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RIVER BASIN MANAGEMENT DEVELOPMENT IN KURA UPSTREAM MINGACHEVIR DAM RIVER BASIN DISTRICT IN AZERBAIJAN

PART 1 - CHARACTERISATION PHASE

THEMATIC SUMMARY

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1. CHARACTERIZATION OF THE RIVER BASIN DISTRICT

1.1 Natural Conditions in the River Basin District (RBD)

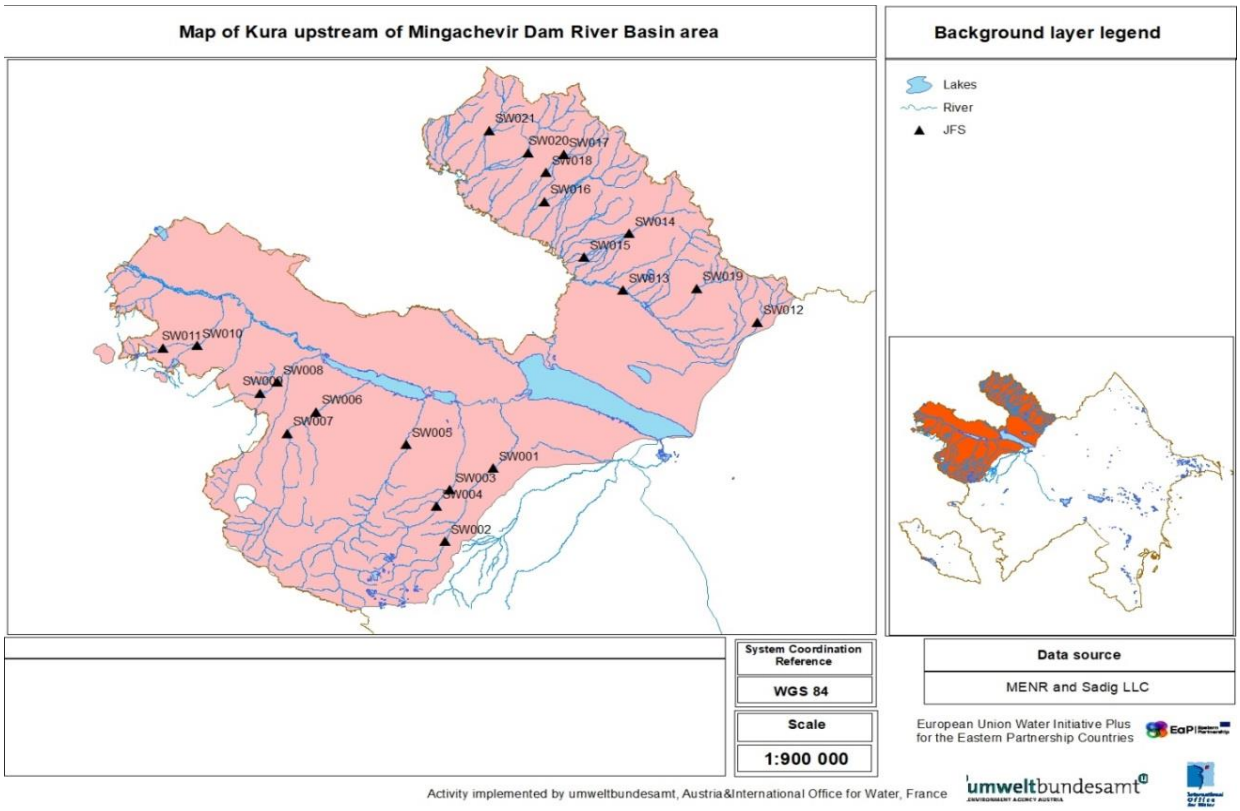
Within the framework of EUWI+ project, the Kura River basin upper Mingachevir Reservoir Dam was selected as a pilot area for River Basin Management Plan (RBMP) development. Basin District is located in the area upper rMingachevir dam, which is an earth-fill embankment dam (the length of the dam is 1,550 meters, its width is 16m and height is 80 m) on the Kura River just north the city of Mingachevir in Azerbaijan. The dam serves the purposes of hydroelectric power production and water storage for irrigation.

Mingachevir reservoir supplies water to the Upper Garabag and Upper Shirvan Channels which help irrigate about 1,000,000 ha (2,500,000 acres) of farmland in the country. The reservoir was built on a section of Kura River in 1953. The filling capacity of the reservoir is 83 m whereas the volume is 15.73 km³ and covering 605 km². The length is 70 km and width is 18 km. Maximum depth is 75 m, for an average depth of 26 m.

Main rivers feeding Mingachevir reservoir are transboundary ones with Georgia; rivers Ganikh(Alazan), Gabirri(Iori) and Kura. In general, Kura upper Mingachevir reservoir basin district within Azerbaijan Republic covers 2 sub basins:

- Central Kura(including Gabirri river) located in Ganja-Gazakh economic region and
- Ganikh/Alazan located in Sheki –Zagatala economic region.

As Central Kura and Gabirri river basins are located in one Economic Region and Gabirri has no large basin area on the territory of Azerbaijan they are presented under one single sub basin in this report.In figure belwo and Annex 1 is shown map of Kura basin district upstream Mingachevir dam in Azerbaijan



Ganja-Gazakh region has dry and warm climate in the plains, temperate-warm and steppe-dry winter climate in the lowlands, and cold and humid climate in the mountain areas.

The temperature in winter change from -5 °C to -20 °C (or lower in mountain areas) in the winter and from +20 °C to +35 °C (or higher in plain areas) in summer. The average annual temperature is 11,8-14,5 °C. The average temperature in July is 23-28°C , with absolute maximums of 37-42°C . Winters are warm: the

average temperature in January is 0°C . The average number of absolute minimums makes a 6-10°C frost. The period without frost is 220-250 days. There is no long snow cover period.

The average annual precipitation ranges between 250 and 550 mm. The amount of annual precipitation is 240-390 mm and precipitation increases with altitude.

Ganikh/Alazan Basin belongs to the transition zone from sub-tropical continental climate to the humid climate. The average annual amount of the atmospheric precipitation varies between 300-4500 mm in Georgia and 500-1300 mm on the Azerbaijan side. The average annual air temperature is from $+9+10^0$ C to $+13+14^0$ C, the minimum air temperature is 0.5 ºC in January, and the maximum temperature is at 23.6 ºC in July.

As in all mountain regions in this region as well temperature(monthly and annual) falls by elevation . Annual temperature is 14-16^{0}C in plain area, in high mountain zone it descends to 0^{0}C. The average annual relative air humidity is around 70% fluctuating over the season from 60 to 85%.

Maximum annual precipitation falls on 2400-2600m (1400mm) height in the south slopes of Major Caucasus. Amount of precipitations changes between 900-1200mm in the south slope of high mountain zone. Precipitations in Ganigh-Ayrichay valley amounts to 550-850 mm.

1.2 Hydrological & geohydrological characteristics of the RBD

The transboundary river Kura with its vast river system is the key water provider is the main water artery of Eastern Caucasus. The river flows through the territory of Turkey, Georgia and Azerbaijan Republics. Average height of Kura river watershed at the west part of the Azerbaijan Republic border equals to 1700 m; total area of the watershed makes up 188 000 km^2 and the length is 1 515 km. The river flows through the territory of the Georgia and Azerbaijan Republics and falls into Mingachevir reservoir.

Kura river starts from north-east slope of Qizil-Gadik mountain in Turkey at 2,720 metres above sea level and reach Azerbaijan at the elevation about 2 meters About 174 kilometres of the river is in Turkey, 522 kilometers in Georgia, and 819 kilometers in Azerbaijan.

The River Gabirri originates on the territory of Geirgia in the Greater Caucasus Mountains (at 2600m height) and flows to the Mingachevir reservoir on the territory of Azerbaijan, where it is known as Gabirri . Its length is 389 km and the catchment area is 4840 km2 (4230 km2 in Georgia and 610 km2 in Azerbaijan). It enters the borders of Azerbaijan near the village of Eldar. The annual flow of the Gabirri/Iori River to the border with Azerbaijan was 805 million m3 .

