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Armenian-Georgian Transboundary Monitoring Programme of Water Resources in Khrami-Debed(a) River Basin

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Guidance Document

on Transboundary Monitoring Programme of Water Resources

in Khrami-Debed(a) River Basin

Final version

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Implementing partners

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List of abbreviations

EU	European Union
EUWI+	European Union Water Initiative Plus
TMP	Transboundary Monitoring Programme
QA	Quality Assurance
QC	Quality Control
RBMP	River Basin Management Plan
TACIS	Technical Assistance to the Commonwealth of Independent States
TBD	To Be Determined
TMP	Transboundary Monitoring Programme
UNECE	United Nations Economic Commission for Europe
WFD	Water Framework Directive

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1. Introduction

A surface and groundwater monitoring programme design should address the objectives of the programme and related information needs. The main objective of a monitoring programme is to supply water users and policy makers with relevant information based on reliable data.

The rationale for the implementation of the Armenian-Georgian transboundary monitoring programme of the Khrami-Debed(a) River Basin is the following:

- Need for obtaining the necessary information for the assessment of water resources (quantitative, chemical and ecological status of surface water bodies and chemical and quantitative status of groundwater bodies) within the Khrami-Debed(a) River Basin and support development of RBMPs.
- Need for obtaining the necessary information for effective management of waters and aquatic ecosystem of the Khrami-Debed(a) River Basin under changing climatic conditions.
- Need for obtaining, in particular, necessary information about prevention and reduction of pollution of the Khrami-Debed(a) River Basin, shared water resources, also as a result of mitigating measures (e.g. RBMP Programme of Measures)
- Implementation of the Comprehensive and Enhanced Partnership Agreement between the EU and Armenia (Chapter 3 Environment) and the Association Agreement between the EU and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part (Article 306, Annex XXVI (Environment)).

Specific objectives of the Armenian-Georgian transboundary monitoring programme in the Khrami-Debed(a) River Basin are:

- Increase awareness of the state, regional and local government agencies, organizations, society and international organizations on the chemical and ecological status of surface and chemical and quantitative status of groundwater bodies in the Armenian-Georgian border region.
- Identify possible pollution sources and causes in this basin.
- Estimate pollutant loads transferred across international boundaries.
- Provide information to assess long-term changes in natural conditions.
- Provide information to assess long-term changes resulting from widespread anthropogenic activity.
- Obtain, process, archive and disseminate information needed for water resources monitoring, forecasting and effective management.

More generally, the transboundary monitoring programme will:

- Encourage transboundary cooperation and communication.
- Reach harmonisation of monitoring and data exchange tools and methods used by Armenia and Georgia.
- Contribute to the priority setting of transboundary management and policy issues.
- Help with the efficient and effective design and implementation of future monitoring programmes.
- Ensure participation in the international intercalibration exercise.

The proposed monitoring programme was initiated in the frame of the EUWI+ project (under Result 1, 2016-2020) and continued under the EU4Environment Water and Environmental Data Programme (2021-2024). It is based on the previous successful experience of the transboundary monitoring activities undertaken by the EU TACIS Kura Phase II project in 2009-2010.

Support for transboundary cooperation between Armenia and Georgia on the Khrami-Debed(a) River Basin and possible bilateral agreement, as well as initiation of the joint basin assessment, including hydropower and nexus, was highlighted as a national priority both for Armenia and Georgia during the inception phase of the EUWI+ project. Following an initial round of field surveys in 2020, a first draft Guidance Document was prepared. Following the second round of field surveys in 2023, the document was updated in 2024 and included groundwater monitoring procedures.

Monitoring methods follow WFD requirements and ISO standards which are specified by the General Manual for Chemical Freshwater Sampling and the General Manual for Surveys in Running Waters developed under the EUWI+ project (Result 2).

2. Monitoring Approach

The first successful transboundary monitoring activities, undertaken in 2020 and 2023, set the core of this document. However, it is beneficial to continue the optimisation and learning process: a revision and update is foreseen at least every three years.

