Reducing Transboundary Degradation in the Kura Aras river basin

UNDP/GEF Kura Aras project

Full sized project

PIMS 2272

Demonstration Project
Inception Workshop Report

November 2011

Empowered lives.
Resilient nations.

Table of Contents

ACRONYMS

CNA	Capacity Needs Assessment
CTA	Chief Technical Advisor
DP	Demonstration Project
DP-IW	Demonstration Project Inception Workshop
EBRD	European Bank for Reconstruction and Development
EQO	Environmental Quality Objectives
EU	European Union
GEF	Global Environmental Facility
GIS	Geographic Information System
HPP	Hydropower plant
IWRM	Integrated Water Resource Management
M&E	Monitoring and Evaluation
MoE	Ministry of Environment of Georgia
MoENR	Ministry of Ecology and Natural Resources of Azerbaijan
MoNP	Ministry of Nature Protection of Armenia
MoU	Memorandum of Understanding
NCs	National Coordinators
NE	National Expert
NFP	National Focal Point for Represented Ministry
NGO	Non Governmental Organization
PCU	Project Coordinating Unit
PDF-B	Project Development Phase B
REA	Rapid Ecological Assessment
SAP	Strategic Action Plan
SC	Steering Committee
SRF	Strategic Results Framework/Logistical Framework
TDA	Transboundary Diagnostic Analysis
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office of Project Services
USAID	United States Agency for International Development
WFD	Water Framework Directive of the European Union

1. INTRODUCTION

The underlying report presents the results of the Demonstration Project Inception Workshop (DP-IW), conducted on the 24th of November, 2011 in the framework of the UNDP/GEF project "Reducing transboundary degradation in the Kura-Aras river basin".

The report includes a brief overall introduction of the UNDP/GEF Kura Aras project, its background, objectives, countries involved and executing organisations, as well as an overview of preparatory activities executed in the run-up to the DP-IW. Chapter 2 presents the objectives and expectations of the DP-IW, as well as the minutes of the workshop. Based on the workshop results, the detailed DP work plan was prepared, presented in chapter 3 – its rationale, a description of project activities and expected results as well as a description of execution modalities and a summarised DP budget. Chapter 4 presents an updated DP Strategic Results Framework (SRF) for monitoring and evaluation (M&E) of project implementation progress against quantified targets while in chapter 5 the main conclusions and next steps of the DP-IW report are summarized.

1.1 Background of the project

The UNDP/GEF Project "Reducing Transboundary Degradation of the Kura Aras River Basin" (hereinafter referred to as the "UNDP/GEF Kura Aras Project") will assist the Kura-Aras riparian states to: 1) identify the principal threats and root causes of the trans-boundary water resources of the Kura-Aras River Basin and 2) develop and implement a sustainable programme of policy, legal and institutional reforms and investments to address these threats. Balancing overuse and conflicting uses of water resources in transboundary surface and groundwater basins is seen as the critical issue in the basin and will be a principal focus of project attention from the very outset of project related activities. The Project will create synergies with and build upon a range of initiatives being undertaken by the countries themselves and those of bi-lateral and multi-lateral donors that have given priority to the Basin.

The long-term development/environmental goal of the project is enhancement of sustainable development of the Kura-Aras River Basin through ecosystem-based Integrated Water Resource Management approaches. The project objective is to improve the management of the Kura-Aras River Transboundary Basin through the implementation of a sustainable programme of policy, legal and institutional reforms and investment options using the Trans-boundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) process. In order to achieve this objective, the project will update the TDA, support National Integrated Water Resources Management (IWRM) plans which will be the base of the SAP, undertake a range of public involvement and awareness activities focusing on trans-boundary activities, and undertake demonstration projects that implement key aspects of the SAP.

During the development of the preliminary TDA, four priority transboundary problems were identified as affecting the Kura-Aras River Basin: 1. variation and reduction of hydrological flow; 2. deterioration of water quality; 3. ecosystem degradation in the river basin; and, 4. increased flooding and bank erosion. The TDA will be revised taking into account key gap filling activities to be undertaken as part of this project and the ongoing activities of the EU funded Kura-Aras Regional Project. The final TDA and National IWRM planning approaches throughout the basin will serve as the basis for development of the SAP as an agreed programme of interventions for the region. The TDA will review the potential impacts of climate change on the priority transboundary issues. The SAP will be underpinned by the development of national Kura-Aras Basin IWRM plans in Armenia, Azerbaijan and Georgia. The SAP will incorporate a basin vision, water resources quality objectives, targets and interventions in the short and medium term to meet the targets. Key activities that will inform the TDA, National IWRM Plans and the SAP will be the demonstration project on ecological flows and rapid river ecology assessments at key locations in the basin.

The project has been designed in close collaboration with the Kura-Aras Basin countries. It has been developed in coordination with the other major donors, *inter alia*, EU, EBRD and USAID, to ensure maximum synergy and minimum overlap between supporting projects.

The overall objective of the demonstration project is to develop guidelines for establishing Ecological Flows in the Kura-Aras basin, and conduct a series of rapid assessments of the river ecology throughout the basin, based on best international practices. The Project Team of international and national consultants will:

- Identify key sites that are ecologically sensitive or flow regime impacted areas throughout the basin;
- Undertake environmental flow and river ecology rapid assessments for key sites in the Kura River basin at different seasons to gauge flow change impacts;
- Develop and provide stakeholder education training activities;
- Develop a Baseline Data Collection Programme to inform the Environmental Flow and Ecosystem Function Reviews;
- Design a long-term Monitoring Programme to assess the impacts of changes in flows and/or other management interventions (i.e. non-flow related) that are to be implemented.

The assessments should aim to develop data sets for the selected sites, which will allow the evaluation of scenarios of both flow change (i.e., change in the volume and timing of water) and non-flow related impacts in terms of: effects on overall downstream river condition, including; changes in the abundance of key biophysical components of the riverine ecosystems; changes in the availability of resources used directly by the people living alongside the river; and possible impacts on the health of people, or their livestock, living alongside the river and estuary.

The results of the study in Kura-Aras basin will be used to provide guidelines to be incorporated into National IWRM plans and be used as baseline data against which to evaluate the feasibility and impacts of new water resource developments including those that will potentially altering the flow regime.

1.2 Preparatory activities to the workshop

During the period between the formal start of the project implementation in June 2011 and the organization of the DP-IW a number of preparatory activities have been executed:

- Terms of References (ToR) for two international experts were prepared and approved by UNOPS and the National Focal Points (NPF) in each project country. Subsequently the two positions were published widely – international, regional and national. Following UNOPS international recruitment procedures and receiving approval from the countries the Demonstration Project Coordinator, Ir. Harald Leummens, and the Senior Biomonitoring & Environmental Flows Expert, Eng. Ahmed Abou Elseoud, were formally contracted;
- A strategy planning meeting was conducted in Tbilisi between 18-23 November 2011. At the meeting all aspects of planning and implementation of the demonstration project were discussed. A detailed work plan, time plan and budget were prepared.

2. DEMONSTRATION PROJECT INCEPTION WORKSHOP

The Demonstration Project Inception Workshop was held in Tbilisi, Georgia, on 24 November 2011. The Ministry of Environment Protection of Georgia kindly provided the meeting facilities in its premises. The Agenda of the Inception Workshop is presented in Annex 1. There were 33 participants present at the workshop. The participants included the Government Ministry National Focal Points, project staff, the National Coordinators for each country as well as contracted thematic experts from the project countries. Additionally also 3 representatives from the EU Kura Aras Project joined the meeting. The list of participants is provided in Annex 2.

2.1 Objectives & expectations

The main objectives of the DP-IW and the preceding Strategic Planning Meeting include:

- Assisting the project team in understanding and taking ownership of the DP's goals and objectives;
- Elaborating on the project activities in accordance with the overall goals and objectives, present the detailed work plan and time line of implementation to the end of the project;
- Revising the Demonstration Project's Strategic Results Framework, including reviewing the indicators, means of verification, and assumptions;
- Discussing the preliminary selection of demonstration project pilot sites, selected based on a set of criteria, with the thematic experts and country representatives;
- Discussing the availability of information required for the final selection of the pilot sites and the needs for additional information and the sources of these information.
- Elaboration of methodological guidelines for environmental flow assessment, biomonitoring and rapid ecological assessment.

The workshop activities were carried out in one day. The main workshop elements were: a) the opening & introductions, b) project overview, rationale and preliminary results, c) presentation of the Demonstration Project's goals and envisioned activities, and d) implementation arrangements and needs for additional information, e) working groups discussion and presentations on the proposed pilot sites and the availability of required data and information and its sources, Minutes of the individual presentations are presented below. The two workshop presentations are made available on the project web site (www.kura-aras.org).

