**APPENDIX 3**

**INCREMENTAL COST ANALYSIS**

**Baseline activities**

The TWAP methodologies for the five transboundary water systems (aquifers, lake basins, river basins, large marine ecosystems, and the open ocean) are largely based on years of work by numerous world renowned institutions on various aspects of water systems analysis, monitoring, and management. The conduct of systematic and indicator-based assessments for five Transboundary water systems around the globe, will build on the baseline further described below. The added value of GEF incremental funding through the TWAP will be the transformation of dispersed information into an integrated assessment useful to underpin high-level management decisions that should ultimately lead to enhanced sustainability of the ecosystem goods and services associated with transboundary waters. Through the activities of this project, the GEF will integrate the outcomes of the baseline assessment programmes of relevant partners, thereby facilitating the acquisition and analysis of the data, information and modelling results that are fundamental to producing the needed holistic approach to global transboundary waters assessment.

***Transboundary Aquifers.*** The programmatic baseline for the Transboundary Aquifers (TBAs) Assessment is largely based on the relevant work and activities of the four members of the TWAP groundwater coalition core group: UNESCO-IHP, IGRAC, the WWAP, and FAO. UNESCO-IHP has 35 years of institutional experience at the global scale, and its ISARM and Worldwide Hydrogeological Mapping and Assessment Programme flagship programmes provide access to the most comprehensive data and knowledge on TBAs available. IGRAC commands the Global Groundwater Information System, relevant TBA data sets and special thematic projects, as well as mapping of TBAs. The UN’s WWAP and World Water Development Reports I to III highlighted the most recent global-scale knowledge on freshwater resources. FAO’s Information System on Water and Agriculture provides comprehensive data on water resources and water use, including the Global Map of Irrigation Areas. The monetary value of these baseline programmes that contribute data, information and expertise to the TWAP assessment of Transboundary Aquifers is estimated at **30 million US$**. Incremental funding provided by the GEF will allow for addressing knowledge gaps, and advancing the knowledge on TBAs globally, by establishing a long-term partnership and pooling of data and information.

***Transboundary Lake Basins.*** The Lake Basin assessment methodology builds on more than 25 years of intense, collaborative, international work on Integrated Lake Basin Management (ILBM) led by the International Lake Environment Committee (ILEC) Foundation **(25 million US$),** as well as monitoring and assessment activities carried out over recent decades in individual lake basins in countries throughout the world, global-level datasets not developed specifically for lakes and reservoirs, but nevertheless directly applicable to the TWAP assessment **(500 million US$)**. The value added by TWAP to this ongoing international work is to: (1) develop formal ILBM indicators applicable to transboundary lake basins, and (2) improve the integration of rivers, groundwater and Large Marine Ecosystem assessments and management within the ILBM concept.

***Transboundary River Basins.*** The River Basins assessment methodology builds on ongoing baseline programmes of partners, worth **30-40 million US$ over the last 10 years**. This includes global modelling and assessments from the Universities of Kassel, Frankfurt, and New York, Center for International Earth Science Information Network, International Geosphere-Biosphere Programme (IGBP), and IUCN. This is complemented by projects and institutional experience in water governance associated with the UNEP-DHI Centre for Water and Environment (UNEP-DHI), Stockholm International Water Institute (SIWI), and Oregon State University. The assessment will utilize global datasets from the World Bank, FAO, United Nations Children’s Fund, World Health Organization, and the Global Water System Project, among other sources. Incremental funding provided by the GEF will allow for filling knowledge gaps and advancing the knowledge on transboundary river basins globally, by establishing a long-term partnership and pooling of data and information.

***Large Marine Ecosystems.*** The TWAP LME assessments will build on a substantial programmatic baseline, consisting of a wide array of global, regional and national monitoring/observing and assessment programmes and datasets relevant to key indicators for assessing LMEs. These sources include satellite remote sensing information, empirical observations and mathematical modelling from organizations such as IOC-UNESCO, NOAA, UNEP, UNEP-WCMC, University of British Columbia ‘Sea Around Us’ project, IGBP, Centre for Resource Management and Environmental Studies, University of the West Indies; GESAMP and FAO. Similarly, baseline assessments can build on the State of the Marine Environment reports conducted periodically by the Regional Seas Conventions and Action Plans. The value of this programmatic baseline collectively amounts to about **10.5 million US$**. However, this baseline has not previously been harnessed in an integrated, coordinated manner for a comprehensive global assessment of LMEs. The GEF increment will catalyze a partnership among these and other key organizations to enable such a global assessment.