2.1 Working Group and Implementing Agencies

A Working Group with representatives of responsible agencies of both Parties and, if appropriate, other relevant stakeholders (relevant ministries and agencies, representatives of academia and NGOs) will be coordinating transboundary monitoring activities. The Working Group will consist of an equal number of representatives from each country. The Working Group will meet at least once a year (physically or virtually). It will decide on the Rules of Procedures at its first meeting.

Implementing agencies of the transboundary monitoring programme:

- **From the Armenian side:** Hydrometeorology and Monitoring Centre SNCO (responsible expert departments and laboratory), Ministry of Environment of Armenia (AM);
- **From the Georgian side:** LEPL National Environmental Agency (responsible expert departments and laboratory), Ministry of Environmental Protection and Agriculture of Georgia (GE).

2.2. Selection of Sampling Sites

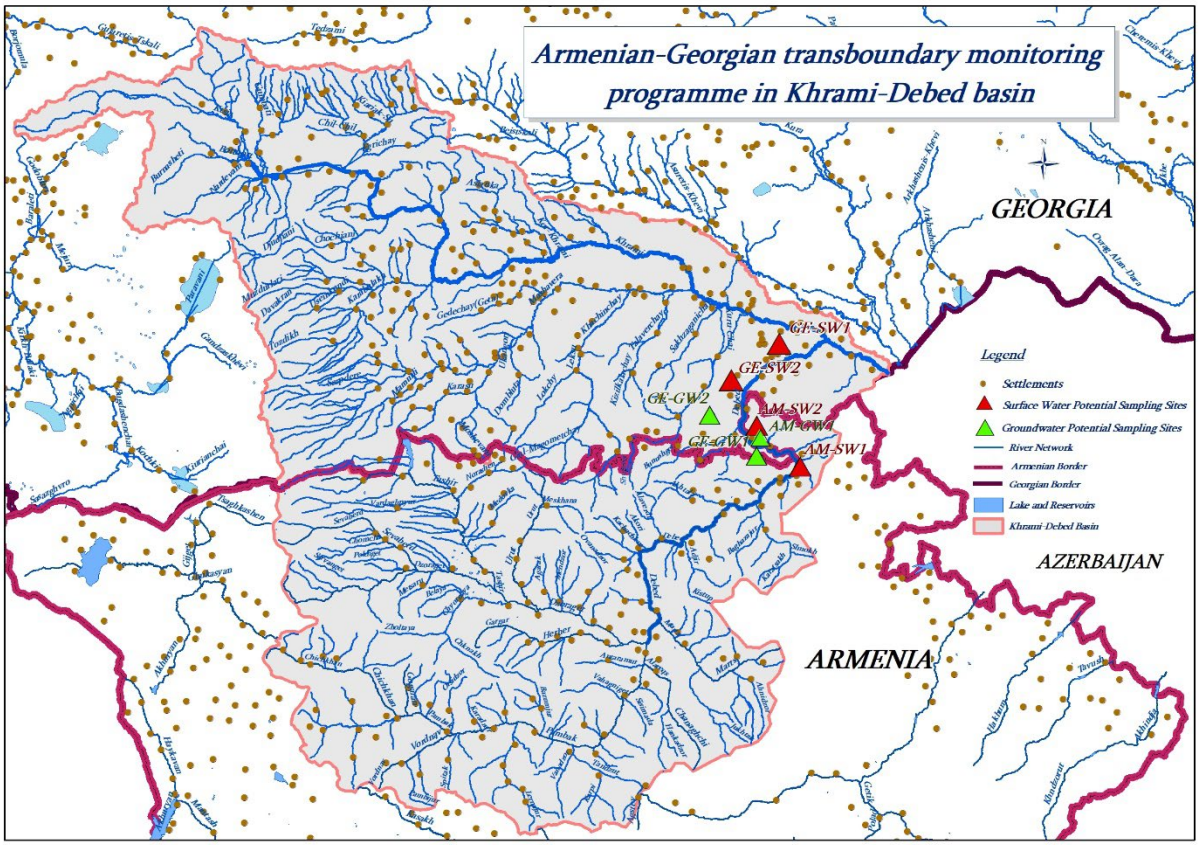
There should be at least two sampling sites for surface water and one sampling site for groundwater on each side of the border selected by the Working Group.

