Output: O.T1.1
Study of data and information: Georgia

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Responsible Organisation	Black Sea Eco Academy
Reference	MARLITER Study of data and information: Georgia. MARLITER BSB 138, Output: O.T1.1, 2019. Shalva Javakhadze, Ia Bakuradze, Thea Turner, Maia Ochigava and Nino Tskhadadze
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Output Version	V1.0

Dissemination Level		
PU	**Public**	✓
RE	Restricted to a group specified by the consortium (including Programme Authorities)	

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1.1.1. Geography of Georgia

Georgia is situated in the central and western parts of Transcaucasia. The total length of the border of Georgia is 2,148 km, 1, 839 km of which is a land border. To the west, between the estuary of the Psou River and the village of Sarpi, Georgia border with the Black Sea; to the north – with the Russian Federation; to the east – with Azerbaijan; to the south – with Armenia; and to the south-west with Turkey.

Vertically, territory of Georgia spreads from the Black Sea level to 5,201 m (Mount Shkhara). Its terrain is quite complex – two thirds of its territory consist of hills and mountains. The Caucasus mountain range covers over one third of its territory along the northern border. The vertical relief of Georgia consists of high, medium and low mountains, plateaus, and plains. It has distinct orographic entities: the Caucasus, inter-mountain lowland, which is divided into Kolkheti and Iveria lowlands by Likhi ridge, Meskheti and Trialeti ridges (part of the Lesser Caucasus Range) and volcanic mountains of Southern Georgia. Some peaks of the main watershed ridge within the territory of Georgia are over 5,000 m high.

Georgia comprises most of the existing climate zones, from humid subtropical to eternal snow and ice cap climate zones. The diversity of its climate is determined, on one hand, by its location on the north border of sub-tropical zone, between the Black and Caspian seas, and, on the other hand, by the complexity of its terrain.

The local climate is shaped by the Caucasus as it protects Georgia from invasion of cold masses of air from north; and the Black Sea, which moderates temperate fluctuations and enables high precipitation, especially in Western Georgia. Annual volume of precipitation varies between 400-4,500 mm.

One of the main mineral resources in Georgia is groundwater, which is a significant factor in the development of Georgia's national economy. Georgia is rich in thermal waters. They are used in agriculture and for utility purposes, but are also valuable in terms of energy supply. There are large resources of fresh water in Georgia with the total of 21.7 km3 of natural debit (23% of the country's rainfall). Their distribution is extremely uneven - increasing from east towards west.

Georgia boasts a large variety of mineral resources: ground-waters, mineral resources, mineral waters. In terms of its internal water resources (rivers, lakes, reservoirs, glaciers, ground-waters, wetlands) Georgia is one of the richest countries among the former USSR countries.

River network is unevenly distributed. Out of 26,060 rivers with the total length of 60,000 km, 18,109 are located in Western Georgia, and 7,951 in Eastern Georgia. Most rivers (25, 923) measure less than 25km, 121 rivers – 25-100 km, and 16 rivers – 100-500 km. The rivers of Georgia are part of the basins of the Black and Caspian seas. Nearly all the rivers of Eastern Georgia form unitary Mtkvari system and drain into the Caspian Sea while, in Western Georgia, rivers independently flow out into the Black Sea. The rivers of Georgia are fed by glaciers, snow, rain and ground-waters. Water resources of Georgia are unequally distributed. The river flow of the rivers of Western Georgia, including transit ones, is 49.8 km3, and that of Eastern Georgia is 16.5 km3. The most abundant river is Rioni. Mtkvari is much sparser – its river flow at Georgia-

Azerbaijan border is 8.3km3. Other noteworthy rivers are Enguri, Kodori, Bzipi, Tskhenistqali, Qvirila, Liakhvi, Aragvi, Ktsia-Khrami, Alazani, etc.

There are more than 860 lakes in Georgia. Most of them are considerably small, and, for this reason, the total area of lakes does not exceed 170 km^2 (0.24% of the country's territory). Having said so, the lakes of Georgia represent a wide variety in terms of their genesis: tectonic, glacial (the largest number), fluvial, shoreline, karst, sinkhole/solution, volcanic, landslide, and anthropogenic. Fresh water lakes predominate in Georgia, with some of them containing very small amount of salt. The largest lake by area is Paravani, by volume – Tabatsquri, by depth – Ritsa - the deepest lake of all South Caucasian lakes.

There are 44 water reservoirs on the territory of Georgia with the total area of 163 km^2 and volume of 3,315 million m^3. Glaciers in Georgia are only in the Caucasus. Their number is 725 and area – 370 km^2 (0.5% of the country's territory). Wetlands occupy significant share of the Kolkheti lowland - 627 km^2. To the west, Georgia is enclosed by the Black Sea. The borderline within Georgia is 330 km. The rivers that flow into the Black Sea from the territory of Georgia are: Rioni, Bzipi, Kodori, Enguri, and Chorokhi. Up to 50 km^3 water drains into the Black Sea (16% of the entire continental river flow). Winter on the Black Sea coast is temperate and warm. The average January temperature is +4-7 C. Rainfall is abundant throughout a year. The wettest area is southern part Kolkheti, with the annual rainfall of over 2,500 mm. The average surface salinity in the open sea fluctuates between 17.80/00 in spring and 18.30/00 in winter. At the depth of 200 m, salinity increases up to 21.30/00. The rivers reduce the surface salinity considerably at the coastline, especially in spring and early summer. But desalination normally stops at around 2-4 miles into the sea, spreading further out during a heavy freshet in rivers, while salinity is reduced for a short period of time and only down to 12.80/00. Ichthyofauna along the coastline of Georgia is almost exclusively marine. They mainly are local species and some migrate here in winter.

Autonomous republics of Abkhazia and Adjara are part of Georgia, as well as 79 municipalities that form nine regions: Kakheti, Shida Kartli, Kvemo Kartli, Imereti, Guria, Samegrelo-Zemo Svaneti, Samtskhe-Javakheti, Racha-Lechkhumi and Kvemo-Svaneti, Mtskheta-Mtianeti.

1.1.2. Black Sea regions and their general characterization

The Black Sea borders with Guria Region, Samegrelo-Zemo Svaneti Region, Autonomous Republic of Abkhazia, and Autonomous Republic of Adjara

1.1.2.1 Guria Region

Guria Region, in the southwest of Georgia, is mainly situated on Kolkheti lowland. To the west it borders with the Black Sea, to the south - with Adjara-Guria mountain ridge, the Choloki River and Autonomous Republic of Adjara, to the east – with Imereti, and to the north – with Samegrelo. Guria's area is 2,033 km^2 (2.9% of the country's territory).

The population of Guria is 139,800, which makes 3.1% of the population of Georgia. There are 189 settlements in the region: 2 towns, 5 dabas (urban settlements), and 182 villages. 26.4% of the population live in towns and dabas, 73.6% - in villages. The density of the population on the territory is 69 people per km^2. There are over ten highland villages that are part of Ozurgeti and Chokhatauri municipalities.

In terms of its natural conditions, Guria Region is divided into lowland and highland. The lowland has humid-subtropical climate. Summers here are temperately hot, and winters – temperately cool.

The highland is known for its salubrious climate, shaped by combination of sea and mountain air. Summers here are temperately warm and winters – temperately cold.

The region is rich in water resources: rivers, lakes, natural and artificial resources, ground-waters, mineral waters, and thermal waters. 25 medium and small size rivers flow through Guria, with the total length of 598 km; while the total area of the basin is over 1,000 km^3. The region has three lakes (with the total area of 4.4 km^2) and 3 reservoirs (with the total area of 4.4 km^2). In 2011, the water intake from natural water bodies was 95 mln m^3, and the water consumption was 94 mln m^3. According to the 2011 data on water intake, 96% of the water resources (ground and surface) of the region is used in hydro energy, 2% - in agriculture, the rest – in industry, irrigation, and recreation.

The regional Black Sea coastline stretches over 22km. Famous resorts -Ureki, Shekvetili, and Grigoleti – are situated along it, while resorts Bakhmaro (2,500 m) and Gomista (2,130 m) are located in the alpine zone of Guria's mountains. There are also two balneological resorts – Nabeghlavi and Nasakrali – in the region. In recent years, the number of hotels on the Black Sea coast has sharply increased.

The Black Sea coastal zone of Guria Region is part of Georgia's system that is most vulnerable to climate change. According to the projection, based on the model calculations, by 2030-2050 the sea level on Supsa-Natanebi stretch will raise by 23 cm, which will increase the probability of freshets in Supsa River.

Sewerage systems in the region are either inadequate (in Ozurgeti, Lanchkhuti) or not in place at all (Chokhatauri). In 2011, due to poorly maintained sewer network, there was an accidental spillage into the surface water bodies in Lanchkhuti resulting in outbreak of epidemic of water-related infection. There are no wastewater treatment facilities in the region. Untreated domestic wastewater, partially treated waters from active industries and medical institutions, as well as wastewater from landfills and agricultural lands first find their way into the rivers and then into the Black Sea. The above-mentioned circumstances are critical and pose significant problems to population and environmental safety and hinder social-economic development. There are no sewerage systems in Ureki or Shekvetili.

Removal of household waste from municipal centres is conducted by respective municipal services. In the villages, population arbitrarily disposes of the household waste in small 'unregulated landfills', in nearest gorges, by roadside and on river banks.

Activities to provide environmental protection, raise public awareness and guarantee its engagement in environmental issues are carried out within the frames of non-governmental projects, and are very sporadic. Despite the presence of the Black Sea – the transboundary body of international importance (territory vulnerable to climate change), and, also, that of Kolkheti wetlands – protected by international convention (the Ramsar Convention), the region has not been included in environmental-protection measures. Like in other regions of Georgia, in Guria planning of any programmes and projects by international organisations, funds and representatives of donor countries is traditionally carried out only on the recommendation and coordination of central government. On the regional and municipal levels, there is practically no planning of any environmental-protection measures and there is no provision for the participation of any representatives of public or private sector. Neither is there any provision for raising awareness on the environmental-protection issues. Active cooperation of the region on the issues environmental-protection with bordering and non-bordering regions and its participation in transboundary water

resource management measures will enable more efficiency in environmental protection and resolution of the existing problems.

1.1.2.2 Samegrelo-Zemo Svaneti Region

Samegrelo-Zemo Svaneti Region is situated in western part of Georgia, mainly on Kolkheti lowland. To the west it borders with the Black Sea, to the north-west – with the Autonomous Republic of Abkhazia, to the north - with the Russian Federation, to the east – with Imereti and Racha-Lechkhumi-Kvemo Svaneti regions, and to the south – with Guria Region. The area of Samegrelo-Zemo Svaneti is 7,500 km^2 (10.8% of the country's territory).

The population of the region is 478,200 which makes 10.66% of the population of Georgia. There are 497 settlements in the region – 8 towns, 2 dabas (urban settlement) and 487 villages. 40.3% of the population of the region live in towns and urban settlements, and 59.7% - in villages. Within the region, there are 100 highland (over 1,000 m) settlements in the municipality of Mestia and one in Martvili. The density of the population is 64 people per km^2.

The climate on the main part of the territory of the region is sub-tropical, the northern part – sub-alpine and alpine. The region contains Kolkheti lowland with extremely humid sub-tropical climate, which is strongly influenced by the Black Sea.

Samegrelo-Zemo Svaneti Region is rich in water resources. It contains the Black Sea coastline, which has transboundary significance. 2,400 large and small rivers are registered in the region. The longest rivers are Enguri (length 213 km), Khobistqali (150 km), T'ekhuri (101 km) and Abashistqali (66 km). The length of the rivers that cross other regions – Rioni and Tskhenistsqali – on the territory of the region respectively are – 88 km and 44 km.

One of the country's two most important ports – Poti Port is situated here. It is the commercial centre of the region and is instrumental to the working of Transport-Europe-Asia corridor (TRACECA). Thanks to the Poti Port, the sector of the transport and communication holds second place in the value added production in the region. At this stage, Poti has got the capacity of 10 mln tons of freight turnover a year. The port has both motor and railway connections. There are 15 specialised docks for unloading oil products, railway wagons, containers, bulks of grains, perishables, fertilizers, metals, pipes and other types of cargo, and for transporting passengers. Within the frames of TRACECA programme, which is funded by the EU, Poti Port is the recipient of many small investment projects. Besides, the port is the beneficiary of the Caucasus Optical Cable Project, funded by the European Union, which, with a view to optimising railway capacity, ensures operational security and provides information system. This project connects west and east - ports of Poti and Baku, and to the south, through Tbilisi – Poti Port and Republic of Armenia. The Caucasus Optical Cable Project serves railway operations, as well as telecommunication purposes. It is noteworthy that the maritime route connecting Ilichevsky Port of Ukraine and Poti Port has started to operate as well.

Sewerage systems are poorly maintained in the region and, respectively, untreated household wastewater, as well as partially treated wastewater from active industry and medical institutions, flow into the rivers of the region and find their way into the Black Sea. Above mentioned situation is alarming and poses significant problems to population and environmental security, and hinders social-economic development. The rehabilitation of water supply and sewage network, as well as the construction of municipal sewerage systems and their treatment facilities along the entire Black Sea coastline (Poti, Zugdidi, Anaklia) and on the mountainous territory of the region (Mestia) have

been completed recently. The construction of wastewater treatment facilities are underway in the town of Poti. All the above measures will reduce the level of the Black Sea contamination considerably and will increase the possibility of the use of the Black Sea coast for recreational purposes.

In Samegrelo-Zemo Svaneti Region, there are 87 air polluting active stationary units that have negative effect on air quality. The largest air polluters are: the sea terminal (49.67%) and quays (17.18%), and asphalt production as well (19.44%).

Apart from the above point sources of pollution (from active industrial units), the water quality of the surface water sites is badly affected by diffuse pollution sources, such as stormwater (discharge from storm water drains) from settlements, quarries, wastewater from agricultural lands and official or unauthorised landfills. The environmental pollution by waste or chemical materials in Samegrelo-Zemo Svaneti Region (the territory of Samegrelo), similar to other regions of Georgia, poses a significant problem to the environmental protection.

The surface water resources of the region – Rioni River and Lake Paliastomi – are part of hydro-meteorological network, so their waters are monitored on a more or less regular basis. According to the data of the 2005-2012 monitoring, BOD5 index is within limit for all the monitoring points. Nitrite ion and ammonium ion exceed the maximum permissible limit by 2-3 times. The source of the above contamination, possibly, are household and industrial wastewaters, and waters from agricultural lands. These circumstances are alarming as the rivers, when flowing out into the sea, carry the pollutants, which affect the quality of the sea.

In the region, in the basin of Rioni, at the river estuary and coastline, the most vulnerable ecosystems are situated – peat bogs protected under the Ramsar International Convention, peat moss bogs, dunes and pine groves and Lake Paliastomi. Artificial canal (dug in 1924) has significantly altered hydrobiology of the lake, resulting in 15-fold reduction of the freshwater plankton biomass and 6-fold reduction of benthos. In 1984, out 36 species of fish 27 were registered in the lake, at present, there are only 16 species left. Due to the importance of the above water bodies, many international projects focus on their research and evaluation by using hydrological, hydro-chemical, and hydro-biological methods.

