TERMS OF REFERENCE FOR PROFESSIONAL CONSULTANCY SERVICES FOR AN INTEGRATED FLOWS ASSESSMENT TO FACILITATE THE DEVELOPMENT AND AGREEMENT OF "OBJECTIVE FLOWS" AT KEY SITES IN THE PUNGWE BASIN

1. Background

The GEF-funded project "Management of competing water uses and associated ecosystems in Pungwe, Buzi and Save basins" is being implemented by the International Union for Conservation of Nature (IUCN) and executed by GWP-SA together with the Government of Mozambique (GoM) and Government of Zimbabwe (GoZ). It targets the conservation and sustainable use of the transboundary water resources, including the risk mitigation components within the Buzi, Pungwe and Save river basins shared bilaterally by Mozambique and Zimbabwe. The 3 basins are located along the Beira corridor, an important economic corridor that links Beira harbour to the hinterland, with associated impacts on the environment (pollution from mining activities, intensive agriculture, deforestation, saline water intrusion etc.). Populations in the basins have become highly vulnerable to climate hazards (i.e., floods, droughts, cyclones) whose occurrence is likely to increase with climate change aggravation.

The increasing developments in the basin water uses is now raising the issue of equitable water allocation and the accompanying dimension of environmental flows that has particular importance in a transboundary context. For example, a number of dams are planned in the Pungwe on the Mozambique side and the Gorongosa Dam was recently commissioned. Both Upstream and downstream there are current and planned developments with an impact on the flows. These resource aspects are of highest importance for the communities that derive their livelihood from ecosystem services, in a context of endemic poverty and low resilience to climate change impacts. The project seeks to promote holistic approaches to the water-food-energy nexus, with specific interest in connected ecosystems. It has a double focus of developing capacities for managing water resources and designing participatory and community–based strategies.

The project's main objective is to strengthen the management of transboundary water resources and connected ecosystems for sustained ecological benefits and improved resilience for the riparian communities. This contributes to GEF's Strategic Objective 1 which seeks to conserve, sustainably use, and manage biodiversity, ecosystems, and natural resources globally, considering the anticipated impacts of climate change. The need for developing transboundary cooperation for water resources management has been materializing for years through several initiatives, including the signing of the Pungwe and Buzi transboundary agreements (the Save agreement is under preparation, and the wish to establish a bilateral tri-basin river basin organisation. Through the following 4 components, the project will contribute to supporting transboundary cooperation for water resources management, either with the development of joint initiatives (joint hydrological monitoring campaigns), common tools development (TDA/SAP, adoption of guidelines for eflows implementation), bilateral capacity building or through experience sharing (on community-based early warning systems for instance).

- **Component 1** will contribute to strengthening water-related risk management through the reinforcement of monitoring systems, the development of real-time operational tools, and the empowerment of communities in their flood mitigation autonomy.

- **Component 2** will focus on enhancing ecosystem services through quantitative water management, including operationalisation of environmental flows (assessment and legal framework establishment), and through water quality improvement.
- **Component 3**: National inter-ministry committees and technical advisory teams will contribute to the development of a regional Transboundary Diagnostic Analysis and subsequently to the preparation of a Strategic Action Plan.

The assessment and implementation of environmental flows is considered a priority by both Mozambique and Zimbabwe. Lack of capacity has previously been identified as a major constraint to improve the transboundary management of the shared water resources in both countries. Consequently, the BRIDGE initiative, piloted by the IUCN, implemented e-flow training sessions for the development of capacity to assess and manage environmental flows. The IUCN collaborated with Waternet, a SADC subsidiary institution mandated to develop capacity on integrated water resources management in the region. Waternet delivered in 2015 and 2016 two modules to participants responsible for planning and managing the shared river basins in Mozambique and Zimbabwe.

IT is within the context of this project that expressions of interest are invited for the environmental flows assessment of the transboundary Pungwe basin.