As a start, two sampling sites for surface water and one sampling site for groundwater have been selected on each side of the border based on the General Manual for Surveys in Running Waters (Annex 1) and General Manual for Surveys in Groundwaters Chemical Freshwater Sampling (Annex 2) as well as on criteria related to the transboundary monitoring of the surface

waters (UNECE 2000[1] and EU WFD 2000[2]) and on the previous experience in the transboundary monitoring activities undertaken by the EU Kura project in 2009-2010, as well as Khrami River basin planning process and first transboundary surveys within the EU Water Initiative Plus Project (2020), and EU4Environment Water and Data Programme (2023), when the first transboundary groundwater sampling took place at few sites.

Before selecting representative groundwater monitoring sites, it is necessary to share hydrogeological maps and groundwater body delineation maps and jointly discuss and develop a conceptual understanding of the transboundary character of groundwater, its vulnerability and its flow direction. The selection of representative monitoring sites should be based on this common understanding.

Transboundary monitoring is not limited to those points, as this activity is strongly interlinked with national data obtained on a regular basis. It is recommended to review the sampling points on a regular basis. If Investigative Monitoring is conducted in the transboundary area, the survey scope needs to be expanded/adapted in terms of survey site as well as parameter selection. In preparation for the next transboundary monitoring survey, suitable sites for groundwater and surface water need to be agreed upon between Armenia and Georgia. These sites should be reviewed for each transboundary monitoring campaign.



[1] Guidelines on Monitoring and Assessment of Transboundary Rivers, UNECE Task Force on Monitoring and Assessment, 2000.

[2] Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance document no 7: Monitoring under the Water Framework Directive, 2003.

Figure 1: Potential surface and groundwater sampling sites for the joint monitoring programme in Khrami-Debed(a) River basin

2.3. Sampling Schedule

2.3.1 Surface water

Monitoring is conducted in **different modes both jointly and simultaneously,** regarding **timing, frequency** and **location**[3]**:**

1) **Joint**: Armenian and Georgian experts conduct the sampling together as a group[4] twice a year in at least the preselected sites reflecting seasonal and natural aspects of the run-off in the catchment area.
2) **Simultaneous**: Armenian and Georgian experts conduct coordinated monthly samplings at the same time at their side of the border section (same water body).

Sampling frequency depends on natural conditions, monitoring network and quality elements - independent of the general location. Macroinvertebrates (first Biological Quality Element under WFD) will be sampled twice a year, hydrology and chemistry should be observed monthly. Field work can only be conducted during the right environmental conditions, the exact timing needs to be selected accordingly. Other Biological Quality Elements might be added in the future.

Sampling scenarios will be prepared and agreed upon by experts of Georgia and Armenia for the 2 joint and 10 simultaneous sampling events every year. The tentative sampling schedule (and of data exchange) of the Armenian-Georgian joint monitoring of the transboundary Khrami-Debed(a) River basin is presented below in Table 1.

Table 1: Tentative schedule of the Armenian-Georgian surface water monitoring in the transboundary Khrami-Debed(a) River basin

No.	Sampling dates of **simultaneous monitoring**	Sampling dates of **joint monitoring** and exchanging monitoring data
1	January	
2	February	
3	March	
4	April	
5		May
6	June	
7	July	
8	August	
9	September	
10		October
11	November	
12	December	

[3] See EUWI+ “Surface Water Monitoring Development Plan Armenia” and “Surface Water Monitoring Development Plan Georgia” for further information on monitoring frequency.

[4] Will depend on restrictions related to force-majeure circumstances e.g. COVID-19 pandemic or other. In such case (difficulties with crossing the state border), the joint sampling will be replaced with simultaneous sampling.

2.3.2 Groundwater

Sampling frequency: Groundwater monitoring is conducted 2 times per year, with **one joint** sampling and **one simultaneous** sampling**.** The sampling covers at least the preselected sites and the timing of the sampling is reflecting seasonal and natural aspects of the run-off in the catchment area and is considering the seasonality of human pressures (e.g. fertilizer and pesticide application)

3) **Joint**: Armenian and Georgian experts conduct one sampling together as a group[5] once a year where samples are taken and analysed by both teams in parallel to allow for better comparison of results.
4) **Simultaneous**: Armenian and Georgian experts conduct one coordinated sampling at the same time at their side of the border section (same water body).