The Black Sea coastline of Georgia is affected by various geophysical processes, some of which are being aggravated by climate change. The territory of the region, delta of Rioni River, and coastal zone represent the system that is most vulnerable to climate change within Georgia. The above mentioned territory is susceptible to floods caused by natural or anthropogenic factors, sea level rise (eustasy), stormflows and sedimentation (reduction-silting of solid debris of the river) and climate change.

1.1.2.3 Autonomous Republic of Adjara

Autonomous Republic of Adjara is situated in the south-west part of Georgia. To the south-west its border is aligned with the border between Georgia and Turkey, to the north – with Guria, to the east – with Samtskhe-Javakheti.

Through the Black Sea the region borders with Varna and Burgas in Bulgaria, Constanta in Romania, Odessa and Crimea in Ukraine, Krasnodar in Russia, and the Black Sea and Marmara Sea regions in Turkey. The shared borders with the regions of various countries allow the Autonomous Republic of Adjara to participate in the EU and other programmes on cooperation of countries with common land and sea borders and to carry out joint border projects. Adjara is easily accessible by

rail, motor, sea and airways. East-west central motorway runs through Adjara. The rehabilitation of the road joining Adjara with Samtskhe-Javakheti draws Adjara closer to the markets of southern Georgia and further to those of Armenia and Iran. Coastal location enables Adjara's access to markets through land, air, and sea ways. Part of Europa-Caucasus-Asia Corridor (TRACECA) goes through Adjara, namely through Batumi Sea Port.

According to the preliminary, operational data of the census of November 2014, 9% of the population of Georgia – 336,000 lives in Adjara, less than at the 1979 census (graph 1). Compared to the 2002 census, the population of Adjara has decreased by 10.6% - less than other regions of Georgia. The population decline is caused by reduction in birth rate, as well country's internal and external migration. By the beginning of the current year, 55.5% of the population of Adjara lived in a city - covering 3.4% of the territory of Adjara. The index for urbanisation in Georgia is 57.4%. Apart from Tbilisi, Adjara has the highest level of urbanisation among the regions of Georgia. The pace of growth of urban population between the two last censuses had been highest in Adjara.

Fresh water resources of Adjara contain rivers, lakes, marshes and groundwaters. According to the 2014 data on water intake, surface water resources of the region are mainly used in hydro energy (94%), drink industry (4%), manufacturing (1.6%), and the rest – for irrigation. Mineral medicinal carbonated and sulphur waters are sourced in the region. There are fewer instances of the use of water resources for fish-farming and recreation.

Adjara stands out in terms of frequency and intensity of natural phenomena. Long and abundant precipitations, including heavy snowfalls, cause floods and freshets, landslides and raging mountain torrent processes, snow avalanches, and recurrence of natural disasters connected to these phenomena. Apart from the above, there are land erosion processes taking place both in coastal zones and along river banks. On the territory of Adjara, landslides and raging mountain torrent processes are mainly spread in the municipalities of Khelvachauri, Kedi and Kobuleti, which also suffer from particularly abundant precipitation. The recurrence of the processes is quite high on the territories of Shuakhevi and Khulo municipalities, especially in the basins of the small rivers in the upper reaches of Adjara. The years of anthropogenic activities along the coastal zone of Adjara, have affected significantly the ecological condition of the coastline. According to the 2013 Climate Change Strategy of Adjara, great danger is posed by the construction of multi-storey buildings on the territory of Batumi Cape - the coastline, weakened by the landslides occurring in the upper reaches of nearby underwater canyons. Projected impact of global warming is annual increase in water level at the rate of 2-3 mm/y and more frequent strong storms. Besides, with a view of possible increased erosion, it is necessary to intensify construction of embankment.

1.1.2.4 Autonomous Republic of Abkhazia

Abkhazia is the most north-western historical province of Georgia. At present, to the south and south-west it is surrounded by the Black Sea, its northern border runs along the top of the Caucasus main watershed ridge, its north-west border – along Psou River, and its eastern border – along Svaneti-Abkhazeti ridge and Enguri River. Today, the area of the Autonomous Republic of Abkhazia is 8,700 km^2 (12.5 % of the country's territory). The capital of the Autonomous Republic of Abkhazia is Sukhumi, which is situated on the Black Sea coast at the altitude of 5 -140 m from the sea level and 405 km (by railway) away from Tbilisi.

In the process of its struggle against the state independence of Georgia, Russian imperial forces succeeded in creating separatist sentiments among the population that led to the 1992-1993 ussian-

Georgian-Abkhaz war in Abkhazia. The above conflict resulted in expulsion of 80% of the population (principally Georgians but also Abkhazians, Russians, etc.) from Abkhazia. On 26 August 2008, Russia completed the annexation of Abkhazia and formally recognised independence of the State of Abkhazia. In reality, this is a grab of the territory of Abkhazia with multiple Russian military units controlling political situation there. Despite the effort on the part of Russian imperial forces, legally Autonomous Republic of Abkhazia is part of the state of Georgia.

Due to the above, there is very scarce information available on the social-economic or environmental condition of the Autonomous Republic of Abkhazia.

1.2 Marine Litter Definition

Marine litter is considered any durable, manufactured or processed solid material that is discarded, left or lost in sea or coastal area. Marine solid litter contains objects – elements that are made and processed by humans, deliberately dumped into the sea, rivers or beaches, and find their way indirectly into the marine environment through rivers, or networks of inflowing rivers, are washed ashore during strong rains, storms and winds; also, are lost inadvertently in bad weather (lost fishing gear), or left deliberately by humans on beaches and river shores. So, marine solid litter includes all elements that are of artificial origin, do not exist naturally in the sea but found their way there regardless of where they were lost or discarded in the first place.

It mainly consists of plastic, wood, metal, glass, rubber, clothes, and paper litter. Around 80% of the marine litter originates from the land. The negative impact of marine litter is both cultural and multi-sectoral, mainly due to poor management of solid litter, lack of infrastructure, various types of human activities, low public awareness, lack of adequate legal and executive systems, paucity of financial resources (Jeftic, 2009). Besides the problems the marine litter poses to environment and human health, it also has negative effect on the social-economic situation. Fish and tourist industries are main victims of marine litter (Gunsilius and Frommann, 2015).

Normally, there are two ways waste can turn into marine solid litter: through land-based and sea-based sources.

According to the UNEO report, the main sources of marine solid litter are:

- merchant ships, ferries and cruise liners;
- fishing vessels;
- military fleets and research vessels;
- pleasure crafts;
- offshore oil and gas platforms and drilling rigs;
- aquaculture installations
- municipal landfills (waste dumps) located on the coast;
- waste transported through rivers and other land streams from landfills, etc;
- untreated municipal waste carried by storm water or other accidental streams;
- industrial facilities (waste from rock dumps, untreated sewage/wastewater
- tourism (guests and visitors on the coasts).

Problem with marine solid litter has become one of the most important challenges for the modern world. The main bulk of solid litter in marine environment originates from land-based sources, where they are carried mainly through rivers (Guidance on Monitoring of Marine Litter in European Seas, 2018).

There is no definition of marine litter in the Legislation of Georgia and not a single classification of waste gives us such a formulation. As a result of the monitoring of the Black Sea coastline and water, it is determined that it is mainly mixed municipal waste that finds its way into marine water and coastal beaches. It contains: medical waste – syringes, drugs, transfusion systems, and sharp objects; plastic waste - polyethylene bags, PET bottles and bottle caps, ice-cream and sweet wrappers; glass bottles and other containers; also, tins containing varnish and paint; leather and rubber waste; textile; scrap metal; building material; timber and biological (animal) waste, both hazardous, non-hazardous, and building waste.

1.2.1 Marine Litter Status in Georgia

It is believed that the Black Sea is one of the most polluted seas in the world. It is being degraded by the six countries (Georgia, Turkey, Russia, Ukraine, Bulgaria, Romania) situated on its coast and by several inflowing largest rivers of Europe. The state of the Black Sea ecosystem has deteriorated dramatically in the last decade. Pollution had been compounded by overfishing.

The main sources of solid household waste pollution of the Black Sea are: inflowing rivers, depending on their volume, especially during heavy rains via runoff; solid waste dumped into streambeds in an unregulated manner and is discharged into the sea during freshets. It is noteworthy that, according to long-term calculations, on average, there are 150-170 days of rain in Georgia. Consequently, waste from streambeds via runoff actively takes place, so average annual calculations are based on 170 rainy days.

The inflowing rivers discharge between 6 and 50 items of litter per hour into the Black Sea. 85% of the litter is plastic; 20% of waste, discharged into the sea through the rivers, is plastic bottles. Polyethylene bags, and plastic containers account for 10% and 9% respectively.

The litter, studied by EMBLAS, is carried into the Black Sea through four major rivers: The Danube (which flows through several European countries, including the Moldova and Ukraine in the Eastern Neighbourhood region), the Dniester (Moldova and Ukraine), the Don (Russia) and finally the Rioni, which flows through Georgia (Parulava, 2019).

Accordong to the UN Goal 14, all forms of the sea pollution, generated from land-based activities, including marine debris and nutrient pollution, must be eliminated and significantly reduced by 2025.

Within the framework of EMBLAS II, several specific studies have been carried out in the Black Sea waters of Georgia. Floating litter in the sea was monitored during the National Pilot Monitoring System (NPMS) and the Joint Open Sea Studies (JOSS). The monitoring of the floating litter was carried out from bridges by trained personnel on a fortnight basis since 2016, using JRC Tablet application. The collected data was sent to the Black Sea Commission and JRC RIMMEL database for analysis.

Monitoring of shore-based litter was carried out in summer 2016. Also, monitoring of rivers and seabed took place (see table 1).

Matrix	EMBLAS surveys	Monitoring methods	Time frame
Sea surface	NPMS/JOSS Georgia, Russia, Ukraine	Visual observation campaigns, JRC App	May, August, November 2016
Seafloor	NPMS/JOSS Georgia, Russia, Ukraine	Bottom net trawl, divers	May 2016, October 2016
Rivers	NPMS	Riverine Litter Observation Network JRC	Since September 2016 ongoing
Beach	NPMS	MarineLitterWatch App (EEA database), Marine Conservation Society and other paper protocols	National campaigns and BSCBD events

Table 1. EMBLAS II – Litter monitoring activities, methods, and time frame.

(EU/UNDP Project: Improving Environmental Monitoring in the Black Sea – Phase II (EMBLAS-II), 2016)

Within the framework of EMBLAS, floating marine macro litter (FMML)[1] monitoring was carried out as well. Monitoring in Georgia took place between 28 and 31 May in Batumi within framework of National Pilot Monitoring System (NPMS) on 20 sections. The total length of the sections was 114 km. 368 types of litter were monitored. Their average concentration was 322 litter per m^2 (see table 2.)

	Size categories						
Litter Items	2.5 – 5 cm	5 - 10 cm	10 - 20 cm	20 – 30 cm	30 – 50 cm	> 50cm	Total by Items
Cover / packaging	27	47	34	12			120
Bag	8	17	30	18	3		76
Plastic pieces 2.5cm - 50cm	15	27	13	2	1	1	59
Plastic bottle	1	5	17	5			28
Plastic container	1	2	7	6	1		17
Synthetic rope	1	7	3	2	1		14
Other paper	1	5	2		1		9
Polyurethane granules <5mm	5	4					9
Paper packaging	1	3	3				7
Foam	1	4	1				6
Polystyrene pieces > 50 cm	1	1		1	2		5
Other textiles		1	1			1	3
Rubber boots			1	2			3
Newspapers & magazines			1	1			2
Other plastic/polystyrene items	2						2
Other rubber		1			1		2
Polystyrene pieces 2.5 cm - 50cm			1	1			2
Buoys		1					1
Cans			1				1
Fish boxes - plastic			1				1
Sheets			1				1
Total by size	64	125	117	50	10	2	368
Litter patch >20 items	2	3	10				15
Non-Litter items	2.5 – 5 cm	5 – 10 cm	10 – 20 cm	20 – 30 cm	30 – 50 cm	> 50cm	Total by Items
Feathers	1	5					6
Leaves	1	4	1				6
Other wood	7	20	20	13	7	3	70
Total by size	11	32	31	13	7	3	82

Table 2. Floating Marine Macro Litter – data. NPMS GE (28-31 May 2016).

[1] Floating Marine Macro Litter - items >2.5 cm in sea subject to long transportation by wind and waves posing direct danger to marine biodiversity.

(EU/UNDP Project: Improving Environmental Monitoring in the Black Sea – Phase II (EMBLAS-II), 2016)

On 23-26 May 2016, within the framework of NPMS, Romanian scientific-research ship Mare Nigrum was used for the research in Odessa-Batumi region (EU/UNDP Project: Improving Environmental Monitoring in the Black Sea – Phase II (EMBLAS-II), 2016).

During monitoring, quite high concentration of solid litter was registered in central section of the Black Sea. Like on shorelines, pollution of the sea with solid litter is dramatic. The concentration of litter in the central part of the sea can be explained by the fact that sea current carries it from the coastline to the central part. Litter accumulation has one advantage – it is easy to remove such litter 'islands' from sea ecosystems. The greatest harm to marine organisms come from micro-litter, the major part of it being microplastics (EU/UNDP Project: Improving Environmental Monitoring in the Black Sea – Phase II (EMBLAS-II), 2017).

Within the framework of EMBLAS and with the help of Ivane Javakhishvili State University, Guidance on Monitoring of Marine Litter in European Seas has been translated, and, in accordance with it, study has been conducted jointly by consulting company Gama and Tbilisi State University in Kobuleti and Sarpi (see diagram 1).

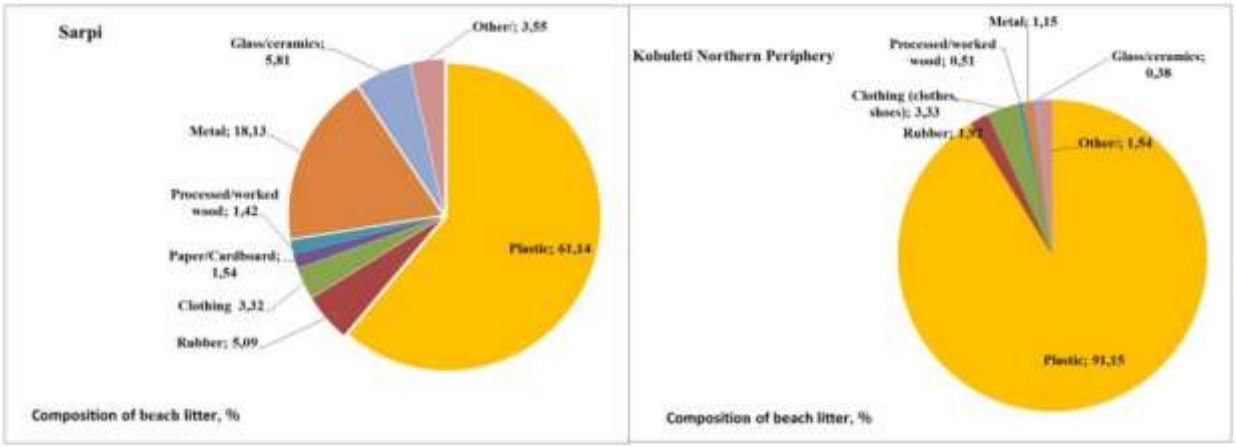


Diagram 1.

