Determining the Water Resource Classes and Resource Quality Objectives in the Thukela River Catchment

Project Steering Committee 2

Background Information Document

September 2020

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

PURPOSE OF THIS DOCUMENT

The purpose of this background information document (BID) is to assist members of the Project Steering Committee (PSC) in preparing for the second meeting to be held online on 22 September 2020.

This BID contains the following:

- A brief overview of the steps of the Water Resources Classification System (WRCS) related to addressing the socio-economic components of the WRCS.
- Provides an understanding of the purpose of conducting a socio-economic assessment and the associated decision-analysis framework that will guide the process of linking the value and condition of water resources, and
- Illustrates the main components of the methodology to be used to achieve the above-mentioned.

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WATER RESOURCE CLASSIFICATION SYSTEM

Chapter 3 of the National Water Act, (Act 36 of 1998) provides for the protection of water resources through the implementation of Resource Directed Measures which include the classification of water resources, setting the Reserve and determining Resource Quality Objectives (RQOs). The first part of the study is the classification of water resources which is described in this background information document (BID). The steps to follow for the setting of RQOs will be highlighted in subsequent BIDs.

The classification of water resources aims to ensure that a balance is reached between the need to protect and sustain water resources on one hand and the need to develop and use them on the other.

The Department of Water and Sanitation (DWS) is busy with the process of determining water resources classes for all river systems in South Africa to ensure their protection and sustainable use, with the Thukela River catchment in KwaZulu-Natal being the current river system being classified.

WHERE ARE WE IN THE CLASSIFICATION PROCESS?

The Water Resource Classification System (WRCS) lays out a set of procedures grouped together in seven steps that, when applied to a specific catchment, will result in the determination of a water resource class. A key component of classification is integrating economic and social goals into the determination of the water resource class. The classification process is indicated in Figure 1.

The Thukela study was initiated in August 2019. Step 1 of the water resource classification process has been completed. Following delineation of integrated units of analysis and status quo assessment, linking the value and condition of the water resources resource is the next step required in terms of the water resource classification procedure. Step 2 of the process is presented here for your information and will be discussed at the second PSC meeting in more detail.

As classification is supported by stakeholder engagement, the Department requires stakeholders to provide technical knowledge and catchment specific attributes for the benefit of the study. At this stage of the study stakeholders were invited to provide inputs into linking the value and condition of water resources in the study area to economic prosperity and social well-being.

DWS Study Managers

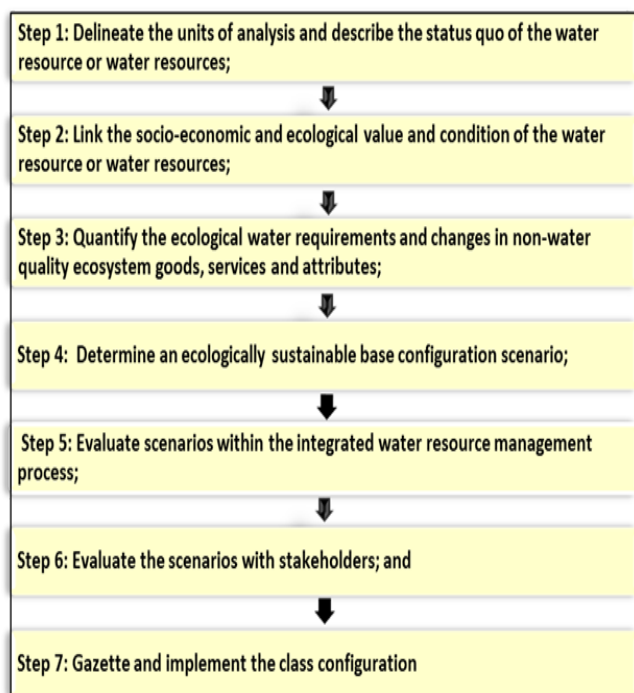| Ms Lebogang Matlala	Director: Water Resource Classification	(012) 336 6707	082 884 5399	matlalal@dws.gov.za
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Figure 1: The 7 Step Classification Procedure

OVERVIEW

Determination of a water resource class aims to achieve a balance between protection of a water resource and the use thereof to meet social and economic goals. The WRCS places the following principles at the forefront of implementation:

- Maximising economic returns from the use of water resources;
- Allocating and distributing the costs and benefits of utilising the water resource fairly; and
- Promoting the sustainable use of water resources to meet social and economic goals without detrimentally impacting on the ecological integrity of the water resource.

The Thukela catchment contributes an estimated R79.3 billion to the economy of South Africa. This economy represents only 1.9% of the national Gross Domestic Product (GDP) of R 4.17 trillion (Stats SA 2017). The largest sectors include the government, agriculture, and hotels and restaurants which represent 14.5%, 10.3% and 4.9% contribution to the catchment.

The catchment has a highly rural character and the economy is relatively small from a formal economic perspective. There is likely an important informal economy. As a result, ecosystem services have been demonstrated to provide significant contributions to socio-economic wellbeing to both formal and informal economy beneficiaries within the catchment.

