Department: Water Affairs and Forestry
Chief Directorate: Resource Directed Measures
Republic of South Africa

A DRAFT POSITION PAPER ON THE DEVELOPMENT OF A NATIONAL WATER RESOURCE CLASSIFICATION SYSTEM (NWRCS)

DRAFT DISCUSSION DOCUMENT

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PREFACE

The Rio Declaration on Environment and Development, Agenda 21 and the Statement of Principles for the Sustainable Management of Forests were adopted by 178 countries at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Chapter 18 of Agenda 21 deals with the protection of the quality and supply of freshwater resources and the application of integrated approaches to their development, management and utilisation. South Africa's approach to integrated water resource management is guided by Agenda 21. The Department of Water Affairs and Forestry, as custodian of the nation's water resources, is mandated to protect, use, develop, conserve, manage and control the nation's water resources in a sustainable and equitable manner for the benefit of all South Africans.

Sustainability embodies both the long- and short-term protection of the water resource to ensure that it can be developed and used effectively into the future. The protection principles are contained in Chapter 3 of South Africa's National Water Act (NWA), Act 36 of 1998. The Reserve, the National Water Resource Classification System (NWRCS) and Resource Quality Objectives (RQOs) are protection-based measures that together form the Resource Directed Measures (RDM). These measures are in various stages of development and implementation. The NWA also requires that all significant water resources in South Africa be classified to determine the quantity and quality of water necessary for ecosystem functioning, and to ensure that they are maintained in a minimum state of health related to an acceptable level of functioning. Classification, however, goes beyond identifying the minimum requirements for ecosystems and human needs, and involves choosing a level of protection between this minimum and complete protection.

Classification thus affects both ecosystem health and the amount of economic activity that relies on water supply, and therefore has considerable socio-economic implications. It is also inherently political, as past inequalities necessitate redress in terms of access to, use of, and benefit from water resources for previously disadvantaged communities. To meet the above requirements the NWRCS seeks to provide the guidelines and procedures for determining the desired characteristics of a water resource (represented by a Management Class (MC)) to help facilitate informed decision-making for integrated water resource management.

This document presents a draft framework for the proposed NWRCS that is being developed. It highlights the legal basis for the NWRCS, draws a distinction between the NWRCS and the process of classification (Classification Process), and outlines the principles being used to guide the development the system. It also discusses the need for, and development of a system that integrates economic, social and ecological goals using a proposed seven-step process. Further, it considers the issues raised by a wide range of stakeholders during an extensive public consultation process for the proposed National Water Resource Strategy (NWRS) and the subsequent intradepartmental processes. This serves as the basis for targeted stakeholder consultation during the development of the NWRCS.

Comment on this paper

The Department: Water Affairs and Forestry is actively seeking comment on this document. Please submit comments by XXXX to:

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ACRONYMS

ASGISA	Accelerated Growth-South Africa
CBA	Cost-Benefit Analysis
CMAs	Catchment Management Agencies
CMS	Catchment Management Strategy
DWAF	Department: Water Affairs and Forestry
EGSAs	Ecological Goods, Services and Attributes
ELU	Existing Lawful Use
I&APs	Interested and Affected Parties
IUA	Integrated Units of Analysis
IWRM	Integrated Water Resource Management
MC	Management Class
MCDA	Multi-Criteria Decision-Analysis
NWA	National Water Act
NWRCS	National Water Resource Classification System
PES	Present Ecological State
RDM	Resource Directed Measures
RQOs	Resource Quality Objectives
SDCs	Source-Directed Controls
WDCS	Waste Discharge Charge System
WMA	Water Management Area

1 INTRODUCTION

1.1 What is the National Water Resource Classification System (NWRCS)?

The NWRCS, which is required by the National Water Act (NWA) (No. 36 of 1998), is a set of guidelines and procedures for determining the desired characteristics of a water resource, and is represented by a Management Class (MC). The MC outlines those attributes that the custodian [Department: Water Affairs and Forestry (DWAF)] and society require of different water resources. The NWRCS will be used (later) in a consultative process to classify water resources (Classification Process) to help facilitate a balance between protection and use of the nation's water resources. The economic, social and ecological implications of choosing a MC will need to be established and communicated to all Interested and Affected Parties (I&AP) during the Classification Process. The outcome of the Classification Process will be the Minister or her delegated authority setting the MC and Resource Quality Objectives (RQOs) for every significant water resource (river, estuary, wetland and aquifer) which will be binding on all authorities or institutions when exercising any power, or performing any duty under the NWA. This MC, which may range from Natural to Heavily Used/Impacted (**Table 1**), essentially describes the desired condition of the resource, and conversely, the degree to which it can be utilised. In other words, the MC of a resource sets the boundaries for the volume, distribution and quality of the Reserve and RQOs, and thus the potential allocable portion of a water resource for off-stream use. This has considerable economic, social and ecological implications.

