

Saving our Sea:

New ways to reduce Marine Pollution in the Black Sea

August 2022

A collective edition of students' essays, published by BSEC PERMIS and ICBSS for Black Sea React!



BLACK SEA React!

Pilot innovative solutions for fighting
marine litter in the Black Sea



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the European Union





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The [BLACK SEA React!](#) project is co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

Partners: *BSEC Permanent International Secretariat (BSEC PERMIS), International Centre for Black Sea Studies (ICBSS), GAMA Recycle A.S., Municipality of Sariyer.* Associated Partner: *USA Consulate in Istanbul.*

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Introduction

The **Black Sea React! – Pilot innovative solutions for fighting marine litter in the Black Sea** research project aims to contribute to the regional dialogue on mitigating and effectively tackling marine pollution and marine litter, while at the same time seeking innovative solutions to salient problems. The project is co-funded by the **European Commission** under Grant Contract ENI/2020/421-957, coordinated by the **BSEC PERMIS**.

The project's activities pilot an innovative circular economy solution to marine (plastic) litter by involving local fishermen and a coastal municipality from the Black Sea region. In parallel, it develops a strong and positive narrative on marine litter prevention targeting specifically young people. Provided the pilot is successful, the proposed activity will ultimately strive to promote a follow-up joint action involving various coastal municipalities from BSEC Member States to tackle marine litter. The target group involves municipalities from the Black Sea littoral countries, fishing communities from Sariyer Municipality of Istanbul (Türkiye) and young people and primary school students from all littoral countries.

It runs under the coordination of the **Permanent International Secretariat of BSEC (BSEC PERMIS)** in cooperation with the **International Centre for Black Sea Studies (ICBSS)**, the **GAMA Recycle A.S.** and the **Municipality of Sariyer**. The **USA Consulate in Istanbul** is Associated Partner.

Within the framework of the Black Sea React! project, the **Regional Essay Competition for the Youth “Saving our Sea: new ways to reduce marine pollution in the Black Sea”**, a BSEC PERMIS and ICBSS initiative, was launched in the period May-September 2021. It aimed to raise awareness and motivate young people in the BSEC Member States to take action against the growing marine pollution challenge in the Black Sea.

The present **collective edition** includes the **top ten essays** of the Regional Essay Competition for the Youth. The essays were submitted by high-school students aged 15 to 18 years, citizens of the 13 BSEC Member States and addressed one or several questions, as follows: (a) *How can you help tackle marine litter in the Black Sea region? Share your ideas and/or experiences!*; (b) *Why is marine litter prevention important?*; (c) *What do you think is standing in the way of a clean Black Sea?*; (d) *Have you ever participated in public or youth initiatives to collect marine litter? What would motivate you to do so?*

On the occasion of the **30th Anniversary of the BSEC Organisation**, the present edition aspires to foster a culture of eco-friendly behaviour and environmental consciousness in younger age groups, as well as to motivate the wider society to learn from its youngsters in adopting sustainable practices for reducing marine litter and marine pollution.

Special thanks go to the supporting team: Ms. Rositsa Stoeva, Ms. Georgia Chantzi, Ms. Ipek Hokkaci, Ms. Evgenia Logiotatou and Ms. Athina Korovesi, for their valuable support provided throughout the entire process.

Black Sea: Some Ideas to Decrease Pollution

By Anastasiia KORPUSOVA (Ukraine)¹

*"It takes all the running you can do, to keep in the same place.
If you want to get somewhere else, you must run at least twice as fast as that!"*
Lewis Carroll, Alice in Wonderland

To stop littering the Black Sea the speed is vital and important. Let's begin! Six o'clock. Get up. In a few minutes, I jog along the beach. Waves caress my feet. I duck like a dolphin into the marine water. Stop. I haven't seen dolphins in an extremely long time. What is the reason? Why did the dolphins stop splashing near the beach?