Ecosystem services linked to the socio-economics of the Thukela were identified to include the following:

- Fresh Water Provisioning;
- Water Quantity Regulation;
- Food, Raw Materials and Wild Collected Products Provisioning;
- Erosion Regulation;
- Water Quality Regulation: Purification and Waste Management;
- Spiritual, Landscape and Amenity Services;
- Tourism and Recreational Services; and
- Biodiversity Support.

ANALYSIS FRAMEWORK

Impacts or changes to ecosystems (or Ecological Infrastructure) alters the ability to supply valuable services to beneficiaries. Ecological infrastructure refers here to functioning ecosystems that deliver valuable services to people such as fresh water, water and climate regulation, cultural services and soil formation. Ecological infrastructure is the nature-based equivalent of built or hard infrastructure which includes features such as wetlands, rivers and other watercourses, forests and entire catchments.

The classification of the cause and effect relationships (or linkages) between ecological infrastructure and beneficiaries of ecosystem services is vital to appropriately manage natural resources in a sustainable manner. Informed appropriate natural resource management maximises natural benefits and opportunities towards contributing to optimal socio-ecological and economic well-being. The classification of these linkages requires an understanding of the role that ecological infrastructure and the presence of beneficiaries (at a landscape, local and regional scale) plays in the delivery of ecosystem services. See Figure 2 for Decision Analysis Framework. The Decision Analysis Framework demonstrates the linkages between ecological value and condition of the water resources and utilises an ecosystem services approach. The Framework allows for the assessment of the implications of different catchment configuration scenarios at an IUA level on economic prosperity, social wellbeing and ecological condition.

An established approach to defining these linkages is through the use of Ecosystem Services Frameworks as formalised and refined through initiatives such as the Millennium Ecosystem Assessment (MEA 2005, MEA 2010), The Economics of Ecosystems and Biodiversity (TEEB, 2013) and the Final Ecosystem Goods and Services Classification System. This approach is refined through the use of complimentary economic tools and methodologies such as environmental economic accounting (specifically water resource accounting) and quasi input-output modelling.
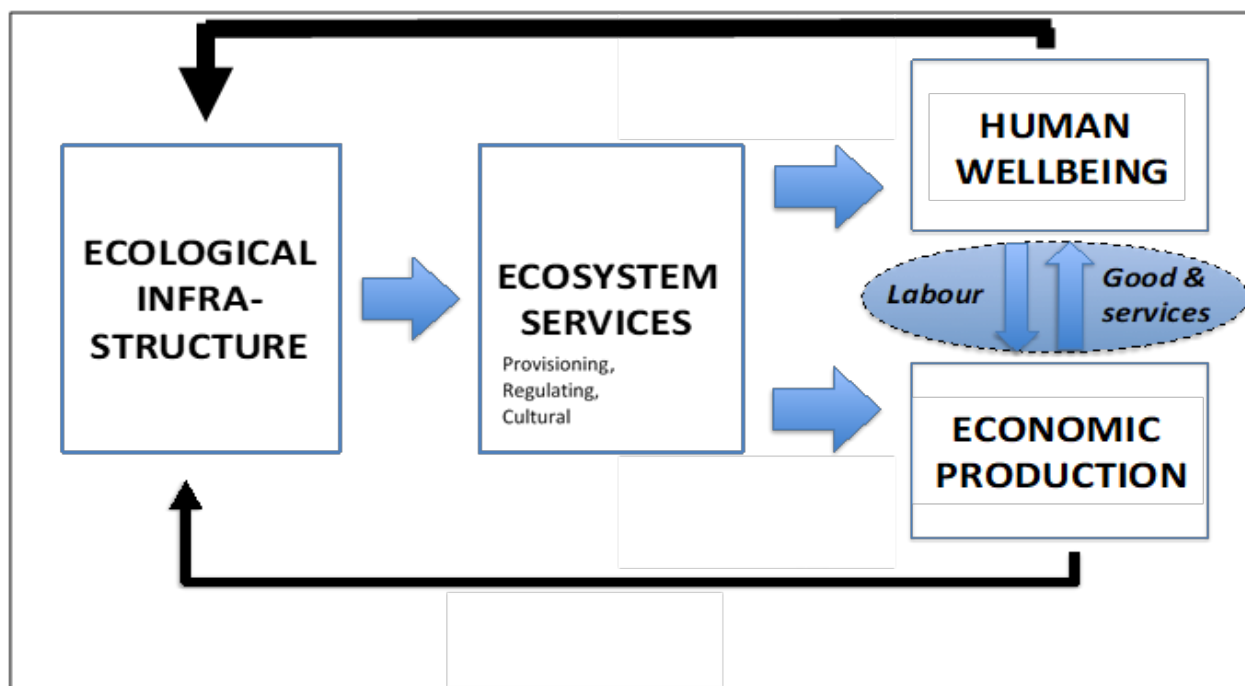
Figure 2: Schematic representation of the Decision Analysis Framework used to inform the assessment of the implications of different catchment configuration scenarios

APPROACH

The aim of this step of the water resource classification process is to demonstrate the linkages between the socio-economic and ecological value and condition of water resources as they currently stand in the Thukela catchment. This linkage step will be used to inform the evaluation of scenarios at a later stage in the WRCS process. This step aimed to develop the Integrated Economic Model (IEM) for the Thukela catchment towards demonstrating socio-economic and ecological linkages. The broad approach taken to develop the IEM is provided in Figure 3.