1.2 What is currently being used to classify water resources?

At present, a prototype classification system using A to F ecological categories has been used for preliminary Reserve determinations (**Table 2**). However, there is a need for a NWRCS that integrates ecological and user requirements into MCs, and allows examination of the socio-economic and ecological implications of water management decisions.

1.3 Why develop this document?

Given the strategic importance of the NWRCS, it is essential that it be developed in consultation with all relevant stakeholders. This is in line with the spirit of legislation that calls for stakeholder participation, and is specifically called for by the NWA. This document reflects the position of DWAF with respect to the proposed NWRCS, and provides the basis for the initial engagement with stakeholders.

Note

The NWRCS is in the process of being developed. It does not currently exist. This paper presents the framework and context that will guide the development of the proposed NWRCS.

Glossary Box 1

Resource Quality Objectives refer to numerical or descriptive statements (in terms of water quality and quantity) of conditions (goals) that should be met in the water resource.

The **Reserve**, as defined by the NWA, consists of two parts; the basic human needs and the ecological reserve. The basic human needs reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, for food preparation and for personal hygiene. The ecological reserve relates to the water required to protect aquatic ecosystems and the water resource. The Reserve refers both to the quantity and quality of the water in the resource, and will vary depending on the class of the resource.

Table 1 National Water Resource Strategy[1] proposed water resource MCs

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: 1. situated in a national or international heritage site or wilderness area; 2. of compelling biodiversity importance; 3. a protected site under the Ramsar Wetlands Convention; 4. situated in an area that has economic importance for tourism or the harvesting of medicinal plants; 5. have social and/or cultural significance; and 6. 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.

[1] www.dwaf.gov.za/Documents

Table 2 Ecological integrity status categories

Category	Ecological integrity status
A	Unmodified, natural; the resource base reserve has not been decreased – the resource capability has not been exploited.
B	Largely natural with few modifications; the resource base reserve has been decreased to a small extent. A small change in natural habitats and biota may have taken place, but the ecosystem functions are essentially unchanged.
C	Moderately modified; the resource base reserve has been decreased to a moderate extent. Changes of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.
D	Largely modified; the resource base reserve has been decreased to a large extent. Large changes in natural habitat, biota and basic ecosystem functions have occurred.
E	Seriously modified; the resource base reserve has been seriously decreased and regularly exceeds the resource base. The loss of natural habitat, biota and basic ecosystem functions are extensive.
F	Critically modified; the resource base reserve has been critically decreased and permanently exceeds the resource base. Modifications have reached a critical level and the resource has been modified completely with an almost total loss of natural habitat and biota. In the worst instances, the basic ecosystem functions have been destroyed and the changes are irreversible.

2 INSTITUTIONAL ARRANGEMENTS FOR THE NWRCS

2.1 What are the key institutional considerations for the development and implementation of the NWRCS?

As mentioned previously, the NWRCS seeks to help facilitate a balance between resource protection and resource development and utilisation. A complex institutional environment is constructed around this balance, both in terms of the systems and processes of Integrated Water Resource Management (IWRM), and the division of roles and responsibilities between DWAF and the Catchment Management Agencies (CMAs).

The NWRCS is, necessarily, an integral component of the IWRM environment. Accordingly, the Classification Process does not occur in isolation, but is fundamentally linked to other processes in the integrated planning of water resource protection, development and utilisation, and in the management and control of water use. In particular, the Classification Process and the Catchment Management Strategy (CMS) are iterative, while the proposed MC has significant implications for water allocation, Compulsory Licensing and the Waste Discharge Charge System (WDCS). A key component of IWRM is therefore an iterative process of evaluating scenarios with stakeholders where the economic, social and ecological trade-offs will be made, and out of which will emerge the allocation schedule, installed modelling system, MC, reserve, RQOs and the CMS. This process is referred to as the 'Larger Process'.

Given the complex and interrelated nature of the IWRM process, careful consideration of the linkages between the evolving NWRCS and the 'Larger Process' is required. As a result, the institutional arrangements to support such linkages are an important element of the evolving NWRCS.

Institutionally, the IWRM environment is complicated by the institutional change process within DWAF; the decentralisation of roles and responsibilities, and the establishment of CMAs. Once decentralisation is complete, the institutional and management arrangements to support the NWRCS and its implementation follow the division of roles and responsibilities between DWAF and the CMAs. DWAF assumes custodianship of the resource and of the broad strategic objectives of IWRM (including the NWRCS and Classification Process) through oversight and regulation of the resource and its management, and through support to the CMAs. The CMAs are fundamentally responsible for management of the resource. Accordingly, the CMAs develop recommendations on the class, which are assessed and reviewed by DWAF for ultimate consideration and gazetting by the Minister. Before decentralisation is complete, DWAF both acts as custodian of the resource and manages the resource, which includes developing recommendations on the class.