Paiu Romulus-Marian, Panigada Simone wrote, "According to the results of these aerial surveys, Black Sea common dolphins seem to be rather scarce in the north-western part, as only a few sightings were reported from the Ukrainian and Romanian waters." (Pg. 50) In my point of view, the declining dolphin population is an indicator that shows us something is wrong with the marine ecosystem. Sometimes water pollution occurs through storms when the waves stir the water as a result, marine life suffers from a lack of oxygen because the lower layers of the Black Sea contain huge amounts of hydrogen sulfide. This deficiency of oxygen could be one of the reasons for decreasing population of dolphins in our sea. However, contamination occurs due to human activity for example sewage - that is not always properly treated, pesticides from farms that enter into the sea along with rainwater through the rivers, wastes from marine ports or construction sites, an oil spill that is spilled during accidents on ships, and trash that people produce. All of this causes many devastating consequences for marine animals, plants, and even people; this can be a foundation to stimulate all kinds of diseases.

More beaches human-inhabited and made attractive, comfortable for visitors than it was in the past. Nowadays at the beach, there are many kinds of establishments build so you can buy a delicious meal, play basketball, ride a jet ski, ride a bicycle, dance, and rent all kinds of beach accessories. Those formations covered most parts of the beach and installed buoys for fences into the water. Are these modifications safe for the seaside? No, it is not. In my point of view, they create rubbish, noise, and pollution, especially in summer when tourists are interested in attractions. In support of this Vasiliy Bogoslovskiy states, "There is a lot of trash in the Black Sea: both separate floating objects like ropes, buoys, pieces of fishing nets, plastic, and accumulations of trash that create islands". (Pg. 1)

Just imagine, tens of millions of cigarettes, millions of plastic bottles, hundreds of thousands of auto parts, several thousand household appliances floating in the sea. A lot of rubbish ends up in the sea because people do not throw it out properly in the bin. After the rain, lots of trash goes down water

¹ **1st Prize Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

drains which then gets swept out into the sea. This trash is incredibly dangerous to marine life.² Dolphins are often caught up in the fishing nets perceiving plastic bags as prey, and fish end up eating little bits of garbage as a result that trash is stuck in their stomach. In addition, algae and plankton suffer from marine debris; that litter can prevent receiving enough sunlight which is necessary to produce oxygen and nutrition for other sea life such as fry and jellies. Consequently, predators, for instance, dolphins, who eat fish, are put at risk due to poor quality or lack of food.

Moreover, water pollution is permanently growing up. So, it became particularly important for everyone to reduce this threat to marine life to keep our clean. We can make our sea cleaner and safer by doing some simple actions, such as:

- Informing people.
- Posting signs at the beaches.
- Contacting your city administration with proposals.
- Grouping volunteers together.

The information about the consequences of water and sea beaches pollution will give the knowledge that can help people reconsider their pollution habits to create less rubbish. Signs will be reminder to visitors how important it is to keep the beach clean. Signs examples: "Marine life: give them a chance to live. Take the trash out" or "Do not feed dolphins with plastic bags and cigarettes. Put it in the bin." All of these signs might motivate people not to litter on the beach. Proposals to the administration could be to equip the beach with baskets for recycling. Those bins will remind us that recycling is a great way to decrease pollution. Also, the cities can make laws that allow businesses next to the beach to use only straws made from paper but not plastic, this action will save marine life from the straws stuck in their noses. Gathering volunteers could be done by volunteers to 'Clean up our beach' events. This type of event will be not only a wonderful strategy to train, motivate people in a fun and joyful way but also a recipe to reduce pollution at the beach.

I surveyed seven friends to find out about their attitudes towards the Black Sea environment. Here are my findings.

Firstly, all seven believe that marine life is at risk, as a result, they are concerned about the future of our sea. Six of my seven friends believe that humans are responsible for harming the seawater (Appendix A). Next, I asked what my friends were doing to help save the environment. All seven friends bring reusable bags to the supermarket to avoid using the disposable ones provided free of charge. Then I asked about water. Three of the seven friends drink tap water instead of buying bottled water (Appendix B). My next question was about which forms of transportation they use. Five of my seven friends walk or ride a bike as much as they can (Appendix C). Lastly, I asked my friends about cleaning up our beach. Three of them are ready to support this action with great pleasure (Appendix D).

The results of the survey show that my friends are helping tackle marine litter in various ways, however, there are more things they could do to stop the pollution. They could try to reuse old products and buy fewer new items.