2.2 Workshop minutes

Introductions

Ms. Mariam Makarova, Head of the Water Resources Management Division, Ministry of Environment Protection of Georgia and UNDP/GEF project National Focal Point (NFP) for Georgia opened the workshop by welcoming all participants. She highlighted the active role of the participants in Integrated Water Resources Management (IWRM) in their countries, as well as the priority status of IWRM for the Governments. The implementation of IWRM is seen as a good chance to improve the status of water resources including their quality. The Ministry of Environment also welcomed the international efforts to support the countries in these, especially of the UNDP/GEF Kura-Aras project successfully launched in 2011. She also stressed the importance of applying the biomonitoring technique in river basin management, and expressed the wish for a successful continuation of project implementation towards reaching real, tangible results on improving the quality of water resources. She wished all participants a fruitful working day to define the necessary steps for the implementation of the demonstration project.

Dr. Mary Matthews, UNDP-GEF Kura-Aras Project Manager, thanks Ms. Makarova for the warm opening words, and all participants for the time made available to participate in the workshop, despite the busy period of the year. She recalled the difficulties for the region to solve problems with transboundary water resources management, and stressed the importance and value of all present in helping to solve these problems. She specially thanks the NFPs for providing support in composing the national and international team of experts. She presented a short overview of the agenda for the Inception Workshop.

After the introductory remarks all participants of the Inception Workshop introduced themselves, including their name, organization and country of origin.

Project overview

Starting her Project Overview presentation, Dr. Mary Matthews noted that half of all Steering Committee (SC) members are present, which provides an excellent opportunity to present an update on the state of affairs in project implementation so far. In her presentation she shortly elaborated on progress reached since June 2011 as well as on the rationale of the Demonstration Project within the overall project. Subsequently Eng. Ahmed Abou Elseoud, Senior Biomonitoring & Environmental Flows Expert of the project, presented details of the planned activities of the Demonstration Project.

Rationale

The main goal of the project is “Reduction of transboundary degradation in the Kura-Aras basin”. However, how do we know that degradation is reduced, how to demonstrate this, what tools are available.

The answer relates to why, after several versions of the DP, the current key elements environmental flows, biomonitoring and ecological assessment were selected. There is a need to determine the ecological state of the river and the basin in relation to land & water use developments as well as external change factors like climate change.

As experience and instruments currently are hardly available in the region, the DP therefore will create methodologies towards obtaining an approach for determining river system health and ecological status based on river flow. For this the seasonal and annual variation in flow and ecological conditions will be monitored, to determine the baseline conditions and predict impacts.

The rationale can be described as a system of dependent and independent variables, in which a change in the independent variable (e.g. flow rate) leads to a change in the dependable variables of the ecosystem status, as measured by means of aquatic biomonitoring and wider-basin rapid ecological assessment (river basin health). As theoretic example, the dependence of ecosystems can be described as a function of river flow, in which not enough or too much water decreases the ecological state from an optimum provided by a medium flow rate.

Additional benefits of the DP approach is to provide for planning the future, made possible by the provision of baseline data, collected in accordance with agreed methodologies. Besides elaborating on methodologies, the DP will demonstrate them in pilot sites, aiming at their future continued broadened use after project end. In selecting appropriate methodologies their compliance with all EU Directives critical for water management will be a leading principle. Also the experiences of previous and ongoing other projects will be taken into account, as well as specific wishes from the governments. Additional issues of importance are methodologies being integrative as well as cost-effective, as typical budget are limited.

The information collected also is critical in analyzing the causes of flow rate changes – abstraction, obstruction, climate change and pollution concentration – and their impact on river ecosystems. At the same this, we should make sure that the information collected is useful for planning, based on the impact on ecosystems as well as on society and the economy.

Demonstration Project activities

Eng. Ahmed Abou Elseoud briefly elaborated his background of working in Egypt, including the transboundary Nile basin. For more than 20 years he is active in water resources management, with the Ministry of Water Resources Management and currently in the Ministry of Environment, including the supervision of the national environmental monitoring programs. As such he is quite well aware and informed on the transboundary problems faced by the region.

Eng. Ahmed Abou Elseoud outlined the content of the presentation – overview of environmental flows and biomonitoring, the objectives of the DP, description of main activities and time line for implementation.

The concept of maintaining environmental flows in the river basin has been developed in the past three decades to mitigate the impacts of variation and reduction of hydrological flow due to natural and anthropogenic reasons. The major environmental impacts of flow variation are:

- *Ecosystem degradation* including: degradation of habitat, losses of species and reduced biodiversity, and increase in invasive species
- *Temporal changes in flow* affecting biological processes such as fish migration and spawning
- *Reduce the natural pollution assimilation capacity* of rivers, increased pollutant concentrations and reduce flux.
- *Increased desertification* due to lowering of groundwater tables

Reduction in hydrological flow with equal pollution loads leads to a reduced assimilation capacity, or reduced capacity of the river to cope with incoming pollution. Increased awareness of this consequence resulted in environmentalists to start fighting for species and ecosystems and for more flow to remain in rivers.

Following a discussion among participants a common definition of Ecological Flows or ''Environmental flows''' was agreed upon: Environmental flows describe the quantity, quality and timing of water flows required to sustain freshwater and estuarine ecosystem, and the human livelihoods and wellbeing that depend on these ecosystems. Through implementation of environmental flows, ecologists require from water managers to achieve a flow regime, or pattern, that provides both for human uses as well as for maintaining the essential processes required to support healthy river ecosystems. As such, environmental flows **do not** necessarily require restoring the **natural, pristine flow patterns** that would occur in absent of human development, use, and diversion but, instead, are intended to produce a broader set of values and benefits from rivers than from management focused strictly on water supply, energy, recreation, or flood control.

The summary of the evolution of the environmental flow principle was presented:

- **Until the 1960s**, water management was focused largely on maximizing flood protection, water supplies, and hydropower generation.
- **During the 1970s**, the adverse ecological and economic effects of these development projects prompted scientists to seek ways to modify dam operations to maintain certain fish species.
- The initial focus was on the **minimum flow** necessary to preserve an **individual species** in a river.
- Environmental flows evolved from this concept of “minimum flows” and, later, “instream flows,” which emphasized the need to keep water within river channels.
- **By the 1990s**, scientists came to realize that the biological and social systems supported by rivers are too complicated to be summarized by a single minimum flow requirement.
- **Since the 1990s**, restoring and maintaining more comprehensive environmental flows has gained increasing support, to maintain the full spectrum of riverine species, processes and services.

- Furthermore, implementation has evolved from dam reoperation to an integration of all aspects of water management, including groundwater and surface water diversions and return flows, as well as land use and storm water management.
- **In 2007**, the Brisbane Declaration on Environmental Flows (Annex 3) was endorsed by more than 750 practitioners from more than 50 countries. The declaration announced an official pledge to work together to protect and restore the world's rivers and lakes.
- **By 2011,** many countries throughout the world had adopted environmental flow policies, although their **implementation remains a challenge**

Subsequently the principles of biomonitoring were presented. Aquatic biomonitoring is defined as the science/practice of inferring the integrated ecological condition of rivers, lakes, streams and wetlands by examining the organisms that live there. Artificial and also natural changes in the physical and chemical nature of freshwaters can cause a diversity of biological responses ranging from the severe (such as a total fish kill) to the subtle (for example changes in enzyme levels or sub-cellular components of organisms). Changes like these indicate that the ecosystem and its associated organisms are under stress or that the ecosystem has become unbalanced. The responses of biological communities, or of the individual organisms, can be monitored in a variety of ways to indicate the effects of imposed impacts on the ecosystem. Some approaches are suitable for field use and some have been developed specifically for use in the laboratory (particularly toxicity tests and bioassays).

In several ways the biomonitoring approach differs from physical and chemical analyses:

- Although physical and chemical analyses can identify that many contaminants may be present in the water, biological methods can integrate overall responses of the water body to combinations of all contaminants.
- Physical and chemical analyses give a measurement which is valid only for the instance in time when the sample was collected, whereas some biological methods reflect the effects of the physical and chemical conditions to which the organisms were exposed over a period of time.
- Biological approaches can be cheaper than chemical methods in terms of equipment, but would normally place heavy demands on field and laboratory personnel.
- Biological monitoring should not be seen as an alternative to physical and chemical monitoring but as a useful complementary approach.
- Financial savings can sometimes be made in a monitoring program by using biological methods to "trigger" the need for intensive and sensitive chemical analyses.