(EU/UNDP Project: Improving Environmental Monitoring in the Black Sea – Phase II (EMBLAS-II), 2016)

One can see from the diagram that the major pollutant is plastic. The main source of pollution on Sarpi coastline is motorway as, due to its closeness to Sarpi - Turkish border, traffic jams are frequent here. Litter mainly consists of food and food containers – jars, wrapping paper, bottles, discarded car parts, etc. It is obvious that the litter accumulated on this stretch originates from the motorway not the sea. This place has been specially selected in order to identify the trends of transboundary pressure, and the study has shown that transport and municipal infrastructures are the main source of coastal litter.

1.3 Drivers, pressures, impacts, sources of pollution

Drivers:

According to the findings of the Environmental Monitoring of the Black Sea (EMBLAS), the water condition of Black Sea continental shelf of Georgia, in terms of eutrophication, is mostly good. However, relatively high concentration of chlorophyll a has been registered in Anaklia and Poti waters, which is caused by nutrients released from urban agglomerations situated along the shoreline. The pollution of coastal waters with hydrocarbon is also caused by human activities, mainly through its transportation and storage.

Pressures:

According to the assessment within the framework of EMBLAS project, the pressure on the Black Sea coastal waters comes from land-based sources and are mainly connected to the problems with urban wastewater treatment.

Contamination of coastal water with hydrocarbons is, possibly, connected to the operations of Batumi Oil Terminal and Poti Port.

At the monitoring points of coastal waters, the cause for increased concentrations of pesticides – chlorinated hydrocarbon (CHC), heptachlor, heptachlor epoxide, and cypermethrin – is unknown. The use of chlorinated hydrocarbon (CHC) is banned under Stockholm Convention on Persistent Organic Pollutants. The above pesticide is neither imported nor produced in Georgia. Heptachlor was used for buildings and killing crop insects. At present, they are used only in power transformer fire protection systems. Cipermethrin is too toxic for sea species and insects. It is found in many household insect (fly, cockroach, mosquito) killers. Study is recommended for identification of the sources of the substance in the waters of Georgia with the aim to prevent and stop pollution.

Pollution of coastal waters with municipal waste is just as serious problem for the Black Sea. The main causes for this are illegal landfills along the rivers and sea-borne solid waste from neighbouring regions and cargo ships.

Impacts:

Chemical pollution of the Black Sea coastal waters poses threat to the marine environment. Eutrophication, one of the biggest challenges in the Black Sea region, is caused by nutrient pollution through untreated wastewater. During warm period, high concentration of nutrients in sea water causes excessive growth of algae (phytoplankton). This creates hypoxic (anoxic) conditions for marine species. Despite, on the whole, relatively low level of threat from eutrophication in the Black Sea coastal waters of Georgia, separate sections of Poti and Anaklia coastal waters register high thropic levels (with isolated cases of hypoxia and anoxia of lower layers of water). Pollution with pesticides and oil generated hydrocarbons also causes decline in marine environment. Municipal wastes that we find in the Black Sea coastal waters have negative impact not only on marine environment but also on marine flora and fauna. It is widely recognised that plastic (macro and micro) waste is particularly dangerous for marine mammals.

Sources of Pollution:

1. Sarpi custom border: X - 0712641

   Y – 4599946

- Municipal waste is washed from Sarpi custom border crossing point and adjacent settlements by storm waters and wind. 1-1.5 m^3 of municipal waste (plastic, glass containers, metal cans, paper/cardboard, plastic and organic waste) finds its way into the sea per 24 hours; on average, 250 m^3 per year.

2. Monument to Saint Andrew the Apostle: X -0712710

   Y – 4601010

- Waste (including PET plastic bottles, metal cans, and organic wastes) dumped in an unregulated manner by tourists from Sarpi settlement and those visiting the monument itself. Probably, 0.2-0.3 m^3 of solid waste per 24 hours; 170 * 0.3 =51 m^3 per year.

3. Kvariati water: X -0713788

   Y -4602415

- Mixed municipal waste (including plastics, PET bottles, paper/cardboard, organic, etc.) dumped in an unregulated manner by local inhabitants into streambed; 0.3-0.5 m^3 of waste is washed out per 24 hours; probably, from discharge point - 170* 0.5=85 m^3 of household waste per year.

4. Adjacent to Gonio rock, hotel ‘Pyramid’ X -0713940

Y -4603638

- Solid household waste, dumped into open storm water canal running from Gonio settlements, is washed through the canals; 0.2-0.3 m^3 of waste is washed out per 24 hours (including small plastic waste, PET-bottles, paper/cardboard and organic wastes); on average - 170* 0.3=51 m^3 per year.

5. Adjacent to Gonio fortress X -0714454

Y -4605707

- Surface water collection channel runs in front of blocks of flats opposite Gonio fortress. Solid household waste is dumped in an unregulated manner by individual residents or visitors and washed out into the sea; 0.3-0.5 m^3 of waste is washed out per 24 hours (including small plastic waste, PET-bottles, paper/cardboard and organic wastes); probably, from the above discharge point 170* 0.5=85 m^3 of household waste - per year.

6. Gonio waters, adjacent to a farm: X -0714636

Y -4606156

- Mixed solid waste dumped in an unregulated manner, in settlements adjacent to Akhalsopeli and Gonio, pollute the streambed washing out to the sea; on average, 0.3-0.5 m^3 of waste is washed out per 24 hours; probably - from the above discharge point - 170* 0.5=85 m^3 of household waste per year.

7. Chorokhi River: X -0716538

Y -4608203

- Chorokhi River is one of the main and significant polluters of the Black Sea; Adjaristsqali is its tributary with the length of 90 km; it begins in Goderdzi Pass and flows through the settlements of the municipalities of Khulo, Shuakhevi, and Kedi with a number of unsupervised and unregulated dumping sites, which, in the period of heavy precipitation (rains), can result in 50-70 m^3 of waste (including household, construction, timber, specific and hazardous wastes) being washed out into the sea per 24 hours. The above waste periodically washes onto the coastal beaches, and gets collected and stored on landfill polygons by the staff of Cleaning Service. Probably, on average, 170*70=11,900m^3 of household waste is washed out from the above discharge point per year.

8. Batumi landfill polygon: X -0716383

Y -4608433

Batumi landfill polygon is situated on the right bank of Chorokhi River. In earlier years, buried waste was washed out actively by the river but it has been partially reduced since the construction

of embankment in 2010. Still, wind transfers paper, polymeric and other small plastic waste to Chorokhi River, and finds its way into the sea. On average, 3-5 m^3 of waste is washed out per 24 hours and, probably, 5* 365=1,825 m^3 - per year.

9. Treatment works of city of Batumi: X -0715027

Y -4609679

- Discharge of sewage from Batumi treatment works. Sewage from Batumi is pumped by two pump stations into the treatment works and average daily flow is 60,000m^3.

10. Mejinistsqali River: X -0716553

Y -4611597

- Mejinistsqali River stretches along 10km from riverhead to river-mouth. It mainly flows through densely populated residential area. Subsequently, there is a great risk of solid household waste finding its way into it, especially in the high-water period, when dumped solid household waste gets washed out from the streambed. On average, 1.0-1.5 m^3 of waste washes out through river per 24 hours. Probably, on average, 170*1.5=255 m^3 of household waste is expected to be washed out from the discharge point per year.

11. Zhilini channel: X -0716822

Y -4612192

- Zhilini channel flows through Batumi residential area, namely, streets of Javakhishvili, Bagrationi, Odzelashvili, Kobaladze, and Ninoshvili. Due to the population or climatic conditions, including wind, household waste is washed out from water collecting channel to the sea, especially during high-water period. Possibly, 0.7-1.0 m^3 solid waste is expected to wash out per 24 hours. Supposedly, on average, 170*1.0=170 m^3 of household waste is expected to be discharged from the above discharge point per year.

12. Batumi Port: X -0720899

Y -4613877

- During economic activities taking place on the territory of Batumi Sea Port, especially when downloading and uploading dry goods, waste can find its way into the sea by means of wind or organic dust. Along with industrial water, it is expected that, on average, 1.0-1.2 m^3 household waste is washed out from the port territory per 24 hours. Probably, 365*1.2=438 m^3 of household waste is washed out from the above discharge point per year.

13. Batumi Oil Terminal: X -0721697

Y -4614118

- Batumi Oil Terminal's main activities include: receiving, storing and reloading oil-products. Although, its grounds, which are quite large, are home to many economic activities that, potentially, can generate solid waste pollution for the sea.

14. Bartskhana River: X -0721979

Y – 4614304

- Bartskhana River mainly runs through densely populated residential area. Respectively, there is a big risk of solid household waste finding its way into the river. In separate districts, the residents of the houses located alongside the streambed dump waste straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.0-1.5 m^3 of waste is washed out per 24 hours. Probably, on average, 170*1.5=255 m^3 of household waste is expected to wash out from the above discharge point per year.

15. Kubastsqali River: X - 0722684

Y -4615011

- Kubastsqali River runs through a residential area. Its water typically does not rise very high. Respectively, 0.3-0.5 m^3 of waste is expected to wash out per 24 hours. On average, 170*0.5=85m^3 of household waste is expected to wash out from the above discharge point per year.

16. Qorolistsqali River: X - 0723387

Y – 4615993

- Qorolistsqali River runs through densely populated residential area. Respectively, there is a big risk of solid household waste finding its way into the river. In isolated districts of Tamar's (Bძ) settlement, the residents of the houses located alongside the streambed dump waste straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.5-2.0 m^3 of waste is washed out per 24 hours. Probably, on average, 170*2.0=340 m^3 of household waste is expected to wash out from the above discharge point per year.

17. Chakvistsqali River: X -0727315

Y -4621841

- Chakvistsqali River mainly runs through densely populated residential area. Respectively, there is a big risk of solid household waste finding its way into the river and been trapped in the streambed. In separate districts, the residents of the houses located alongside the streambed dump waste straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.0-1.5 m^3 of waste is washed out per 24 hours. Probably, on average, 170*1.5=255 m^3 of household waste is expected to wash out from the above discharge point per year.

18. Adjaristsqali River (Chakvi): X -0727321

Y -4622947

- Adjaristsqali River runs through residential area. Its water typically does not rise very high. Respectively, 0.3-0.5 m^3 of waste is washed out per 24 hours. On average, 170*0.5=85m^3 of household waste is expected to be washed out from the above discharge point per year.

19. Dekhva River: X -0730403

Y -4631135

- Dekhva River runs through sparsely populated residential area and its water typically does not rise very high. Respectively, 0.2-0.3 m^3 of waste is washed out per 24 hours. On average, 170*0.3=51m^3 of household waste is expected to be washed out from the above discharge point per year.

20. Kintrisi River: X -07306619

Y -4631647

- Kintrisi River runs through densely populated residential area. Respectively, there is a big risk of solid waste finding its way into the river. In separate districts when disposing of the household waste, the residents of the houses located alongside the streambed dump it straight into the streambed. Respectively, in the high-water period, solid household waste, dumped in the streambed is washed down the river. On average, 1.5-2.0 m^3 of waste is washed per 24 hours. Probably, on average, 170*2.0 =340 m^3 of household waste is expected to wash out from the above discharge point per year.

21. Choloki River: X - 0730090

Y -4642254

- Choloki River runs through rural residential area. Respectively, there is a big risk of solid household waste finding its way into the river. In separate districts, the residents of the houses located alongside the streambed dump waste straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.0-1.5 m^3 of waste is washed out per 24 hours. Probably, on average, 170*1.5=255 m^3 of household waste is expected to wash out from the above discharge point per year.

22. Natanebi River: X -0730073

Y -4643712

- Natanebi River runs through a number of settlements. Respectively, there is a high risk of solid household waste finding its way into the river. In separate districts, the residents of the houses located alongside the streambed dump waste straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.6-2.0 m^3 of waste is washed per 24 hours. Probably, on average, 170*2.0=340 m^3 of household waste is expected to be washed out from the above discharge point per year.

23. Sepa River: X -0730525

Y -4652124

- Sepa River runs through partially populated residential area. Its water typically does not rise very high. Respectively, 0.3-0.5 m^3 of waste is expected per 24 hours. On average, 170*0.5=85 m^3 of household waste is expected to be washed out from the above discharge point per year.

24. Supsa River: X -0728261

Y -4656009

- Supsa River runs through a number of settlements. Respectively, there is a high risk of solid household waste finding its way into the river. In separate districts, the residents of the houses located alongside the streambed dump waste straight into the streambed causing, in the high-water period, solid household waste to be washed down the river. On average, 1.5-2.0 m^3 of waste is washed per 24 hours. Despite the special net for trapping solid waste at the estuary, it is still washed out into the sea. Probably, on average, 170*2.0=340 m^3 of household waste is expected to be washed out from the above discharge point per year.

25. Lake Paliastomi: X - 0724747

Y -4661373

- Solid household waste and the waste deposited by visitors or residents from adjacent settlements, possibly, find their way through Lake Paliastomi into the sea. On average, 1.0-1.5 m^3 of waste is washed down during the lake outflow per 24 hours. Despite the special net for trapping waste at the estuary, it is still washed out into the see. Probably, on average, 170*1.5=255 m^3 household waste is expected to wash out from the above discharge point per year.

26. Maltaqva River: X - 0723647

Y -4663786.

- Matlaqva River runs through a number of settlements. Respectively, there is a high risk of solid waste finding its way into the river. In separate districts, when disposing of the household waste the residents of the houses located alongside the streambed dump it straight into the streambed. Respectively, in the high-water period, solid household waste is washed out. On average, 1.6-2.0 m^3 of waste is washed per 24 hours. Probably, on average, 170*2.0 = 340 m^3 of household waste is expected to wash out from the above discharge point per year.

1.4 Information, data and knowledge about the state of the environment

1.4.1 Nature and Biodiversity

The Caucasus is recognised by international organisations as one of the most biologically diverse regions. The Caucasus Region is part of Greater Black Sea Basin - one of the 35 WWF priority places; among 34 Biodiversity Hotspots (endangered territories of outstanding biodiversity values)

identified by Conservation International, two hotspots – the Caucasus and Iran-Anatolia – include Georgia. Main threats to biodiversity here, like in the rest of the world, are habitat degradation/loss, excessive mining, spread of alien species and environmental pollution.

In terms of biological value, Georgia is a rich country: 4, 120 species of vascular plants have been identified here, around 600 of which (14.2%) are endemic to the Caucasus, and approximately 300 species (9.0%) - endemic to Georgia. In Georgia, 16,054 species of fauna have been identified, 758 of which are mammals.