² As S. E. Nelms, et al. wrote, "Plastic pollution represents a pervasive and increasing threat to marine ecosystems worldwide." "Microplastics in Marine Mammals Stranded around the British Coast: Ubiquitous but Transitory?" *Nature News*, Nature Publishing Group, 31 Jan. 2019, www.nature.com/articles/s41598-018-37428-3, 1.

In conclusion, human activities such as building roads, building cities, transporting all kinds of goods, overfishing, are creating pollution and restricting some types of organisms living in the Black Sea. In most cases, these organisms can adapt and restore a healthy balance to the marine ecosystem if we stop polluting it. However, people use the Black Sea as a source of food resources, so we must try to protect its marine life. Fortunately, there are many different ways to create a positive consequence on the Black Sea ecosystem! By doing something, as small as throwing your rubbish in the bin, - so it doesn't end up going down storm water drains and polluting the sea - reducing the amount of water that person uses at home by having a shorter shower and turning off running taps, lessening the amount of packaging that you use by buying a reusable drink bottle or plastic container instead of using disposable wrapping, telling other people about water pollution including how it is caused and what they can do to keep our water safe and clean, participating in a cleanup of a beach or waterway, we can help the ecosystem around us and ourselves, in particular, become happier and healthier. Let's start moving as fast as we can to reduce the pollution of our lovely, blue, water in the Black Sea! We are in this together, so each of us can take steps into improving the world we are living in.

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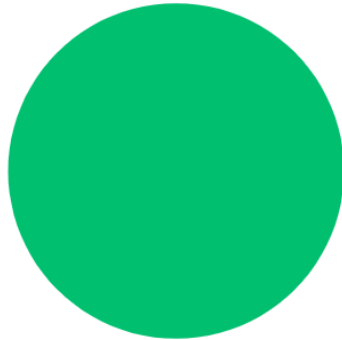
Appendixes

Appendix A: Survey Results: Your Attitudes Towards the Black Sea Environment 2 Questions

How concerned are you about marine water pollution?

Answered: 7 Skipped: 0

7 (100.00%)

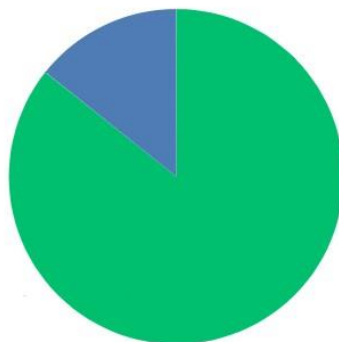


Extremely concerned Slightly concerned Not at all concerned

ANSWER CHOICES	RESPONSES
Extremely concerned	100.00% 7
Slightly concerned	0.00% 0
Not at all concerned	0.00% 0
TOTAL	7

Who is responsible for harming the seawater?

Answered: 7 Skipped: 0



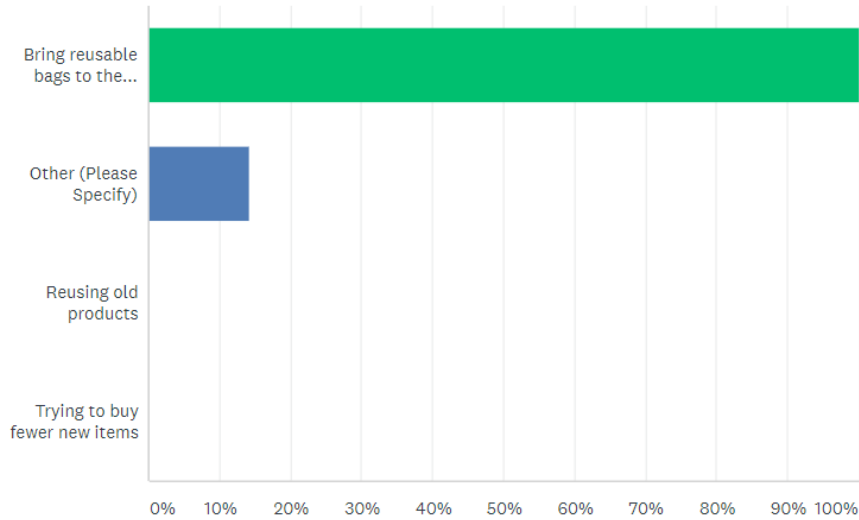
Human causes Natural causes

ANSWER CHOICES	RESPONSES
Human causes	85.71% 6
Natural causes	14.29% 1
TOTAL	7

Appendix B: Survey Results: Questions Regarding Environment

What are you doing to help save the environment?