***Open Ocean.*** The Open Ocean methodology builds on natural science observations and research coordinated globally by the Intergovernmental Oceanographic Commission of UNESCO’s (IOC-UNESCO) (GOOS). The IOC coordination effort of **1 million US$/year** leverages about **2 billion US$/year** of national investment in global ocean observations. A specific grant to IOC-UNESCO from the European Commission for the Global Earth Observation System of Systems interoperability for Weather, Ocean and Water) will underpin the information management and mapping in the assessment. Thematic partner programmes in climate (the World Climate Research Programme), ocean ecosystems and biodiversity (Center for Marine Assessment and Planning; UNEP-WCMC), fisheries (‘Sea Around Us,’ FAO), pollution (GESAMP), and marine governance (Centre for Resource Management and Environmental Studies, University of the West Indies; Dalhousie University) have elements essential to the TWAP Open Ocean assessment. The scientific community is active in research on the link between human well-being and the management of the human impact on the open ocean, and a desk review of this literature will add to the assessment of potentially high-uncertainty but high-risk issues. The GEF increment will transform this extensive, but disperse, knowledge base into information of relevance to stakeholders, catalyzing political action and sounder policy and management.

***UNEP’s baseline – a cross cutting contribution***. Consistent with its mandate to keep the state of the global environment under review, and to promote scientific assessments of current and emerging issues for policy and decision making purposes, UNEP is providing the world community with improved access to, and better understanding of, meaningful environmental data and information. In doing so, it also is helping to increase the capacity of governments to use environmental information for decision-making and action-planning for sustainable human development. UNEP also works closely with many partners and collaborating centres in all regions of the world, and has over time established functional networks for data, information, assessments and capacity development. Further, in carrying out its mission, primarily through its Division of Early Warning and Assessment (DEWA), UNEP is implementing or participating in several ongoing global and regional environmental assessments, as well as the planned UNGA 60/30 regular process for Global Reporting and Assessment on the State of the Marine Environment, including the socioeconomic aspects. UNEP’s role in incorporating science into multi-national water projects has continuously been demonstrated through its oversight functions and its leadership role in the framework of its Regional Seas Programme. This role includes development of a comprehensive framework for the study of various water systems, with the main objective of identifying, assessing and proposing best management options directed to fresh, coastal and marine waters. Under its Marine and Coastal Ecosystems Branch, UNEP coordinates the 18 Regional Seas Conventions and Action Plans representing 143 member countries. These quasi-legal frameworks provide valuable entry points for conducting regular assessments at the national and regional level, including over 30 years of experience in developing regional State-of-the-Marine Environment reports. Similarly, UNEP also participates in the freshwater agenda at the international and national level, promoting scientific assessment and access to scientifically-credible environmental data and information, and supporting capacity building through its Freshwater Programme and Strategy, the GPA, GEMS-Water Programme, GEO water cluster, etc.

The UNEP DEWA and UNEP Regional Seas programmes baseline contribution from its global and regional assessment programmes and datasets is valued at 2.5 million US$ to support the TWAP (Rivers-LMEs-OO). The assessments will build on existing assessments, with access to scientifically credible data and information being made available through UNEP’s programmes, and its long-term partnerships and networks. The GEF increment will facilitate the solidification of long-term coordinated partnerships in support of a periodic assessment process, the results of which will be of interest and value to scientists, decision-makers and the public. It will also promote and facilitate the incorporation of transboundary concerns into regular assessment programmes.

**Business as usual scenario**

One of the major constraints to the effective management of transboundary waters at the present time is the lack of a systematic, periodic assessment of their changing conditions, and their subsequent impacts on human wellbeing. This hinders the GEF and other agencies from setting priorities for funding, and for documenting the results of its investments in relation to the changing state of these transboundary systems. Without the assessment framework proposed by this project, the ability of the GEF and international communities to prioritize their interventions will remain limited. Under the business as usual scenario, the efforts to assess transboundary water systems around the world are likely to continue in the current unsystematic and inefficient manner. In the absence of GEF resources, little attention will be given to a process that allows for a robust science-based foundation, in the form of a global assessment of transboundary systems, designed to support informed interventions in key strategic systems. Further, a lack of systematic utilization of available data, information and expertise around the world, results in a lack of synergistic effects regarding the use of the existing enormous, but scattered, data and knowledge base.

