ecosystems with different Ecological Categories (see Management Class).

### **EcoStatus**

"The totality of the features and characteristics of a river (or other inland aquatic ecosystem) and its riparian areas that bear upon its ability to support an appropriate natural flora and fauna" (after Iversen et al. 2000). The EcoStatus of an aquatic

ecosystem relates directly to its capacity to provide a variety of goods and services.

### **Ecological Category**

The condition of various biophysical attributes of aquatic ecosystems relative their natural or Reference Condition (Table A4.1).

Regardless of the freshwater ecosystem under consideration, ecological condition is defined using a six-point scale, which has been in use since the late 1980s. Although the points on the scale represent a continuum from natural to severely degraded, and as such are difficult to define, the use of a common approach across all ecosystem types, meant that, over time, scientists and managers have developed a common understanding of what is meant by an A-category ecosystem as opposed to a D-category ecosystem, and the scale is now widely accepted and understood across all disciplines.

**Table A4.1 Ecological Status categories (from Kleynhans 1996)**

CATEGORY	DESCRIPTION
A – Reference Condition	Unmodified, natural.
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.
E	The loss of natural habitat, biota and basic ecosystem functions is extensive.
F	Critically modified: An almost complete loss of natural habitat, biota and ecosystem functioning. In the worst cases, the changes are irreversible.

### **Present Ecological State (PES)**

Refers to the Ecological Category of the ecosystem and is expressed as:

- Drivers (physico-chemistry, geomorphology, hydrology), which provide a particular habitat template; and
- Biological responses (fish, riparian vegetation and aquatic invertebrates).

### **Reference Condition**

Describes the biophysical condition of the site, river reach or delineation prior to anthropogenic change and is formulated for each component considered in the EcoStatus determination (fish, aquatic invertebrates, riparian vegetation, water quality, geomorphology and hydrology).

### **Recommended Ecological Category (REC)**

The REC is either equal to the PES (i.e. maintain present condition), or an improvement thereon. The decision whether or not to recommend an improved condition is based on the EIS (if the EIS evaluated as moderate or low, the ecological aim should be to maintain the river in its PES; if the EIS is evaluated as high or very high, the aim should be to improve the river from the PES unless that is already natural) and also considers the causes related to a particular PES (i.e. is improvement is realistic and attainable). This relates to whether or not the land uses in the catchment that impact on its water resources can be addressed and mitigated (after Kleynhans and Louw 2007).

### **Alternative Ecological Category (AEC)**

Refers to categories other than the Recommended Ecological Category for which Ecological Water Requirements are determined in a Reserve Determination Study. These AECs refer to a range of different scenarios for which Ecological Water Requirements are also set, and could represent one ecological category up or one down from the Recommended Ecological Category (Kleynhans and Louw 2007). In RDM Methods (DWAF 1999a) AEC also refers to Attainable Ecological Category (in the Ecological Importance and Sensitivity – Present Ecological Status context) – this term seems to have found favour again in the biodiversity context).

### **Ecological Importance and Sensitivity (EIS)**

The ecological importance of an aquatic ecosystem is an expression of its importance to the maintenance of biological diversity and ecological functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience) (Resh et al. 1988; Milner 1994). Both abiotic and biotic components of the system are taken into consideration in the assessment of Ecological Importance and Sensitivity (Kleynhans and Louw 2007).

### **Ecological Specifications (EcoSpecs)**

Ecological specifications (EcoSpecs) are developed and specified in terms of the Resource Quality Objectives (RQOs) as per the Resource Directed Measures (RDM; IWR Environmental 2003) and the EcoClassification process (Kleynhans and Louw 2008). This encompasses biological specifications that are numerical values or narrative statements that define a desired biological condition for a waterbody (Burton and Gerritsen 2003). EcoSpecs must be quantifiable, measurable, verifiable and enforceable and ensure protection of all components of the resource that make up ecological integrity.

### **Reserve Determination Study**

Refers to any study that implements the eight-step generic RDM procedure for Preliminary Reserve determinations. All Reserve determination studies undertaken to date in South Africa have resulted in a Preliminary Reserve. The outcome of all of these studies must now be subjected to a Classification Process, as a result of which the Preliminary Reserve will either be ratified or altered, and will then become the official Reserve.

### **Resource Units (RUs)**

RUs of a river frequently have different natural flow patterns, react differently to stress according to their sensitivity, and require individual specifications of the EWR appropriate for that reach. The guiding principle is that natural RUs (NRUs) can be demarcated for areas with similar hydrology, geomorphological characteristics (i.e. geomorphological zone), physico-chemical attributes and river size. However, management requirements (Kleynhans and Louw 2007) play a role in the delineation process. Management RUs (MRUs) are therefore finally selected. These MRUs are homogenous units that are sufficiently different from adjacent areas to warrant separate assessments for ecological water resource management both in terms of EWRs and the River Health Programme (RHP) (Louw and Hughes 2002). This means that results generated in the MRU will be applicable for the whole MRU.

**Nodes**

For the purposes of WRCS, a node is a modelling point that represent(s) the downstream end of a reach or area for which a suite of relationships apply.

***Integrated Units of Analysis (IUAs)***

Integrated Units of Analysis are a combination of the socio-economic units and watershed boundaries, within which ecological information is provided at a finer scale, i.e., the ecological nodes are nested within the IUAs.