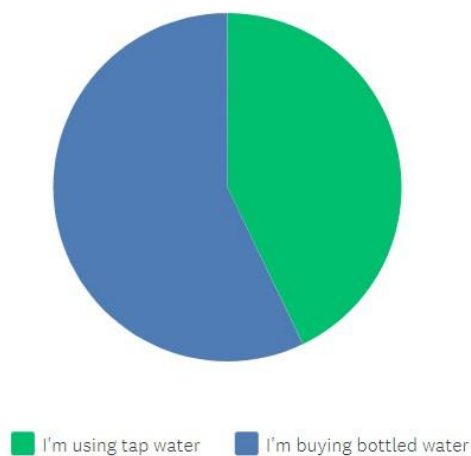
Answered: 7 Skipped: 0



ANSWER CHOICES	RESPONSES
Bring reusable bags to the supermarket to avoid using the disposable ones	100.00% 7
Other (Please Specify) Responses	14.29% 1
Reusing old products	0.00% 0
Trying to buy fewer new items	0.00% 0
Total Respondents: 7	

What type of water do you use for drinking and cooking?

Answered: 7 Skipped: 0

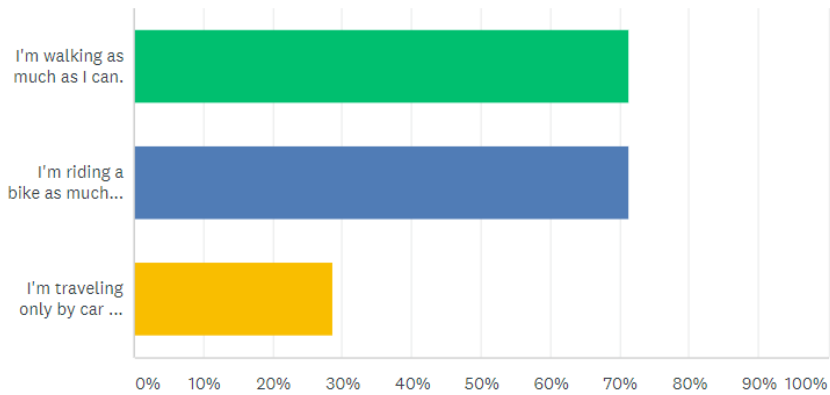


ANSWER CHOICES	RESPONSES
I'm using tap water	42.86% 3
I'm buying bottled water	57.14% 4
TOTAL	7

Appendix C: Survey Results: Questions Regarding Environment

Which forms of transportation are you usually use?

Answered: 7 Skipped: 0

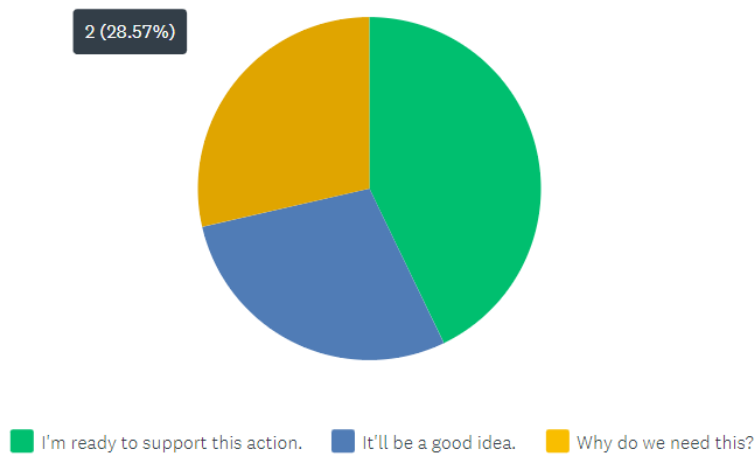


ANSWER CHOICES	RESPONSES
▼ I'm walking as much as I can.	71.43% 5
▼ I'm riding a bike as much as I can.	71.43% 5
▼ I'm traveling only by car or public transportation.	28.57% 2
Total Respondents: 7	

Appendix D: Survey Results: Question about the Beach

What do you think about cleaning up our beach?