**Incremental cost reasoning**

GEF has invested one billion dollars since 1990 to address transboundary water concerns identified by countries based on system-specific analyses of the transboundary waters and the root causes for degradation of their resources and environment. There is currently no global/regional mechanism that specifically focuses on the assessment of transboundary water systems, although there are a number of global/regional assessment programmes which either focus on specific issues (such as fisheries), or which assess both transboundary and domestic issues together in a limited manner. There is currently no way to utilize the data arising from GEF international waters projects beyond the projects themselves, and there is no global system to track the status of these water systems over time, in order to determine whether they are improving or degrading. Without a framework such as that to be provided through this project, as outlined above, the GEF and international community risk spending scarce financial resources in the wrong places, and will not be able to demonstrate results over time relative to other waterbodies. This project will apply the agreed methodology, and formalise the needed partnerships and implementation arrangements with existing, fragmented programs to serve GEF corporate needs as specified in the International Waters Focal Area Strategy and Strategic Programming for GEF-4 and International Water Strateg for GEF-5 approved by the GEF Council.

In the absence of a global comparative baseline assessment to determine priority transboundary concerns, and priorities for investments, and without an institutional framework and agreed methodology for tracking the status of these water systems over time, the GEF and the international community risk spending their scarce financial resources in a manner that is not cost–effective. Such a global, comprehensive assessment has not yet been undertaken, since the existing assessment situation is quite complex, with many agencies collecting some relevant information, and global science organizations undertaking modelling and making projections based on the data collected. Additionally, there is no GEF programme for capturing and analysing the time series of data collected by GEF IW projects, the latter being a valuable addition to a global assessment. The MSP, upon which this proposed project expands, has developed and validated a system and indicator-based assessment methodologies, and has established a consortium of partners ready to collaborate and share information toward such a global assessment.

The proposed project will provide GEF with tools for effective allocation and management of GEF financial resources for priority waterbodies. It will also facilitate incorporation of “transboundary” aspects in ongoing and regular global water assessment programmes, as summarised above in “Baseline Projects” and presented in Appendix 2. The proposed projections of the states of the assessed transboundary waters for 2030 and 2050 will be used for policy applications. Through pilot efforts on a smaller subset of aquifers, rivers, lakes, and LMEs, in-depth assessments of the root causes of environmental degradation will be conducted. The project will also contribute to addressing specific data gaps identified during the MSP that are of critical importance for assessing the five water systems at the global level.

The project, as appropriate, will identify “high risk” transboundary groundwater aquifers, lake basins, river basins, and LMEs, as well as “high risk” issues related to the open ocean that will allow the most cost-effective use of available funds. While seeking to minimize costs, the project will also add value by utilizing: (i) GEF IW projects, ongoing assessment processes, current datasets and information, and (ii) a consortium of partners established during the MSP, and effective coordination among agencies carrying out regular assessments, which will result in a significant cost-effective system for assessment of transboundary waters, as well as helping to secure long-term sustainability of the assessment. Thus, the GEF contribution to this project is both catalytic and incremental. Given that the project will focus on assessing transboundary water concerns, it is wholly incremental to the baseline efforts. The proposed global assessment of transboundary water systems in identifying the most urgent problems, and therefore priorities, and the most cost-effective investments will help maximise global environment benefits.

This project is designed from the perspective that, by understanding the existing situation regarding transboundary water systems, it may have at least a catalytic, and hopefully a transformational impact on global political discussions addressing transboundary waters. This would occur through project partners and their intergovernmental and political processes, as well as through global political processes related to oceans and water.

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| **Component** | **GEF Grant** | **Co-financing** | **∑** | **Ratio** | **Source** |
| Aquifers | **1.500.000** | **7.614.000** | **9.114.000** | 5.1 | FSP |
| Lake Basins | **300.000** | **1.210.000** | **1.510.000** | 4 | FSP |
| River Basins | **1.500.000** | **6.188.731** | **7.688.731** | 4.1 | FSP |
| LME-s | **400.000** | **4.325.000** | **4.725.000** | 10.8 | FSP |
| Open Ocean | **600.000** | **6.201.582** | **6.801.582** | 10.3 | FSP |
| Cross-cutting | **100.000** | **100.000** | **200.000** | 1 | FSP |
| D&M Manag. | **180.000** | **1.189.000** | **1.369.000** | 6.6 | FSP |
| Terminal Eval. | **70.000** | **50.000** | **120.000** | 0.7 | FSP |
| Project Manag. | **350.000** | **1.470.500** | **1.820.500** | 4.2 | FSP |
| **∑** | **5.000.000** | **28.348.813** | **33.348.813** | **5.7** | FSP |