2. Objectives of Consultancy

The objective of this integrated flows assessment assignment is therefore to support the Mozambique and Zimbabwe governments to facilitate the consultation process of determining 'objective' flows at strategic points in the transboundary Pungwe basin, that will, amongst other considerations, inform specifications about downstream flows in the Pungwe basin agreement. Downstream flows will rely both on e-flows determination (flows to feed ecosystems) and allocation (e-flows + flows to feed downstream uses), based on environmental targets as specified by basin stakeholders. The specific objectives will include:

- Identification and characterization of key ecosystems connected to rivers (aquatic, wetlands, groundwater), and of their water needs, in addition to identification of key water management nodes from a resource allocation and use perspective;
- E-flows model development and determination of e-flows in a range of typical aquatic habitats and "hotspot" ecosystems.
- Characterization of current and potential water demand and uses and their impact on river flows.
- Determination of objective flows and the corresponding ecological status they can support at strategic points in the basins, based on the environmental targets agreed upon by basin stakeholders.
- Recommendations to both countries of objective flow values at strategic points and rules/tools for computing these values elsewhere;
- Recommendations on the incorporation of eflows considerations in the establishment of guidelines and legal texts for the transboundary framework (basin agreements) and national frameworks (water allocation).

3. Scope

This Consultancy will include (but may not be limited to) the following tasks:

Phase I

3.1. Characterize the ecosystems connected to the river system and value their benefits through the following:

- Ecosystems characterization in identified hotspots
- Resource economic - identify and characterize the benefits derived from ecosystems connected to the hydro-systems.
- Ecosystem prioritisation - Designate priority ecosystems, in terms of biodiversity and in terms of economic contribution, so as to highlight and raise awareness on the ecosystems particularly important in terms of services provision/economic contribution and nature conservation.
- characterization of current and potential future demand or water use scenarios and their impact on the river system.

Phase II

3.2. Determine e-flows for priority ecosystems using identified suitable pilot sites across the basin through:

- Adapting an acknowledged international methodology for assessing real ecosystems needs to the basin's concerns, specifying clear requirements for stakeholders' involvement.
- Determining e-flows at priority sites, including key sites as dictated by the requirements of the basin agreements, and validating these with project stakeholders.

3.3. Using assessment results from 2, determine the trade-offs and options for integrated flow management in the Pungwe Basin – this includes a focus on flow management during drought conditions, developing recommendation for defining both:

- Drought management procedures, including the definition of water levels warnings and alerts, defining vigilance levels; and,
- Drought mitigation interventions

Phase III

3.4. Determine the optimal flow regulations in coastal areas - e-flows assessment scope should cover the mitigation of saline water intrusion in the estuaries.

3.5. Recommendations for integrated flow management guidelines - once the eflows assessment is concluded and stakeholders have decided on the environmental targets and desired ecological status, the e-flows to maintain this, recommendations will need to be made to inform guidelines for operationalising and monitoring e-flows through a negotiated process between member states.

Cross Cutting across all Phase

3.6. Capacity building on e-flows – this should include knowledge transfer activities during the delivery of the integrated flows assessment, to build stakeholders capacity for environmental mainstreaming and e-flows implementation, and the use of tools or procedures developed during the integrated flows assessment

4. Scope of Assignment

These TORs relate to the specialist team that will contribute to setting of the baseline knowledge and analytical framework for a shared diagnosis of ecosystems status, functioning and economic value of the Pungwe basin to inform the Pungwe eflows assessment, which will subsequently inform the development of a Transboundary Diagnostic Analysis and an updated shared water resources strategy, i.e. the Strategic Action Programme (SAP) for joint ecosystem based management of the Pungwe- Buzi-Save river basin.