Main local rivers in the sub basin are Agstafachay, Tovuzchay, Zayamchay, Shamkirhcay, Goshgarchay and Ganjachay rivers. The total water resources of small rivers of Ganja-Gazakh region vary between 1,4 and 1,5 km^3. There are many lakes in the region. Most of these are fresh water lakes. Lakes of erosion and glacier type lakes are located in high mountain areas of Murovdag and Shahdag. Lakes of dam type (sink bed) are the most characteristic for the Lesser Caucasus area, e.g. Goygol, Maralgol, Garagol lakes.

The main reservoirs are located on Kura River ARE Mingechavir(15,7km^3),Shamkir(2,7km^3), Yenikend (1,58km^3) and also located belwo Mingechavir reservoir Varvara(0,06km^3)),

On Agstafachay, Akhinjachay ,Tovuzchay , Jogazchay , Indjachay , Shamkirchay rivers are constructed small water reservoir and one is planned to be built on Zayamchay River

Ganikh(Alazan) river is the major tributary of Kura River in the pilot area and is created by the tributary of two mountain rivers, Tsiplovaniskhevi and Samkuristskali, which flow from the southern slopes of the Main Caucasus Range from 825 m above sea level on Georgian territory. The river crosses intermountain depression, streams along Georgian-Azerbaijan border and then flows in Mingachevir Water Reservoir, situated on Azerbaijan territory. The total length of the river is 351 km, average fall - 745 m and average gradient - 2.12‰, total catchment area 11,800 km^2. Basin is directed from northwest to southeast, and at the entry of the River Agrichay (Azerbaijan) it changes the direction to south.

The main tributaries of Ganikh/Alazan are shown at table below. Balakanchay, Katekhchay, Talachay, Kurmukchay, Shinchay, Kishchay and Ayrichay Average quantity of annual flow is 3942.5mln m^3. 1876m^3 of them is in Georgia, 1216mln m^3 is in Azerbaijan.

Groundwater resources of Central Kura sub basin are estimated to be 42 m^3/sec

Groundwater reserves in the major part of the Ganikh Basin are estimated to be 39.3 m^3/sec; 20.4 m^3/sec is in the Georgian part and 18.9 m^3/sec in Azerbaijan.

1.3 Driving forces

Population of Central Kura sub basin according to the information of State Statistics Committee by the beginning of 2018 was 1161,49 th., which is about 90 % of population of the Ganja-Gazakh economic region and 11,7% of total population of Azerbaijan Republic. According to the same source in Ganikh/Alazan river sub basin area live 467,30th Population which is about 75 % of population of the Sheki-Zagatala economic region and 4,72% of total population of Azerbaijan Republic

During last 6 years number of population increased in both Central Kura and Ganikh/Alazan sub basins for about 6% or 1% per year. The increase of population was observed in all raions of the pilot area

Population of Kura upstream of Mingachevir Reservoir						
Raion/Region	2010	2012	2013	2014	2015	2016
Central Kura river sub basin	1086,4	1108,6	1118,9	1130,9	1142,3	1152,8
Ganikh/Alazan river sub basin	438,8	447,4	451,1	455,8	460	464

(Source : Stat.gov.az)

Of the total land used for agricultural purposed in Azerbaijan, 13% is in Ganja-Gazakh, as well as 15% of the total cattle and 28% of all vineyards in the country.

The main agricultural field products are potato, grain and wine. Cotton is cultivated only in Goranboy. Gazakh, Agstafa, Shamkir and Samukh regions are specialized in wine-growing, Gadabay, Shamkir, Tovuz – in potatoes, and Goranboy – in grain. Horticulture, fruit-growing, vegetable-growing and cattle-breeding are also developed in the Ganja-Gazakh economic region.

Grape is planted both in irrigated (60%), and dry-farming land (40%) conditions. Cultivated varieties (over 250) are technical (the majority), table grapes and raisins grapes. The first place in grape production belongs to Shamkir, Tovuz, Samukh

Agriculture is the most developed field of economy in the Sheki-Zagatala economical region. Land fund in the basin is 1,1mln hectare and 17,2% or 179 thousand hectare of it is sowing area.

Irrigated grain planting was developed in the lowland (plain) regions. In grain planting Sheki –Zagatala rregion play special role. Fodder crops are also planted in the region as a base of cattle breeding and include barley, maize, sunflower, sugar beet, etc.

Tobacco is grown in Sheki, Zagatala, Balakan raions and tea partly in Zagatala.

Seedy fruit (apple) , nuts and fruit - (walnut, hazelnut, chestnut) are grown in Sheki –Zagatala region

Agricultured lands, ha

Raion/Region	2010	2012	2013	2014	2015	2016

Central Kura sub basin	130797	133825	140413	133820	129697	137412
Ganikh sub basin	152356	155086	162584	151248	143004	164809

Cattle breeding (both meat and milk-meat) include cattle (cows), sheep breeding In Ganja Gazakh region is based on summer - winter pastures and on the natural forage base.

Wool and skin is raw materials for light industry. Is profitable area, because the number grows fast, requires the less labor cost, less feed.

Poultry - poultry facilities are in the extremities of the city of Ganja . Kept in individual farms.

The main economic field for agriculture is Tovuz region: cattle-breeding, horticulture and wine growing.

Cattle breeding (both meat and milk-meat) in Ganikh river sub basin is based on the rural economy. The local cattle (cows) occupy the main place. There are cattle in all raions. Buffalo breeding is also developed in Sheki – Zagatala region

Silkworm breeding – in areas of planting of mulberry trees in lowland and highland regions (Balaken, Zagatala)

Livestock, unit

Raion/Region	2010	2012	2013	2014	2015	2016
Central Kura sub basin	3192817	3235730	3752402	3895071	3331867	3314978
Ganikh sub basin	1617799	1650147	1641025	1603233	1605147	1647877

In Central Kura main industries are sulphuric pyrites, cobalt, barite, iron ore, alunite, stone marble, gypsum, zeolite, bentonite, crude cement, gold, copper, and limestone. Ganja-Gazakh is the second most important industrial region in the Republic, and its share of total industrial production in Azerbaijan is 12-13%. The region of Dashkasan is significant for the metallurgy and mining industries. It is located near the Koshkarchay River basin.

The area of Gadabay at present there is one operational plant in the area for production of gold, which employs about 2000 people. Enterprises of non-ferrous and ferrous metallurgy are active in Ganja and Dashkasan. Power industry: operational are Ganja, Shamkir and Enikend HPP. Chemical industry: plants operate in Ganja for the production of sulphuric acid and potash fertilizers.

Light industry is mostly based on the processing of local raw materials: cotton in Dalimamedli, and cotton, wool and carpet production in Ganja, Gazakh, and Dashkasan.

Industry of this economical region mainly based on treatment of agricultural production. At present 103 industrial enterprises work in this area. .

Main industry in Ganikh basinis represented mainly by food industry, light industry nad partly by construction enterprises. Food industry gives more than 70% of all industry production in the economical region. Meat, butter, cheese, fruit-vegetable, can factory, tobacco made fermented enterprises, different kinds of sweet enterprises represent food industry in the economical city centre.In last years production of non-alcoholic drink based on mineral waters,mineral and aerated water is increased.

Light industry is approximately 5% of all productive capacity of region (Sheki silk enterprises).

Among industry fields production of building materials takes the third place. There is a perspective opportunity in the development of this field in this region. Though it is rich with raw building reserve in the comparison with 2000, growth was observed in the main funds put into use from 2007 in the economical region.