Answered: 7 Skipped: 0



ANSWER CHOICES	RESPONSES
▼ I'm ready to support this action.	42.86% 3
▼ It'll be a good idea.	28.57% 2
▼ Why do we need this?	28.57% 2
TOTAL	7

Fighting for Crystal Waves

By Iulia-Cristiana VLĂDĂREANU (Romania)³

“There once lived an old man on the shore of a beautiful sea. All day he wove nets and caught fish. There were so many that the old fisherman shared them with his animals. He had a nice dog and an evil black cat.”⁴

Our childhood years are frequently sprinkled with legends of cheery sailors, enchanting mermaid songs and mythical sea creatures prowling the abysmal depths. Such a story is the one of this fisherman, and although this children’s tale was not chosen at random, the plot shall remain hidden for now. It is of utmost importance, however, to keep in mind that every story has a little bit of truth in it.

A certain body of water is the leading actor in this particular chapter. Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine share a common heritage, namely the Black Sea, which has been a centre point for many civilizations. A nearly enclosed and zonally elongated basin with a maximum depth of almost 2,200m and a volume of 547,000 km³, the Black Sea has a surface area of roughly 430,000 km² and represents approximately one-fifth of the surface area of the Mediterranean. It has a limited interaction with the Aegean Sea through the Turkish Straits System and receives fresh water inflows all around the basin, but the important ones (Danube, Dnieper and Dniester) discharge into the north-western coastal waters. It is described as a “unicum hydrobiologicum”⁵, a sea with unique biological characteristics which is part of a larger social-ecological system of interacting environmental and human processes. The Black Sea is the largest water body with a meromictic basin, which means the lower and upper layers of the sea do not mix; over 90% of its deeper layers is anoxic water (lacking in oxygen).

The Black Sea forms the boundary between Europe and Asia. It is bordered by six nations which have very different social and economic characteristics. This body of water is an important year-round transportation artery, linking the eastern European countries with world markets. Odessa, the historic Ukrainian city, together with the nearby port of Illichivsk, account for most of the sea’s freight turnover. The ports of Novorossiysk and, to a lesser extent, Tuapse (both in Russia) and Batumi (Georgia) farther to the east specialize in petroleum. In Bulgaria, Varna and Burgas are the main ports. Constanța, in Romania, connects oil-bearing regions with foreign markets. Istanbul on the Sea of Marmara is Turkey’s main port, while the Danube acts as a huge trade artery for the Balkan countries.

Fish constitute the most widely utilized biological resource of the Black Sea. One still finds bottlenose dolphins and about 180 species of fish, including tuna, anchovy, herring, mackerel and the famous white sturgeon. Monk seals, sadly, have become extinct here.

The Black Sea and its surrounding areas are marked by majestic scenery and a rich cultural and natural heritage. The fantastic climate and mineral springs around it have made it a major

³ **2nd Prize Winner** of the Regional Essay Competition for the Youth “Saving our Sea: new ways to reduce marine pollution in the Black Sea” within the framework of the Project “Pilot innovative solutions for fighting marine litter in the Black Sea”, co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

⁴ Sergey Nikolov, “The Legend of the Black Sea”.

⁵ Knipovich, 1932.

recreational and recuperative centre, with Crimea being the most important region. The sandy beaches of Bulgaria and Romania have attracted an increasing number of tourists as well.

The region's natural wealth, however, is under severe pressure.

Pollution, oil spills, marine traffic, invasive species and overfishing threaten the sea and rivers. Owing to natural factors, the diversity of species of Black Sea fauna is approximately three times lower when compared with that of the Mediterranean. Specific features of the Black Sea make it very vulnerable to disturbances of its environment and ecosystems; it is highly sensitive to anthropogenic impacts due to the huge catchment area and almost landlocked nature. Excessive and illegal logging, intensive agriculture and unsustainable coastal development are problems on land. The region is also vulnerable to climate change, which could add to the stress its natural systems are already under.