Beyond the IWRM environment, the NWRCS has bearing on a range of broader processes, given the wider socio-economic, political and environmental implications of the class. Accordingly, cooperation with all three spheres of Government, participation of stakeholders and engagement with civil society is required to ensure appropriateness and acceptability of the NWRCS and, ultimately, of the proposed class. This implies that the NWRCS

process is founded on consensus-seeking, participation and cooperative governance, to ensure socio-economic balance and sustainability in addition to the technical elements of ecological sustainability. The institutional arrangements and, importantly, the capacity for implementation of the NWRCS must take cognisance of this socio-economic imperative.

Accordingly, the key institutional issues in terms of the evolving NWRCS should focus on:

- creating an enabling environment, both in terms of the enabling legislation and the institutional environment, to ensure integration with associated systems and processes in IWRM;
- clarifying the roles and responsibilities of different groups and institutions in the Classification Process, considering the process of institutional change; and
- developing appropriate institutional arrangements and the requisite capacity for implementation, particularly in the CMAs, to enable cooperative governance, participation and stakeholder consultation, and to support the technical processes of the NWRCS.

Glossary Box 2

Integrated Water Resource Management can be defined as a participatory planning and implementation process, based on sound science, which brings together stakeholders to determine how to meet society's long-term needs for water and coastal resources while maintaining essential ecological services and economic benefits (USAID http://www.usaid.gov/our_work/environment/water/what_is_iwrm.html).

Catchment Management Agencies are statutory bodies established by a notice in the government gazette, with jurisdiction in a defined water management area (WMA). A CMA therefore manages water resources and coordinates functions of other institutions involved in water related matters within WMAs. A CMA begins to be functional once a governing board has been appointed, and is then responsible for specified initial functions, as well as any other functions delegated or assigned to it.

A **Catchment Management Strategy** may be defined as an overall plan or campaign to handle the affairs of a WMA to achieve specific objectives.

Waste Discharge Charge System aims to attach a cost to the use of water for disposal or discharge of waste. The WDCS suggests a novel approach towards environmental management and governance, since traditional economic systems regarded natural resources simply as inputs for production by overlooking the fact that not all natural resources renew themselves at a rate that matches their use. Furthermore, natural resources have a certain ability to absorb contaminants without adverse impacts. This so called 'carrying capacity' of the environment, has not been recognised as a service provided to which a cost can be attached. One of the ways in which resource economics and law may correct these oversights, is by looking at the costs associated with the use of resources, in comparison with their renewal rates and carrying capacity services.

3 NWRCS GUIDING PRINCIPLES

3.1 What are the main guiding principles that will inform the scope and intent of the NWRCS?

Given the aforementioned context, it is prudent to define an acceptable set of principles, based on sound scientific knowledge and informed by the spirit and letter of the South African Constitution to guide the NWRCS and Classification Process. This will help make the process open, transparent and reasonably predictable, and will also reduce the level of potential contestation. The following principles were identified for the evolving NWRCS during Phase 1 of the project:

3.1.1 Principle 1: Balance and trade-off for optimal use

The chosen MC should balance protection of the resource with its utilisation in line with societal norms and values. Utilisation of the resource provides economic and social benefits; it also has the potential, however, to compromise ecosystem integrity, which has economic and social costs. This balance will require trade-offs. The NWRCS should therefore clearly outline the implications of different MCs to facilitate informed decision-making.

3.1.2 Principle 2: Sustainability

The principle reason for the protection of water resources is to maintain ecosystem integrity at a level that ensures the continued delivery of desired ecosystem goods, services and attributes for use. The NWRCS therefore needs to provide a framework to help facilitate the sustainable use of water resources. It is also recognised that there is a sustainability baseline that if crossed, could result in the non-delivery of the goods, services and attributes necessary for economic growth, poverty alleviation and the redress of historical inequality. As there is a degree of uncertainty as to the exact position of this baseline, and as the risks exceeding the limits of sustainability are considerable, the precautionary principle[2] will be applied.

3.1.3 Principle 3: National interest and consistency

A MC of a resource may produce solutions that are acceptable at a local-level, but are sub-optimal when considered at a national-level. Catchment-level decisions therefore need to be evaluated against national-level interests (and where appropriate, international-level constraints e.g. international obligations). The NWRCS should also outline a clear intention with respect to the characteristics of different MCs and provide for consistency in this regard.