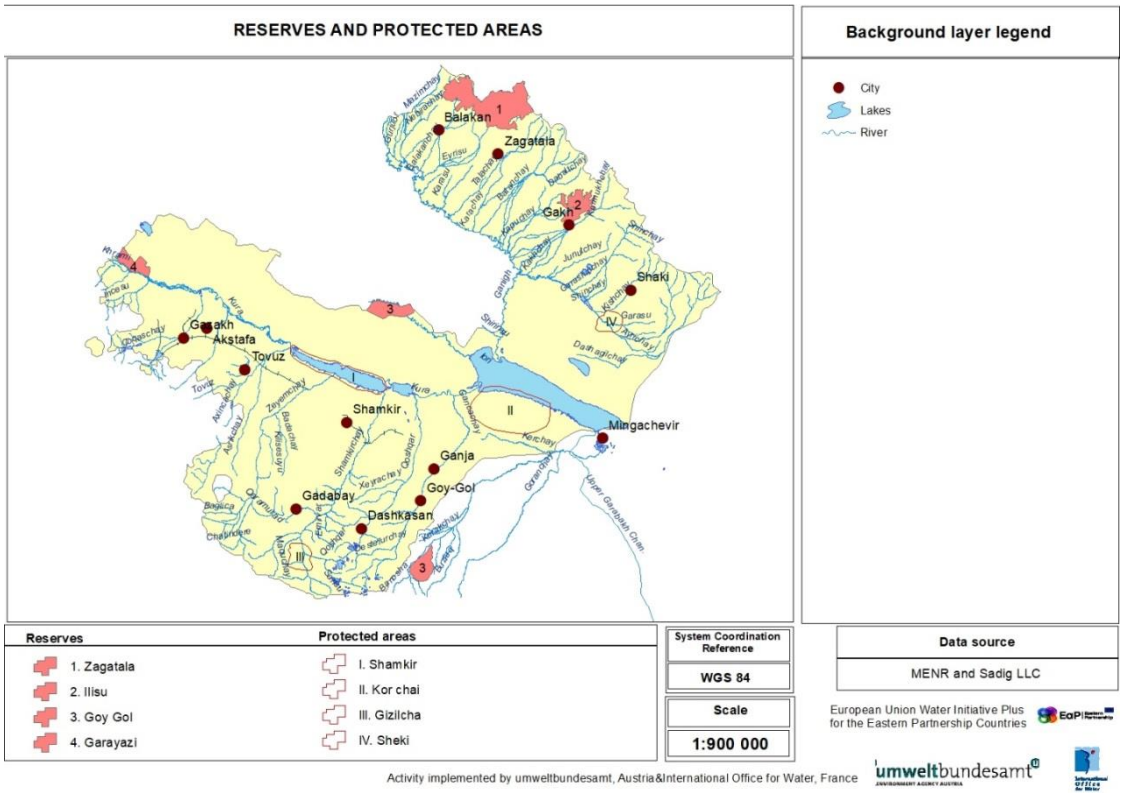
1.4 The river basin in the future

- State Water strategy of Azerbaijan Re[public developed on the basis of principles of IWRM and basin approach according to EU WFD for period till 2035 is expected to be adopted in early 2019
- National Water supply and sanitation program will continue to be implemented for major cities and large residential areas of the pilot river basin
- Decree of President of the Republic of Azerbaijan on approval of “AZERBAIJAN 2020: LOOK INTO THE FUTURE” DEVELOPMENT CONCEPT.
- Strategic Road Map for the development of utilities (electricity and thermal energy, water and gas supply) in the Republic of Azerbaijan (Approved by presidential decree of the Republic of Azerbaijan of March 16, 2016 no. 1897)
- State program on development of agricultural cooperation in the Republic of Azerbaijan in 2017-2022'.
- The Strategic Road Map for the manufacture and processing of agricultural products in Azerbaijan

1.5 Protected areas.

In Central Kura sub basin national parks, reserves and sanctuaries are created in areas where natural complexes of preferential ecological, historical, aesthetic and similar value is placed. These are used for nature conservation, enlightenment, scientific, cultural and other purposes. There is one National Park (Goygol), two State Nature Reserves (Garayazi, Eldar Shami), and four State Nature Sanctuaries (in Gadabey, Goygol, Agstafa and Shamkir regions). All these areas are designated for the protection of habitats and species.

Also in Ganikh river basin in areas there are reserves, where there are natural complexes of preferential ecological, historical, aesthetic and similar values. These are also used for nature conservation, enlightenment, scientific, cultural and other purposes. There are State Nature Reserves (Zagatala and Gakh raions) and three State Nature Sanctuaries (in Zagatala, Qakh and Shaki raions). Protected areas are shown on map below.


RESERVES AND PROTECTED AREAS
Background layer legend
City
Lakes
River
Balakan
Zagatala
Gakh
Shaki
Gazakh
Akstafa
Tovuz
Shamkir
Mingachevir
Ganja
Goy-Gol
Gadabay
Dashkasan
Reserves
1. Zagatala
2. Ilisu
3. Goy Gol
4. Garayazi
Protected areas
I. Shamkir
II. Kor chai
III. Gizilcha
IV. Sheki
System Coordination Reference
WGS 84
Scale
1:900 000
Data source
MENR and Sadig LLC
European Union Water Initiative Plus for the Eastern Partnership Countries
Activity implemented by umweltbundesamt, Austria&International Office for Water, France

2. PRESSURES AND IMPACTS OF HUMAN ACTIVITIES

2.1. Water abstraction

Water abstraction and flow regulation can be considered as a main quantities pressure on water resources. In order to supply irrigation water are constructed 5 big canals and 7 water reservoirs in pilot area (see below). In result of water abstraction many rivers in pilot area dry in low flow period of year. Almost for all rivers environmental flow requirements aren't met. Amounts of abstracted from sources water are given in table below.

Water abstraction from natural sources, mln kub m.

Raion/Region	2011	2012	2013	2014	2015	2016
Ganja-Gazakh region	746,5	797,9	829,6	842,3	832,1	853,9
Sheki-Zagatala region	282,9	282,6	287	277	312,8	320,7

As one can see from table in general total amount of abstracted water is lower than existing annual values of water resources (in Ganja-Gazakh region vary between 1,4 and 1,5 km^3 and in Azeri part of Ganikh basin 1216mln m^3) and reach 50 % of total water resources in Ganja _gazakh region. But it shoudl be noted that when it comes to vegetation period the values of abstratced waters become equal to existing water discharges in river and rivers dry. Results of study show that in result of cimate chnages water discharges in many rivers are reducing and in last 5-6 years this process is more evident.

2.2. Waste waters

Waste water management system in most of raions of the basin is old and based on constructed during former soviet union sewage and waste water treatment facilities. But OJSC on drinking water supply Azersu started to rehabilitate water supply and sanitation system of regions under National Water Supply and Sanitation Program, including the pilot area.

Currently in most of cities_the sewerage system was developed in last century and at the moment it is not sufficient to serve all city residents, most of the wastewater collection system is outdated and needs to be replaced. Pipes have defects and damaged. Counter-filtration in the sewerage system is a significant source of pollution.

Population in all settlements near rivers, including the four pilot rivers, discharge their household waste waters into these rivers. Hence, waste waters from residential areas located in or near the pilot river basins exert significant impact on water quality in the basins. Change of total volume of polluted waste waters during last years is shown in table below,

Amount of waste waters , mln. kub m.

Raion/Region	2011	2012	2013	2014	2015	2016
Ganja-Gazakh region	35,28	50,41	13,1	12,2	13,8	12,8
Sheki raion	1,9	1,5	1,3	0,8	0,6	0,8
Sheki-Zagatala region	3,24	2,84	2,4	0,94	1,56	1,86

Industrial wastewaterwaters are connected to the main sewage systems of cities in raions of Azerbaijan. But industries have to follow requirements on quality and level of treatment of their waste waters before discharging them into cities main sewage system according to the licences given by MENR

The website of the State Statistical Committee does not provide any information on the amount of water volume discharged from industrial and ore extraction facilities in the pilot area, even as in the pilot area there are industrial enterprises and ore mines.