Today, the Black Sea region is at an environmental crossroads. Eutrophication⁶, pollution, and irresponsible fishing resulted in an overall decline of biological resources, the diversity of species and landscapes, and of the aesthetic and recreational values of the Black Sea, thereby bringing its ecosystems to the edge of collapse. It can continue on the path of neglect or it can move towards a more sustainable future.

On a large scale, many improvements can be made and many are already in the process. There are a number of legislative and institutional approaches for managing the marine environment of the Black Sea. They operate at different scales, including national, sub-regional, and global. As individuals, it may seem pointless to attempt to solve such a broad problem independently; there is, however, a chapter in which each person can have a say: the chapter of marine littering.

At long last, the question arises: how can you help tackle marine litter in the Black Sea region?

It all starts with a better understanding of the root causes of sea pollution: reading articles or paying attention to the news, attending conferences, talking to professionals or gathering information from any certified source.

It all starts with bringing awareness to the topic by discussing with friends, family or acquaintances. This means playing a most significant role, by bringing to public attention the necessity of taking a stand in front of marine littering.

It all starts with preventing waste, properly disposing of or recycling used plastics and all types of materials that make up marine litter, becoming part of communities that collect litter from beaches.

It all starts with you.

Since the question of "how" was answered, naturally, "why" must follow: why is marine litter prevention important?

"Prevention (noun) = the act of stopping something bad from happening"⁷. Preventive care means

⁶ Anthropogenic or cultural eutrophication is a process in which nutrients are added to a water body from any of a wide variety of polluting inputs including untreated or partially treated sewage, industrial wastewater and fertilizer from farming practices, stimulating algal and aquatic plant growth that can cause substantial ecological degradation.

⁷ Oxford Advanced Learner's Dictionary.

catching potential problems before they become real problems, preserving the state of the coastal and marine environment as well as protecting the socio-economic advantages the Black Sea region offers.

Marine litter is not reversible. Experienced fishermen and sailors recognize the change: “a decade ago, this entire sea was alive with beasts, birds and fish”.⁸ Now, amid the pollutants and clusters of floating debris that litter the murky waters, they feel lucky to even snatch a glimpse of marine life. Such is the case of monk seals, some of which have survived in the Sea of Marmara, but the last report of a specimen in the Black Sea dates to 1997. Monk seals were present at Snake Island until the 1950s, and several locations such as the Danube Plavni Nature Reserve and Doğankent were the last known hauling-out sites post-1990.

Nowadays, its entire population is estimated to be less than 700 individuals widely scattered, which qualifies this species as endangered. This is only one example of what exploitation, ignorance and pollution can do to a living being, and a - sadly – perfect demonstration on why prevention is better than having to deal with the outcome.

The following question is: what is standing in the way of a clean Black Sea?

National efforts and regional - international cooperation have been put into motion, yet the need to preserve the Black Sea ecosystem as a valuable natural endowment of the region has not been met. Marine litter issues are not properly addressed and managed and the actual levels of marine litter pollution are not adequately evaluated and monitored in the Black Sea riparian countries. The environmental, economic, health, aesthetic and cultural problems are rooted in poor solid waste management practices, lack of infrastructure, indiscriminate human activities and behaviours, inadequate understanding on the part of the public of the potential consequences of their actions, lack of adequate legal and enforcement systems, lack of implementation of existing legal systems and a lack of financial resources.⁹ Marine litter is a complex multi-dimensional and transboundary problem and despite efforts made internationally, regionally and nationally, there are indications that the marine litter is not properly dealt with. The road to a clean Black Sea is not easy to walk, and many challenges still lie ahead.

However, despite only being a student myself, I cherish the idea that “if I can do it, the world can do it as well”. I live an hour away from a coastal Black Sea city and every summer, the sea becomes my second home. Over the years, learning the beautiful history and observing the magnificent scenery of this marine haven has motivated me to do my best in taking care of its artistry. My family and I would often recycle used oil in specially designed centres, collect plastic bottles and litter whenever we went to the beach and, with the guidance of my teachers, I would participate in youth initiatives to collect marine litter with every opportunity I had. I am proud to say that, even years later, these actions are not just habits, but part of my everyday life.