Sampling timing depends on natural conditions, the accessibility of the site and the quality elements which are monitored to reflect the seasonality of anthropogenic pressure exposure. Scope and schedule for the joint and the simultaneous groundwater sampling events and data exchange will be prepared and agreed upon by experts of Georgia and Armenia every year.

2.4. Monitored parameters (substances and indicators)

The essential basis for harmonisation of the water monitoring methods and mutual trust building can be seen in the joint measurements on the transboundary water courses.

2.4.1 Surface waters

Taking into consideration the existing capacities and expertise of the laboratories in Armenia and Georgia, the joint surface water monitoring programme (twice a year) will initially include analysis of physico-chemical, chemical (e.g. priority substances) and biological quality elements (e.g. (benthic macroinvertebrates) as well as hydromorphological parameters. An initial list of monitored parameters is given in Table 2. As countries progress and gain additional experience with transboundary monitoring, this list will be reviewed and extended based on the WFD requirements (such as basin-specific pollutants) and as specified in Annex 1.

Table 2: Initial list of general, physical and chemical parameters to be used for the transboundary surface water monitoring programme.

Category		Parameters
Field measurements		Weather conditions
		Hydrological conditions
		Colour
		Turbidity
		Odour
		Water temperature
		Oxygen concentration

[5] Will depend on restrictions related to force-majeure circumstances e.g. COVID-19 pandemic or other. In such case (difficulties with crossing the state border), the joint sampling will be replaced with simultaneous sampling.

Category		Parameters
		Oxygen saturation
		pH
		Electroconductivity
General physical-chemical elements (measured in laboratory)	Thermal conditions	Water temperature
	Oxygenation conditions	Biological oxygen demand
		Chemical oxygen demand
	Salinity	Electroconductivity
		Chloride
		Sulphate, total ion
		Acid neutralizing capacity (m-value, pH 4.3)
		Calcium
		Magnesium
		Sodium
		Potassium
	Acidification status	pH value
	Nutrient conditions	Total phosphorous
		Total dissolved phosphorous, as P
		Ortophosphate, as P
		Nitrate-N
		Ammonia-N
	Additional parameters[6]	Total suspended solids
		TPH (petroleum hydrocarbons)
	Heavy metals	Arsenic
		Cadmium
		Copper
		Iron
		Mercury
		Molybdenum
		Nickel

[6] See EUWI+ “Background and concept paper for investigative monitoring” on which parameters should be added in case of certain circumstances.

Category		Parameters
		Lead
		Vanadium
		Aluminium
		Chromium
		Zinc

2.4.2 Groundwater

The transboundary groundwater monitoring programme includes the following field, physico-chemical and quantitative monitoring elements. An initial list of monitored parameters is given in Table 3.

Table 3: Initial list of general, physical and chemical parameters to be considered for the transboundary groundwater monitoring programme

Parameter/Indicator	**unit**
Field measurements	
Depth to groundwater table (or pressure head)	m
Water discharge (at springs or artesian wells)	l/s
Water temperature	°C
Electrical conductivity, reference temperature 25°C	µS/cm
Dissolved oxygen	mg/l
pH value	
Odour	
Colour	
Taste	
Turbidity	
Major ions – analysed in the laboratory	
Calcium Ca	mg/l
Magnesium Mg	mg/l
Sodium Na	mg/l
Potassium K	mg/l
Chloride Cl	mg/l
Nitrate NO3	Mg NO3/l
Sulphate SO4	Mg SO4/l
Orthophosphate oPO4	mg oPO4/l
Hydrogen carbonate HCO3	mg/l
Nitrite NO2	Mg NO2/l
Ammonia NH4	Mg NH4/l
Total mineralisation	mg/l
Total hardness	mg/l
Heavy metals (total, unfiltered) – analysed in the laboratory	
Iron Fe	mg/l