Assessment of agricultural lands and livestock impact on status of water bodies in the pilot basin was done according to pressure Indicator "Likelihood for diffuse pollution" for water bodies Kura upstream of Mingachevir pilot river basin, including typical agricultural contaminants, such as nutrients from fertilisers, pesticides and other plant protection products. Animal husbandry is practiced primarily in the mountain and to a lesser degree in the plain parts of the pilot area and has impact on status of water bodies. As manure infiltrates into ground and surface water, the amounts of organic compounds in water increase.

2.3. Water quality

Results of assessment show that almost all surface water bodies below main cities and in lowland agricultural areas are polluted by household waste waters, nitrates, pesticides and heavy metals.

All deep groundwater bodies are of good chemical and quantitative status. But shallow groundwaters have some local pollution therefore they aren't used widely in drinking purposes therefore their quality. But implementation of National Program on Water Supply and Sanitation and also National Solid Waste Management Strategy parallel to implementation environment friendly agricultural development programs status these ground waters can also be improved.

Below pressures are identical for almost all of shallow ground waters in Kura Upstream of Mingachevir Reservoir pilot basin in areas impacted by population and agriculture:

- Water abstraction for irrigation
- Waste waters from households
- Deforestation
- Solid waste disposal
- Waste waters from households
- Impact through pollution of rivers by human activities
- Pollution by pesticides and fertilisers from agriculture

3. Water bodies status & delineation

3.1. Definition of water bodies

Surface water bodies are classified into water bodies in natural conditions, heavily modified and artificial water bodies. Determination of surface water bodies and heavily modified water bodies is based on several guidelines and an agreed methodology, is described below.

102 surface water bodies have been identified on the rivers of the Pilot area BD. Five water bodies (irrigation canals) have been identified as the artificial water body. Nine lake water bodies are located on the territory of the pilot basin. Eight of them (reservoirs) have been identified as the heavily modified water body. The results of WBs delineation are provided in Tables below.

Number and total length of river water bodies of the Pilot area

Water bodies in natural conditions		Artificial water bodies		Heavily modified water bodies	
Number	**Length, km**	**Number**	**Length, km**	**Number**	**Length, km**
95	2793.8	5	107.68	2	11

Below 2 river water bodies have been identified as heavily modified in pilot river basin.

Heavily Modified river water bodies

	DelName	DelCode	Criteria	Elevation, m	Geology	Length (km)	Area, km2	Type
	GANIKH RIVER WATER BODIES							
10	Kishchay	Gan1013-3-WB010	CHMWB-R	200-800	Siliceous	2.7	35	2
	KURA RIVER WATER BODIES							
6	Ganjachay	Kur011-4-WB006	CHMWB-R	200-800	Siliceous	8.7	11	2

Nine lake water bodies are located on the territory of the pilot basin are given below

Number and total area of lake water bodies in the Pilot area

Natural lakes		Artificial water bodies		Heavily modified water bodies	
Number	**Area, km^2**	**Number**	**Area, km^2**	**Number**	**Area, km^2**
1	0.6	-	-	8	788.1

In result of assessment of existing information and as well field observation below Heavily modified and artificial water bodies have been identified in pilot river basin.

Heavily Modified lake water bodies

	DelName	DelCode	Criteria	Elevation, m	Geology	Depth, m	Surface area, km2	Type
1	Mingachevir Reservoir	Kur01-1-HMWB001	HMWB-PR	<200	Siliceous	26	605	10
2	Yenikend Reservoir	Kur01-2-HMWB002	HMWB-PR	<200	Siliceous	6.8	23.2	7
3	Shamkir Reservoir	Kur01-3-HMWB003	HMWB-PR	200-800	Siliceous	23.2	115	11
5	Shamkirchay Reservoir	Kur013-2-HMWB005	HMWB-PR	200-800	Siliceous	7	25	8
6	Tovuzchay Rezervoir	Kur015-1-HMWB006	HMWB-PR	200-800	Siliceous	13	1.6	5
7	Aghstafachay Rezervoir	Kur016-1-HMWB007	HMWB –R	200-800	Siliceous	19.0	6.30	5
8	Ayrichay Reservoir	Gan101-1-HMWB008	HMWB –R	200-800	Siliceous	7.5	12	8

Artificial channels are given below

Artificial water bodies

	DelName	DelCode	Criteria	Elevation, m	Geology	Length (km)	Area, km2	Type
1	Shamkir canal	Kur016-1-AWB001	AWB	200-800	Siliceous	56.6	56.6	2
2	Salahli canal	Kur016-2-AWB002	AWB	200-800	Siliceous	11.2	11.2	2
3	Kosalar canal	Kur016-3-AWB003	AWB	200-800	Siliceous	10.5	10.5	2
4	Konullu canal	Kur013-1-AWB004	AWB	200-800	Siliceous	14.8	14.8	2
5	Dallar canal	Kur013-2-AWB005	AWB	200-800	Siliceous	14.5	14.5	2

A total of nine groundwater bodies (GWB G-100–602) have been preliminary identified and delineated in the upstream of Mingachevir reservoir dump. Four groundwater bodies have been identified in Quaternary aquifers, including one unconfined GWB, six confined (artesian) GWB, and three GWB delineated in Pre-Quaternary aquifers.

All deep groundwater bodies(except for local aquifers in intrusive rocks and shallow ground waters) are used for drinking, agricultural and/or industrial water supply with abstraction of over 10 m^3/d.

3.2. Water bodies status

To assess hydromorphological condition of water bodies was analysed information of water resources measured in hydrological points, which was compared with values of abstracted water discharges, flow regulation patterns etc. Map of monitoring points is given in Annex 2.

During the undertaken EUWI+ Project Field Surveys in September 2018 the following hydromorphological elements have been addressed aligned to the WFD requirements (see also table above):

- Interruption of river and habitat continuity;
- Hydrological alterations;
- Modification of river morphology.

Based on risk criteria and by use of different risk categories identified in Guidance was assessed morphological and hydrological status of rivers fro monitoring sires at September 2018 field survey period.

Analysis of changes in the hydrological regime has been done on the base of specific average and minimum flow maps prepared using the hydrological information from the existing hydrological monitoring network. Flow measurements were carried out for the pollution load calculation, and to define the analogue monitoring station for the non-gauged rivers in the pilot basin. The values of the measured water discharges were used for the hydrological regime assessment.

For each water body in addition to hydromorphology also other elements of the geology, relief , substrata, form of the river section and other elements have been considered to make prices hydromorphological status assessment.

Based on methodology of 5 class status was assessed morphological and hydrological status of monitored water bodies and results are given in Table below .

JFS sites characteristics and hydromorphological assessment results in Kura Upstream of Mingachevir pilot basin

Site No.	Site name	Altitude, m	WB type	Basin area, km2	Mean flow, m3/3	Min flow, m3/s	Measured flow, m3/s	Water use*	M score/ status	H score/ status
SW-01	Ganjachay-Below magistral bridge	593	4	465	2.05	0.89	0.97	WW, WA	3.3	3.6
SW-02	Ganjachay-Zurnabad	864	5	330	3.93	0.69	2.35	NO	1.5	1.0
SW-03	Qoshqarchay –Upper part	844	5	17.3	0.71	0.38	0.62	WW	1.3	1.0
SW-04	Qoshqarchay – Below bridge	584	5	246	1.63	0.56	0.58	WW, WA	2.6	2.8
SW-5	Shamkirchay- Below bridge	392	7	1061	5.94	1.57	1.15	WW, WA	3.7	3.5
SW-6	Zayamchay – Below Restoran	676	5	138	4.31	0.77	2.80	NO	1.8	1.9
SW-7	Zayamchay – Tatarlı	547	4	740	5.32	1.220	1.45	WA	2.7	3.1
SW-8	Tovuzchay –Below Tovuz park	350	4	807	0.63	0.36	0.37	WA	2.6	3.1
SW-9	Tovuzchay – Oysuzlu	466	4	280	0.83	0.42	0.28	WA	2.6	3.1