In Georgia, 31 important sites have been identified for birds. Besides, two wetlands on the Kolkheti Lowland are included in the List of Wetlands of International Importance under Ramsar Convention.

Due to loss/decline and irregular use of habitat, many species of plants and animals are endangered. Namely, 29 mammals, 35 birds, 11 reptiles, 2 amphibians, 14 fish, and 56 bark plants have been entered into the National Red List. Besides, 44 species of vertebrates common in Georgia are on the verge of extinction and have been entered into the IUCN Red List as vulnerable, endangered or critically endangered.

There are 139 species of fauna and 56 species of bark plants endangered in Georgia; 275 species /subspecies of vascular plants are considered endemic to Georgia, 152 species of which (approximately 60% of endemic species) are categorised as endangered. Due to absence of regular monitoring, the information on the population and dynamics of endangered species is scarce. In recent years, there is a marked increase in deer population in Borjomi-Kharagauli and Lagodekhi protected areas. In the 1990s, the number of deer was extremely reduced due to poaching. From 2007, as a result of implemented measures, the number of deer has increased. In 2014, the total number exceeded 800.

Under the signature of the International Convention in 1994, Georgia pledged to 'protect biodiversity and use it in a sustainable manner for the benefit of the present and future generations'. The protection of the biodiversity will enable the future generations to value and enjoy it. (The fifth National Report of Georgia to the Convention on Biological Diversity).

Due to the loss of habitats and spawning migration routes, and overfishing, all of the six sturgeon species and trout are threatened. Within the last decade, owing to fragmentation and degradation of habitats, endemic amphibian — Caucasian Salamander (Mertensiellacaucasica) and endemic reptile – Caucasus Viper (Viperakaznakovi) have considerably decreased in numbers.

1.4.1.1 Black Sea Biodiversity

There are three types of dolphins in the Black Sea waters of Georgia: white-sided dolphin, bottlenose, and harbour porpoise. The Black Sea dolphins are recognised as separate sub-species: Tursiops truncatus ponticus, Delphinus delphis ponticus, Phocoena phocoena relicta. All the three sub-species of dolphins found in the Black Sea are included in the IUCN Red List: white-sided dolphin (Delphinus delphis ponticus) - categorized as vulnerable; bottlenose (Tursiops truncatus ponticus) - categorized as endangered; and harbour porpoise (Phocoena phocoena relicta) – categorized as endangered. Due to their genetic uniqueness, adaptation to special conditions of the Black Sea and existing threats, the status of populations of Cetaceans of the Black Sea is a cause for concern at the national, regional and European, as well as global levels.

Recordings of 2014 have revealed that, in winter, approximately 18,000 harbour porpoises and 16, 000 white-sided dolphins come together in the territorial waters of Georgia. (Programme on Monitoring the Black Sea Cetaceans). The above concentration indicates that the Black Sea waters of Georgia are wintering and thus vital area for the Black Sea Cetaceans. The population of the bottlenose dolphins is extremely small in numbers with only 100-150 individuals. Significant threats to the Black Sea dolphins include: seining (especially for harbour porpoises that get caught in the dragnets installed at the seabed), chemical pollution (with oil products, heavy metal, and solid waste), also, sound pollution, and eutrophication. Under the law of Georgia (of 1999) On the establishment and Management of Kolkheti Protected Areas, a 5-mile-wide sea water area between the mouths of Churia and Rioni rivers (15,276 ha area) is included in the Kolkheti National Park. The total sea water area of the National Park, where the fishing activities and water transport traffic are prohibited (the only activity allowed is scientific-research work), is 15,276 ha.

Eutrophication, as well as pollution by oil and heavy metals, is one of the significant threats to the Georgian Black Sea waters and the entire Black Sea. Pollution by organicchloride pesticides is worth mentioning as well. The compound is highly resistant and, at first, settles at the bottom of the coastal zone. Organicchloride pesticides cause various diseases, mostly in benthonic fish and, consequently, also affect harbour porpoises since these animals feed on benthonic fish in coastal waters. One of the major threats to the Black Sea is pollution with solid waste, especially by polyethylene objects, discharged by rivers.

Invasion of alien species pose serious threat to the Black Sea ecosystems. Presently, there are 26 invasive alien species in the Black Sea. Among them, the following species have had the greatest impact on Black Sea ecosystems and native biodiversity: comb jelly (Mnemiopsis leidyi), mud crab (Rhithropanopeus harrisii), veined rapa whelk (Rapana thomasiana, or Rapanavenosa), sand gaper (Mya arenaria), redlip mullet, and Cunearca cornea, and fish - so-iuy mullet (Mugil soiuy, or Liza haematocheila). The invasion of the comb jelly has had the greatest negative impact. It was probably brought to the Black Sea along with ballast waters in the early 1980s. The invasion and rapid increase in this species coincided with a decline in the densities and species diversity of ichthyoplankton and mesozooplankton in the Black Sea. Another invasive species that has had a dramatic impact is the veined rapa whelk. It has caused a decrease in the populations of filter feeding bivalve molluscs, which has led to deterioration of water quality and to a decrease in the food source for benthic fish (including important species such as sturgeon).

Under the National Biodiversity Strategy and Action Plan of Georgia 2014 – 2020, with a view to conserving the biodiversity of the Black Sea and its waters, it is planned to create new marine protected area, develop and implement strategy for conservation of Cetaceans, renewal of the conservation status of the Black Sea fish, evaluation of the condition of inland water fish population, and inventory of aquatic invertebrate groups (Fifth National Report to CBD. Ministry of the environment protection of Georgia).

1.4.1.2 Soil Protection

Soil is a vital natural resource, our lives and that of a whole host of living organisms depend on it. Soil safeguards our existence, and that of bio-diversities and ecosystems. Besides, soil traps carbon, hence hugely contributing to the fight for climate change. In the course of the last 200 years, human actions, mainly through intensive agricultural production and industrial activities, caused land degradation. Land degradation has a negative effect on social-economic activities that depend on it: crop production, animal husbandry, forestry, tourism, etc. Unfortunately, the pressure on land

is continuing, which makes it essential to at least minimise negative effect of ongoing processes on soil in short and medium terms.

The area of the Georgia is 69,500 km^2, 40% of which is covered by forests. Agricultural lands occupy largest part – 43% of the total area. One quarter of agricultural lands are croplands (4% of which contain perennial plants), and the rest – pastures.

Due to climatic conditions and topography, natural soil erosion is quite widespread in Georgia. 3 mln ha (35% of total agricultural land) is degraded due to erosion. The western part of the country suffers more from water erosion, and eastern part – wind erosion, mainly due to destruction of wind-belts (1,800 km of 2,000 km of shelterbelt has been cut down for firewood) and human activity. Overgrazing both in the western and eastern Georgia is among the most significant factors accelerating soil degradation processes.

Soil erosion is particularly evident in Eastern Georgia, where natural desertification processes due to climatic conditions is intensified by human activities and overgrazing. The Georgian semi-arid zone (Kakheti) has been historically used as winter pastures (from September to April) for livestock (mainly sheep), moving from summer pastures in the northeast and central parts of the country. However, there are insufficient winter pastures to cope with the recent increase in the flocks. There are seasonal concentrations of large sheep herds in the semi-arid zone with uncontrolled grazing. For example, in the Shiraki Valley, pasture land covers 57,000 ha and hosts over 400, 000 heads (more than half of the country's stock) during more than seven months. This high concentration of livestock and the intensive use of pastures lead to overgrazing and, consequently, soil degradation in those areas. It should also be noted that a portion of the pasture land is located along the boundaries of South Ossetia and Abkhazia. Since the local population is unable to use those 107 pastures, it is forced to use other pastures, and this increases pressure on them. Grazing is hardly controlled on state-owned lands. The majority of the country's pastures are not privatised and only 48% of state-owned pastureland is leased out. Approximately 1.1 million hectares of Georgia's state-owned land, classified as pasture, suffers from overuse and lack of oversight. As a result, many pastures are overgrazed, degraded and produce low yields.

Soil salinization and its pollution by hazardous chemicals are other factors in Georgia that lead to deterioration of soil quality and limitation of its use. In Eastern Georgia, where salinization is observed, it is mainly caused by excessive irrigation, which at the same time is needed to increase soil fertility. For this reason, irrigation has to be planned and implemented in a way that will help to keep the balance in order to avoid secondary salinization problem. As for the contamination of soil by different chemicals, high level of chemicals in soil, exceeding the maximum allowed concentrations (MAC), is mainly observed in the country's industrial regions. For example, in Ambrolauri (Racha-Lechkhumi and Kvemo Svaneti Region), there is a high concentration of arsenic in soil; in Chiatura (Imereti Region), manganese concentration in soil is increased; and in Bolnisi (Kvemo Kartli Region), heavy metals exceed limits in soil due to leaking from copper mining and tailings. It should be mentioned that soil can also be polluted by winds carrying pollutants from adjacent or transboundary sources of pollution. Pollutants can find their way into the soil through water or waste. Besides, high levels of chemicals might also be caused by natural reasons.

There are no maps available in Georgia on salinization or soil pollution by heavy metals at present due to the lack of comprehensive data on overall quality of soil. The Ministry of Environmental Protection and Agriculture developed thematic maps (1:500, 000) depicting lands exposed to wind

and water erosion (actual and potential areas), lands under acidification, and levels of nutrients in soil (Third National Environmental Action Programme of Georgia 2017-2021).

1.4.1.3 Marine Protection

Pollution of the Black Sea and degradation of ecosystems are transboundary problems. Eutrophication has been attested in the Black Sea waters of Georgia. Chemical contamination is manifested less in coastal waters of Georgia than it is in other countries of the Black Sea basin, although, high concentrations of certain pollutants have been registered in a number of points of the coastal area.

The system of monitoring of the Black Sea waters pays particular attention to the study of physical-chemical parameters (transparency, nitrites, nitrates, ammoniacal nitrogen, organic materials, chlorophyll) and hydro-biological monitoring. Hydro-biological monitoring of the coastal waters is conducted four time a year at the depths of 10, 20, 40 and 60 m at four observation sites: Gonio, Batumi, Chakvi, Kobuleti, Poti, and Anaklia.

In 2016, as a result of expeditionary and scientific-research work carried out along the Black Sea coast with the help of the EU project on Improving Environmental Monitoring in the Black Sea (EMBLAS), Georgia managed to obtain significant information on water quality. The research was carried out at 15 sites of the coast of Georgia, including the sites that had not been monitored for the previous 25 years. Macrobenthos, meiobenthos, microplankton, ichthyoplankton, as well as solid waste, noise and chemical waste pollution was studied within the framework of the research. As a result of this research, entire information on the condition of the Black Sea coastal waters in Georgia is currently available.

According to the results of the monitoring, the level of eutrophication in the Black Sea coastal waters of Georgia is mainly good. However, along two stretches - waters of Anaklia and Poti, moderately high level of chlorophyll has been registered. The accuracy of the above figures has been corroborated by hydro-biological monitoring, which revealed intensive increase-growth of diatoms, especially in the coastal waters of Supsa-Poti.

The outcomes of the research also indicate pollution of the Black Sea by organic materials. If concentration of polychlorinated biphenyls (PCBs) was within the limit established by the Black Sea Environmental Quality Standard (EQS), pesticides – concentrations of hexachlorocyclohexane, heptaclorepoxide, and cypermethrin exceeded the limits established by EQS. According to the recommendations of the experts, it is crucial to address the results of this monitoring and continue to observe these substances. If the pollution indices persist, respective measures will need to be taken. In recent years, the growth in diversity of zooplankton species has been observed which indicates the improvement in water quality. According to the results of the monitoring of species of microphytes and microzoobenthos, relatively bad or medium status of coastal waters has only been observed near Batumi.

Eutrophication: in May 2016, the measurements were carried out on continental shelf, within the framework of EMBLAS project, which registered relatively low concentration of non-organic nitrogen in both surface and deep layers. Sum total of dissolved inorganic nitrogen (DIN) and total nitrogen (TN) concentrates was low. The highest value of total nitrogen was registered in the Enguri River estuary and Kobuleti waters. On the continental shelf of Georgia (above 116 m), registered average concentration of silicic acid turned out higher than respective index of the

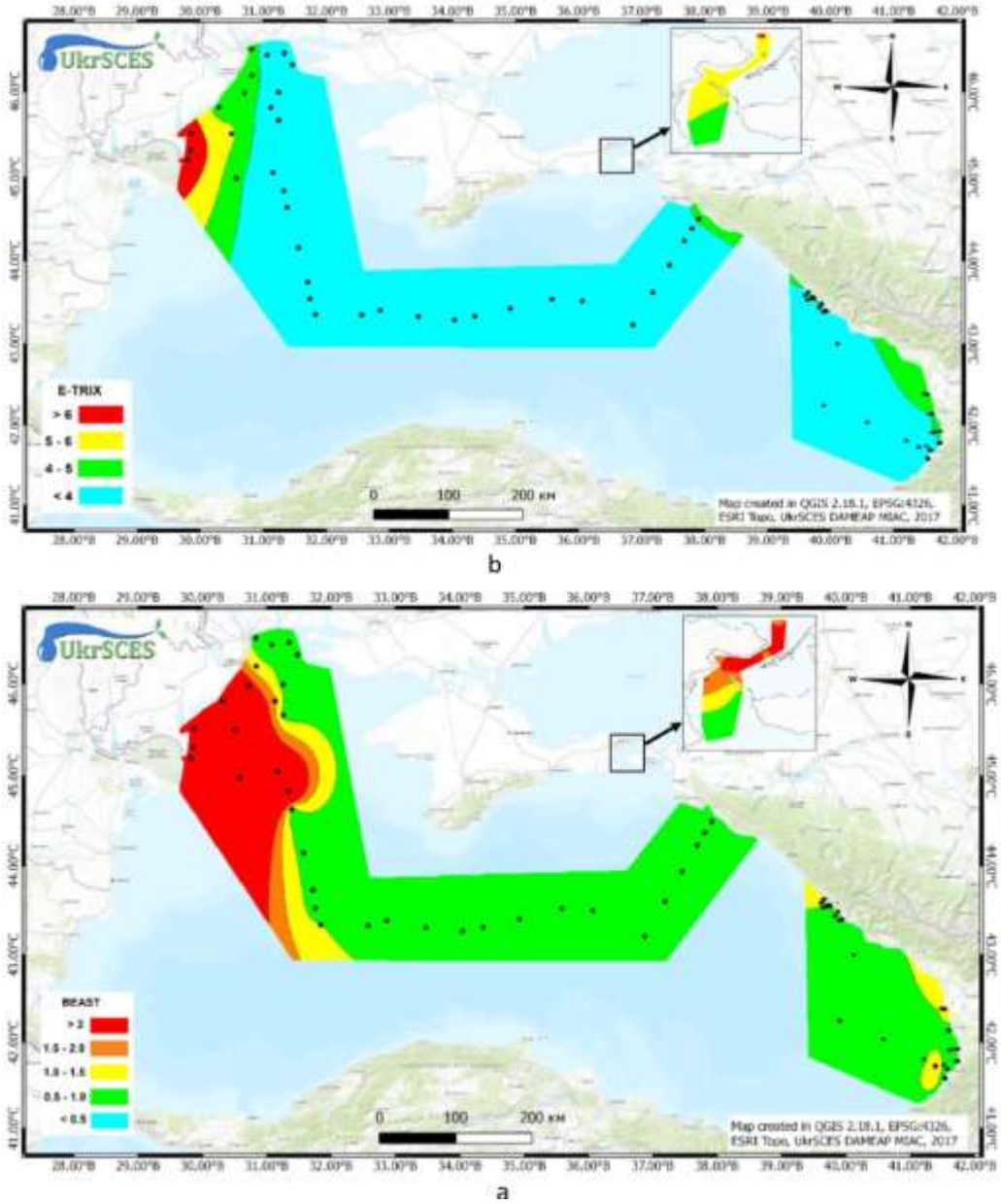
continental shelf of north-west Black Sea. Increased concentration of silicic acid was registered in the surface layer of the water as well; the concentration grows as the depth increases.