The main principles for the successful application of aquatic biomonitoring include:

- Compare to defined "reference" conditions.
- Select biological group & parameters that are most susceptible to pressures, e.g. macrophytes, fish, birds, macro-invertebrates.
- Integrated assessment of impact on ecology over time.
- Approximation to EU WFD principles.

In the framework of the Demonstration Project, aquatic biomonitoring will be developed using macro-invertebrates, because this group is easily visible by eye, widespread, easy to sample and to determine families & species, rapidly responses to changes in stress levels, do live sufficiently long and occur in heterogeneous communities. Also the focus on macro-invertebrates makes use of the results reached by previous project, notable the EU Kura project, providing added value to equipment purchased, training provided and joint monitoring been implemented.

The overall objectives of the Demonstration Project component are:

- To develop guidelines for establishing Ecological Flows in the Kura-Aras basin,
- Conduct a series of rapid assessments of the river ecology throughout the basin, based on best international practices
- Design and implement Biomonitoring program using macro-invertebrates to compliment with the EU Kura project initiatives.

In order to reach the overall objectives of the Demonstration Project, 5 main activities were formulated, the tasks of which will be described and discussed separately below.

Task (1): Develop the Project work plan, including site selection and review and selection of appropriate methodologies:

- Development of a project work plan that will include final details of the approach to be adopted.
- Selection of the potential sites to be monitored by the project.
- A review of the scientific literature will be undertaken by the project experts to select appropriate methodologies for Biomonitoring and ecological flow rapid assessment.
- National experts will collect the existing ecological data on the present conditions at each proposed site.
- Project Team will undertake field visits to each of the potential sites and prepare a Site Selection Report describing each site in full details.
- The report will include the final selection of the proposed sites that will be monitored by the project to be endorsed by the countries individually.

Depending on data availability, the assessment as to be described in each Site Selection report should include at least the geographical extent, present environmental condition, summary of the socioeconomic data related to the utilization of the river (ecosystem values & functions), ecological importance of the river reach in a local and regional context, species or features of special significance, other relevant aspects such as important cultural sites, historical series of annual flows at the site, past and present problems related to water management. One other criterion to be taken into account during site selection will be the available DP budget.

Task (2): Develop and implement a Baseline Data Collection Program for Environmental Flow and Ecosystem Function Reviews:

- Design a Biophysical and Ecosystem Function Data Collection Program based on the selected assessment methodology.
- Basic laboratory and monitoring equipment will be provided to the countries in support of these activities.
- Design and develop GIS database for the monitoring data.
- Training on Biomonitoring and Rapid Ecological Assessment will be given to the responsible staff in each country.
- Multi-disciplinary teams of experts will conduct the first monitoring campaign to describe the different functions of the ecosystem at each site.
- The team shall also assess non-flow related impacts at each site.

Task (3): Undertake environmental flow and river ecology rapid assessments for selected sites at different seasons to identify flow variation impacts:

- The national experts will continue the field monitoring campaigns (7 campaigns) of Rapid Ecological assessment for the selected sites (seasonal variation).
- Provide detailed description of 3 key scenarios for river flow variations and their implications on the biophysical and ecosystem function.
- Preparation of 3 National and one Regional Summary Reports that describes the biophysical, ecological, and socio-economic impacts of the variation of the flow regime (seasonal & annual) on the selected sites.
- The summary report will include recommendations for the environmental flow to be adopted at each site and will form the basis for technical guidelines on the determination of environmental flows in the Kura-Aras basin.

Task (4): Develop and Provide Stakeholder Education Training Activities on biological and ecological monitoring:

- Educational training activities will be conducted for the Stakeholders in the communities near the selected sites.
- Emphasis will be given on creating self-contained teaching materials to focus on age appropriate biology and ecology lessons.
- National level project staff and experts will work with curriculum specialists to develop a kit to be distributed to schools near the selected sites.
- Training will be given to selected teachers on the use of this kit.
- The kits will contain materials needed for basic assessments to be conducted by the students under the supervision of the trained teacher.
- These materials will include buckets, laminated guide sheets, species measuring, flow gauges, thermometers, and other needed materials.

Task (5): Develop Guidelines for designing a long-term Monitoring Program to assess the impacts of changes in flows or other water management interventions on the river basin ecology:

- This Guideline will be based on evaluation of the key biophysical, ecological and social parameters in the region.
- It will take into consideration the current national monitoring programs in each country.
- The availability of equipment and expertise in each country will be taken into consideration.
- The monitoring program will provide a set of indicators of agreed site specific Environmental Quality Objectives (EQOs) to achieve good ecological status for the river basin.
- This guideline will follow the EU WFD.

Upon completion of the DP activities, the project will organize a regional workshop to present the whole set of Demonstration Project results to a wide audience.

The proposed time table for the implementation of Demonstration Project activities is presented in chapter 3.3.

Demonstration project implementation arrangements

Issues to be discussed in the working groups – DP pilot sites, needs for additional information and implementation arrangements were subsequently presented by the Demonstration Project Coordinator, Mr. Harald Leummens.

Pilot sites

In order to test proposed methodologies for biomonitoring and rapid ecological assessment as well as for the implementation of field monitoring, a number of guiding principles for the pre-selection of sites were formulated:

- Importance for transboundary water management:
  - Upstream/downstream aspects.
  - Flow impact (dams & hydropower, climate change) vs. non-flow related human disturbances (water consumption, urban waste water, non-point pollution from agriculture, land degradation & erosion).
- Create interpretive framework – clean natural conditions vs. degraded.
- Ecological importance of the aquatic & riparian zones, provision of ecosystem services to humans.
- National importance for the project countries.
- Practicability for regular monitoring / visits.
- Usefulness of monitoring data towards supporting (future) water management decision taking.
- Kura-Aras river basin.
- Budget available for implementation

Applying the guiding principles for site selection and having completed initial discussions with the project's NFPs and NCs, the following list of pre-selected sites was prepared:

For Georgia:

- Upstream/downstream Tbilisi
  - *urban pollution*
- Aragvi basin, confluence with Kura
  - *Flow regulation, land development, rural pollution*
- Rustavi-Gardabani area
  - *Urban-industrial pollution, tugai floodplain forests, transboundary*
- Kura upstream
  - *Natural conditions, Turkey inflow and transboundary*

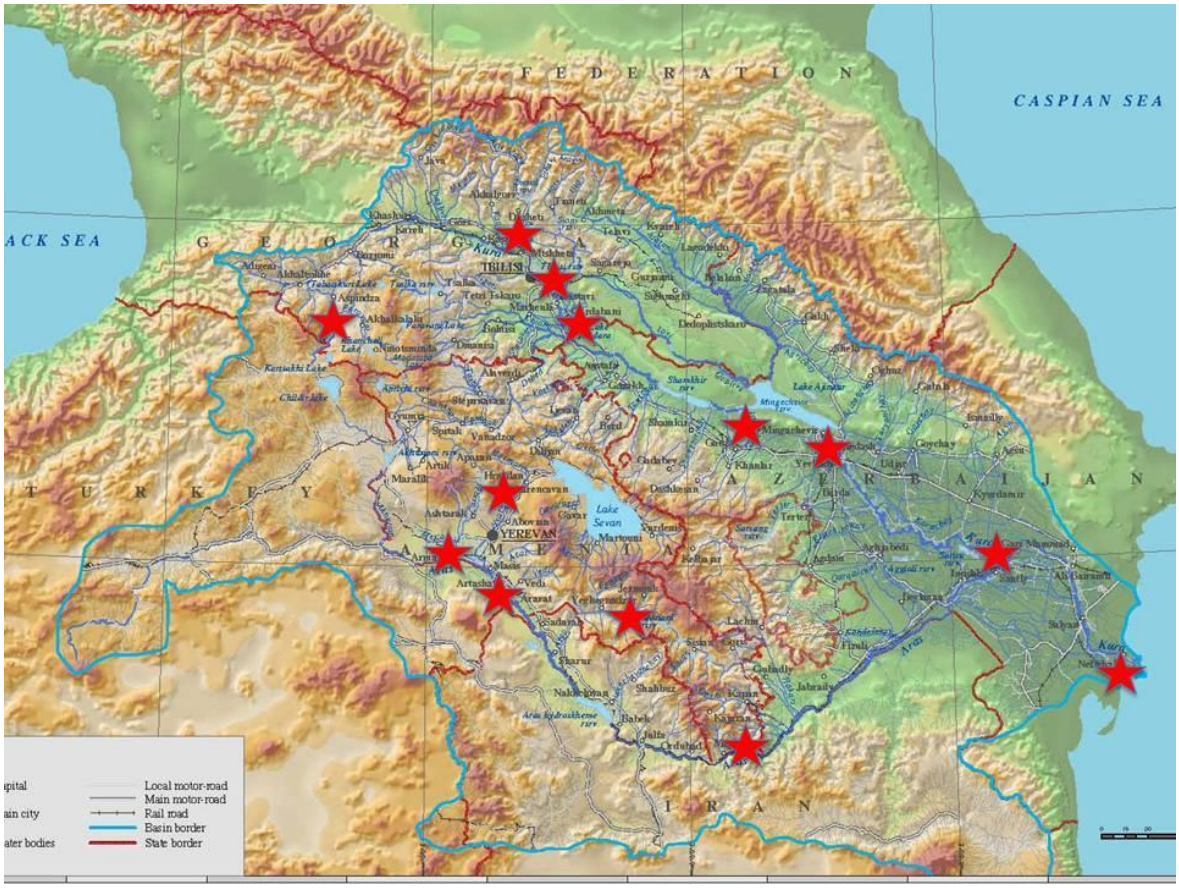
For Armenia:

- Upstream –downstream Yerevan
  - *Urban-industrial pollution*
- Arpa river basin
  - *Land development, tourism, urban & rural pollution, climate change, flow regulation (dam, inter-basin transfer), ecosystems*
- Meghri surroundings
  - *Transboundary, flow regulation, pollution*

For Azerbaijan:

- Upstream Agstafa
    - *Urban-industrial pollution, tugai floodplain forests, transboundary*
- Gyandzhachay basin
    - *Land development, rural pollution, climate change*
- Mingechevir downstream area
    - *Flow regulation, tugai floodplain forests*
- Confluence Kura-Aras
    - *Transboundary, water abstraction, rural pollution, flow regulation*
- Delta Kura-Aras river
    - *Delta ecosystems, transboundary, pollution accumulation, climate change*

The location of the pre-selected pilot sites is shown in the figure below.



Needs for additional information

In order to obtain a good understanding of pilot sites conditions, of importance for considerations during the upcoming final pilot site selection process – field visits to the potential sites will be conducted by the project team to collect additional information required for the preparation of site selection reports. The project team concluded on the need for additional information for the pilot sites. Especially more information is needed on ecological conditions in the basin in general and the pilot sites specifically: birds, floodplain vegetation, fish, endangered species, hunting species. Also more detailed information is needed on river flow and its temporal variations as well as water quality (chemical, hydromorphological, biological). The information

needs include more detailed information of who is running any monitoring done, on what locations, length of time series available as well as human resources and equipment.

Additional information needs also cover the locations of river protected areas and the ongoing monitoring activities on their territories, maps of hot-spots for pollution, biodiversity, flooding & erosion risks.

Also more information is needed on future policies and plans for ecological monitoring, as well as ongoing or planned international projects related to ecological monitoring.

Implementation arrangements

To implement project tasks and activities, two types of implementation arrangements are envisioned: contracts and purchases.

Contracts subdivide in:

- Individual National Expert contracts, appropriate for
  - The collection & analysis of additional information needs, especially on aspects of biodiversity in the basin and the pre-selected pilot sites.
  - Awareness raising and support for school aquatic monitoring programs.
  - National expert support for the preparation of recommendations for the long-term monitoring program.
- Company contracts, designed for the effective and efficient execution of field monitoring activities in the three countries.
- International expert to support on the organization and implementation of training courses in biomonitoring and rapid ecological assessment

Purchases apply to strengthening equipment needs in the countries for the successful execution of field monitoring activities in the pilot sites, as well as obtaining school aquatic monitoring kits.

Discussion

Question: how does the DP fit into overall IWRM national plans and other project activities?

Answer: During the redesigning of the PDF-B more focus was laid on IWRM, including ecological aspects of river basin management. Also each country has expressed interest in the process towards approaching EU standards, namely the WFD. The DP therefore focusses on testing issues that need to be introduced for bringing the river basin approach in line with EU practices. Also part of the IWRM process is the design and implementation of training activities in 2012. Overall, the IWRM can be considered the macro-level, the training session the mid-level, and the DP the lowest, most practical level, targeting detailed, technical methodologies, and demonstrating approaches, and providing answers to questions of what, where and how. The project is happy that in these all relevant experts are available to help, explain and design the DP.

Question: the DP wants to develop environmental flow methodology, but what will be calculated - yearly, monthly, or something else?

Answer: The DP will not calculate flow, but describe ecological conditions in relation to flow characteristics, and assess their interrelationship. In this services provided by ecosystems depending on flow are of importance. So no strict flow measurements, but biological monitoring and rapid ecological assessment.

Question: will the elaboration of prognosis of flow also be covered, them being the basis for water use, distribution, licensing?

Answer: Forecasting is part of the IWRM system, but this activity in not included in the DP. In the Nile basin a complex forecasting system based on Remote Sensing is in place, linking cloud cover, actual precipitation in the upper basin, calculating water discharge volumes towards lake Nasser. This is considered the short-term forecasting system. Also a long-term forecasting exists, based on historical data analysis, to decide upon a high/medium/low water flow year based on actual water levels at the start of the growing season. The DP focusses on establishing the link between ecological health & conditions of the river and the relationship with water flow, information which is needed to establish environmental flow discharges. But environmental flow is not equal to average annual flow, it more relates to the overall water flow regime, the hydrograph varying over the seasons, in turn determined by the environmental conditions in the river basin.

IWRM is about regulation of all demands on water and water use – for agriculture, industry, human consumption. In this also the ecosystems have a demand, which is normally not a steady flow during the year. Also establishing environmental flows is not only about flow volumes, but also about water quality and pollution.

Meanwhile in forecasting also the forecasting of human water demands is of importance. Using historical water flow data and water abstraction data can provide some prognosis for the coming 5 years, and as such be of use what the flow in the different seasons can be.

What the DP does is providing, testing a set of methodologies to integrate the assessment of water quality and quantity in various stretches of the river in different seasons.

Comment: Some of the proposed pilot project sites are located on the border between countries. Specifically the Aras river sites are located on the border with Turkey and as such are difficult to access.

Question: How to assess reference conditions of good ecological state?

Answer: Different approaches can be used. One option is to use upstream unpolluted river stretches as reference to compare with downstream impacted sites. This approach has the disadvantage that hydromorphological and chemical characteristics and consequently biological feature are not the same even when no pollution is present. Second option is selecting unpolluted river stretches with comparable hydromorphological and chemical characteristics in other basins. This has the disadvantage that still due to climate differences, species distribution pattern etc. biological features may not be comparable. Third approach is to make use of historical data and descriptions. This may be the most appropriate with respect to noting changes, although also aspects of invasive species and increased pressure on the basin need to be accounted for. In addition, for many rivers such historical data are very limited and insufficient detailed, if available at all.

Country workgroup discussions

National Experts of the three countries joined the National Coordinators and the National Focal Points in per-country workgroups to discuss the proposed DP activities, pre-selected pilot sites based on the presented criteria, as well as the requested additional information needs.

Country presentations

The results of the workgroup discussions were presented by the project National Coordinator for each country.

Georgia

Having analyzed the DP implementation vision, the pilot site criteria and the pre-selected sites, the country experts agreed to add two relevant sites to the list of potential pilot sites for monitoring and testing methodology. As such, 7 locations were proposed, which the experts prioritized: 1)

upstream Kura river near the Turkish border – important to know inflow quantity and quality, because this may be a valid location for reference conditions, as pollution is assessed to be minimal or absent; 2) Borjomi; 3) downstream Gori; 4) Dusheti – 40% of drinking water for Tbilisi comes from this area; 5) Mtsheta – Hydropower Plant (HPP) and upstream reference location for assessing the impact of Tbilisi on water quality; 6) Rustavi – industrial area, irrigation intake location for Gardabani; 7) Border with Azerbaijan –quality of water flowing into neighboring country, floodplain forests.

Environmental monitoring is monthly executed on 5 of the 7 mentioned locations (exemptions are Zhinvali and Gardabani). Times series of 6 years on physical, chemical and microbiological data are available.

The Ministry for Environment (MoE) of the Government of Georgia includes an Agency for Protected Areas. The Agency monitors some parameters in donor projects. There is a need still to become acquainted with and to collect this information.

Ecological monitoring is executed by MoE, its Biodiversity Service and Agency for Protected Areas, as well as individual biodiversity experts.