SW-10	Agstafachay - Gazakh aşağı	346	7	1682	9.10	2.19	0.26	WW, WA	4.3	4.6
SW-11	Jagazchay – Below bridge	516	4	296	1.20	0.64	0.32	WA	3.0	3.2
SW-12	Ayrichay Bash Dashaqil aşağı	700		92	2.90	1.41	2.32	WA	1,7	1,8
SW-13	Ayrichay after Kishchay	196		1810	17.4	4.97	4.31	WA, WW	2,1	2,1
SW-14	Kurmukchay - Ulu bridge	998		166	4.90	3.07	3.1		1,8	1,7
SW-15	Kurmukchay – Below bridge	223		-	5,11	2,10	2.63	WA,WW	2,7	2,8
SW-16	Karachyay – Lahıc bridge	225		-	1,24	0,81	0.42	WA,	2,8	2,8
SW-17	Talachay upper Zagatala	686		136	3.97	2.08	3.10		1,8	1,8
SW-18	Talachay Ashagi Tala	493		-	4,2	2,4	2.90	WA,WW	3,7	3,7
SW-19	Kishchay upper Sheki	1057		265	2.84	1.26	2.1		1,8	1,8
SW-20	Katekhchay (Bitdili) – Above the bridge	264		-	2,11	0,811-	0.85	WA	37	3,8
SW-21	Belokanchay upper Belokan	470		146	4.36	1.33	4.20		1,8	1,9

Result of assessment show that main impact on water bodies is flow regulation by water reservoirs, interruption of flow continuity ,significant water abstraction

SW-01-has “poor” water conditions due to the impact from the artificial structure in the river bed and riparian zone;

SW-04, SW-07, SW-08, SW-09, SW-11 - SW-13, SW-15 and SW-16 have “moderate” water conditions due to the significant changes in the hydrological regime from the water abstraction;

SW-12, SW-15 , SW-18 and SW-20 have “poor” water conditions due to the impact from the artificial structure in the river bed and riparian zone, and from the water abstraction.

SW-10-has “bad” water condition due to to the impact from the artificial structure in the river bed and riparian zone, and from the water abstraction.

In result of assessment of existing information and as well field observation below Heavily modified and artificial water bodies have been identified in pilot river basin.

In pilot basin 2 river water bodies have been identified as heavily modified water bodies see below), five water bodies (irrigation canals) have been identified as the artificial water body and eight lake water bodies (reservoirs) have been identified as the heavily modified water bodies.

All above point (houshold and industrial waste waters) and diffusion pollution(agricultural lands and livestock, illegal solid waste disposal sites) and also water abstraction pressure on water bodies in the pilot basin have been summarized and final status of water bodies have been assessed according to risk criteria

and are given in map in Annex 3.

As mentioned above all deep groundwater bodies are of good chemical and quantitative status. But shallow groundwaters have some local pollution therefore they aren't used widely in drinking purposes therefore their quality. Map of shallow groundwaters is given in Annez

4. Monitoring

At present, there are 18 hydrological observation points of the National Hydrometeorology Department in the basins of Ganja-Gazakh. Of these 14 are located on rivers in the region, which flow into Kura River, three on Kura River, and one on Iori River. The NHD of MENR has located the points in different height zones of basins.

Back to the Soviet Union water quantity was monitored in all hydro-meteorological monitoring sites, existing on the River Ganikh /Alazan. During the Soviet period, the sites were well equipped and the following activities were executing, such as: measuring the water discharge, level, temperature and the level of sedimentation, as well as the air temperature, precipitation, sun radiation and other meteorological activities, with regular sampling.

Nowadays National Hydro Meteorological Service of the Ministry of Ecology and Natural Resources of Azerbaijan implement the systematic monitoring on the water quality and quantity of the Ganikh /Alazan Basin Rivers. Currently on the Azerbaijan part of the Basin there are 10 operating hydrological monitoring sites observing the quantity of the waters.

The monitoring of groundwater level, flow quality and temperature in Azerbaijan has been conducted since the 40th -50th years of the 20 century. The monitoring system covers almost all hydrogeological regions associated with foothill plains and depressions and embraces wells, springs and kahrizes.

The monitoring involves:

- Groundwater level, output and temperature – 3 times per months;
- Groundwater quality – 1-2 times per year.

Same monitoring sites are used to assess groundwater quality, level, yield and temperature.

In case of detection of local pollution, frequency of monitoring is increased up to daily.

Existing over 90 ground water monitoring stations(52 in Central Kura and over 40 in Ganikh sub basins boreholes) will be sufficient for the quantitative and surveillance monitoring if all monitoring wells are working properly.

Chemical parameters, such as pH, temperature, dissolved oxygen, electric conductivity; total dissolved solids, etc. have to be measured in the field at the well. Monitoring wells must be properly purged before collecting groundwater samples.

There will be need to assess status of all existing in Ganikh river basin monitoring sites, select more representative ones for quantitative and surveillance monitoring and assess their status to see if any rehabilitation work is needed.

5. GOVERNANCE

5.1. Latest legal development of importance for RBMP

Key legal acts are (i) the Law on Environmental Protection and (ii) the Law on Environmental Safety; addressing inter alia among others also water resources, use of natural resources etc. The **Azerbaijan Water Code** has been adopted in December 1997 and is complemented by thematic water legislation dealing with irrigation, water supply and sanitation, municipal water management, environmental protection and others. It does not directly address the IWRM principles despite the provision that water resource management should apply a combined approach between hydrological and administrative-territorial principles

It is expected that in 2019 will be adopted National Water Strategy document, which is developed according to principles of IWRM approach and EU WFD and other international legislation.

5.2. Institutions for water management & stakeholders involved in the process so far

The following main water management institutions are in Azerbaijan :

- Ministry of Ecology and Natural Resources and its below divisions:
  - National Environmental Monitoring Department, under the Ministry of Ecology and Natural Resources
  - National Hydro-meteorology Department, under the Ministry of Ecology and Natural Resources
  - Hydro-geological Expedition, under the Ministry of Ecology and Natural resources
  - State Water Resources Agency, under the Ministry of Emergency Situations
  - Azerbaijan Amelioration and Water Farm OJSC
  - Azersu JSC on Drinking Water Supply and Sanitation

There is a wide variety of stakeholders that have an interest or impact on the management of the pilot river basin and the rivers within the whole basin, such as the general public, people living in the pilot basin who are the end-beneficiary of the project's result, benefiting of the quality and quantity of water resources.

The main stakeholders are the: national, regional local line agencies/authorities in charge of different sectors, national planning agencies, other regional and national research institutions and international organisations with expertise in one or more sectors, NGOs dealing with water management/environmental issues, water users, and those which have or might have activities with potential impact on the water issues in the pilot basin, or which are affected or might be affected potentially by planned measures and activities .

5.3. Data exchange and public access to information

As Azerbaijan adopted Aarhus Convention, therefore relevant legal and institutional framework is created to make environmental information available fro decision makers, stakeholders and general population.

The Communication Strategy for the Kura Upstream of Mingachevir Dam Pilot Basin will support first of all the project implementation, more concretely, the RBM planning in the pilot basin and its implementation through proper communication, access to information, stakeholder and public involvement.

The overall goals of the Communication Strategy prepared by EUWI+project for the Central Kura Pilot Basin are the following:

- to ensure proper communication, access to information, stakeholder and public involvement in the development and implementation of the RBMPs in the basin;
- to provide assistance to the government authorities in the basin on how to comply with their obligations, including practical support and guidance in addressing communication, access to information, stakeholder involvement and public participation in the development and implementation of RBMP;
- to facilitate the establishment of effective structures and mechanisms for public participation in the basin that will continue operating beyond the project.