3.1.4 Principle 4: Transparency

Stakeholders should be consulted both in the development of the NWRCS and in the process of classifying the nation's water resources. The approach should be legitimate and transparent, and ensure that the valuation method used for determining trade-offs is fair. As the MC has considerable economic, social and ecological implications, stakeholders will need to be informed in a

[2] The precautionary principle is an internationally accepted norm that suggests prudence in decision-making when the exact implications of a perceived trend or new policy intervention are unknown.

meaningful way of the potential impacts on and risks (and benefits) of the NWRCS to them. Further, stakeholders will need to be informed about the level of uncertainty that accompanies many of the economic, social and ecological predictions inherent in the Classification (and 'Larger') Process.

3.1.5 Principle 5: Implementability

The NWRCS needs to be used, at reasonable cost, by trained DWAF/CMA staff at an operational level. The institutional and transactional costs associated with making a decision on the MC should be as low as possible. The NWRCS should also be sufficiently robust to make a decision in the light of imperfect knowledge. The final outcome of the Classification Process should take into consideration the impacts of existing entitlements to use water (for both abstraction and disposal) as well as regional- and national-development objectives.

3.1.6 Principle 6: Interdependency of the hydrological cycle

All components of a water resource are linked. As such, the NWRCS needs to account for the interlinkages between all resources dependent on water; rivers, aquifers, wetlands and estuaries.

3.1.7 Principle 7: Legally defensible and scientifically robust

The NWRCS should be legally defensible and scientifically robust. It should be based on sound socio-economic and ecological principles in line with IWRM goals. The NWRCS and Classification Process should be legally defensible, apply due diligence in the decision-making process, and prevent legal liability accruing to DWAF or the stakeholders. It should also be consistent with South Africa's international obligations and other environmental legislation both at a national- and international-level. The guidelines should indicate the best available tools and data sets to be used in the Classification Process. These will need to be regularly updated to account for developments in science and technology.

3.1.8 Principle 8: Management scales

The scale at which the NWRCS is applied should be appropriate to the problem at hand. The end result of the Classification Process will be the recommendation of a MC. The implications of this will need to be understood, implemented and checked at multiple scales.

3.1.9 Principle 9: Auditable and enforceable

The NWRCS needs to be auditable and enforceable to ensure that it is operationalised. Thus, the regulator will need to ensure that a transparent, permanent record of the procedures, information and logic used for classifying a particular resource is created and maintained. The outcomes of the NWRCS also need to be monitored and enforced.

3.1.10 Principle 10: Lowest level of contestation and the highest level of legitimacy

Given the strategic importance of the NWRCS, the principle of lowest level of contestation and highest level of legitimacy should be applied. This requires

consultation with, and the highest level of buy-in from, internal (DWAF) and external strategic stakeholders and I&APs.

3.1.11 Principle 11: Utilisation of existing tools, data and information

The NWRCS will use existing tools, data and information wherever possible. Where applicable, existing tools, data and information will be modified or extended to meet the requirements of the NWRCS. Unless there is an urgent need to do so, no new tools, data or information will be developed or collected.

4 INTEGRATION OF ECONOMIC, SOCIAL AND ECOLOGICAL GOALS IN THE NWRCS

4.1 Why is there a need to consider the economic, social and ecological implications of a MC?

The NWA calls for the efficient, equitable and sustainable use of the nation's water resources. These economic, social and ecological goals respectively, are embodied in DWAF's official motto, '*ensuring some, for all, for ever, together*'. The economic goal of efficiency relates to maximising economic returns from water resources, or achieving the maximum net benefit. The social goal of equity seeks to allocate and distribute the costs and benefits of utilising the resource fairly, while the ecological goal of sustainability seeks to promote the use of resources in a way that meets the needs of current generations, but does not compromise the economic opportunities and social wellbeing of future generations. These goals are also consistent with government's Accelerated and Shared Growth-South Africa (ASGISA)[3] strategy that takes the position that without interventions targeted at reducing South Africa's historical inequalities, growth is unsustainable. In the context of IWRM, this involves allocating water for historic redress as a legal imperative, and contributing to eliminating the second economy.

Given this context, it is clear that these economic, social and ecological goals are potentially conflicting, and are not easy to solve simultaneously. It is also clear that trade-offs[4] will need to be made in the Classification and 'Larger' Process (and reflected as a MC and allocation schedule respectively) that will require a suitable, integrated, analytical decision-making system. For example, if the resource is not protected, then most water resources will be allocated to consumptive use. On the other hand, overprotection has opportunity costs in the form of lost economic production and societal welfare. An optimal balance is therefore required that maximises societal welfare and effectively deals with the core issues of redressing historical inequality and reducing poverty. This balance requires trading-off the value of water as a direct input to economic production and, for example, the costs associated with the use of the resource to dissipate waste, the socio-economic costs of environmental damages, and the potential health risks and cost that overuse, stream flow reduction activities and dry land agriculture may have on other users. These costs (negative externalities) and benefits (goods and services that a functioning resource contributes to economic production e.g. fish, reeds, water purification and flood attenuation), however, are seldom accounted for in conventional economic analyses. It is proposed that these costs and benefits and trade-offs need to be accounted for both in the Classification and 'Larger' Process and therefore in designing the NWRCS.