Armenia

Having analyzed the DP implementation vision, the pilot site criteria and the pre-selected sites, the country experts propose a different approach to be applied for the DP project. It is proposed to select one sub-basin of the Aras River to implement DP activities, namely the Arpa basin, for the following reasons:

- So far no donor involvement is executed in the Arpa basin.
- The basin is transboundary with Azerbaijan.
- Four protected areas are located in the Arpa basin, important to conserve relict open woodland, mountainous forest, hydrological features of mineral waters, as well as valuable rare & endangered fauna species, e.g. Armenian mouflon, Bezoar goat, brown bear, Caucasian leopard.
- The basin includes also important flora, including 92 vegetation types of which 56 are endangered, 17 vulnerable and 19 critical, as well as a rich diversity in wild wheat.
- The Arpa-Sevan tunnel provides for inter-basin transfer of water from 3 rivers to the Lake Sevan, yearly up to 430 million m^3. In 20 years the water level of the Lake Sevan increased with 6 meters. Additionally 120 million m^3 of water from Lake Sevan are yearly used for irrigation purposes.
- Four HPPs are operational in the Arpa basin, while 7-8 are planned or under construction, increasing the level of conflict between water use and the needs to maintain environmental flows.
- Tourism infrastructure is well developed in the Arpa basin – mineral water production, spa health centers are operational. The area is also of cultural importance.
- Climate change is predicted to have significant impacts on the Arpa basin. In the 2nd Communication to the United Nations Framework Convention on Climate Change (UNFCCC) a 10 to 20% reduction in water flow is predicted by 2030, increasing to 20-40% by 2070.
- Systematic monitoring – physical, chemical, hydrological, meteorological and groundwater – is being executed in the Arpa basin. Some of the locations are being monitored since 1928. Six hydrological posts are operational, as well as 6 water quality sampling sites. Groundwater monitoring was restarted in 2010.

The focus of the DP for Armenia is on

- The execution of 8 seasons of biological monitoring – sampling and analyses, supported by appropriate training.

- The determination of environmental flows, including hydrological measurements to be linked to the hydro-biological data to be collected.
- Rapid ecological assessments as parallel inventory of the ecological state of the Arpa river basin.

Expected results for Armenia include knowledge on methodologies, training of experts in new approaches, and increased awareness among various stakeholder groups.

Azerbaijan

Having analyzed the DP implementation vision, the pilot site criteria and the pre-selected sites, the country experts agreed to maintain the 5 proposed sites, but propose to move the location of the proposed site on the confluence of the Kura and Aras river upstream the Aras. The rationale for the 5 pilot sites was discussed:

- Kura delta: gathers pollution from the 5 riparian countries, and transports remaining pollution into the Caspian Sea.
- The Aras river has sufficient environmental and water use issues to warrant sufficient attention, therefore one pilot site was designated on this river.
- The Mingachevir reservoir is the largest reservoir in the South Caucasus, impacting on downstream water flow and ecosystems since 1953. The reservoir especially affected valuable tugai (floodplain) forests. The workgroup proposes not only to look at downstream impacts, but also to take aspects of water quality and quantity of the reservoir itself into account in the pilot site.
- Garayazskiy reserve is of special importance for the protection of tugai forest, and due to its location on the border with Georgia the site is of transboundary importance, also for pollution.
- A Kura tributary basin: the workgroup proposes to select an in-country tributary basin of the Kura to assess non-transboundary issues of water management – excessive water diversion for irrigation, pollution, etc.

Data on environmental monitoring as envisioned needed by the project team are all available in the Ministry of Ecology and Natural Resources (MoENR), specifically the Department for Biodiversity. Since the Soviet era also a number of scientific institutes work on issues of biodiversity. However, at present no complete overview of available data is available, including detailed information on time series.

On water quality and quantity, today about 80 hydrological stations are executing regular measurements, while 20-25 stations are engaged in water quality analysis. Also long-term monitoring time series are available, but the quality of the data needs to be checked – for hydrological measurements since 1918, hydro-chemical since 1960. Important sources of information are the MoENR Department for Environmental Monitoring, and the Department for the Protection of Water Biological resources. Additionally also the Committee for Nature Protection and the Fisheries unit may be of importance in data provision.

Information on past or present international projects related to biodiversity needs to be checked.

In order for biomonitoring or ecological monitoring to become standard practice, legislative changes are needed.

3. WORK PLAN

3.1 Rationale

The Demonstration Project's work plan for the period December 2011 – June 2014 is based on the approved UNDP/GEF Kura-Aras project document.

The detailed work plan is presented in detail in chapter 3.2, according to five DP tasks defined. These tasks represent a restructured representation of the activities envisioned for the demonstration project in the approved project document. These changes are not considered substantial, but represent minor alterations and specifications aimed at improving the implementation logic and timely implementation of the envisioned DP tasks.

The time schedule presented in chapter 3.3 meanwhile remains in accordance with the overall time line of project implementation.

3.2 Project activities and envisioned results

Task (1): Develop the Project work plan, including site selection and review and selection of appropriate methodologies:

This task includes the following detailed activities:

- *Development of a project work plan*

  A draft DP work plan was prepared by the Senior International Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator and presented to the NFPs and NEs during the DP Inception Workshop on 24 November 2011. The countries representatives reviewed and endorsed the project work plan.

- *Preliminary selection of pilot sites*

  Based on discussions with NFPs and NEs, the DP International Experts prepared a preliminary selection of DP pilot sites to implement the Biomonitoring and Rapid Ecological Assessment (REA) surveys, based on the defined criteria. The pre-selected pilot sites were discussed and commented on by country expert groups at the DP Inception Workshop. The preselected sites were all preliminary endorsed. For the final pilot site selection, available environmental and ecological information will be gathered by the NEs.

- *Review of scientific literature & selection of methodologies for Biomonitoring and REA*

  The scientific literature review and the selection of appropriate methodologies for biomonitoring in accordance with the EU WFD and the Rapid Ecological Assessment surveys will be carried out by the Senior International Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator. This activity includes assessment of suitable data integration (indices) and processing approaches. A summary selection report will be presented for endorsement to the NFPs.

- *Collection of available environmental and ecological data for each preselected pilot site*

  Supported by the NCs, NEs will collect the available environmental and ecological data on the present conditions at each proposed pilot site. Information will be compiled in comprehensive draft Site Selection Reports. The following thematic expertise is envisioned to be required in each country to prepare the baseline desk review of available information:

Expertise	Input needed (days)
Vegetation	5
Birds	5
Fisheries	5
Hydrology	7
Microbiology	10
Water quality	10
Floodplain ecology	5
GIS and Remote Sensing	7
Groundwater	5

- *Field visits to pre-selected pilot sites*

  The Project CTA, the Senior International Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator will make field visits to the pre-selected pilot sites to execute a review of actual conditions and to finalize Site Selection Reports for each pilot site. They also will prepare a proposal for the final selection of the list of pilot sites that will be included in monitoring activities under the Demonstration Project, based on the qualitative and quantitative baseline information collected, methodologies agreed upon and budget availability. The final pilot site selection will be endorsed by the NFPs.

Activities under this task will be completed during the period November 2011 – February 2012. The envisioned specific **deliverables** of Task (1) are:

- Final approved Demonstration Project Inception Workshop report;
- Approved detailed Demonstration Project work plan and related budget, formally endorsed by the countries NFPs;
- NFP-endorsed selection of at least 2 DP pilot sites in each country, with Site Selection reports for each site available, based on the readily available environmental & ecological information provided by NEs and field pilot site visits by the International Experts;
- Agreed methodological framework for environmental flow assessment and rapid ecological assessment.

Task (2): Develop and implement a Baseline Data Collection Program for Environmental Flow and Ecosystem Function Reviews:

This task includes the following detailed activities:

- *Design a Biophysical and Ecosystem Function Data Collection Program*

  The Senior International Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator will prepare a detailed design to execute data collection activities under the Biophysical and Ecosystem Function Program. Based on the selected and endorsed pilot sites and Site Selection Reports, the design includes a detailed plan of action to execute the seasonal field work – type of data collected, sampling program, and team composition. The preliminary envisioned thematic disciplines to be participating in the Data Collection Program include biomonitoring, vegetation cover / floodplain ecology, fauna / fish, water quality, water quantity / river morphology. Standard, well-accepted and known methods shall be applied for each discipline, as well as selected methodologies for biomonitoring and Rapid Ecological Assessment.

- *Delivery of basic laboratory and monitoring equipment*

  Based on designated pilot sites, selected methodologies for biomonitoring and Rapid Ecological Assessment, and assessment of current laboratory and field equipment capacity of relevant organizations, the project team will prepare a proposal for equipment purchase in the three countries, including envisioned recipient. The proposal will be approved by the NFPs, after which the project will provide the equipment to the recipient.

- *Design a GIS database structure to store monitoring data*

  In accordance with the Biophysical and Ecosystem Function Data Collection Program an appropriate unified database structure will be prepared. The set-up will offer all involved field experts a standardized format to input collected information on pre-defined parameters, for subsequent integration among experts in the three countries as well as visualization in GIS. The database structure will make use of experiences and agreed protocols of GIS data storage and sharing obtained from other international projects in the region.