It has been established as a result of the research within the framework of EMBLAS project that the territorial waters of Georgia contain lower concentration of chlorophyll than those of Ukraine and Russia. This indicates relatively small content of nutrients. Although, it must be noted that highest content of chlorophyll a in the coastal waters of Georgia was registered in the upper mixed layer of Anaklia waters, supposedly, caused by pollution by ammoniacal nitrogen, which finds its way into the sea through Enguri River. The only area where the concentration in territorial waters exceeds the concentration on the coast is Poti section, which, presumably, is due to the high anthropogenic impact in Poti Port.

High concentration of suspended particles indicates eutrophication process and it was relatively high in Batumi waters and within the zone of impact of Chorokhi River (EMBLAS, 2016).

In order to identify the level of eutrophication, EMBLAS project used tool for evaluation of the Black Sea eutrophication (BEAST) and trophic index (E-TRIX). According to the findings of the project, the status of the quality of continental shelf water in Georgia is identified as mostly good. The status of the continental shelf part where, supposedly, Poti Port has negative impact has been assessed as medium. Similar results were reached with the use of trophic index (E-TRIX) method. With the trophic index (E-TRIX) method, the status of the water is mainly good, and in separate areas – very good (see map 1) (Ministry of the Environmental Protection and Agriculture of Georgia, no date).

Map 1. Assessment of the environmental status of the studied areas of the Black Sea in 2016 by using the methods of the nstrument (BEAST) for evaluation of the Black Sea eutrophication process and trophic index (E-TRIX).



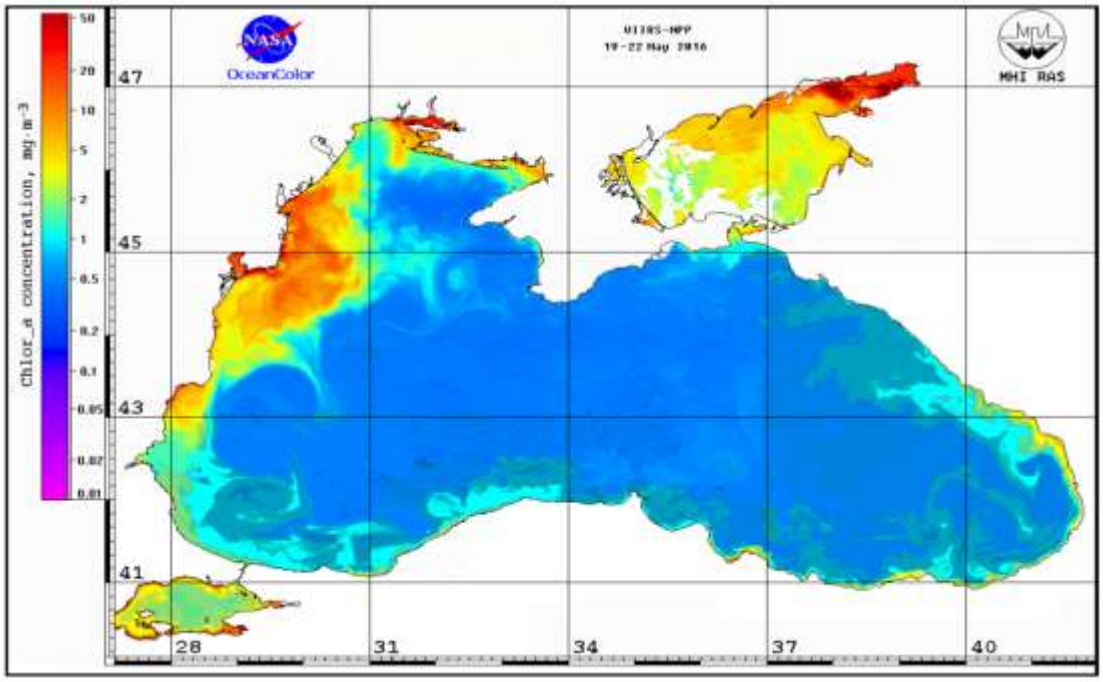
Source: EMBLAS, 2016

Chemical pollution: the results of the monitoring indicate that in the surface layers of the Black Sea waters, the concentrations of heavy metals are within permissible limits. The research of EMBLAS project that studied concentrations of As, Cd, Cu, Fe, Ni, Mn, Pb, Zn confirmed the results of the monitoring of LEPL National Environmental Agency. According to the data of EMBLAS, concentrations of cadmium, lead, and nickel were considerably lower than EU Environmental Quality Standard (EQS). The only discrepancy was concentration of nickel registered near Tsikhisdziri and Kobuleti three times exceeding EQS.

Analysis of the content of the priority substance under Water Framework Directives revealed presence of separate pollutants in water samples. However, their concentrations were considerably lower than limits established by EQS. Namely, increased concentration of polyaromatic hydrocarbons was observed at several monitoring sites (mainly near Anaklia, also near Batumi and

Gonio). Polychlorinated biphenyl (PCB) was registered at most studied sites but within permissible limits.

Map 2. Combined satellite image depicting chlorophyll a concentration (2016).



*Red indicates maximum concentration value; yellow, green, and blue indicate its decrease
Source: JRC, http://marine.jrc.ec.europa.eu/

The research conducted in 2016, within the framework of EMBLAS project, revealed that concentration of pesticides in EU EQS was considerably low. Separate pesticides were registered as a result of the research, e.g. hexachlorobutadiene (HCBD) near Gonio and Batumi, dichlorodiphenyltrichloroethane (DDT). However, the concentrations of both pollutants were within EQS limits.

Increased concentration of hexachlorocyclohexane (HCH) was registered in the waters of Gonio. Heptachlor and heptaclorepoxide were present at four sites. At two of those, their concentrations exceeded EQS limits. Concentration of cypermethrin that considerably exceeded EQS limit was registered at two sites near Gonio. Under EMBLAS project recommendation, it is essential to proceed with monitoring.

Contamination of the Black Sea by municipal waste is common in Georgia. As mentioned above, the research within the framework of EMBLAS project revealed that, on average, there are 322 items of solid waste per km^2. The largest share of solid waste is packaging, polyethylene, plastic bags and bottles. According to the findings of the research, largest and small size waste is washed out by rivers.

Microbiological monitoring mainly focuses on coliform bacteria (E-coli group bacteria) and faecal streptococci. The parameters of the bacteria were within the limits in 2014, however, high concentration (especially that of coliform bacteria) was registered in Supsa and Batumi in 2015. In 2016, the above parameters were within permissible limits of concentration (PLC) near Mtsvane Kontskhi, Batumi and Sarpi. Insignificantly high concentration of coliform bacteria was registered

at Batumi observation site during summer, and in samples taken near Batumi Sea Port (site – Batumi Port) during summer and autumn (Ministry of Environmental Protection and Agriculture of Georgia, no date).

1.4.1.4 Waste Management

Waste is mainly produced from industrial, agricultural and household sectors. According to 2017 data on waste disposal in non-hazardous waste landfills, the country produced approximately 900,000 tons of municipal waste. However, considering that waste management services have not been established throughout the whole country yet and, besides, there still are unregulated landfills, it is probable that municipal waste produced in the country exceeds 900,000 tons. In 2015-2016, within the framework of Caucasus Environmental NGO Network (CENN) project Waste Management Technologies in Georgia, seasonal morphological study was carried out in three regions of Georgia (Kakheti, Shida Kartli, and Autonomous Republic of Adjara). The study results showed that the morphological content was similar in all three regions and identified 10 main categories of waste (see table 3).

	Waste category	Kakheti %	Shida Kartli %	A/P of Adjara %	Average %
1	Organic waste	42.71	46.725	36.61	42.015
2	Paper/cardboard	11.19	11.72	14.7	12.5
3	Plastic	12.84	14.257	16.68	14.59
4	textile	6.11	6.235	6.81	6.38
5	Construction waste	3.17	4.365	6	4.51
6	Sanitary towels	8.71	5.477	5.89	6.69
7	Glass	5.95	3.25	5.02	4.74
8	Hazardous municipal waste	1.12	1.012	1.81	1.314
9	Scrap metal	2.27	1.825	1.73	1.941
10	Leather/rubber	3.25	2.45	2	2.56
11	Other	2.2	0.85	1.4	1.483
12	Loss	0.43	0.605	1.3	0.778

Table 3. Morphological content of municipal waste in three regions of Georgia in 2015-2016 yy (%)

Source: Reports on the findings of seasonal study designed to identify morphological content of solid household waste[2]

As the study showed, largest share of municipal waste per cent was biodegradable waste (food, garden, and paper waste), then - plastic waste, etc.

[2] The study was carried out within the framework of project 'Waste Management Technologies in Georgia', which was funded by US Agency for International Development and implemented by Caucasus Environmental NGO Network (CENN).

According to the established municipal waste plans, average indices of municipal waste production are as follows: in a city/town - 0.77 kg/person/day; in a village – 0.31 kg/person/ day. The above indices match the corresponding indices for Eastern European countries: 0.7 kg/person/day in a city/town and 0.3 kg/person/day in a village. Approximately 78% of the total volume of municipal waste is produced in cities/towns, and 22% - in villages.[3]

There are still many unauthorised, uncontrolled and unregulated landfills in the country. They are mostly situated at river banks or near settlements and, therefore, pose danger to human health and environment. According to the National Waste Management Strategy and National Action Plan, municipalities are tasked with closure/remediation of unregulated landfills by 2020. This is prescribed in their waste management plans. The above process has already commenced, though the data on closed unregulated landfill is not available at this stage.

Also, all existing unauthorised landfills in the country must be closed down, and eight regional landfills established by 2023.

There are no authorised landfills for inert waste in the country. Therefore, inert and construction waste in particular is partially disposed of in non-hazardous waste landfills or is used for corrective works on certain infrastructure construction sites.

From 2019, municipalities started separating municipal waste at the source (paper, plastic, glass, and metal). At this stage, pilot projects on waste separation have been implemented in the city of Batumi and 5 villages of Kakheti Region; besides, separate waste collection containers were set up at 25 public gathering sites in Tbilisi, where population can dispose of paper, plastic, glass, and metals[4] (Ministry of Environmental Protection and Agriculture of Georgia, no date).

1.4.1.5 Air Quality

In Georgia air quality monitoring is carried out by LEPL National Environmental Agency. Since 2014, air quality testing system has improved significantly. Namely, in accordance with the current European practices, the country started quarterly index tests in 2015 (so called passive sampling method). In 2017, air quality monitoring was carried out by means of indicative testing in 20 municipalities of the country. In 2016, single automatic monitoring station started operating in Chiatura and Batumi, and three automatic stations were added to Tbilisi monitoring network. As a consequence, Tbilisi has a fully automated monitoring network with four automatic stations, and its technical parameters and the number of stations correspond to European standards. Two more modern automatic stations (in Kutaisi and Batumi) were added to the country's monitoring network in 2017. By the end of 2017, country had eight working automatic stations.

It is worth noting that the main cause for significantly high PM10 value in Georgia, considerably exceeding daily limit, is transboundary air pollution. Namely, as a result of dispersal on the territory of Georgia of the desert dust from African continent and Arabian Peninsula (Ministry of Environmental Protection and Agriculture of Georgia, no date).

Industry also contributes to air pollution. Typically, industrial sector (mainly cement and asphalt) is responsible for 64% of solid particles present in the air. Air pollution caused by industrial sector is registered in Batumi, Rustavi and Zestaponi. Particularly high level of air pollution is noted in Zestaponi where the level of manganese oxide (MnO2) exceeds the permissible concentration limit five times due to the operation of technically obsolete ferro-alloy factory (Third National Environmental Action Programme of Georgia 2017-2021).

[3] Source: working papers on strategy of biodegradable waste.
[4] Within the framework of project 'Waste Management Technologies in Georgia', which was funded by US Agency for International Development and implemented by Caucasus Environmental NGO Network (CENN).

1.4.1.6 Noise Pollution Status

Rapid urban development, growth of human population, development of motorised transport, and economic progress result in higher noise pollution in all parts of planet. It is particularly prominent in large cities where there are many sources of pollution. Noise pollution is a prevalent problem in Georgia with quite weak or almost non-existent preventive methods.

There are many definitions of noise pollution. EU Directive on Evaluation and Management of Environmental Noise provides following interpretation of noise: undesirable or harmful external noise, created as a result of human activity, including activities to do with vehicles, motorways, railway transport, air, and industry. World Health Organisation (WHO) identifies noise as excessive noise that poses serious threat to a human health and prevents humans from daily activities at school, at work, at home or during pastime. It can prevent one from sleep and can cause vascular and physiological problems, irritability, decrease in work efficiency, and changes in social behaviour. Road noise alone affects health of every third person.

Noise pollution also has a negative effect on biodiversity. All flying, land and marine species fall victim to it. Dolphins and whales are particularly affected as they use special sonars to get about and navigate. The source of noise pollution is increased number of ships, excessive offshore oil and gas production. It is scientifically proven that noise spreads five times as fast in the water than on the land (Parris and McCauley, no date).

Noise pollution is one of the major problems in the EU. In 2002, it adopted Directive on Evaluation and Management of Environmental Noise. The Directive establishes pollution levels and tasks the member states to appoint competent bodies that will be held responsible for application of the Directive. The member states are also obligated to develop noise maps and implement action plans in residential areas, along large roads, main railway lines and major airports.

The main noise pollution sources in Georgia are:

- commercial and industrial sources;
- household sources:
- social measures;
- transport;
- construction.

The noise originated from household sources are not regulated in Georgia. One can often hear loud music late at night in residential houses. It is also common to have noise pollution by construction works and other means at odd hours. Social events followed by fireworks also pose a big problem and cause sleep-disruption. Loud music in restaurants, cafes and night-clubs is normally not controlled. Noise pollution is also linked to mining and processing. The noise generated by drilling and blasting, equipment and vehicles has negative effect on the health of population and wild nature of the adjacent territory.