A children’s tale appeared in the prologue of this essay. To epitomize its contents, it can be said that a fisherman, which had a nice dog and an evil black cat, lost his faith in good and succumbed to his anger by punishing his – soon to be discovered innocent – cat: he threw her into the sea.

⁸ Peter Schwartzstein, the Smithsonian Magazine.

⁹ Black Sea Marine Litter Regional Action Plan.

that the marine litter is not properly dealt with. The road to a clean Black Sea is not easy to walk, and many challenges still lie ahead.

Immediately after, he lost his home and was not able to catch a single fish anymore. His final act of kindness, sharing his last fish with a poor, stray kitten, was what finally saved him.

And because every story has a little bit of truth in it, the moral of this tale shall be deciphered as such: we must not forget our past, but learn from it and start working towards a better future with the best thing each of us has to offer: kindness.

And as the tale of the fisherman goes:

“He lived for a long time after that, but he never again lost his faith in goodness even though the sea remained black.”

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Investigation of the causes of pollution in the Black Sea and finding solutions

By *Umut ŞAHAN (Türkiye)*¹⁰

Abstract

Especially after the 70s, the countries with a coast to the Black Sea ignored the situation of the Black Sea in order not to slow down their economic growth and continued to apply the linear economic growth model, which does not require an action plan. Due to the developing industry and maritime transport within this period, new wastes of astronomical dimensions have emerged. Since a sustainable economic model has not yet been adopted in the region, the Black Sea countries have also failed in the disposal of these wastes. In addition, the ecology and geology of the Black Sea could not be understood because the Black Sea countries did not attach sufficient importance to marine sciences, this situation has eliminated the possibility of controlling the ecological and chemical disasters experienced in the Black Sea for the last 30 years when they are in micro dimensions. When the current data are examined, there is no more polluted sea in the world than the Black Sea. There is no oxygen 200 meters below the Black Sea, so there is no life. Although these are big problems, they still have solutions, but if this pollution is the accumulation of humanity's callousness over the decades, it will not change everything as it comes with solutions, it will test our patience. Even though the situation we are in is bad, the countries of the region are looking for a solution to the problem with practices that emphasize cooperation in the Black Sea problem, such as the BSEC and the Bucharest Convention, but of course, more needs to be done.

Keywords: Microplastics, Ecosystem, Recycling, Black Sea, Pollution, Waste, Flora.