Manganese Mn	mg/l
Aluminium Al	µg/l
Arsenic As	µg/l
Lead Pb	µg/l
Cadmium Cd	µg/l
Chromium Cr	µg/l
Copper Cu	µg/l
Nickel Ni	µg/l
Molybden Mo	µg/l
Zinc Zn	µg/l

2.5 Sampling methods and sample treatment

Details of the sampling planning, logistics, sampling parameters, sample treatment and conservation, sample transportation, laboratory analysis, interpretation of data and reporting, as well as supporting documentation, such as checklist of materials for the field work, field protocols for surface and groundwater water sampling, template for hydro-morphological site description, template for multi-habitat sampling, protocol for sample delivery and handover at the laboratory are provided in Annex 1 to this Guidance Document ("General Manual for Surveys in Running Waters"), Annex 2 ("General Manual for Freshwater Sampling") and Annex 3 ("Specific Manual for Surveys in Groundwater) and any further (transboundary) survey manuals that are already available..

Depending on the status of a water body or in case of an uncertain or accidental pollution, the EUWI+ "Background and concept paper for investigative monitoring" provides additional guidance on how to approach specific situations in terms of selection of parameters and sampling sites – see. Annex 4.

2.6 Roadmap and planning of surveys

The roadmap below highlights the importance of bilateral cooperation and coordination before and after the field work. A detailed example time-schedule of collecting samples for the Armenia-Georgia transboundary monitoring of the Khrami-Debed(a) River basin is proposed in the Annex 5.

Table 3: Roadmap scheme and time frame of transboundary monitoring activities

Preparation phase (1 month)

1. Preparatory discussions/ e-meetings by national experts from both countries, agreement on:
    - Timing.
    - Survey scope.
    - Parameters.
    - site selection.
    - Sampling, sample treatment and conservation as well as measuring, analyses and assessment methods.
2. Contracting of external experts (if necessary).
3. Organisation of survey logistics and materials.

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4. Field work.

Processing and evaluation phase (2 months)

5. Sample analyses, data exchange and data assessment:
    - Biological and chemical analyses.
    - Ecological and chemical status assessment.
    - Exchange, comparison and discussion of results,
    - Joint interpretation of the data.
6. Conclusions, reporting and follow up:
    - Joint evaluation of the achievement of the survey objectives.
    - Sharing of experience and lessons learned.
    - Proposal of follow-up actions.
    - Results and conclusions in a joint annual Monitoring Report.
    - Reporting to relevant stakeholders (local and national authorities etc.).

Based on the transboundary monitoring experience, an analysis of procedures and results will be performed regularly with the purpose of improving effectiveness and efficiency of the TMP and all relevant documents, templates and this guidance will be updated.

3. Quality Control/Quality Management

To ensure the accuracy and precision as well as overall reliability of the collected data, a transparent and well-specified analytical quality control procedure shall be applied by all the involved sampling experts and laboratories. For the purposes of the TMP the following quality system shall be applied as described below.

A plausibility check of raw data as well as of analysed data such as the ecological status is required.[7] The ecological status classification systems developed by EUWI+ are still being refined and expanded.[8]

3.1. Sampling and Analysis

When gathering monitoring data, sampling is of utmost importance, as mistakes and errors in sampling cannot be ‘repaired’. Hence, it is necessary, that the sampling teams are well and regularly trained and follow precisely the instructions of the relevant ISO standards which are partly substance specific. Many of these aspects are already summarised in the accompanying sampling manuals attached as Annexes 1, 2 and 3 of this guidance document as well as further survey manuals that are already available.

[7] See EUWI+ “Transboundary Surface Water Survey 2020, Armenia and Georgia” for further recommendations and lessons learned.

[8] See EUWI+ “ESCS Definition of Reference Conditions and Class Boundaries in Rivers of Armenia for the BQE Benthic Invertebrates” and “ESCS Definition of Reference Conditions and Class Boundaries in Rivers of Georgia for the BQE Benthic Invertebrates” for further information on ecological status classification systems.

Field blank samples shall be collected and analysed as basic quality control of the sampling process. The field blank consists of an aliquot of blank water processed sequentially through each component of the sampling system. The field blank provides a measure of the total contamination (bias) present in the sample (blank sample shall be distilled/deionized water with the certificate on the purity).