The most difficult is to find solution to the problem of noise generated by transport. The reason for this is a high number of dated cars that make huge noise when moving both in the daytime and at night. Large construction vehicles are allowed in central parts of a city. Also, horn honking is not

illegal in the streets of Georgian cities – all this results in huge clamour during congestions. For that reason, living in central parts of a city poses huge danger to health. In last decade, construction became a powerful source of noise pollution with construction work during daytime causing immense public nuisance. Recently the speed of urbanisation has been particularly high in Georgia.

1.4.1.7 Water quality and management

In terms of surface and groundwater, Georgia is one of the richest countries in Europe. Here share of fresh water per person is 14,000 m^3 while corresponding European index is 9,300 m^3. Surface water resources in Georgia comprise over 26,000 rivers and 850 lakes, 43 reservoirs, 734 glaciers and wetlands with a total area of 627 km^2. The volume of fresh groundwater supply is 18 bln per year, and consumption – only 1,077 mln a year (by 2015 account). Besides, Georgia is rich in mineral and thermal groundwaters.

In order to evaluate the quality of water resources, LEPL National Environmental Agency conducts regular monitoring of water bodies on the entire territory of Georgia.[5] Monitoring is performed on surface waters (rivers and lakes), ground waters and coastal waters.

According to the results of 2014-2017 monitoring of surface water bodies, the quality of surface waters in Georgia is satisfactory. Contamination with ammoniacal nitrogen, mainly to do with discharge of untreated wastewater from urban and agricultural sites, is the most common form of pollution of surface water. Contamination with heavy metals poses serious challenge only for a handful of rivers and is mainly due to mining activities.

Concentration of ammoniacal nitrogen in surface waters is mostly within the limit. As a result of regular monitoring, isolated cases of increased concentration are mainly registered during low water period when they are less diluted. However, the situation is different when it comes to the rivers where concentration of ammoniacal nitrogen is mostly high throughout the year and exceeds permissible limit of concentration (PLC). In 2014-2017, increased level of ammoniacal nitrogen concentration was registered in following rivers: Kubastsqali (Batumi), Bartskhana (Batumi), Choloki, Menjistsqali (Batumi) Qvirila (Chiatura, Zestaponi), Rioni, Suramula, Mtkvari (Khashuri, Kareli, Zahesi, Tbilisi, Rustavi, Gachiani), Vere (Tbilisi), Gldaniskhevi (Tbilisi), Dighmula (Tbilisi), and Kazretula (daba Kazreti). Lakes Paravani, Khanchali, Saghamos Tba, and Lisi are contaminated by ammoniacal nitrogen.

Nitrates and nitrites nitrogen, sulphates, phosphates, and chlorides: the results of the 2014-2017 monitoring indicate that the concentrations of the above compounds in the rivers and lakes that were subject to the monitoring were within permissible limit of concentration (PLC). The only exception was Kazretula River where the level of sulphates at times exceeded permissible limit of concentration (PLC).

Biological oxygen demand (BOD**):** BOD is an important parameter for water quality. Samples from rivers and lakes of both the Black and Caspian Sea basins showed that they were within the limit of BOD parameters.

Metals: In water bodies of Georgia, regular monitoring is carried out on the following metals: barium, arsenic, silver, zinc, cadmium, cobalt, manganese, molyndenum, nickel, copper, and lead.

Monitoring of groundwater is carried out on 51 sites. Existing hydrological appliances make it possible to automatically monitor groundwater consumption, temperature, mineralisation, pH, and electro conductivity. Twice a year, Department for Monitoring Environmental Pollution jointly with

[5] At present, monitoring is not carried out on the water bodies that are within the occupied territories of Georgia.

Geological Department of LEPL National Environmental Agency take samples. The analysis of the samples on the content of several chemical (nitrites, phosphates, fluorine, silicic acid) and biological (coliform bacteria, faecal streptococci, mesophilic bacteria, etc.) pollutants in water is carried out at LEPL National Environmental Agency laboratory. The results of the monitoring showed that the chemical and microbiological parameters in the ground waters that were subject to monitoring were within limits in 2014-2017. No changes were registered in microbiological parameters either. Heavy metal content in groundwater under Technical Regulations on Drinking Water (in effect since January 2011) is within PLC (Ministry of Environmental Protection and Agriculture of Georgia, no date).

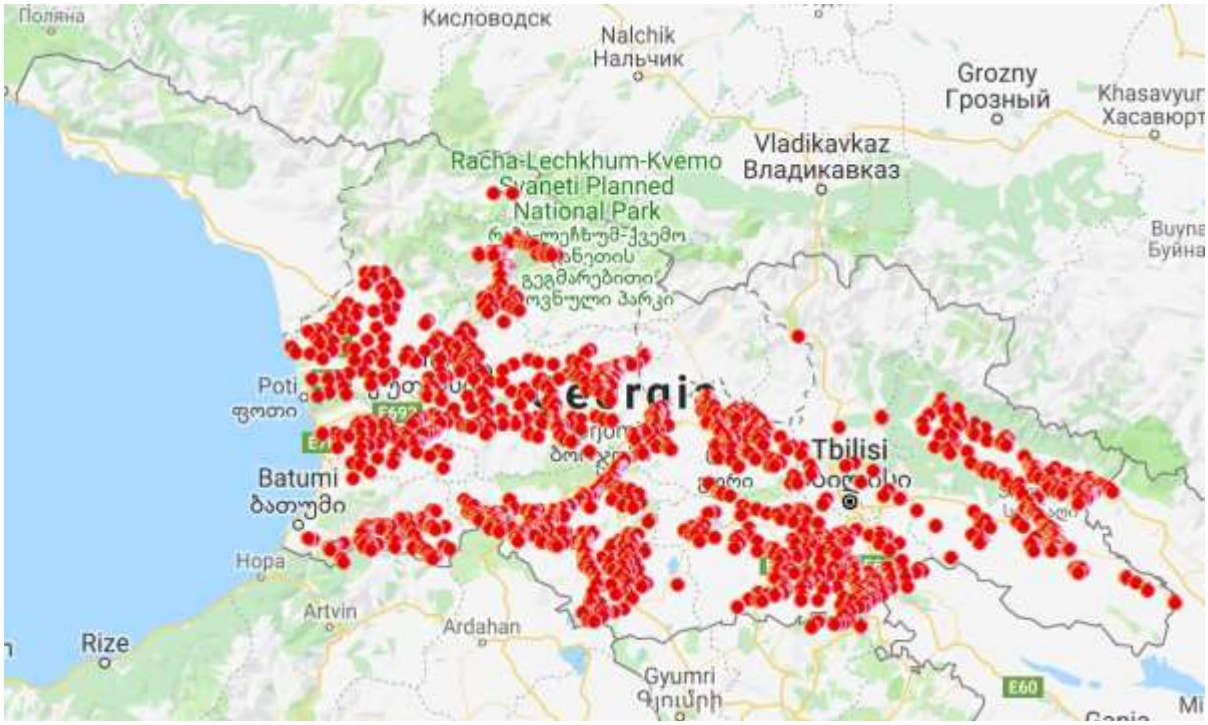
1.5 Gaps of knowledge and information, data and expertise on marine litter issue and national level peculiarities

Under existing Legislation of the country and international conventions, it is forbidden to pollute the sea by any means or scale. However, there are certain cases that are impossible or difficult to identify, or are the consequences of indirect impact - like river contamination caused by waste mismanagement which results in sea water pollution. For example, waste washed away from the territory of Khulo municipality by Adjaristsqali River running through the administrative territory of Adjara finds its way into the Black Sea. Likewise, waste washed away from Oni municipality, Samegrelo-Zemo Svaneti Region by Rioni River finds its way into the Black Sea. In both above cases, it is essential that the local authorities establish and implement correct waste management system.

It is necessary to provide full waste collection and transport service to the local population. Environmental protection monitoring needs to be carried out and necessary actions need to be implemented, including improved legislation, stricter supervision, etc.

Distribution of illegal landslides that pose threat to the Black Sea water (see Map 3).

Tougher control by authorities (the Black Sea Convention Agency) over entities in charge of sea vessels is also required; as well as calculations of the limit on waste collection for 24 hours and comprehensive information on its transfer and storage as it is common occurrence to dump waste from ships in neutral water two miles away from the coast. Also, there are sea vessels on duty in the waters of Batumi and Poti on a regular basis that are suspected of unregulated waste disposal.



Map 3. Illegal landslides

2 Legislation related to the Marine Litter

2.1 Waste Management in Georgia

Correct waste management and waste pollution prevention is an important priority of the country. Illegally dumped household and hazardous waste, or landfills set up with disregard to respective standards contaminate soil and water; and the methane generated from organic waste is conducive to climate change processes. Incorrect waste management, like burning of oils and plastics, produces toxic emissions which endangers human health and environment. Uncontrolled and unregulated landfills is a potential source for spreading diseases. It is no less important to reduce negative impact of waste on the Black Sea environment and prevent pollution and this is an international challenge for the Black Sea countries.

2.2 Overview of National Legislation and Regulatory Documents

The following main legislation on waste is in force on Georgian territory:

Waste Management Code that was adopted in 2014 will take effect on 1 December 2019.

The code has been developed in line with the requirements of directives and regulations under EU-Georgia Association Agreement (AA). It is based on four principles:

1. precaution;
2. pollutant pays;
3. proximity;
4. self-sufficiency.

Waste Management Code defines waste management hierarchy based on the following priorities: prevention, reduction, preparation for re-use, recycling, recovery, and disposal.

Under Point 2, Article 15 of Chapter 5 of the Waste Management Code of Georgia on management of hazardous waste, it is forbidden to discharge hazardous waste into sewerage system or ground or/and surface waters (including the sea). Though under point e) of the second part of Article 2, waste water and pollution of water bodies (including the Black Sea) with waste water or/and waste are not regulated by the Code.

Waste Management Code has not fully come into effect yet. Article 9 of the Code on Extended Producer Responsibility is taking effect on 1 December 2019.

Law of Georgia on Import, Export, and Transit of Waste was adopted in 1995 and it regulates import, export and transit of hazardous and non-hazardous waste.

Law of Georgia on Radioactive Waste took effect in 2016 and it regulates legal relationships between state administration and physical or legal entity in charge of management of radioactive waste and identifies requirements for storage and safety of radioactive waste.

Chapter 9 of Law of Georgia on Environmental Protection covers ecological requirements on waste. Point 4 of Article 34 states that it is forbidden to dump any waste into the sea or any other water bodies.

Article 54 of the Law of Georgia on Environmental Protection covers protection of the Black Sea from pollution and it obligates the entity in charge of activities to implement measures for prevention, elimination, reduction, and control of pollution of the sea from sources of contamination on land, sea vessels, activities on continental shelf, transboundary shipment, atmosphere, waste water, and hazardous substance and materials. The same Law identifies the Ministry as the body that organises waste management and issues licenses on import, export and transit of waste.

Mining waste management issues are regulated to an extent by Law on Mining. Although this Law does not meet the requirements of the EU-Georgia Association Agreement (AA).

In 2016, in accordance with the existing Waste Management Code, normative acts were developed and adopted:

- Resolution N144 of 29 March 2015 of the government of Georgia ‘on terms and rules on the registration of collection, transportation, preliminary processing and temporary storage’.
- Resolution N145 of 29 March 2015 of the government of Georgia ‘on adoption of technical regulations on special requirements for collecting and processing hazardous waste’.
- Resolution N143 of 29 March 2015 of the government of Georgia ‘on adoption of technical regulations on the way of waste transportation’.
- Resolution N159 of 29 March 2015 of the government of Georgia ‘on adoption of technical regulations on the way of municipal waste collection and processing’.
- Resolution N160 of 29 March 2015 of the government of Georgia ‘on adoption of 2016-2030 national strategy on waste management and 2016-2020 national action plan’.
- Resolution N446 of 29 March 2015 of the government of Georgia ‘on adoption of rules and regulations on certain obligations under the Waste Management Code’

- Resolution N263 of 29 March 2015 of the government of Georgia ‘on rules and pre-approved procedures on export-import of separate hazardous chemical substances and pesticides’.

2.3 International Cooperation

In 1994, Georgia joined MARPOL - International Convention for the Prevention of Pollution from Ships. In 1994, Georgia also became a signatory to the Convention on the Protection of the Black Sea against Pollution which took effect in 1994, and the Black Sea Biodiversity and Landscape Conservation Protocol.

Convention on the Protection of the Black Sea against Pollution – so called Bucharest Convention, which is signed by six Black Sea countries, acts to protect the Black Sea from pollution and has been in force since 1994. The convention is implemented by the Black Sea Commission. Under Bucharest Convention, contracting parties are to prevent, reduce and control pollution in order to protect and preserve the marine environment, marine biodiversity, and marine living resources of the Black Sea. Article II of the Bucharest Convention defines that ‘**Pollution of the marine environment** means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazard to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities’. Convention on the Protection of the Black Sea Against PollutionContracting parties of the convention are to ‘take individually or jointly, as appropriate, all necessary measures consistent with international law and in accordance with the provisions of this Convention to prevent, reduce and control pollution thereof in order to protect and preserve the marine environment of the Black Sea’. Bucharest Convention aso gives the following definition of **harmful substances** – ‘any hazardous, noxious or other substance, the introduction of which into the marine environment would result in pollution or adversely affect the biological processes due to its toxicity and/or persistence and/or bioaccumulation characteristics’.

Georgia is also signatory to the Convention on Control and Management of Ships' Ballast Water and Sediments and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

2.4 Ongoing Projects

Approximately 150 refuse trucks and 7,200 solid waste containers have been bought and supplied to municipalities within the framework of Solid Waste Management Project funded by EBRD (the European Bank for Reconstruction and Development).

Kvemo Kartli Solid Waste Managemeent Project: Kvemo Kartli Solid Waste Management Project is co-financed by EBRD - 4.3 mln euros and SIDA (Swedish International Development Cooperation Agency) – 1.843 mln euros. The aim of the Project is to build a new landfill in Kvemo Kartli Region (Marneuli).

Project on Upgrading Municipal Infrastructure of Georgia is financed by the European Investment Bank (EIB) and it provides funding for municipal solid waste infrastructure.

Waste Management Technologies in Regions, phase II (WMTR II) comprises territories of Kakethi and Shida Kartli, Autonomous Republic of Adjara, and Tbilisi. The purpose of the project is to assist the Government of Georgia to modernize the country’s waste management sector and support

sustainable development and inclusive economic growth. The project encourages responsible management of natural resources in order to minimize adverse impacts from waste on human health and natural resources. The previous phase of WMRT programme in conjunction with the Ministry of Environmental Protection and Natural Resources developed Guidance on Municipal Waste Management Strategy.

