



## TERMS OF REFERENCE FOR A SOLICITED PROJECT

<b>KEY STRATEGIC AREA</b>	Water Resources and Ecosystems
<b>THRUST: 3</b>	Water resources and ecosystem protection and utilization
<b>PROGRAMME: 1</b>	Resource directed measures
<b>TITLE</b>	Ecological infrastructure-climate change and economy nexus through revised present ecological state (PES) lens.

### **Overall aim:**

The research has followed silo approach in most cases, where Ecological infrastructure, or resilience to climate change, green economy are not thought and dealt with as a complex, yet they are inter-dependent as in a nexus. The country is missing the state of water resources report, particularly on water quality. Present Ecological State (PES) has the ability to generate this, provided the decade old PES is reviewed and enhanced with latest scientific advancement such as the ecological infrastructure, climate change and economy in a nexus. Therefore the overall aim of this call is to develop a decision support framework that brings the real world of socio-ecological complexity through integrating the economic development demands and impacts of climate change on water resources health.

### **Specific:**

1. Update the data (PES/EIS and the REC) of rivers, estuarine and wetlands according to quaternary catchments for each of the 9 WMAs
2. Provide information on the state of rivers, Ramsar wetlands and estuaries ecological states in the country
3. Input information to determining ecological conditions for the assessment of Water Use Licence Authorisations (WULAs), water resource reconciliation, planning and management plans
4. Monitoring benchmarks and compliance to recommended management ecological categories (REC), including resource health, restoration and mitigation/resilience measures
5. Mapping of country water resources with their associated aquatic health state (PES and REC)
6. A framework to assist in decision-making where economic development, climatic changes and ecological infrastructure are considered in a nexus

### **Rationale:**

Present Ecological State (PES) refers to overall condition or health of a water resource type (ecostatus) which is based on its biophysical characteristics. The health of a river, wetland or estuary indicates its ability and capacity to provide a variety of services to society. Ecological importance (EI) refers to the diversity, rarity or uniqueness of the habitats and biota. Consequently, it reflects the importance of protecting these ecological attributes, from a local, national and international perspective (e.g. Ramsar site). Ecological sensitivity (ES) refers to the ability of the ecosystem to tolerate disturbances and to recover from certain impacts (resilience). Therefore, the more sensitive the system is, the lower its tolerance will be to various forms of alteration and disturbance. This serves as a valuable indication of the degree to which a water resource can be utilized without putting its ecological sustainability at risk or beyond its threshold. This is the recommended ecological management class, an output of water resource classification (REC)

The ecological importance and sensitivity (EIS) data is used in the eco-classification process of DWS to determine ecological sensitivity of a water resource reach (e.g. a river) as well as the current (present) ecological state of such a water resource reach. The Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) were determined a decade ago for all main stem rivers in one thousand nine hundred and forty six (1946) Quaternary catchments in the country. Since the completion of the first PES/EIS study the need for more accurate and higher confidence data has become dire (DWS). Important management decisions are dependant and based on the ecological targets set for catchment sites. Decisions that influences increased protection and conservation measures (including biodiversity), impact on future development and subsequent economic investment in SA, as well as decisions around the social equitable and efficient use of the countries scarce water resources, all rely greatly on the accuracy and confidence of the PES/EIS and REC data.

Chapter 3 of the NWA, places an obligation on Minister to determine the Class, setting Resource Quality Objectives (RQO), and determining the suit of associated Reserve categories for significant water resources. The main objective being to balance the flow needs for the natural water resource (EFR or EWR) and its future use for socio economic development. This ensures sustainable development. The pressure on natural resources in a rush to green economy recovery post the COVID-19 pandemic is on global agendas, such as World Economic Forum list of Risks to humanity. On the other hand all our water resources in South Africa (and globally) have been degraded well beyond the 50%, some estimated as high as 78% for wetlands (NBA, 2018). The situation is progressively made worse by climate change and lack of resilience, the spread of thirsty alien invasive plants, as well as unlicensed mining activities which have no mitigation/rehabilitation measures in place post the mining lifespan and pollution from irresponsible agricultural activities. No economy will prosper on a sick catchment (World Economic Fofum-UNEP), hence the urgent need to focus more on restoration of the degraded ecosystems that can in turn provide benefits to society. It is therefore imperative that drought impacts driven by climate change, ecosystem degradation due to poor landscape or ignored recommended ecological management categories (REC) provided by the water resource classification processes are all conceptualized together (as opposed to current silo approaches) as the country tries to recover the economy so critical in creating job opportunities where unemployment is currently above 40% and worsening following the COVID 19 impacts on business.

#### **Deliverables:**

The main aim of this project is to assess and update the PES/EIS/REC data for appropriate use in the several environmental processes as outlined under objectives section. The Recommended Management ecological categories (REC), the ecological importance and sensitivity (EIS) as well as the present ecological states (PES) will be determined according to quaternary, and in some cases sub-quaternary catchments depending on the sensitivity of the ecosystem's biota versus the threats posed by economic development, climate change on the ecological infrastructure status. The PES/EIS/REC assessment will be done for all of the nine (9) WMAs, thereby generating a map of the current state of rivers, wetlands and estuarine health in SA at a glance. A framework to assist in the decision-making where economic development, climatic changes and ecological infrastructure are considered in a nexus will be the key final deliverable of this study.

As it is most unlikely that a single organization will have all the expertise required, it is strongly recommended that a consortium of expert and organizations with full appreciation of the climate change risks/mitigation, ecological infrastructure and green economy principles is formed in order to provide the highly specialised knowledge required.

#### **Impact Area:**

Policy support and other related Knowledge tree impact areas

The estimated budget over a 36-month long study is available from KSA 1-2

**Time Frame: 36-months**

**Total Funds Available: R 2 500 000**

**Budget for 1<sup>st</sup> year: R 500 000**