- *Training on Biomonitoring and Rapid Ecological Assessment*

  The project will organize a training course for technical experts from the three countries – including training on methods of conducting Biomonitoring, as well as training for the Rapid Ecological Assessment methodology. Four experts from each country will be invited to participate in the training held in Tbilisi, Georgia. The training course will include field work practice.

- *Execution of first field monitoring campaign*

  An established team of experts, guided by the experts that participated in the training, will execute the initial practical data collection on the designated pilot sites, describing the different functions of the ecosystem at each site according to their thematic disciplines. The team shall also assess non-flow related impacts at each site. The preliminary list of thematic disciplines includes biomonitoring, vegetation cover / floodplain ecology, fauna / fish, water quality, water quantity / river morphology.

Task (3): Undertake environmental flow and river ecology rapid assessments for selected sites at different seasons to identify flow variation impacts:

This task includes the following detailed activities:

- *Execution of seven field monitoring campaigns*

  The composed national expert team will continue seasonal monitoring campaigns on selected pilot sites.

- *Reporting of results*

  Based on results collected and analyzed, each team will define 3 key flow scenarios for river flow variation and describe their implications on the biophysical and ecosystem functions. The three National Reports will be integrated by the Senior International Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator into a Regional Summary Report that describes the biophysical, ecological, and socio-economic impacts of the variation of the flow regime (seasonal & annual) on the selected sites, including mitigation measures. The summary report will include recommendations for the environmental flow to be adopted at each site and will form the basis for technical guidelines on the determination of environmental flows in the Kura-Aras basin.

Task (4): Develop and Provide Stakeholder Education Training Activities on biological and ecological monitoring:

This task includes the following detailed activities:

- *Elaboration and implementation of a school aquatic monitoring program*

  Based on international best practice and experience, a national level expert will prepare an easy-to-use school kit for children to monitor ecological and chemical water quality parameters in water bodies near the selected pilot sites. Emphasis will be given on creating self-contained teaching materials to focus on age appropriate practically oriented biology and ecology lessons. Instructive training will be organized for teachers in how to use the kits. Appropriate equipment and consumables, e.g. buckets, laminated guide sheets, species

identification guides sheets, flow gauges, thermometers to execute the school training monitoring will be purchased and distributed among participating schools. Schools may be promoted to participate in available international school monitoring information exchange programmes.

Task (5): Develop Guidelines for designing a long-term Monitoring Program to assess the impacts of changes in flows or other water management interventions on the river basin ecology:

This task includes the following detailed activities:

- *Elaboration of guidelines for the design of a long-term monitoring program*

  Based on the three national reports and the summary regional report on flow scenarios and implications for biophysical and ecosystem functions, guidelines will be developed to establish a long-term monitoring program on river ecological impact. The current national monitoring programs as well as availability of equipment and expertise in each country will take into consideration. The monitoring program also will provide a set of indicators - site specific Environmental Quality Objectives (EQOs) - to achieve good ecological status for the river basin. The principles of the monitoring program as presented in the guidelines will follow the EU WFD approach. The project will seek adoption of proposed monitoring and assessment methodology and EQOs in the SAP.

- *Regional workshop*

  All results of the Demonstration Project Component will be presented at a South Caucasus Regional Workshop.

3.3 Implementation modality

The central PCU is located in Tbilisi Georgia, staffed by the Project CTA, the International Demonstration Project Coordinator, the International IWRM Coordinator, the Administrative Associate, and the National Coordinator for Georgia. In Baku and Yerevan satellite offices will be staffed by the National Coordinators and Administrative Assistants. The Senior International Experts and National Experts will use PCUs as needed and appropriate. The CTA has overall responsibility for the project, in her absence the Administrative Associate will have the responsibility and authority to ensure project functioning in coordination with the International IWRM Coordinator and International Demonstration Project Coordinator. Close coordination will be maintained throughout the project life with UNDP and its Country Offices.

The Senior Biomonitoring & Environmental Flows Expert and the International Demonstration Project Coordinator are responsible for the overall planning and design of theoretical and practical aspects of the DP implementation, including pilot site selection reports, the review and selection of appropriate scientific methodologies for Biomonitoring and REA, based on international best practice, and the Biophysical and Ecosystem Function Data Collection Program.

Based on the selected methodologies, the project will develop and implement a procurement plan for the required equipment for biomonitoring and REA for the three countries. This procurement plan will depend on the results of the assessment of the existing sampling and monitoring equipment in each country.

The International Demonstration Project Coordinator is responsible for the day-to-day implementation of the DP work plan. The Senior Biomonitoring & Environmental Flows Expert will provide oversight and guidance in planning and implementation throughout the project time span.

During the preparatory phase towards the DP IW 16 National Experts were contracted in each country to support the development of the DP work plan, pilot site selection and review of

appropriate methodologies. The NEs also will provide the International Experts with baseline information on all aspects of water management in the Kura-Aras basin.

Up to 5 additional individual NEs will be contracted in each country, to provide the PCU with an overview of the ecological state and aspects of biodiversity in the Kura-Aras river basin, with special focus on the pre-selected pilot sites. The preliminary themes to be covered by additionally contracted NEs may include ichthyology, floodplain vegetation, fauna (birds, mammals), socio-economy.

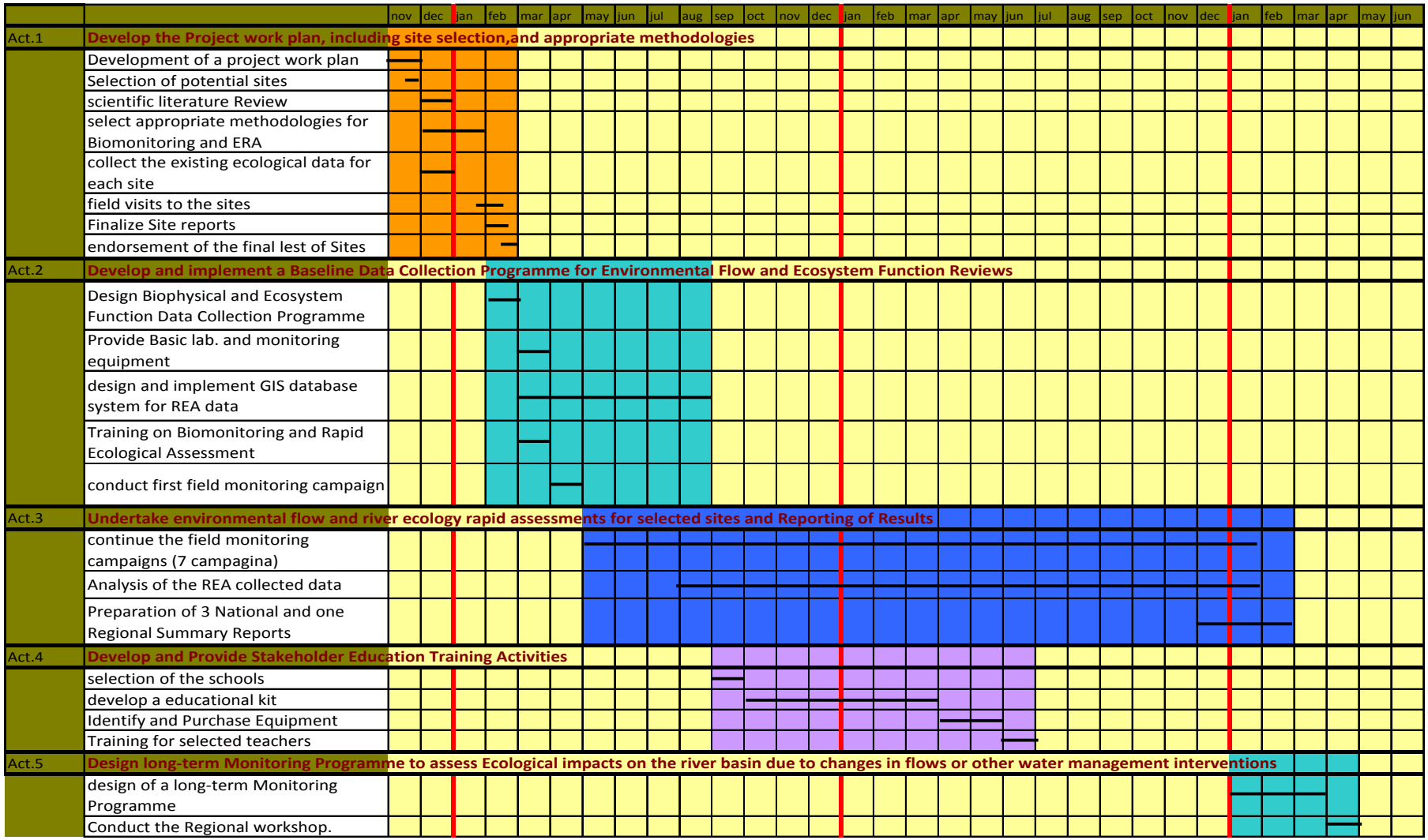
International experts will conduct a combined training course on methods of conducting Biomonitoring and Rapid Ecological Assessment. The Ministry in each country is offered the opportunity to nominate 4 participants for the training. These should include specialists in aquatic fauna, aquatic flora and micro invertebrates as well as one additional senior person from the Ministry. These specialists may be nominated from within the Ministry staff or from those institutions, organizations and individuals who support the Ministry. To support sustainability of the training after project end, it is envisioned that experts will be selected from government and/or scientific organizations, and are motivated to long-term commitment in these fields of expertise. Suitable candidates will have the endorsement of the NFPs after which their participation will be approved by the CTA. The training course will include a one day field work practice. Additionally, it is suggested that private firms specializing in EIA/ESIA in all 3 countries may be invited to send staff at their own expense for the Biomonitoring and Rapid Ecological Assessment training, and their participation will depend upon available space and subject to approval from the National Focal Points and the CTA.