Integrated Solid Waste Management Programme phase II aims to develop integrated system in Kakheti, Samegrelo, and Zemo Kartli regions. It will be financed by 2017 Credit Agreement between KfW Development Bank (Germany) and Georgia. Meanwhile, there are negotiations for Integrated Solid Waste Management Programme phase III to be implemented in Mtskheta-Mtianeti, Shida Kartli and Samtskhe-Javakheti. Besides, KfW Development Bank is financing Kutaisis Solid Waste Project to be implemented in 2015-2019. The Project plans to build a new regional landfill in accordance with European standards that will replace the old landfill and will serve Imereti, Racha-Lechkhumi, and Kvemo-Svaneti regions.

'Let's keep Georgia tidy together' is a campaign by Greens Movement of Georgia/Friends of the Earth Georgia, Georgian Society of Nature Explorers 'Orchis'; within the framework of the Project on Raising Environmental Ecological Awareness and Waste Mangement by non-governmental organisations, clean-up actions and thematic meetings are organised. The project is supported by Sweden.

The Project on Improving Environmental Monitoring in the Black Sea - EMBLAS + is financed by the EU and its aim is to support joint measures in the reduction of sea pollution in the Black Sea basin. It builds on the results of phase I and phase II of EMBLAS Project implemented in 2015-2018. The current project is phase III. It is noteworthy that, in 2016, within the framework of this project, Guidance on Monitoring of Marine Litter in European Seas was translated and prepared for publication in Georgian.

Georgia is also involved with other Black Sea basin countries in transboundary cooperation programme 'Black Sea Basin 2014-2020'. The overall objectives of the programme are to improve joint environmental monitoring and promote common awareness-raising and joint actions to reduce river and marine litter. The project funded by the programme - BSB552 "Innovative techniques and methods for reducing the marine litter in the Black Sea coastal areas – RedMarLitter"aims to reduce pollution in the Black Sea basin by analysing main pollution flow and implementing pilot measures for cleaning-up pre-selected locations. The project is jointly implemented by "Ovidius" from Constanta, Romania and Tbilisi State University, Georgia.

2.5 Overview of Institutional Arrangements for Waste Management

Currently, the responsibilities in waste management are distributed in the following way:

- The Ministry of Environmental Protection and Agriculture of Georgia is obligated to develop and implement joint state policy on waste management; record waste and create waste database; develop national strategy for municipal waste management and strategy for biodegradable municipal waste management; develop national action plan for waste management, coordinate its implementation, and submit report on its implementation; issue environmental decisions and carry out the registration of waste management activities according to the Waste Management Code; implement control on prevention, separation, pre-treatment, re-use and recycling of waste;

- The Ministry of Environmental Protection and Agriculture of Georgia also regulates and supervises animal waste management;
- The Ministry of Finance of Georgia jointly with the Ministry of Environmental Protection and Agriculture of Georgia regulate transboundary movements of waste;
- The Ministry of Internally Displaced Persons from the Occupied Territories, Accommodation and Refugees of Georgia jointly with the Ministry of Environmental Protection and Agriculture of Georgia regulate and control medical waste management;
- A relevant agency within the system of the Ministry of Economy and Sustainable Development of Georgia issues admission certificates for means of transport to transport hazardous waste.
- The Ministry of Economy and Sustainable Development of Georgia and a relevant agency within its system shall, together with the Ministry, develop and submit to the Ministry subordinate acts determining the requirements related to the transportation of waste;
- The competence of 'Solid Waste Management Company of Georgia' subordinated to the Ministry of Regional Development and Infrastructure of Georgia is to construct, operate and close non-hazardous waste landfills; to construct and operate waste transfer stations;
- The competence of municipalities is to manage municipal waste, as well as to develop municipal waste management plan;
- The competence of the municipalities of Autonomous Republic of Adjara and Tbilisi is to construct, operate and close non-hazardous waste landfills on their respective territories.

2.6 Current Status of Waste Management in Georgia

Until 2015, there practically was no complete information on waste due to the lack of legal obligation on the part of the municipal bodies and the companies involved in waste management to provide any data. The change to the above was introduced by new Waste Management Code which, in January 2017, brought into effect an obligation to keep a record of waste and report it (adopted in 11 August 2015), and which was halted under the resolution of 24 January 2017 until 1 January 2018. However, only the activities and waste producers defined by Articles 24 ('Waste treatment activities subject to environmental expertise') and 26 ('Registration of waste management activities') of Waste Management Code are subject to the above obligation.

Under Waste Management Code, municipalities are obligated to collect and transport waste, and in the targets of National Waste Management Strategy and Action Plan, the target for development and implementation of 5-year plan on waste management for 2017 was defined.

Kutaisi City of Kutaisi has developed waste management plan for 2018-2022. Household waste in the city is removed by Special Services. By means of 106 containers bought with the support of the EU Black Sea Programme and the US Embassy, over 100 tons of plastic was collected between 2015 and 2016. By 2022, the city's target is to reach 100% of municipal waste collection, and in terms of waste separation, it has determined following indicators:

	2020	2022

Paper	30%	35%
Glass	20%	30%
Metal	70%	75%
Plastic	30%	35%

Ozurgeti. Municipality of Ozurgeti has developed waste management plan for 2018-2022. The organisations responsible for waste management activities are Ozurgeti Municipality administration and Municipal Service Centres NNLE. According to the account of current state in the waste management paper, the existing waste management service cannot cover the whole territory of the Ozurgeti Municipality. There are 745 waste collection containers with the volume of 1.1 m^3 and 0.8 m^3. In administrative units, waste is collected every second day. Municipality has purchased and received waste transportation vehicles that are adequate to modern standard, waste-collection containers, beach cleaning machines and other equipment of modern standard. Transfer station that is in compliance with modern standards has been constructed and polygon situated in the administrative unit of daba Ureki has been closed. The so called problem with the unregulated landfill still persists. As a result of the analysis of the waste disposed of in the municipality, it became clear that organic matters makes 50 % of the total waste, while cardboard, plastic and glass – 15% each.

Kedi Municipality. Kedi municipality has developed waste management plan for 2017-2021. The waste generated on the territory of municipality is collected by Kedi Komunalservisi Ltd and transported by Sandasuptaveba Ltd. 142 waste collection containers are placed in the municipality. The challenge for the municipality is unregulated landfills.

Batumi. City of Batumi developed waste management plan for 2018=2022. Municipality waste management is carried out by Sandasuptaveba Ltd and Supervisory Agency of Batumi Municipality draws up administrative offence reports to do with waste littering. There are 120 unauthorised waste disposal sites registered on the territory of municipality. An initial processing equipment for the collected material containing municipal waste is in operation on the territory.

A significant challenge in Georgia remains the issue of waste sorting and processing. Especially in the regions where municipalities due to lack of infrastructure or funds cannot provide adequate services to local population. Problems with waste collection containers and transport force residents to dump on the territories alongside rivers or into the rivers causing pollution of surface water bodies. Under Local Self-Governing Code of Organic Law of Georgia, municipal waste collection falls within the power of a municipality (Point g, Article 16). However, as it is noted in the Regional Development Programme of Georgia and in separate waste management documents, the need for a substantial financial investment for new infrastructure requires support of central authorities and alternative sources of funding.

Waste generated in Georgia every year is approximately 900,000 tons. However, the number of landfills is nearly 60. Waste separating practices are uncommon and chances for waste re-use, recycling and recovery are limited.

Non-government organisations, with the help of various international donors, are actively campaigning to raise public awareness. The USAID project WMTR, II, implemented by CENN, prepared and distributed boxes for paper waste in Kareli, Gori, Kaspi, and Khashuri municipalities. As far as Tbilisi is concerned, 23 waste separation sites have been set up in the city.

Under Waste Management Code, there are fines established for littering. In reality, though, implementation is still problematic for a number of reasons, not least because of inefficient waste management system. Tariff policy and effective mechanisms for recovering costs are also missing.

The challenges also are to raise public awareness, educate in terms of waste management and encourage good practices.

Waste Management Code of Georgia, as mentioned above, has not come fully into force yet. Article 9 of the Code on extended producer responsibility will take effect on 1 December 2019. On the initiative of The Ministry of Environmental Protection and Agriculture of Georgia and with the support of donors, several working meetings took place with a view to discussing legal requirements to do with the obligations, introducing the best international practices, reviewing waste issues,

2.7. Pollution of Water Objects With Waste

Legislation of Georgia and new Waste Management Code do not regulate pollution of surface waters with waste. There is no adequate Legislation on national level regarding solid waste that finds its way into the sea. Though we have problem with pollution that is caused by ineffective respective waste management mechanisms. The main source for river and surface water pollution in Georgia is landfills and waste dumped by population. Through rivers waste flows out into the sea and the problem becomes a global issue. Pollution of the sea with municipal waste is a serious problem. Uncontrolled disposal of municipal waste into streambeds of rivers that flow into the sea and along coastal territories causes pollution of coastal zones and waters. This, in turn, endangers environment, marine living organisms, human health, and also has a negative effect on the development of tourism. Waste carried by rivers, including Rioni, makes up a large proportion of the Black Sea pollutants along with ship discharge, untreated wastewater, etc. Large pollutant of the Black Sea coast is plastic solid waste. According to the data on pollution published by EMBLAS project in April 2019, plastic waste leads the list of waste carried down by rivers with the following shares; plastic bottle – 20%, packaging – 14%, plastic waste – 14%, plastic balloons – 10%, plastic containers – 9%.

Geographically, the Black Sea is isolated from oceans. Its basin comprises about one third of continental Europe. Therefore, pollution of coastal waters and quality and volume of the water in the rivers flowing into it are essential for the ecological condition of the sea. In the last 50 years, pollution and excessive consumption of the Black Sea resources caused deterioration of water quality and ecosystem. Discharge of untreated urban wastewater and municipal waste into the Black Sea waters of Georgia is a serious threat to the sea. Development of tourism in the region increased pollution of the sea by urban wastewater even more. According to the results of the intensive seasonal monitoring of coastal waters, best water quality in coastal waters is in Sarpi-Kvariati and Gonio areas.

However, in the places where untreated urban wastewater is discharged, high concentration of E-coli is registered. The worst case is at the mouth of Bartskhana River. Here E-coli reaches 24,000/L the limit being 10,000/L. In order to resolve the problem of untreated wastewater finding its way

into the Black Sea, wastewater treatment plant has been built in Batumi (Adlia). Wastewater treatment plants are being built in Ureki and Kobuleti. Pollution with municipal solid waste poses more danger to the sea. Uncontrolled dumping of municipal waste into streambeds of the rivers flowing into the sea and along coastal territories causes pollution of coastal zones and waters. This, in turn, endangers environment, marine living organisms, human health, and also has a negative effect on the development of tourism. Discharge of waters and municipal waste into the sea enriches the sea with nutrients and, consequently, boosts the process of eutrophication, which poses the biggest threat to the Black Sea. The signs of eutrophication are apparent on the coastal zone of Georgia as well. Other threat to the sea is pollution by oil and oil products in the ports of Georgia. Particularly high level of pollution is observed along maritime routes (0.3 mg/L). The reason for this could be discharge of ballast waters. The equipment for receiving and treating ballast water is built at several ports (e.g. Batumi Oil Terminal) (NEAP, no date).

Supervisory activities with regard to the Black Sea are carried out by the Black Sea Protection Convention Division of the Department of Environmental Supervision and sea pollution from ships is supervised by the Ministry of Economy and Sustainable Development jointly with Maritime Transport Agency. Agency of Environmental Protection and Natural Resources of the Republic of Adjara is also involved with the monitoring of the coastal waters of the Autonomous Republic of Adjara. Monitoring of bio-diversity and pollution is carried out by Fisheries and Black Sea Monitoring Division of the National Environmental Agency.

With regard to water resources, including ground-waters and the Black Sea, the Second National Environmental Action Programme of Georgia 2012-2016 develops concrete objectives, targets and actions. Namely, for the surface waters, the Programme identifies four objectives and 13 actions; in the Black Sea chapter, there are two objectives and five actions; in the mineral resources chapter – two objectives and three actions. Out of 21 actions, three have been implemented, four actions have not been successful, and the rest actions are at different stages of implementation (NEA, no date).

3 Stakeholders Analysis

Stakeholder is any individual or group of individuals that are directly or indirectly involved in the project activity. They could be people that will benefit from the outcomes of the project. One can distinguish between two groups of stakeholders. The first group comprises people with direct interest in the results of the project and ICT-based tools developed by the project. Normally, it is not difficult to identify them. There is also a group that is no less interested in the application of the outcomes of the project but often are overlooked by us. When analysing the stakeholders, we need to pay attention to both groups. It should not be difficult to identify stakeholders if we find correct answers to the questions like – 'Who is interested in the outcomes of the objectives implemented by us'? Or, 'Who might benefit from our initiative'? It is important to identify not only stakeholders (groups, individuals) who have clear and direct interest in using ICT-based tools developed by the project (staff working in the field, customers, etc.), but also to recognise the parties that are not obvious beneficiaries however will be impacted by our activities.

Direct or indirect beneficiary of the project can be both who issues or receives information.

According to the project, the stakeholder is:

Local authority, like an administrative body of a city, town, or village, mayors and chief experts in specific fields that are involved in planning, development, environmental protection, transport, tourism, healthcare, education. This group of individuals is one of the major stakeholders in this project as it is essential that they own and use ICT-based tools developed by the project, as well as issue and receive relevant and required information.

Representatives of regional authorities tasked with planning, responding to pollution, and its prevention, as well as environmental protection, healthcare, and tourism. Administrations of national authorities, including environmental protection, water, maritime transport, ports, fisheries, forestry, tourism, healthcare that have access to various data on a national level. The above tool will one of the additional sources of information.

The group that possesses specific information, but not in conjunction with other fields. These are various agencies of the national authority in the following fields: environmental protection, water management, healthcare, maritime transport, ports, fisheries, tourism. They each have information within its field but have no integrated information on the environmental status as such. Often, a representative of one agency has no knowledge or information of data and information owned by another agency.

Similar situation is with stakeholders that are involved in providing services. Namely the ones providing services in ports, water and wastewater-companies, staff maintain beaches, solid waste removal companies. They possess information on waste and solid waste pollution at a local level, knowledge on volume and types of waste in the area that cannot give integrated, full picture.

Non-governmental organisation, namely those that have implemented solid waste-related projects and are generally focused on water and marine habitat, environmental protection policies, coastal zone management, and those involved in regional cooperation. These organisations might have certain information on marine litter. They are also interested in information to which they do not have access.

Scientists are an important link within stakeholders. Reliable information on environmental status, in this specific case, on marine litter, is only possible on the basis of scientific research and knowledge. One of the most important aims for the country should be to make most of the available scientific knowledge and provide conditions for scientists to carry out research.

An important group of stakeholders is higher education centres, universities both state and private. The teaching staff of a higher education have both interest and competence in environmental protection, they teach basics of marine science, biology, geography, sea technologies, and the concept of sustainable development. This group is also very much interested in the issues of marine litter as they know of the damage it can cause.

Before individuals becomes students and learn about science, they attend a school. So the interests they might pursue in life will, most likely, be discovered at school. For this reason, school (teachers and pupils) is an important stakeholder in this project. Many of them are part of the schools and extracurricular activites that already engage with environmental issues. Marine litter is one of the most important issues raised by children and teachers in the recent years. And they often participate with pleasure in clean-up actions that have become a tradition in the course of the last 5-6 years.