[3] www.info.gov.za/issues/asgisa/

[4] The trade-offs, however, are also influenced by the characteristics of the resources themselves and by scale.

5 BACKGROUND TO THE ENVISAGED CLASSIFICATION PROCESS

5.1 What is the Classification Process?

The NWRCS should be designed to deliver on the outcome of the Classification Process – information for the Minister or her delegated authority to set the MC and RQOs of a resource. As mentioned earlier, the Classification Process, which is nested within (and informs and influences) the 'Larger IWRM Process', will require a wide range of complex trade-offs to be assessed and evaluated at a number of scales. These trade-offs will include those between use and protection (which may or may not be conflicting), between downstream impacts and upstream uses and *vice versa*, between possible use of resources within a catchment and between catchments, and between possible resource use between different parts of the country. Decisions on these trade-offs will have different implications for different stakeholders at local-, regional- and national-levels, and will thus be inherently complex and contestable. It is proposed, however, that the primary scale for implementation of the NWRCS be at the river basin scale (catchment) which provides a practical, understandable spatial unit within which socio-economic and ecological trade-offs can be made. Catchment-level decisions, may however be sub-optimal when placed in the context of broader national-interest, so catchment-level decisions may need to be evaluated against national- and regional-level constraints and/or opportunities. It is therefore proposed that the Classification Process focus initially on finding a balance between protection and use at a catchment-scale, through within catchment trade-offs, but that the final decision-making process around a MC find an appropriate balance between national-, regional- and catchment-scale socio-economic implications of a MC and biodiversity, and between national-, regional- and catchment-scale biodiversity and sustainability considerations of a MC. The NWRCS therefore should take cognisance of national- and regional-level considerations (and possible trade-offs) at multiple scales. This requires an appropriate decision-analysis tool/process.

5.2 What tools/processes can be used to help facilitate a decision on the desired MC of a resource

It is proposed that in addition to existing DWAF tools, a hybrid Cost-Benefit Analysis (CBA) and Multi-Criteria Decision-Analysis (MCDA) tool be utilised to help facilitate a decision on the MC of a resource. The hybrid tool should incorporate the benefits of a conventional CBA tool and the utility of a MCDA tool. The hybrid CBA/MCDA tool should help facilitate the Classification Process at a number of levels: first, in selecting a subset of flow scenarios for detailed analysis from a broad range of scenarios. Second, through identifying the criteria that are required for evaluation, and third, through evaluating (scoring and weighting) the criteria that have been chosen, and comparing the consequences of different scenarios. MC scenarios will need to be assessed and aligned with existing DWAF approaches and methodologies for water resources/catchment planning, system management, compulsory licensing, source-directed controls (SDCs) and related management instruments [including command and control, economic instruments (e.g. WDCS) and through system operation and/or resource remediation (i.e. as part of the 'Larger IWRM Process')].

Glossary Box 3

Cost-Benefit Analysis is a technique designed to determine the feasibility of a project or plan by quantifying its costs and benefits.

Multi-Criteria Decision-Analysis evaluates or 'scores' alternatives from different perspectives (criteria), weighting and combining these scores to obtain an overall ranking of alternatives. Selection of the criteria against which scenarios are evaluated, the relative weights of those criteria and the scoring are done by representative stakeholders.

Source-Directed Controls refer to measures that define the limits and constraints which must be imposed on the use of water resources. They are primarily designed to control water use activities at the source of impact, through tools such as standards and situation-specific conditions in water use authorisations issued to individual water users.

6 OUTLINE OF THE ENVISAGED CLASSIFICATION PROCESS

6.1 What steps are proposed for the Classification Process?

In order to help design the NWRCS, a seven-step process to recommending the MC of a resource (the final outcome of the Classification Process) is proposed (**Figure 1**). The seven steps are:

6.1.1 Step 1: Delineate units of analysis and description of the status quo; including:

a. Description of water resource infrastructure.
b. Delineation of aquifers, estuaries, rivers and wetlands and description of Present Ecological Status (PES) and reference condition.
c. Delineation and description of socio-economic communities and their use of water and Ecological Goods, Services and Attributes (EGSAs).
d. Identification and description of sectoral use of water and EGSAs.
e. Overlay of units delineated in Steps 1a to 1d and map the linkages between them.
f. Consolidation and definition of Integrated Units of Analysis (IUA).