The execution of environmental flow and river ecology rapid assessments at the pilot sites during different seasons in each country will be integrated into 3 country-specific contracts, designed for the effective and efficient execution of field monitoring activities. A tender procedure in accordance with UNOPS rules will be open to commercial, non-commercial, academic and scientific organizations, or consortia of these organizations. The preliminary field monitoring plan provides for teams of 6-10 to include the Project National Coordinator and three thematic participants from the regional training to guide data collection. They will visit seasonally (4 times per year) during 2 years the pilot sites to sample and assess ecological conditions in relation to flow. The field monitoring team will consist of experienced field experts supported by junior experts for training purposes. The preliminary list of thematic disciplines includes biomonitoring, vegetation cover / floodplain ecology, fauna / fish, water quality, water quantity / river morphology. Final ToRs for these contracts will be drafted and finalized in early February following country meetings with the international team

A national expert will be contracted to prepare and implement a school program on aquatic monitoring of ecological and chemical water quality parameters. The NE will also be responsible for the convening of a teachers' training program to introduce the course to selected teachers. At least 3 local schools from each country will be invited for participation in the school monitoring program. The project team will seek co-financing to provide the selected schools with simple kits to be used in the training course.

An envisioned number of up to 5 NEs will be contracted in each country to support the elaboration of recommendations for the environmental flow to be adopted at pilot sites. The NEs also will provide support in the preparation of the technical guidelines for the design of a long-term monitoring program on river ecological impact due to flow variation and use of water resources.

3.4 Project time line



4. STRATEGIC RESULTS FRAMEWORK

Environmental flows & Rapid Ecological Assessment study of the Kura-Aras River Basin	**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOME Environmental flows & Rapid Ecological Assessment study of the Kura-Aras River Basin - develop guidelines for establishing Ecological Flows; Conduct a series of rapid assessments of the river ecology throughout the basin, based on best international practices; Design and implement Biomonitoring program.			
ACTIVITIES			
1. Develop the Project work plan, including site selection and review and selection of appropriate methodologies Inception Workshop & project plan Preliminary assessment and site selection Review of methodologies	▪ Inception Workshop report including project plan, by December 2011 ▪ Demonstration sites selected, by February 2012 ▪ Selection of methodologies to be tested, by February 2012	▪ Inception report – minutes, ▪ project plan - agreed ▪ Site Selection Reports ▪ MoU with Governments on selected pilot sites ▪ Methodology review report	Data made available All appropriate Government stakeholders consulted
2. Develop and implement a Baseline Data Collection Program for Environmental Flow and Ecosystem Function Reviews Design Biophysical & Ecosystem Function Data Collection Program Delivery of laboratory and monitoring equipment Design a GIS database structure for monitoring Training on Biomonitoring and Rapid Ecological Assessment Execution of first field monitoring campaign	▪ Design data collection program, by March 2012 ▪ Purchase of Equipment, by April 2012 ▪ Database designed, by May 2012 ▪ 2 trainings, by March 2012 ▪ Field monitoring in 3 countries on selected sites, by May 2012	▪ Data collection program report ▪ Report on equipment needs analysis, delivery statements ▪ Database structure report ▪ Training reports (2) ▪ Field monitoring report -1	Sufficient time and resources to collect meaningful baseline data
3. Undertake environmental flow and river ecology rapid assessments for selected sites during different seasons Field monitoring campaigns – 7 National & regional reports	▪ Field monitoring executed in 3 countries on selected sites, by May 2014 ▪ National and regional summary reports drafted, by May 2014 ▪ Database filled, by May 2014	▪ Field monitoring report -2-7 ▪ National and Regional Reports delivered ▪ Database functioning	Appropriate methodologies selected National and regional reports useful to IWRM and SAP development
4. **Develop and Provide Stakeholder Education Training Activities on biological and ecological monitoring** Develop curriculum and materials for assessment kits Train teachers in use of assessment materials for students Implement school aquatic monitoring	▪ Curriculum developed, by March 2013 ▪ Training conducted, by May 2013 ▪ Monitoring implemented, by November 2013 ▪ Lessons learned reviewed, by December 2013	▪ Curriculum materials in local languages ▪ Report on training ▪ Implementation report, including lessons learned	Curriculum acceptable to local schools Teachers able to use training in classrooms
5. **Develop Guidelines for designing a long-term Monitoring Program to assess the impacts of changes in flows or other water management interventions on the river basin ecology**. Guidelines for a Long-term Monitoring Programme Final workshop	▪ Guidelines delivered and approved, by April 2014 ▪ Final workshop held and results disseminated, by May 2014	▪ Approved report on guidelines for long-term monitoring ▪ Regional workshop report & minutes	Monitoring programme sustained by countries Methodology replicable in other sites

5. CONCLUSIONS & NEXT STEPS

Eng. Ahmed Abu Elseoud thanks all participants for their presence, their attention and contributions, the project team received more information than expected.

All information received will be studied and analyzed, and taken into account in preparing the final list of proposed pilot sites for the Demonstration project. After reviewing the currently available information on these sites and the field visit planned for January-February, the final proposed selection will be discussed with the NFPs, as budget limitations may limit covering all envisioned sites. However, the project will do its utmost to make sure that all proposed sites will be recommended for inclusion in the future demonstration project's activities.

Summarizing, the following activities have been accomplished during the workshop:

- An overview of the state of implementation of the project has been presented.
- The relationship between the DP activities – environmental flows, Rapid Ecological Assessment and biomonitoring - and other project activities has been discussed.
- The concept of environmental flows was presented, useful for all experts that are no specialists in the subject.
- A list of potential sites were reviewed and modified by the countries participants, and final list of pre-selected sites was endorsed by all participants,
- The envisioned implementation logistics were discussed, the most challenging aspect of the project compared to theoretical knowledge improvement (on REA, biomonitoring).

The following next steps are envisioned:

- Based on the presentations and discussions, the DP work plan will be revised and finalized, taking the budget into account
- The collection of available information on the pre-selected pilot sites will be initiated.
- Terms of References (ToR) for necessary biodiversity experts will be prepared, and following the appropriate tender procedures, be contracted to provide available information on the pre-selected pilot sites.
- The review of international best practice methodology in environmental flows, Rapid Ecological Assessment and biomonitoring will be prepared and agreed with appropriate experts as well as the NFPs.
- Late January – early February 2012 the project team will visit the countries to meet with the NFPs and NEs, and visit the pre-selected pilot sites.
- In mutual understanding with the NFPs the final list of selected pilot sites will be endorsed.
- Training in biomonitoring and REA will be prepared for convening in March 2012
- The ToRs for the implementation of field monitoring activities will finalized, and following the appropriate tender procedures, integrated contracts will be signed.
- Late March to Early April 2012, hopefully, the field monitoring will start.

Additional general next steps for the nearest future include:

- The project web site functions, the presentations of the DP IW will be uploaded.
- The IWRM coordinator will launch the intranet for project staff and national experts.
- Cooperation with the NEs will continue in gathering additional detailed information on issues of importance for planning not only the DP, but also the TDA and IWRM process. For this the implementation deadline of the signed contracts with NEs is extended with one month.