Not least important stakeholder is the group that consists of business-associations, especially the ones involved in hotel management, various tourism activities, water sports, and aquaculture. All these spheres more or less generate solid waste and, in order to adequately protect marine habitat,

they need to have access to the relevant information, be aware of the dangers of uncontrolled solid waste production and management. Also, the entire society as there is no individual or a family that is not connected in one way or another to the sea. This is the group that will use the ICT-based tools developed by the project.

A single database will enable all stakeholders to have access to integrated information. This approach is the only way to make decisions, develop policies and ameliorate the condition that is called marine litter.

4 Strategies, practices, measures

Currently, Georgia is guided by National Waste Management Strategy for 2016-2030 and a National Action Plan for 2016-2020 enacted on 1 April 2016. To coordinate the implementation of the document is the responsibility of the Ministry of Environmental Protection and Agriculture, which is also obligated to report once every three years to the government of Georgia on the implementation of the national action plan.

National Waste Management Strategy of Georgia, which covers 15-year period, corresponds to the 2012-2016 Environmental Protection Action Programme of Georgia and takes into consideration recommendations based on the evaluation of environmental protection actions of Georgia (the UN European Economic Commission 2015). It also determines key priorities, directions and objectives of waste management, like waste prevention, re-use, recycling, recovery and disposal measures, its goal being to introduce integrated waste management system in stages.

Indices of recycling determined by National Waste Management Strategy.

	2020	2025	2030
Paper	30%	50%	75%
Glass	20%	45%	80%
metal	70%	80%	80%
plastic	30%	50%	80%

In targets of Waste Management Strategy one of the objectives is to recover entire waste management costs based on ‘pollutant-pays’ principle.

Target 6.1. To develop and implement at each municipality the system for waste management cost recovery from population by 2030.

Target 6.2. To develop and implement the system for cost recovery from a private sector.

National Waste Management Action Plan includes the actions for 2016-2020, their timespan, funding sources, etc. Inter-Departmental Coordinating Council was set up in order to ensure efficient implementation of the plan. Apart from the Ministry of Environmental Protection and Agriculture, the council consists of all parties involved in the implementation of the plan. The main

targets and powers of the Coordinating Council is to facilitate the implementation of National Waste Management Strategy and Plan, co-ordinate the parties involved in the process, receive reports on the implementation of actions under the National Action Plan, consider existing challenges and problems and develop relevant recommendations, co-ordinate co-operation with donor organisations, etc.

There are also waste management plans in place: municipal waste management plans for 5-year period, and company waste management plans for 3-year period.

In May 2018, Georgia adopted a third National Environmental Protection Action Plan for 2017-2021 and identified plans and priorities of the sector. In the above document, a special attention is paid to waste management issues its one of the main aspects being the issue of extended producer responsibility and regulations on processing which will considerably improve the management.

The document 2018-2021 Regional Development Programme of Georgia highlights the urgency of developing waste management infrastructure. It is pointed out in the document that solid waste collection only exists in few municipalities and it requires further improvement. The development of solid waste management infrastructure is part of one of the five groups of horizontally applied requirements identified by a sector-based approach. 'Over the last 5 years, solid waste management system has significantly improved: 31 municipal landfills have been rehabilitated, 23 landfills have been closed and 5 waste transfer stations have been arranged. This significantly reduced the adverse effects on environment and population. By 2023, it is planned to close existing municipal landfills and build in parallel new regional landfills of international standards '.

Still, according to the document, in some villages and towns waste problem is still relevant as waste is dumped along rivers and gorges. The above actions are aimed at solving this very issue. It is directed at development of waste management system by closing down of old landfills and building of new landfills of international standards. These actions will considerably reduce the volume of solid waste in environment (implementing bodies are: United Water Supply Company of Georgia LLC, Solid Waste Company of Georgia Ltd, Municipal development Fund of Georgia LEPL, and municipalities). According to the Regional Development Programme, low efficiency of solid waste collection system remains the weakest area in waste management sphere. It also notes low public engagement with the issue.

On the part of the EU, within the framework of investment platform, the initiatives are being financed and this will assist the projects on solid waste management (2019 Association Implementation Report on Georgia).

Georgia is actively involved in the process of implementation of the 'UN 2030 Sustainable Development Goals'.

The country managed to nationalise 17 (out of 17) priority objectives and 98 (out of 219) targets

(https://sustainabledevelopment.un.org/content/documents/21117updateGeorgia.pdf, 2016 report). The objective concerning waste is N 11 according to which Georgia has pledged to reduce index for environmental impact per capita by 2030 with particular attention being paid to improvement of municipal and other types of waste management. According to the Action Plan of the Committee on European Integration of the Parliament of Georgia (http://www.parliament.ge/uploads/other/85/85952.pdf), the adjusted indicator-target of Georgia looks like this: By 2030, 100% of urban solid waste will be collected and of this - 80% will be well managed (sorted by the types of waste). According to baseline indicator: Annually generated

municipal waste — 900 thousand tons; anually, collected and disposed municipal waste — 700 thousand tons. Municipal waste disposed at landfills — 100%; Recycled 0 %.

5 Monitoring Status

Till 2018, the state did not conduct any permanent waste monitoring. It was carried out by projects of international organizations in a sporadic and fragmentary way. The results of monitoring, according to 2017 data, are as follow: based on the amount of waste disposed of at non-hazardous landfills, approximately 900,000 tons of municipal waste is produced in the country per year. However, if we take into account the fact that there is no integrated waste management service throughout the country, and also, there are still many unregulated landfills here, it is possible that the amount of waste generated in the country exceeds 900,000 tons.

Since I January 2018, the obligation to register for waste management activities came into force. Under Article 26 of Waste Management Code, the following activities, connected to waste management, are subject to registration:

a) waste collection and transportation;
b) construction and operation of temporary sites for storing of over 50 tons of non-hazardous waste;
c) preliminary processing of non-hazardous waste;
d) construction and operation of temporary sites for storing hazardous waste between 2 and 10 tons in volume;
e) construction and operation of waste transfer stations.

The procedure of registration and requirements are determined under 'terms and rules of registration on collection, transportation, preliminary processing and temporary storage', under the resolution N144 of 29 March 2015 of the government of Georgia (https://matsne.gov.ge/ka/document/download/3237277/2/ge/pdf).

The application forms for registration of the activities can be filled in and submitted online on the following website: http://waste.moe.gov.ge. Report on the registered waste is being prepared and will be publicly discussed by the ministry on its completion.

As to the monitoring of marine litter, it will only be implemented within the framework of international project on a pilot territory and will need to be carried out on regular basis.
It is possible to set up and implement population monitoring system if general public awareness is raised and relevant information is available to population.

6. Recommendations: policy, mitigation and management actions

Despite the positive steps, additional efforts are needed in order to be able to apply proper waste management standards on a national level and resolve the relevant problems that have accumulated through years. It is essential to continue implementing actions in accordance with Waste Management Strategy and Action Plan and provide appropriate funding.

There is still no coherent waste management infrastructure in the country yet. There are no landfills for hazardous and inert (construction) waste either. There is still no comprehensive municipal waste

management service and, also, there are still many unregulated landfills. Besides, it is important to raise awareness on waste management issues among population.

From 2019 responsibility for separating municipality waste by municipalities will be enacted in stages. Also, from December 2019, extended producer responsibility (EPR) will take effect, which means, that those that produce (import) and market the goods that generate specific waste are obligated to collect, transport and manage it in accordance with the requirements of environmental protection. EPR also covers wrapping and packaging waste, car and household batteries, electric and electronic waste, oils, tires, and obsolete vehicles. The implementation of the above responsibilities will considerably increase the waste recycling index.

One must also note that it is important to establish state inspectorate on current environmental standards and efficient management of the activity. A number of beneficial changes have taken place in order to optimise of the Department of Environmental Supervision. New structural subdivisions have been created:

• waste control unit;

• unit for control on genetically modified live organisms;

• express-laboratory unit.

The powers of the Department were widened in 2016-2016. As a result of enforcement of new laws of Georgia and in order to implement EU Association Agreement, the Department of Environmental Supervision will now also be authorised to control observation of the responsibilities under Waste Management Code and, in case of violations, to respond in accordance with the relevant article of then Code.

All the above demonstrate the improvements in waste system that are taken place in stages in Georgia.

To facilitate waste management and control is as significant function on the part of the state as it is to establish the rule of law, etc. For this reason, the responsibility for waste management in the country lies with the local or central authorities. The role of the authorities in developing of this sphere is very important as it covers the following issues:

• improve laws;

• carry out relevant reforms;

• monitoring;

• efficient co-ordination of the work of various agencies.

The benefit to environment from development of waste management in Georgia will be immense. It will be most evident to the people living closest to landfills who suffer from smell, rodents, unsanitary conditions and smoke from waste burning, and, most certainly, from unsavoury sight of landfills.

Georgia is a small country as it is. Respectively, more landfills mean more inefficient land use and contamination. From illegal landfills waste finds its way into the sea and results in the Black Sea pollution.

One should also note the importance of involvement of the private sector in waste management in order to understand the complexity of the system. The country has started to separate, sort and process waste. For that reason, more stakeholders need to get involve in the process. Separation when collecting waste is the best future for waste management. This should be implemented at the level of organisations to start with. At schools, public offices, and universities separation of waste will, on the one hand, help to raise public awareness and, on the other, encourage waste processing and reduction in household waste. It is not very easy to set up waste management system – it

requires engagement on the part of each person and efficient cooperation on the part of various agencies, organisation, and institutions. It will take dozens of years to reach a coherent system but good planning and implementation will lead the country to the desired result.

It is recommended: to actualise the subject of marine litter and bring it more into focus; as mentioned above, prevent illegal landfills and clear up uncontrolled and unregulated landfills; set up the Black Sea coastal population monitoring system and engage younger generation; for each municipality to introduce a day for coastal clean-up action with public involvement; stop dumping of waste into natural world by using legal and executive measures of the state, and constant public actions.

References

1. Berglund, B; Lindvall, T; Schwela H,D; GUIDELINES FOR COMMUNITY NOISE. WHO. 1995. Retrieved from http://whqlibdoc.who.int/hq/1999/a68672.pdf
2. BSB552 / RedMarLitter. Retrieved from https://viapontica.org/en/projects/bsb552 redmarlitter/
3. Black Sea in Pollution Crisis: Georgian Communities Take Action.2014. Retrieved from https://www.unenvironment.org/news-and-stories/press-release/black-sea-pollution-crisis-georgian-communities-take-action
4. DIRECTIVE 2002/49/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 June 2002 relating to the assessment and management of environmental noise. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0049&from=EN
5. European Commision – Noise. Retrieved from http://ec.europa.eu/environment/noise/index_en.htm
6. GOAL 14 TARGETS. N.a Retrieved from https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-14-life-below-water/targets.html
7. Goines, L; Hagler L; Noise Pollution: A Modern Plague http://docs.wind-watch.org/goineshagler-noisepollution.html
8. Gunsilius. E; Frommann J. Marine Litter Causes, impacts and potential solutions GIZ. 2015. Retrieved from https://www.giz.de/en/downloads/giz2016-en-marine-litter.pdf
9. Jeftic,L; Sheavley, S; Adler,E. Marine Litter: A Global Challenge. 2009. Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/10744/MarineLitterAglobalChallenge.pdf?sequence=1&isAllowed=y
10. National Pilot Monitoring Studies and Joint Open Sea Surveys in Georgia, Russian Federation and Ukraine, 2016. December 2017. Retrieved from http://emblasproject.org/wp-content/uploads/2018/08/EMBLAS-II_NPMS_JOSS_2016_ScReport_Final3.pdf
11. Parris,K; McCauley R; Noise Pollution and Environment. Australian Academy of Science. Retrieved from http://nova.org.au/earth-environment/noise-pollution-and-environment
12. saqarTvelos garemos dacvis moqmedebaTa meore erovnuli programa (2012-2016). Retrieved from http://www.moe.gov.ge/res/docs/1790NEAP_geo_2012.pdf
13. Third National Environmental Action Programme of Georgia. Retrieved from http://mepa.gov.ge/En/Files/ViewFile/1605

14. United Nations Partnerships for SDGs platform. Retrieved from http://sustainabledevelopment.un.org/content/documents/21117updateGeorgia.pdf
15. Word Health Organization – Noise. Retrieved from http://www.euro.who.int/en/health-topics/environment-and-health/noise/noise
16. აჭარის ავტონომიური რესპუბლიკის 2016-2021 წლების სტარტეგიული განვითარების გეგმა. Batumi 2016. Retrieved from http://adjara.gov.ge/uploads/Docs/acdb5711834a4d0e86f1f4f04e46.pdf
17. 12 ახალი ფაქტი შავი ზღვის შესახებ. 2017. Retrieved from http://emblasproject.org/wp-content/uploads/2017/04/Georgia_brochure.pdf
18. აფხაზეთი. საქართველოს მთავრობა. N.a. Retrieved from http://gov.ge/index.php?lang_id=geo&sec_id=213
19. გურიის რეგიონის განვითარების 2014-2021 წლების სტრატეგიის დამტკიცების თაობაზე. 2013. Retrieved from https://matsne.gov.ge/ka/document/view/2024372?publication=0
20. ევროპის ზღვებში საზღვაო ნარჩენების (მარინოლიტერის) მონიტორინგის სახელმძღვანელო. Retrieved from http://oceandna.ge/index.php?lang_id=GEO&sec_id=27&info_id=120
21. ნარჩენების მართვა - პროექტები. Retrieved from http://environment.cenn.org/waste-management/projects/
22. ნარჩენების მართვის კოდექსი. Retrieved from https://matsne.gov.ge/ka/document/view/2676416?publication=8
23. როგორ შევამციროთ შავი ზღვის პლასტმასით დაბინძურება. 2019. Retrieved from https://www.euneighbours.eu/ka/east/eu-in-action/stories/rogor-shevamtsirot-shavi-zghvis-plastmasit-dabindzureba
24. სამეგრელო-ზემო სვანეთის რეგიონის განვითარების 2014 – 2021 წლების სტრატეგიის დამტკიცების თაობაზე. 2013. Retrieved from https://matsne.gov.ge/ka/document/view/2024548?publication=0
25. საქართველოს ბუნებრივი რესურსები და გარემოს დაცვა 2017. Tbilisi 2018. Retrieved from https://www.geostat.ge/media/13848/Garemo_2017.pdf
26. საქართველოს გარემოს დაცვის მოქმედებათა მესამე ეროვნული პროგრამა 2017-2021 წწ. Retrieved from http://gov.ge/files/495_65924_530178_1124.pdf
27. ხმაურით დაბინძურების წინააღმდეგ ბრძოლის ინსტრუმენტები საქართველოში თორნიკე ბუბაშვილი. 2017
28. სამუსაო ვერსია ანგარიშის გარემოს მდგომარეობის შესახებ 2014-2017 წლებისათვის.