Key inputs, components and outputs of the process include the following:

- The drivers of change, which represents the current baseline scenario. This component will eventually represent various scenarios which will drive changes in the relationships defined at this point;
- The ecological responses to change in development scenario, which in this case are quantified change to hydrological (flows) and ecological (condition) indicators;
- The classification of socio, ecological and economic characteristics within the target catchment linked to the effects of varying response inputs. The classification process was done through the use of three modular tools (described below), which through the IEM linked

ecological responses to changing scenarios with a socio-economic response:

- o The ecosystem services valuation module aims to link the presence and condition of ecological infrastructure with key beneficiaries through the use of ecosystem services frameworks;
- o The Water Account module aims to define the use of water through physical flows and financial transactions. This allows analysis on how economic changes impact the environment and conversely how changes in water availability impact the economy;
- o The Quasi-Social Accounting Matrix (QSAM) module aims to quantify the size of the Thukela economy. The QSAM combines the suppliers and consumers of economic products into a single matrix (table of interacting economic sectors) in order to determine the magnitude of the macro-economic indicators of the Thukela economy.

- The socio-economic response to change in development scenario, which in this case is presented through key economic indicators such as Gross value adding, jobs and value of ecosystem services. At this point the socio-economic response represents the current status-quo of the catchment.

At this point of the WRCS 7 step process the methodologies are used to establish the IEM architecture and populate the modules using the best available data obtained at a desktop level. The IEM will be updated as additional primary data becomes available.
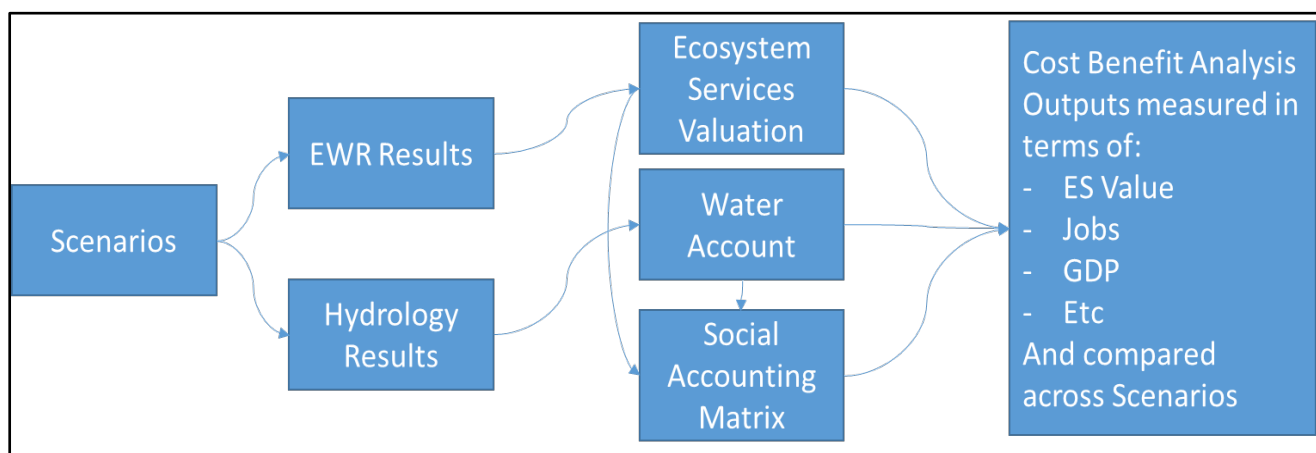

Figure 3: Approach to the development of the Integrated Economic Model that Demonstrates the Socio-Economic Linkages in the Thukela Catchment (Arrows indicate flow of data from input to output)

THE WAY FORWARD

This BID and the task report serve as a basis for engagements with the PSC members on Step 2 of water resource classification process in the Thukela catchment. The socio-economic analysis is dependent on (a) acquiring relevant information through acceptable data sources, (b) developing an appropriate decision-analysis framework to enable modelling and cost-benefit comparison of the future water resource management scenarios, and (c) development and assessment of plausible future water resource management scenarios. This engagement is to enable PSC members to contribute effectively to the finalisation of the socio-economic components of the classification process in the Thukela catchment. Given the importance of this component to the broader process, participation is strongly encouraged.

The next steps of the classification process that will follow, include, quantifying the ecological water requirements, and defining the ecological sustainable base scenarios for the water resources per IUA.

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