5.4. Main Issues

Main water management issues existing in pilot area are connected with water pollution, drying of rivers and subsequent negative environmental and human health impact connected with deterioration of quality and quantity of water are:

1. Overexploitation of water resources because of lack of modern irrigation methods and technologies and also about over 40% water losses in old (ground) irrigation water supply infrastructure
2. Drying of rivers in result of over abstraction
3. Discharge of untreated wastewaters into water sources
4. Release solid wastes to river banks
5. Diffuse pollution from agriculture
6. Car washing in river
7. Lack of monitoring data to assess qualitative and quantities impact on water bodies

Regarding Ground Water bodies it should be noted that mainly shallow ground waters of the pilot basin area are facing with pollution . Potential groundwater pollution sources include: areas where pollutants can enter aquifers through surface waters; areas where various industrial and agricultural wastes are discharged, collected and stored at storages or fields (sludge collectors, ash-spilled place, filling reservoirs, basins, infiltration fields, etc.); agricultural irrigation areas (where fertilizers and pesticides are utilized); areas of mining, geological exploration and other works

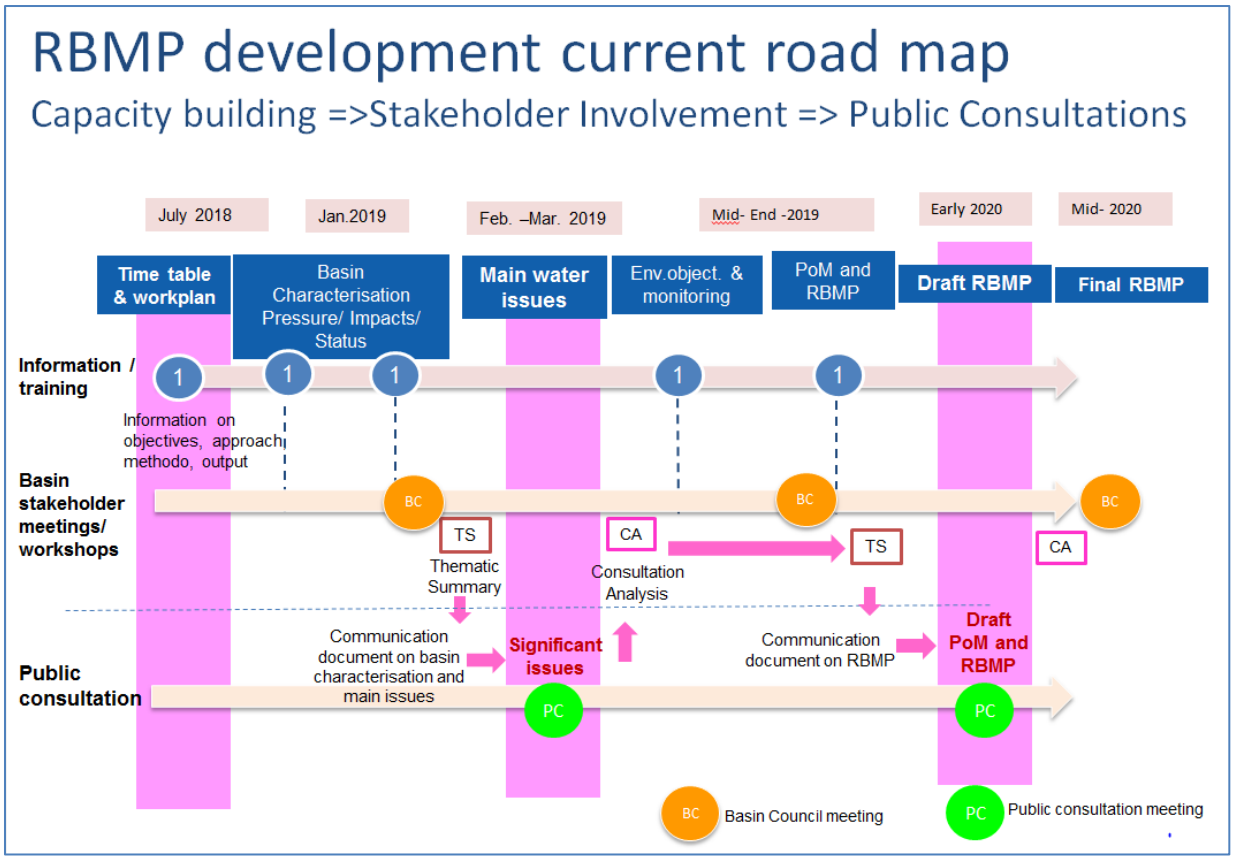
Shallow GWBs in the area impacted by population and agriculture. Significant impact on this GWB of the Ganikh river basin is resulting from the following human activities:

- Water abstraction for irrigation
- Deforestation
- Solid waste disposal
- Car washing in rivers
- Discharge of waste waters from residential areas to rivers
- Hydromorphological changes
- Pollution by pesticides and fertilisers from agriculture

As mentioned above main pollutants of surface waters are also sources of pollution of shallow ground waters. Results of delineation work show that deep pressured ground water bodies can only be polluted in areas where they interact with polluted surface or shallow ground waters. Results of assessment in Central Kura show that only possible local areas in the basin where ground water bodies may not have GOOD status is area of Ganja Aliminium plant polluted with different pollutants of related industry.

In pilot basin shallow ground waters starting from foot hill areas where is impact from residential areas and other human impact these water bodies are in risk of not reaching GOOD status. In Annex 4 is given map of shallow ground waters (laid over coloured pressured ground water layers) with status of at risk and possibly at risk of not reaching GOOD status

5.5. Timetable and work plan till the adoption of the RBMP



5.6. Technical reports

(give the link or the place where the documents are available for more information

1. Kura upstream of Mingachevir Water Reservoir Pilot River Basin Analyses
2. Pressure and Impact assessment in Kura upstream of Mingachevir Water Reservoir Pilot River Basin
3. Protected areas
4. Surface water body delineation in Kura Kura upstream of Mingachevir Water Reservoir Pilot River Basin
5. Ground water body delineation in Kura upstream of Mingachevir Water Reservoir Pilot River Basin