6.1.2 Step 2: Link IUA and define relationships:

a. Link and define biophysical-socio-economic relationships between and within IUA.

6.1.3 Step 3: Determine and quantify class thresholds

a. Determine and quantify the class thresholds of the current ecological categories (A to F) to account for upstream-downstream linkages.

6.1.4 Step 4: Description of the catchment sustainability baseline configuration scenario; including:

a. Defining non-negotiable constraints (national- and regional-level constraints and second-level constraints).
b. Description of the catchment sustainability baseline configuration scenario for catchment.

6.1.5 Step 5: Description of alternative scenario configurations for catchment; including:

a. Identification of future pressures and priorities for water use, ecosystem use and conservation.
b. Identification of feasible scenarios and selection of a subset of scenarios for detailed analysis.
c. Description of the socio-economic and ecological implications of scenarios at catchment-, regional- and national-scales.

6.1.6  p 6a: Internal DWAF IWRM process

Step 6a involves an internal DWAF IWRM process of evaluating scenarios generated during Steps 4 and 5 in conjunction with the verification of Existing Lawful Use (ELU) process, Compulsory Licensing process (including

reconciliation and licence applications), Water requirements for redress and equity, CMS and future use scenarios. This will constrain the number of scenarios for Step 6b.

6.1.7 Step 6b: Iterative process of evaluating alternative scenarios with stakeholders

Step 6b forms part of the 'Larger Process' where the economic, social and ecological trade-offs will be made. Emerging from this 'Larger Process' will be the recommended MC, RQOs and Reserve, CMS, allocation schedule, modelling system and the monitoring, auditing and compliance strategy. A number of key questions will need to be addressed in this 'Larger Process'. These include:

- At what level will the trade-offs be negotiated?
- In what institutional setting will they be negotiated?
- What types of scenarios will inform the process of negotiation?
- The recommended MC, Reserve, RQOs, CMS and allocation schedule will impact on specific groups of people, so the key question will be who benefits and who pays the social and economic cost?

These key questions should be framed (and assessed) in the context of equity, efficiency and sustainability as required by the NWA, and by the core objectives of the present government which are, amongst others, to '…halve poverty and unemployment by 2014', reduce the regulatory burden on small and medium businesses and eliminate the second economy[5]. Step 6 should therefore contribute to meeting government's objective of '…reduce(ing) inequality and virtually eliminating poverty'[6].

6.1.8 Step 7: Presentation of summary information and recommendation of a class configuration scenario to the Minister or her delegated authority

A template will be developed for presenting the summary information from the generated scenarios to the Minister or her delegated authority for a decision on the MC. This will include:

- the economic, social and ecological implications of each scenario;
- the input from the stakeholders; and
- the recommended class configuration.

[5] www.info.gov.za/issues/asgisa/
[6] www.info.gov.za/issues/asgisa/

6.2 How are the guidelines and procedures going to be developed for each of the steps?

For Steps 1 to 5 and 7, guidelines and procedures will be recommended, and where appropriate, developed for the NWRCS. Rapid methods should be devised, possibly drawing on the findings of Comprehensive Reserve studies. For example, in estimating property price premiums attributed to ecosystem attributes, it is possible to derive similar results to hedonic pricing by using shortcut techniques involving experts. Similar types of shortcuts could be used for the ecological and socio-economic components of the NWRCS. Shortcut methods will also need to be devised for all the other types of value. In many cases this might be possible through broad-scale research that investigates general relationships between the output of EGSAs and the values generated. It is envisaged that this aspect of the Classification Process will ultimately be facilitated by a set of simple, rule-based models for which only limited additional data collection will be required.

For Steps 6a and 6b, guidelines and procedures will be recommended for how the NWRCS can inform, contribute and influence the 'Larger Process', out of which will emerge the recommended class, RQOs and Reserve.

Glossary Box 4

Present Ecological State refers to the current state or condition of a resource in terms of its various components, i.e. drivers (physico-chemical, geomorphology, hydrology) and biological response (fish, riparian vegetation and aquatic invertebrates).

Reference condition refers to the condition of a site, river reach or delineation prior to anthropogenic change.

Ecological, goods, services and attributes or 'goods and services' or 'EGSAs' for short, are essentially alternative names for the 'stocks' 'processes' and 'organisation' of ecosystems from which humans (directly) derive utility. It is important to note that these are described in the same physical terms no matter what they are called collectively.

Existing Lawful Use is defined in the National Water Act as a water use:

- which took place at any time during a period of two years immediately before 1st October 1998; or
- which has been declared an existing lawful water use under Section 33, and, which was authorised by or under any other law before that date.