The E-flows Consultancy is expected to consist of a team of specialists to carry out a comprehensive eflows assessment of the Pungwe basin. The team carrying out the environmental flows assessment is expected to be multidisciplinary, consisting of the following specialist areas;

i. *Socio-economics:* Natural resource use and resource economics, Policy and governance

ii. *Biological/Ecosystems:* Water quality, Geomorphology and sediments, Vegetation, etc

iii. *Hydrological:* Hydraulics, Hydrogeology, Water resources, Hydrology

The Pungwe eflows assessment will proceed in 3 phases. **Phase 1** of the Pungwe assessment consists of an initial physiographic and socio-economic characterisation of the basin, informing delineation of the basin into homogeneous biophysical and social areas, undertaken by a multidisciplinary team of specialists led by an eflows process expert. This will be followed by a rapid estimate of EFlows (holding eflows) for several sites along the drainage network, which will indicate the monthly volumes of flow that could be expected to support different levels of flow driven ecological condition in the river at those sites. This will include a characterisation of the socioeconomic landscape, hydrogeology and groundwater dependant ecosystems, and may also be informed by a concurrent consultancy that is focused on hydraulic modelling to inform flood hazard and vulnerability mapping. These specialist studies will also start interrogating transboundary basin management issues relating to water and other natural resources, and the immediate and underlying causes of these issues among the social and economic activities.

Phase 2 will consist of extensive stakeholder consultation on basin development and basin management scenarios, and objective setting to inform the selection of focus sites for a comprehensive eflows assessment, including field campaigns to get additional information for an in-depth eflows investigation for the focus sites. This assessment will then inform the development of guidelines for eflows implementation at critical sites in the basin in **Phase 3**.

Capacity building – This will be crosscutting across all phases, the consultant is expected to develop a detailed capacity building action plan at project inception, which will then be implemented throughout the execution of the e-flows assessment

5. Tasks, Activities and Deliverables

Phase I

i. Delineation of the study area and profiling of the river
ii. Desktop selection of potential e-flows sites or reaches, and desktop status and trends assessment
iii. Setup for hydrological modelling

Phase II

iv. Hydraulics and hydrodynamic modelling
v. Selection of indicators
vi. E-flows site field visits and capacity building

Phase III

vii. Set up e-flows assessment model and run scenarios
   - Determine estuarine ecological flow requirements
   - Determine marine ecological flow requirements
viii. Develop e-flows basin configuration model/balance model
ix. Report on the implementation of the Capacity building Plan
x. Develop E-flows implementation plan with clear recommendations for guidelines and legal texts

6. Supervision, Reporting and Deliverables

It is envisaged that this Consultancy will produce the following deliverables: -

xi. An Inception Report that contains a clearly defined programme of work and methodology including the estimated budget and scope of work.
xii. Draft Report on the homogeneous delineation of the river basin based on the hydrology, geomorphology, biological, water quality and socioeconomic delineation of the river, with individual Specialist reports as the annexes.
xiii. A synthesis e-flows assessment report covering a range of development scenarios and ecological protection targets with the corresponding environmental flow regimes to be presented to basin member States and stakeholders for consensus on the best scenario to adopt in basin agreements and legal text. In addition to the basin interior, the report should be clear and explicit on e-flows for coastal and marine areas.

xiv. A Basin configuration tool/eflows balance model with a training manual for its deployment

xv. An implementation plan for the agreed-on e-flows with a monitoring and evaluation system and recommendations for the development of guidelines and legal text.

The Consultant shall be supervised and report to the Global Water Partnership SA, specifically, the Transboundary Water Governance and Environment Specialist. Deliverables and reports will undergo an approval process that includes the basin countries and Project Steering Committee. All reports will therefore be submitted as draft, to be finalised after feedback is addressed.

7. Timeline for the development of the Pungwe Eflows assessment

The Consultancy will be undertaken over a period of Thirty (30) months from the commencement of the contract. The Consultant is expected to commence work not later than 2 weeks from the date of the notice to proceed. The Consultant must deploy necessary manpower, logistics and all other necessary items to complete the assignment within the stipulated time. The assignment will include a high degree of consultation with basin stakeholders, and deliverables and reports will undergo an approval process that includes the basin countries and Project Steering Committee. The proposed workplan in the technical proposal should therefore allow for sufficient time for the discussion and approval of the various reports including ensuring that there is knowledge transfer and capacity building for key institutions responsible for water resources management in BUPUSA.