The use of certified reference materials, when available, along with the samples is required.

Biological sampling shall be applied following the General Manual for Surveys in Running Waters (Annex 1). The ecological status is then assessed and compared.

3.2. Interlaboratory Testing

As an integrated part of the TMP of the Khrami-Debed(a) River basin, interlaboratory testing shall be organized at least once a year (in the initial stage potentially project-supported) to contribute to the QA/QC system. Such testing shall consist of the analysis of the standard water samples prepared by the reference laboratory (to be defined) for selected parameters, see Table 2 and Table 3.

Biological samples will be analysed by both respective country teams. This should follow the guidelines of the AQEM method, which requires a) 20 replicates per Multi-Habitat Sampling, b) sorting and identifying at least 700 individuals per sample. The same identification keys must be applied to achieve similar taxonomic levels and therefore provide comparable results.

3.3. Control Samples

Control samples (for parallel analysis) from 2 sampling sites might be taken by the sampling teams and subsequently analyzed by the Reference Laboratory (to be defined) for the selected heavy metals (As, Cd, Cu, Fe, Hg, Mo, Ni, Pb, V, Al, Cr and Zn) and other parameters.

These results will be compared with the results from the laboratories involved in the TMP as part of the QA/QC system and be addressed in the Monitoring Report.

3.4 Exchange, interpretation and harmonisation of analysed data

After the laboratory analyses are completed, the measured and analysed monitoring results shall be exchanged by email between the institutions involved in the survey. The exchange comprises the laboratory reports and in addition, the measured values shall be inserted in a jointly elaborated electronic data exchange template (e.g. Excel template). Such a template can reduce induced errors by unnecessary handling of the data.

After this internal data exchange, relevant differences in the analysed data need to be jointly reviewed between the competent laboratory experts with the objective of achieving harmonised results and/or explanations/justifications for certain differences. This e.g. could be:

1) “False positive/negative values“ in relation to Proficiency Tests.
2) Outliers: Measured values are out of the combined measurement uncertainty.
3) Exceedance of European Quality Standard values and national threshold-/limit values.

The result of this data review should be presented in the respective joint monitoring report. This interpretation and harmonisation may require an adaptive process towards corrective actions and stepwise improvement(s). Progress on the effectiveness of the implemented corrective measures will be reviewed in the next monitoring report.

4. Reporting of results and conclusions

The results of the transboundary monitoring programme will be presented in joint annual monitoring reports, which will be adopted by the bilateral Working Group.

The reports shall provide a general overview of the survey(s) over the last year, analysis of the data collected and shall include all raw data (as Annexes) in a transparent way to allow a thorough evaluation of the data. It shall be a stand-alone document with all relevant information included in the Word document or in the Annexes. The reports shall be prepared in both national languages and ideally also in English. A summary of the report (or a full document) should be made available for all interested stakeholders and published online through the websites of the HMC and NEA.

The results and experiences gained shall be used in the process of further harmonization of monitoring methods in the Khrami-Debed(a) River basin and of mutual trust building of the cooperating countries regarding the water resources in the transboundary region. Furthermore, results should be used by beneficiaries to fulfill the shared goals of transboundary monitoring, such as the enhancement of data availability and quality for sound decision-making.

The common activities will increase communication among the monitoring partners and the joint monitoring will be beneficial as an essential instrument in increasing transboundary trust, avoiding any misunderstanding among partners on the pollution of water resources, increasing the accuracy and stimulating the inter-laboratory calibration by the involved partners. Such exercise will contribute significantly to increasing the data quality generated by the involved laboratories.

The data and information obtained under the Transboundary Monitoring Programme of the Khrami-Debed(a) River basin will support integrated water resources management in the Khrami-Debed(a) River basin and in the wider Kura River basin.