Compulsory Licensing comprises:

- verification of existing water use;
- determination of water resource availability;
- classification of the water resource;
- setting of resource quality objectives;
- determination of the Reserve;
- development of components of the catchment management strategy;
- calling for and evaluation of licence applications;
- preparation of water allocation schedules and undertaking public consultation on them;
- announcing water use allocations in the Government Gazette; and
- issuing licences.

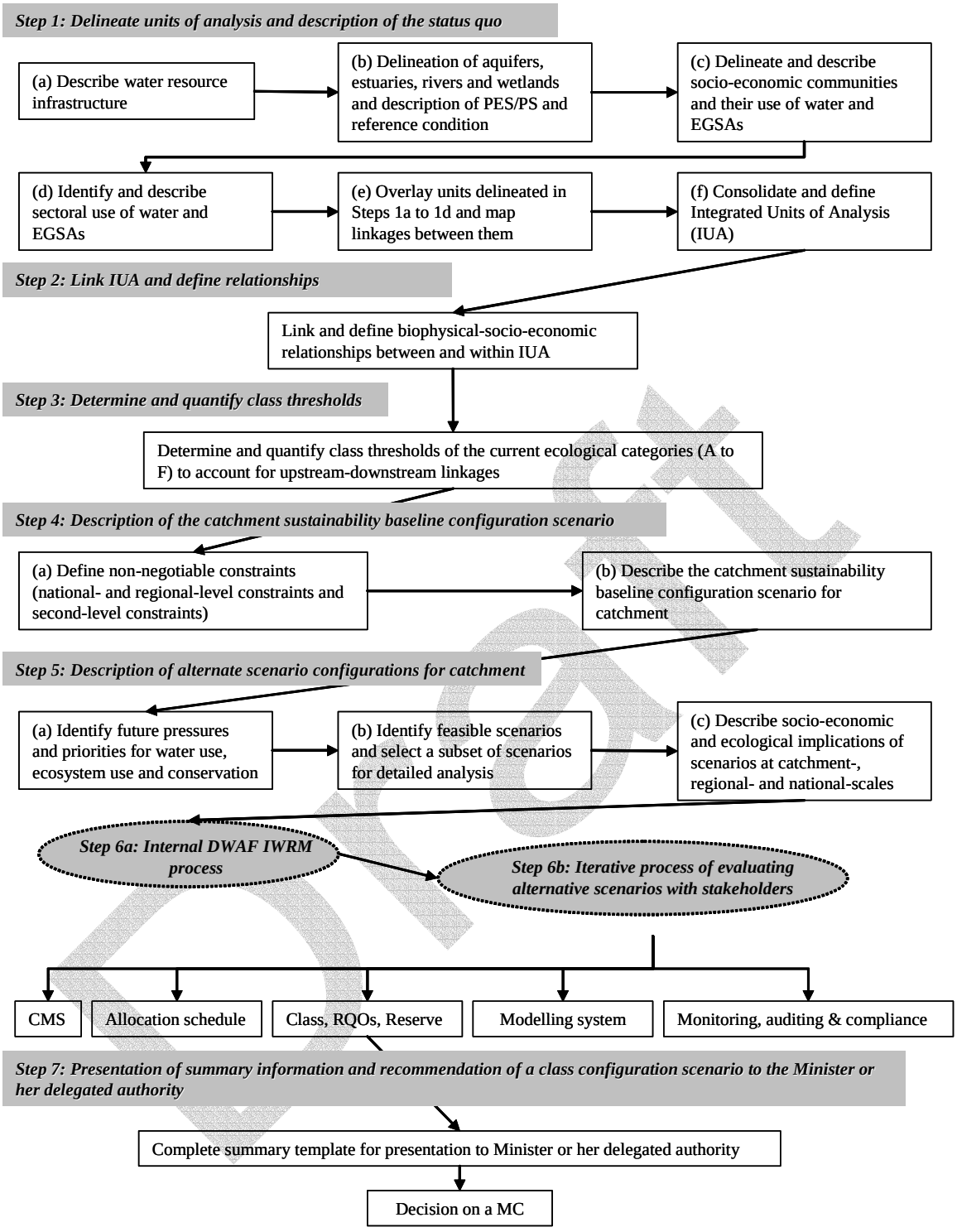

Figure 1 Proposed seven-step Classification Process (note that Step 6 forms part of the 'Larger [illegible]cess')

7 PROJECT SCOPE AND OBJECTIVES

7.1 What is the scope of the NWRCS project?

The scope of the NWRCS project is determined by the key information that the Minister or her delegated authority requires for a decision on the MC of a resource. The NWRCS should be designed to provide this information when used in the Classification Process. The scope of the socio-economic tasks should be constrained by the coarse-scale trade-offs between ecological and other allocations of water involved in alternative class scenarios. This will require focussing on the valuation of ecological costs and benefits for inclusion in the decision-process, assuming that data on consumptive uses are relatively easy to access. The scope of the ecological tasks of the project should be determined by the key ecological implications of classification that have measurable socio-economic impacts and on the ecological sustainability baseline.