Progress meetings will be held between the client and the consultant, and the consultant will also be expected to participate in strategic meetings to make recommendations and give technical opinion to other project areas based on this assignment.

8. Composition of the Consultant Team

The Consultant is expected to submit a description of the Consultancy team, with staff profiles reflecting the number and levels of professional and support staff required to complete the assignment effectively, efficiently, on-time and on-budget. Brief descriptions of the expected key staff and the minimum requirements for their qualifications and experiences are as follows:

6.1. Team Leader/Eflows Process Specialist

The Team Leader will be responsible for the overall planning and implementation of the consultancy services including team management and coordination; ensuring the achievement of the study objectives; and facilitating stakeholder consultation. He/she will have the overall responsibility for the preparation and finalization of the various reports outlined under this assignment. He/she should have as a minimum, a Master Degree in Water Engineering / Environmental Sciences, water resources management, environmental management, law or social science, or any related field, and 15 years of work experience, of which at least 10 years in the field of relevant ecological studies and other studies like this project, with a significant part of this being in Africa. General Working knowledge of the Southern African region, and in particular familiarity with the BUPUSA Basin will be an added advantage. The Team Leader should have a proven track record of managing multi-disciplinary teams and should have acted as a Team Leader for at least 3 similar projects, with experience in the undertaking and preparing of Environmental Flows projects and reports. Previous experience and knowledge of the relevant laws and regulations in Zimbabwe and Mozambique will be a significant advantage. The Team Leader must be fluent in English and must possess excellent communication and report writing skills.

6.2. River Hydraulics Engineer

Minimum qualification of a Bachelor Degree in Civil or Agricultural Engineering or any other relevant fields and 10 years of work experience in planning and development of concept and preliminary designs of hydraulic structures.

6.3. Hydrologist(s): Minimum qualification of a Bachelor degree in Hydrology/Water Resources Planning/Civil Engineering or related fields, with 10 years of relevant work experience in in undertaking feasibility hydrology studies of large river basins with surface, wet land and lake systems; large water pipelines' projects, multipurpose water projects and strategic water assessments.

In addition to the above, the Consultancy team must also have the following expertise

- Wetland and River Ecology Specialist
- Marine and Estuary Specialist
- Geomorphologist
- Water Quality Specialist
- Ecologists: vegetation, wildlife etc Specialists
- Governance and Resource Economics Specialist

The Consultant may propose a schedule of other required staff. The combined team should have a good experience of similar projects in Southern Africa, and knowledge of local languages will be an added advantage.

7. Other Provisions

7.1 Taxes

A withholding tax shall be charged to the consultant, and GWPSA will avail the corresponding tax certificates. GWPSA will not be liable for any additional taxes due to tax Authority/ies in the country of origin of the Consultant.

7.2 Travel

The Consultant is expected to engage stakeholders and key role players through a number of regional workshops and field visits. The list will include, but not be limited to relevant Departments and institutions in the Member states, and project partners as listed in the BUPUSA GEF Project Document.

8. Application for Consultancy

The applicant is expected to submit separate **Technical and Financial Proposals** clearly detailing total number of days to complete work and daily rates inclusive of all anticipated costs in United States Dollars (USD) during the period of assignment. The term "all-inclusive" implies that all costs (professional fees, communications, consumables, VAT etc.) that could be incurred by the consultant in completing the assignment are already factored into the daily fee submitted in the proposal. However, travel costs should be identified separately in line with proposed activities and allocated consulting days.

Electronic Technical and Financial proposals should be submitted in the **English Language** with a subject line clearly titled: **"Consultancy services for an integrated flows assessment to facilitate the development and agreement of "objective flows" at key sites in the Pungwe basin"** through email to Mr Mark Naidoo mark.naidoo@gwpsaf.org with a copy to Dr Pinimidzai Sithole pinimidzai.sithole@gwpsaf.org by no later than the 31st of December 2021. Detailed Terms of Reference for this consultancy can also be obtained from the GWPSA website here.