Links

- Guidelines on Monitoring and Assessment of Transboundary Rivers, UNECE Task Force on Monitoring and Assessment, 2000
  https://unece.org/info/Environment-Policy/pub/21682

- Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance document no 7: Monitoring under the Water Framework Directive, 2003
  https://circabc.europa.eu/sd/a/63f7715f-0f45-4955-b7cb-58ca305e42a8/Guidance%20No%207%20-%20Monitoring%20(WG%202.7).pdf

- EUWI+ Surface Water Monitoring Development Plan Armenia (2021)
  Armenian:
  https://www.euwipluseast.eu/en/component/k2/item/1783-armenia-surface-water-monitoring-development-plan-2021-eng?fromsearch=1

  English:
  https://www.euwipluseast.eu/en/component/k2/item/1782-armenia-surface-water-monitoring-development-plan-2021-am?fromsearch=1

- EUWI+ Groundwater Monitoring Development Plan Armenia (2021)
  English:
  https://www.euwipluseast.eu/en/component/k2/item/1781-armenia-groundwater-monitoring-development-plan-2021-eng?fromsearch=1

  Armenian:
  https://www.euwipluseast.eu/en/component/k2/item/1780-armenia-groundwater-monitoring-development-plan-2021-am?fromsearch=1

- EUWI+ Surface Water Monitoring Development Plan Georgia (2021)
  English:
  https://www.euwipluseast.eu/en/component/k2/item/1847-georgia-surface-water-monitoring-development-plan-2021-eng?fromsearch=1

  Georgian:
  https://www.euwipluseast.eu/en/component/k2/item/1849-georgia-surface-water-monitoring-development-plan-2021-geo?fromsearch=1

- EUWI+ Groundwater Monitoring Development Plan Georgia (2021)
  English:
  https://www.euwipluseast.eu/en/component/k2/item/1843-georgia-groundwater-monitoring-development-plan-2021-eng?fromsearch=1

  Georgian:
  https://www.euwipluseast.eu/en/component/k2/item/1845-georgia-groundwater-monitoring-development-plan-2021-geo?fromsearch=1

- EUWI+ Background and concept paper for investigative monitoring - Armenia
  https://www.euwipluseast.eu/en/component/k2/item/1930-armenia-background-and-concept-paper-for-investigative-monitoring-2021-eng?fromsearch=1

- EUWI+ Background and concept paper for investigative monitoring - Georgia

https://www.euwipluseast.eu/en/component/k2/item/1924-georgia-background-and-concept-paper-for-investigative-monitoring-2021-eng?fromsearch=1

- EUWI+ Transboundary Surface Water Survey 2020, Armenia and Georgia https://euwipluseast.eu/en/component/k2/item/1679-armenia-georgia-transboundary-surface-water-survey-2020-technical-report-eng?fromsearch=1

- EUWI+ ESCS Definition of Reference Conditions and Class Boundaries in Rivers of Armenia for the BQE Benthic Invertebrates https://euwipluseast.eu/en/component/k2/item/1113-armenia-definition-of-reference-conditions-and-class-boundaries-in-rivers-of-armenia-for-the-bqe-benthic-invertebrates-eng?fromsearch=1

- EUWI+ ESCS Definition of Reference Conditions and Class Boundaries in Rivers of Georgia for the BQE Benthic Invertebrates https://euwipluseast.eu/en/component/k2/item/1115-georgia-definition-of-reference-conditions-and-class-boundaries-in-rivers-of-georgia-for-the-bqe-benthic-invertebrates-eng?fromsearch=1

Annexes

Annex 1 – General Manual for Surveys in Running Waters

https://www.euwipluseast.eu/en/component/k2/item/790-general-manual-for-surveys-in-surface-water

https://euwipluseast.eu/en/component/k2/item/1071-georgia-guidelines-general-manual-for-surveys-in-surface-water-ge?fromsearch=1

https://euwipluseast.eu/en/component/k2/item/1068-guidelines-general-manual-for-surveys-in-surface-water-arm?fromsearch=1

Annex 2 – General Manual for Chemical Freshwater Sampling

https://www.euwipluseast.eu/en/component/k2/item/1548-regional-general-manual-for-chemical-freshwater-sampling-2020-eng?fromsearch=1

Annex 3 – Specific Manual for Chemical Surveys in Groundwater

https://www.euwipluseast.eu/en/component/k2/item/1550-regional-specific-manual-for-chemical-surveys-in-groundwater-2020-eng?fromsearch=1