7.2 What are the objectives of the NWRCS project?

Given the aforementioned context, the NWRCS project has six main objectives. These are:

1. The development of a procedure for determining the integrated economic, social and ecological values and implications of a MC.
2. The refinement of the guidelines that underpin the NWRCS.
3. The development of guidelines for the best available tools and methods to be used in support of determining the MC.
4. A development of an appropriate stakeholder consultation process.
5. The development and delivery of a draft NWRCS ready for gazetting by a legal team.
6. To help integrate the NWRCS into DWAF's broader IWRM mandate.

7.3 What specialist input is required to meet the objectives of the NWRCS project?

To meet the above objectives, a multidisciplinary, integrated approach will be required. The following major specialist components are involved:

1. Economic.
2. Social.
3. Ecological.
4. Water resources assessment.
5. Groundwater.
6. Technical.
7. Decision-analysis.

Two cross-cutting themes are part of the approach:

1. The development of organisational and institutional relationships and processes.
2. Targeted stakeholder process.

8 FORMAT AND CONTENT OF THE PROPOSED NWRCS

8.1 How much additional work will be required to develop the NWRCS?

Wherever possible, existing data, information, tools, procedures, methods and models will be incorporated or utilised in the NWRCS. Similarly, the Classification Process should be accomplished using mainly existing information (i.e. desktop studies) with little or no accompanying field work or research. This means that the NWRCS needs to:

- be transparent and easy to use;
- be applicable nationally;
- allow trade-offs between use and protection to be achieved in a nationally-consistent manner;
- be calibrated for the target catchment using existing information;
- rely on pre-established or assumed relationships between flow and water quality and the provision of valued goods and services to translate ecological condition into socio-economically relevant information;
- be easily packaged for dissemination to a wide range of stakeholders; and
- allow for the inclusion of data generated outside the NWRCS.

8.2 What will the gazetted NWRCS look like?

Section 12 of the NWA provides that the Minister must prescribe a system for classifying water resources. This requires that the NWRCS be published in the Government Gazette for comments for a period of not less than 60 days. All comments received will be recorded and considered. The National Assembly and National Council of Provinces may require information on how particular comments were dealt with. It is anticipated that the NWRCS will be submitted for gazetting in 2007. This is to ensure that there is sufficient time to process the NWRCS through DWAF line functions right up to the Minister for approval before publication in the Government Gazette can take place.

The gazetted NWRCS will describe the process that is required to define the classes, and will also provide a definition of the classes that are to be used. The NWRCS project will, however, develop the guidelines for the procedures to be followed to recommend a class. These guidelines will be sanctioned by DWAF.

8.3 What will the NWRCS guidelines look like?

The NWRCS guidelines should comprise (at least) the following:

- A manual of guideline(s) and procedure(s) for implementing the NWRCS, including:

    1. Protocol(s) for a systematic approach for describing the ecological/biophysical implications of different scenarios.
    2. Protocol(s) for a systematic approach for describing the groundwater implications of different scenarios.

3. Protocol(s) for a systematic approach for describing the social implications of different scenarios.
4. Protocol(s) for a systematic approach for predicting changes in economic value due to the implications of different scenarios.
5. Checklist(s) to ensure that the appropriate economic, social and ecological criteria are considered in the Classification Process.
6. Procedure(s) for generating class scenarios.
7. Procedure(s) for the aggregation and presentation of economic, social and ecological data at a catchment-level for alternate scenarios.
8. A protocol for an integrated decision-analysis tool.
9. A protocol for identifying stakeholders for a catchment.
10. A protocol for the stakeholder consultation process.
11. A template for delivering the required information on the economic, social and ecological implications of different scenarios to the Minister or her delegated authority for a decision on a MC.

- A Geographical Information System (GIS) database including:

  1. A database of national- and regional-level context information for classification.
  2. A 'rule-based' model for predicting upstream/downstream linkages.
  3. An optimisation technique(s) for scenario generation.

- A hybrid CBA/MCDA decision-analysis tool.

9 PHASED APPROACH TO THE DEVELOPMENT OF THE NWRCS

9.1 How long will it take to develop the NWRCS?

The development of the proposed NWRCS will occur in three major phases, each with clear outputs. These are:

Phase 1: Initiation (complete).
Phase 2: Development of the NWRCS on a test catchment (Olifants/Doring) (1 November 2005 to 31 October 2006).
Phase 3: Testing and refinement of the NWRCS on pilot catchments (to be decided).

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