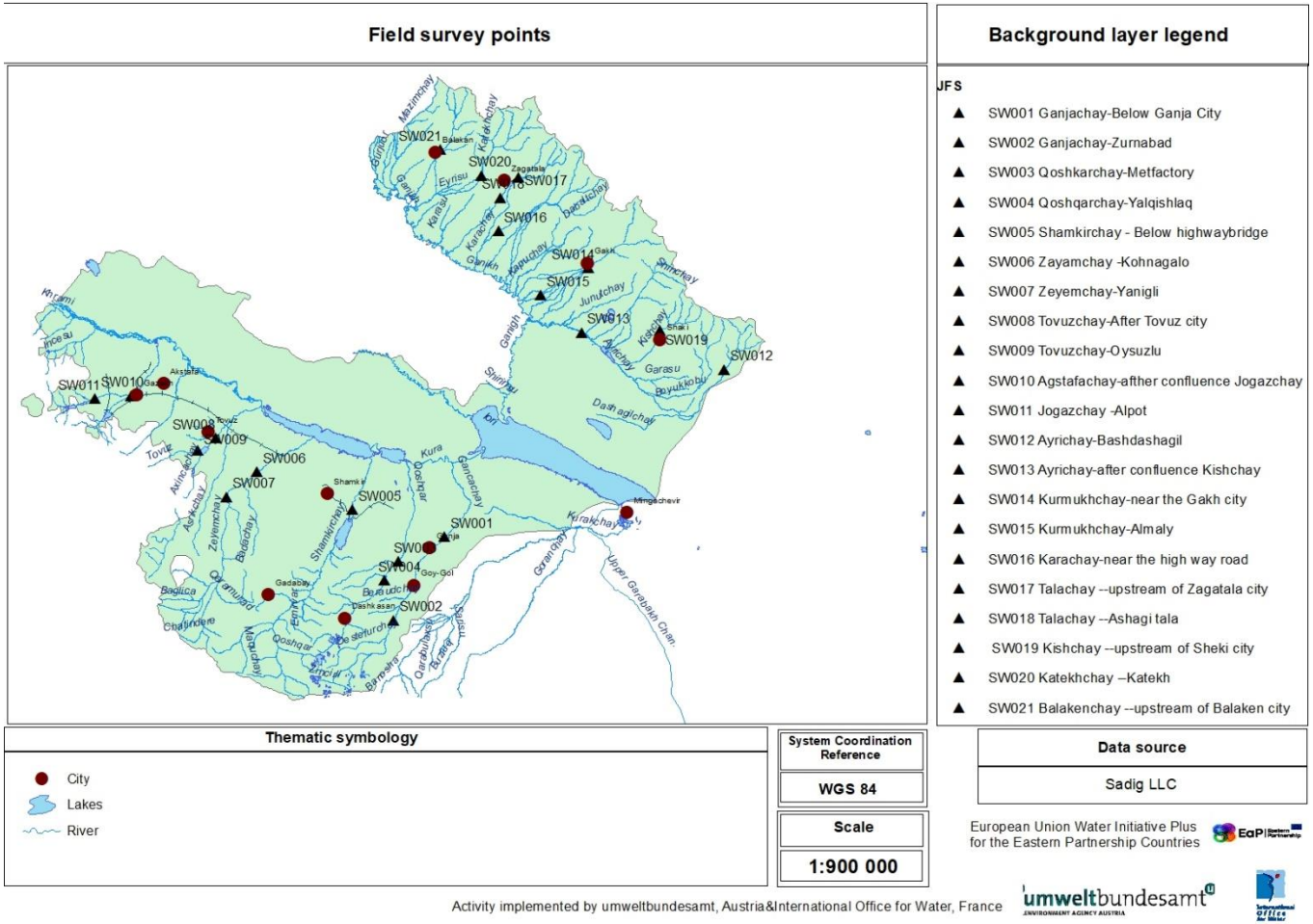
5.7. Glossary

Impacts	The environmental effect of a pressure (e.g. fish killed, ecosystem modified).
Artificial water body	A body of surface water created by human activity.*
Hydromor-phology	The physical characteristics of the shape, the boundaries and the content of a waterbody.
Point source pollution	Pollution arising from a discrete source , e.g. the discharge from a sewage treatment works
Pressures	The direct effect of the driver (for example, an effect that causes a change in flow or a change in the water chemistry on water bodies). A significant pressure, on its own, or in combination with other pressures, would be liable to cause a failure to achieve the environmental objectives.

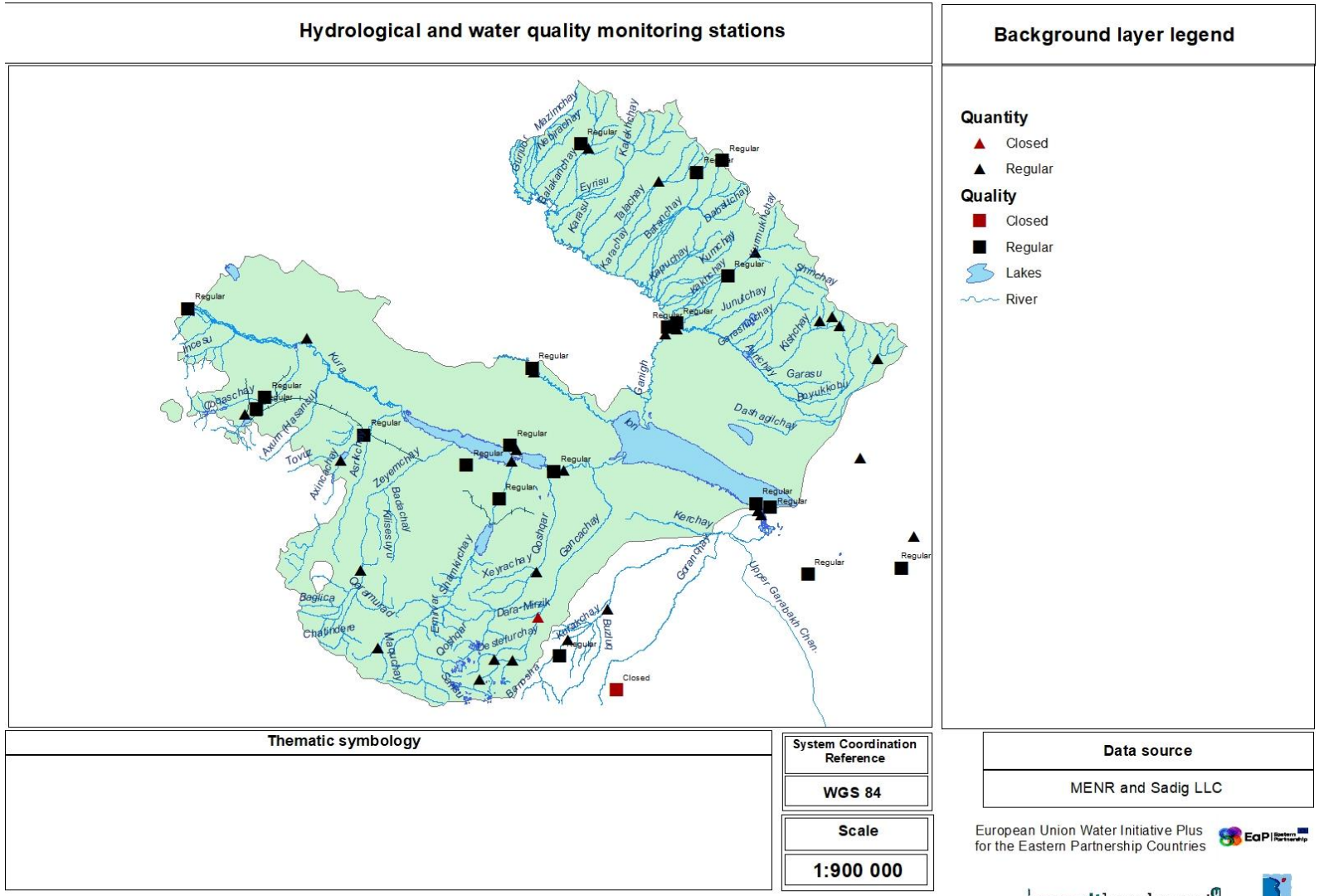
RBMP	River Basin management Plan, territorial planning document: it gives the overall orientations of water management in the basin and the objectives to be reached, the delay and the priorities in the actions to be developed for a defined period of time
Significant pressure	In the context of the WFD, a pressure that, on its own, or in combination with other pressures, would be liable to cause a failure to achieve the environmental objectives set out under Article 4.
State	The condition of the water body resulting from both natural and anthropogenic factors (i.e. physical, chemical and biological characteristics)
Status	Condition of a water body resulting from natural and anthropogenic factors (= potential). Can be High, good, moderate, poor, or bad
Water Allocation	The planning process using regulatory tools which consists in supplying all users with water volumes according to the legal framework in order to meet the demand. Water allocation refers to sectorial share but also to individual water permits.
Water balance	It is the gap between existing water supplies and water demand (including ecological flow). As both water demands and supply facilities (dams' storage, water table…) fluctuate on a seasonal and daily basis, water balance must enable to account for these variations in fluctuations.
Water bodies	homogeneous natural hydrological basic unit or volume of groundwater within an aquifer