ANNEXES

Annex 1 Demonstration Project Inception Workshop: agenda

Time	Subject	Speaker / Facilitator
10:00 - 10:15	Introductions	Dr. Mary Matthews
10:15 - 10:30	Project Overview Update - main goals & activities of the UNDP/GEF project	Dr. Mary Matthews
10:30 - 11:00	Demonstration Project Rationale Objectives within the project	Dr. Mary Matthews
11:00 - 11:15	Coffee Break	
11:15 - 12:15	Demonstration Project Activities	Eng. Ahmed Abou Elseoud
12:15 - 12:30	Demonstration Project Implementation logistics	Ir. Harald Leummens
12:30 - 13:00	Questions and discussion	All Participants
13:00 - 14:00	Lunch	
14:00 - 15:00	Working Groups Discussion on Demonstration Project (3 Country Groups)	All Participants
15:00 - 15:45	Working Groups Presentations	Country National Coordinators
15:45 - 16:00	Break	
16:00 - 16:45	Discussion	Eng. Ahmed Abou Elseoud Ir. Harald Leummens
16:45 - 17:00	Wrap-up and Next Steps	Dr. Mary Matthews

Annex 2 Demonstration Project Inception Workshop: List of participants

ARMENIA

Climate Change Expert	Hamlet Melkonyan
Flood plain ecologist	Karlen Grigoryan
Hydrologist	Benyamin Zakaryan
Microbiology expert	Astghik Danielyan
Municipal Water Use and Sanitation Expert	Vilik Sargsyan
Environmental Impact Monitoring Centre Armenia	Baghdasar Sngryan
Project Focal Point – Armenia	Volodya Narimanyan

GEORGIA

Climate Change Expert	Medea Inashvili
Environmental Economist	Zaal Lomtadze
Flood Plain Ecologist	Marina Arabidze
Hydrologist	Baadur Ukleba
Hydropower EIA expert	Medgar Chelidze
Microbiology expert	Nino Gagelidze
Municipal Water Use and Sanitation Expert	Ilia Mtskhvetadze
Water Quality Expert	Elina Bakradze
Project Focal Point - Georgia	Marina Marakova

AZERBAIJAN

Flood plain ecologist	Rustam Rajabov
Hydrologist	Asif Verdiyev
Stakeholder Expert	Anar Nuriyav
Water Quality Expert	Matanat Avazova
Project Focal Point - Azerbaijan	Mutallim Abdulhasanov

UNDP/GEF PROJECT STAFF

Project CTA/Coordinator	Mary Matthews
Senior Biomonitoring & Env.Flows Expert	Ahmed Abou Elseoud
Demonstration Project Coordinator	Harald Leummens
Senior IWRM Expert	Tim Hannan
IWRM coordinator	Seiichi Sasaki
Project Coordinator - Georgia	Nino Kizikurashvili
Project Coordinator - Azerbaijan	Farda Imanov
Project Coordinator - Armenia	Vahagn Tonoyan
Project Administrative Associate	Maia (Maka) Ochigava

EU KURA PROJECT

Project Manager	Anatoly Pichugin
Senior Expert	Jesper Ansbek
Senior Expert	Peter Roncak

Annex 3 The Brisbane Declaration

Environmental Flows are Essential for Freshwater Ecosystem Health and Human Well-Being

Environmental flows describe the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems.

> **This declaration presents summary findings and a global action agenda that address the urgent need to protect rivers globally, as proclaimed at the 10th International River*symposium* and International Environmental Flows Conference, held in Brisbane, Australia, on 3-6 September 2007. The conference was attended by more than 750 scientists, economists, engineers, resource managers and policy makers from more than 50 countries.**

Key findings include:

1. **Freshwater ecosystems are the foundation of our social, cultural, and economic well-being**. Healthy freshwater ecosystems - rivers, lakes, floodplains, wetlands, and estuaries - provide clean water, food, fiber, energy and many other benefits that support economies and livelihoods around the world. They are essential to human health and well-being.
2. **Freshwater ecosystems are seriously impaired and continue to degrade at alarming rates**. Aquatic species are declining more rapidly than terrestrial and marine species. As freshwater ecosystems degrade, human communities lose important social, cultural, and economic benefits; estuaries lose productivity; invasive plants and animals flourish; and the natural resilience of rivers, lakes, wetlands, and estuaries weaken. The severe cumulative impact is global in scope.
3. **Water flowing to the sea is not wasted**. Fresh water that flows into the ocean nourishes estuaries, which provide abundant food supplies, buffer infrastructure against storms and tidal surges, and dilute and evacuate pollutants.
4. **Flow alteration imperils freshwater and estuarine ecosystems**. These ecosystems have evolved with, and depend upon, naturally variable flows of high-quality fresh water. Greater attention to environmental flow needs must be exercised when attempting to manage floods; supply water to cities, farms, and industries; generate power; and facilitate navigation, recreation, and drainage.
5. **Environmental flow management provides the water flows needed to sustain freshwater and estuarine ecosystems in coexistence with agriculture, industry, and cities**. The goal of environmental flow management is to restore and maintain the socially-valued benefits of healthy, resilient freshwater ecosystems through participatory decision-making informed by sound science. Ground-water and floodplain management are integral to environmental flow management.
6. **Climate change intensifies the urgency**. Sound environmental flow management hedges against potentially serious and irreversible damage to freshwater ecosystems from climate change impacts by maintaining and enhancing ecosystem resiliency.
7. **Progress has been made, but much more attention is needed**. Several governments have instituted innovative water policies that explicitly recognize environmental flow needs. Environmental flow needs are increasingly being considered in water infrastructure development and are being maintained or restored through releases of water from dams, limitations on ground-water and surface-water diversions, and management of land-use practices. Even so, the progress made to date falls far short of the global effort needed to sustain healthy freshwater ecosystems and the economies, livelihoods, and human well-being that depend upon them.

Global Action Agenda

The delegates to the 10th International River*symposium* and Environmental Flows Conference call upon all governments, development banks, donors, river basin organizations, water and energy associations, multilateral and bilateral institutions, community-based organizations, research institutions, and the private sector across the globe to commit to the following actions for restoring and maintaining environmental flows:

1. **Estimate environmental flow needs everywhere immediately**. Environmental flow needs are currently unknown for the vast majority of freshwater and estuarine ecosystems. Scientifically credible methodologies quantify the variable - not just minimum - flows needed for each water body by explicitly linking environmental flows to specific ecological functions and social values. Recent advances enable rapid, region-wide, scientifically credible environmental flow assessments.
2. **Integrate environmental flow management into every aspect of land and water management**. Environmental flow assessment and management should be a basic requirement of Integrated Water Resource Management (IWRM); environmental impact assessment (EIA); strategic environmental assessment (SEA); infrastructure and industrial development and certification; and land-use, water-use, and energy-production strategies.
3. **Establish institutional frameworks**. Consistent integration of environmental flows into land and water management requires laws, regulations, policies and programs that: (1) recognize environmental flows as integral to sustainable water management, (2) establish precautionary limits on allowable depletions and alterations of natural flow, (3) treat ground water and surface water as a single hydrologic resource, and (4) maintain environmental flows across political boundaries.
4. **Integrate water quality management**. Minimizing and treating wastewater reduces the need to maintain un-naturally high streamflow for dilution purposes. Properly-treated wastewater discharges can be an important source of water for meeting environmental flow needs.
5. **Actively engage all stakeholders**. Effective environmental flow management involves all potentially affected parties and relevant stakeholders and considers the full range of human needs and values tied to freshwater ecosystems. Stakeholders suffering losses of ecosystem service benefits should be identified and properly compensated in development schemes.
6. **Implement and enforce environmental flow standards**. Expressly limit the depletion and alteration of natural water flows according to physical and legal availability, and accounting for environmental flow needs. Where these needs are uncertain, apply the precautionary principle and base flow standards on best available knowledge. Where flows are already highly altered, utilize management strategies, including water trading, conservation, floodplain restoration, and dam re-operation, to restore environmental flows to appropriate levels.
7. **Identify and conserve a global network of free-flowing rivers**. Dams and dry reaches of rivers prevent fish migration and sediment transport, physically limiting the benefits of environmental flows. Protecting high-value river systems from development ensures that environmental flows and hydrological connectivity are maintained from river headwaters to mouths. It is far less costly and more effective to protect ecosystems from degradation than to restore them.
8. **Build capacity**. Train experts to scientifically assess environmental flow needs. Empower local communities to participate effectively in water management and policy-making. Improve engineering expertise to incorporate environmental flow management in sustainable water supply, flood management, and hydropower generation.
9. **Learn by doing**. Routinely monitor relationships between flow alteration and ecological response before and during environmental flow management, and refine flow provisions accordingly. Present results to all stakeholders and to the global community of environmental flow practitioners.