Annex 4 – Background and Concept Papers on Investigative Monitoring

https://www.euwipluseast.eu/en/component/k2/item/1930-armenia-background-and-concept-paper-for-investigative-monitoring-2021-eng

https://www.euwipluseast.eu/en/component/k2/item/1939-armenia-background-and-concept-paper-for-investigative-monitoring-annexes-2021-eng

https://www.euwipluseast.eu/en/component/k2/item/1924-georgia-background-and-concept-paper-for-investigative-monitoring-2021-eng

Annex 5 – Example of a detailed time-schedule of collecting samples for the Armenia-Georgia Joint Monitoring of the Khrami-Debed(a) River basin

Annex 5 – Example of a detailed time-schedule of collecting samples for the Armenia-Georgia Joint Monitoring of the Khrami-Debed(a) River basin

Time	AM / GE	Time	GE / AM
09^{00}-09^{30}	GE group is crossing the border check point GE Sadakhlo and the border check point Bagrateshen, AM	09^{00}-09^{30}	AM group is crossing the Bagrateshen border check point, AM and border check point GE Sadakhlo
09^{30}	AM/GE groups meet at Bagrateshen border check point, AM	09^{30}	GE/AM groups meet at Sadakhlo border check point, GE
09^{30}-10^{00}	AM/GE groups driving to the station AM-1, Hydrological post between Akhtala and Ayrum, Debed river, AM	09^{30}-10^{00}	GE/AM groups driving to Kirovka station GE-2 Debed river, GE
10^{00}-11^{30}	AM/GE group collects samples and measure the water flow at the station AM-1, Hydrological post between Akhtala and Ayrum, Debed river, AM	10^{00}-11^{30}	GE/AM group collects samples at Kirovka station GE-2, Debed river, GE
11^{30}-11^{45}	AM/GE groups driving to Ayrum station AM-2, Debed river, AM	11^{30}-12^{00}	GE/AM groups driving to Tazakendi station GE-1, Debed river, GE
11^{45}-13^{15}	AM/GE group collects samples at Ayrum station AM-2, Debed river, AM	12^{00}-13^{30}	GE/ AM group collects samples and measure the waterflow at Tazakendi station GE-1, Debed river, GE
13^{15}-13^{30}	AM/GE groups driving to border check point Bagratashen, AM	13^{30}-14^{00}	GE/ AM groups driving to border check point Sadakhlo, GE
13^{30}-14^{00}	Time of crossing the border check point Bagratashen, AM and the border check point Sadakhlo, GE	14^{00}-15^{00}	Time of crossing the the border check point Sadakhlo, GE and the border check point Bagratashen, AM
14^{00}-14^{30}	GE/AM groups driving to Kirovka station GE-2, Debed river, GE	15^{00}-15^{15}	AM/GE groups driving to the station AM-1, Hydrological post between Akhtala and Ayrum, Debed river, AM
14^{30}-16^{00}	GE/AM groups collect samples at Kirovka station GE-2, Debed river, GE	15^{15}-16^{45}	AM/GE group collects samples and mesure the water flow at the station AM-1, Hydrological post between Akhtala and Ayrum the Debed river, AM
16^{00}-16^{45}	GE/AM groups driving to Tazakendi station GE-1 from the Debed river, GE	16^{45}-17^{00}	AM/GE groups driving to Ayrum station AM-2, Debed river, AM
16^{45}-18^{15}	GE/ AM groups collects samples and mesure the water flow at Tazakendi station GE-1, from the Debed river, GE	17^{00}-18^{30}	AM/GE group collects samples at Ayrum station AM-2, Debed river, AM
18^{45}-19^{00}	GE/ AM groups driving to border check point GE Sadakhlo, GE	18^{30}-18^{45}	AM/GE groups driving to border check point Bagrateshen, AM
19^{30}	GE group to Tbilisi	18^{45}	AM group depart to Yerevan
19^{30}-20^{00}	AM group of crossing the Sadakhlo border check point, GE and the border check point Bagrateshen, AM	18^{45}-19^{00}	GE group of crossing the border check point Bagrateshen AM and the Sadakhlo border check point, GE
20^{00}	AM group depart to Yerevan	19^{00}	GE group depart to Tbilisi