ANNEXES

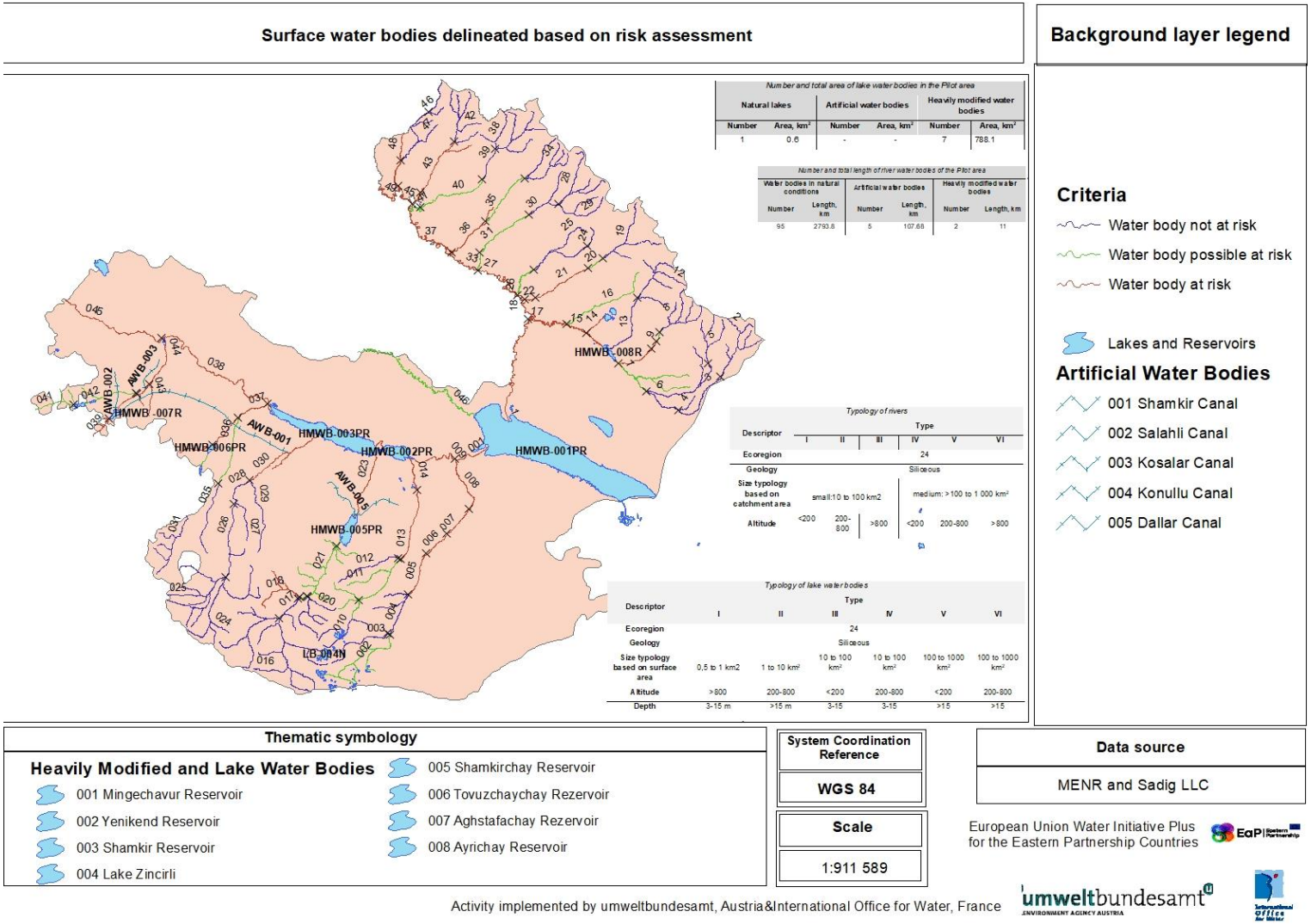
Annex 1.1 Field survey points



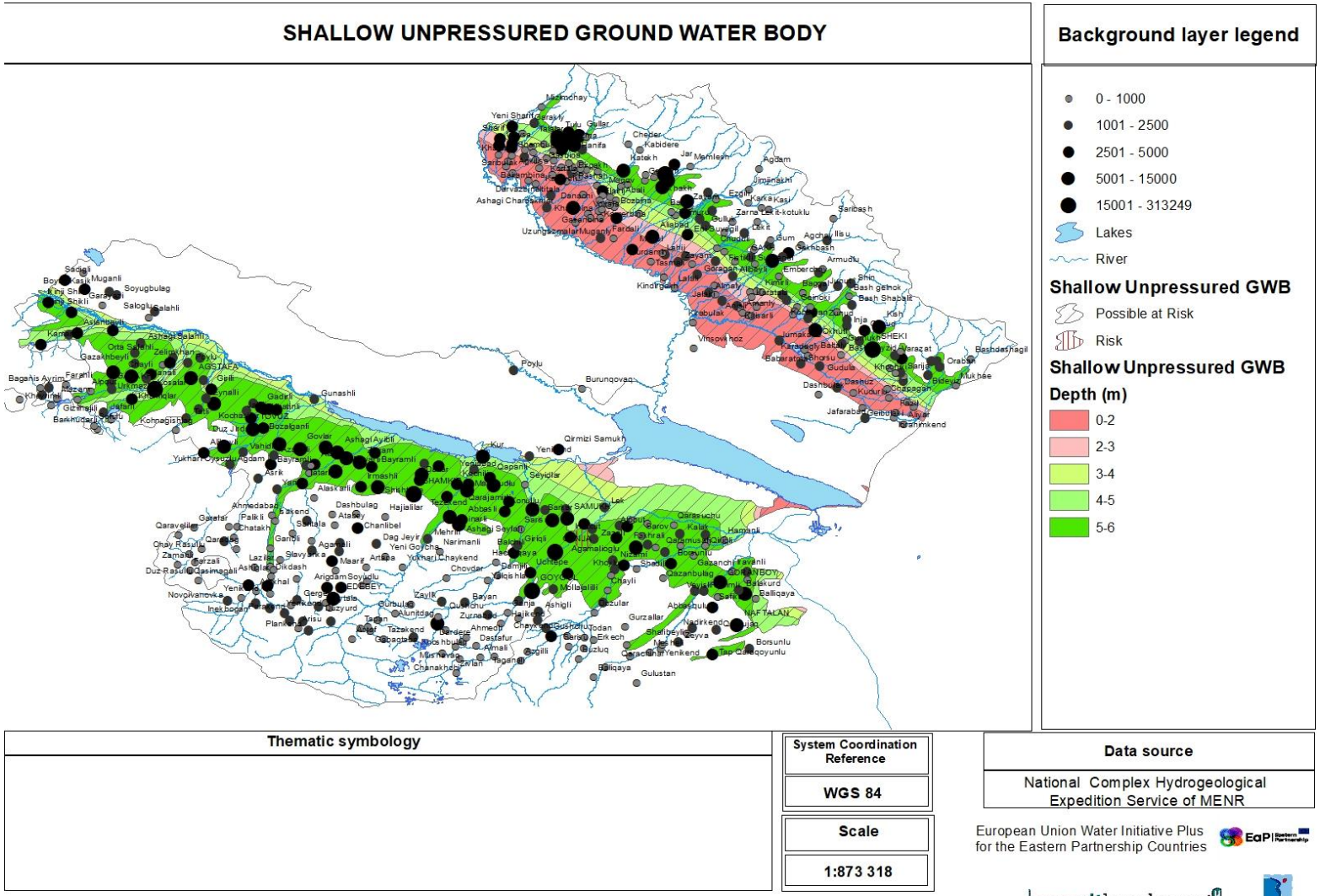
Annex 1.2 Hydrological and water quality monitoring stations



Annex 1.3 Surface water bodies delineated based on risk assessment



Annex 1.4 Shallow unpressured ground water body


SHALLOW UNPRESSURED GROUND WATER BODY
Background layer legend
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1001 - 2500
2501 - 5000
5001 - 15000
15001 - 313249
Lakes
River
Shallow Unpressured GWB
Possible at Risk
Risk
Shallow Unpressured GWB
Depth (m)
0-2
2-3
3-4
4-5
5-6
Thematic symbology
System Coordination Reference
WGS 84
Scale
1:873 318
Data source
National Complex Hydrogeological Expedition Service of MENR
European Union Water Initiative Plus for the Eastern Partnership Countries
Activity implemented by umweltbundesamt, Austria&International Office for Water, France

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