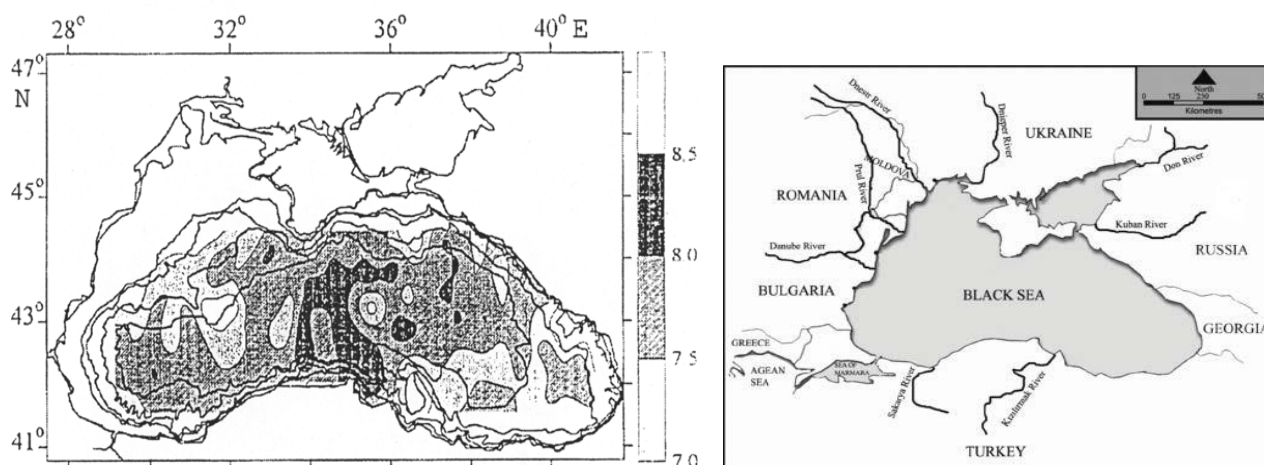
Entry

Located between the Black Sea, Southeast Europe and the Anatolian peninsula, Ukraine in the north, Russia in the northeast, Georgia in the east; It is an inland sea surrounded by Turkey in the south and Romania and Bulgaria in the west, connected to the Atlantic Ocean by the Mediterranean Sea, the Aegean Sea and the Sea of Marmara. Five big rivers flow into the Black Sea: the Dnieper, the Dniester, the Don River, the Kuban River, and the Danube, which covers all of eastern and central Europe. The Danube alone carries 203 cubic kilometers of fresh water to the Black Sea every year. This amount is more than any fresh water flowing into the North Sea. It is one of the busiest seas in the world in terms of maritime traffic, and the busiest in terms of oil transportation. The flora and fauna of the Black Sea are getting poorer day by day due to domestic and industrial pollution. Since the amount of organic matter from rivers is greater than the bacteria in seawater can normally decompose, bacteria obtain oxygen from sulfur ions, a component of seawater, instead of the dissolved oxygen normally found in seawater. As a result of this process, extremely poisonous hydrogen sulfide (H₂S) gas is produced and prevents life below 200 meters. The Black Sea is the world's largest hydrogen sulfide reserve. There is no life below the depths varying

¹⁰ **3rd Prize Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

between 150-200 meters. There is no oxygen in water and it is loaded with H₂S. Hydrogen Sulfide kills the entire ecosystem where it is found, destroys coastal fisheries, and if it rises to the surface, it paints the bottom of the ships black with the chemical composition it creates. In this respect, if pollution is not controlled in the Black Sea, where there is already low oxygen and 87% of which has no life, it means the mass extinction of fauna and flora at an unprecedented rate in other seas and oceans awaits us.

The ratio of hydrogen sulfide, which is an obstacle to aquatic life below 200 meters in the Black



Sea, by regions and the map of the rivers flowing into the Black Sea

Why Should Marine Pollution Be Prevented?

40% of the world lives within the 100km² hinterland of the coasts. In other words, one of the natural habitats of approximately three billion people in the world is the sea and they are in a mutual relationship with the sea as they are the first interlocutors of all kinds of events that may occur in the sea. Just like on land, many people meet their needs such as food and employment thanks to the sea. People who live their lives thanks to the sea are affected positively when a positive event occurs, and they are also affected in the same way when a negative event occurs. Currently, the most adverse situation on the world's seas and the most critical issue that concerns 3 billion people is marine pollution.

Marine pollution is disrupting the ecological balance, as we are currently experiencing in the Black Sea and other seas. Only in the Black Sea 59 fish species have become extinct due to pollution. With extinct species, both raw materials and nutrients are lost. There is also a decrease in biodiversity. Because of this, an astronomical increase is observed in the species whose natural enemies are eliminated, this time hegemon species begin to emerge. In other words, the lack of biodiversity may also leave the region's geography vulnerable to invasive species. Because the species, which may be the natural enemy of the invasive species, may become extinct in the ecological imbalance caused by pollution. In fact, Karadeniz experienced this situation firsthand with the species "Mnemiopsis Leidyi" in the 1980s. The most likely cause of its introduction was accidental by the ballast water of merchant ships. Especially since it has caused a decrease in the number of fish of great commercial importance, such as Anchovy (*Engraulis encrasicolus*), it has brought the fishery to the point of extinction in the Black Sea.

At the same time, marine pollution prevents the sea from absorbing oxygen and getting sunlight as a result of the wastes circulating on the living things or the sea surface cuts off the air contact,

causing underwater structures such as seagrass and reefs and their flora to be deprived of oxygen. In addition to disrupting the ecological balance and causing eutrophication, this situation also stops the influx of tourists coming by boats and yachts to see underwater structures. Even if the pollution does not spoil the enjoyment of the tourists, it also hinders the water transportation by getting caught in the propellers of the ships and other water vehicles passing through the region.

In addition to the damage it causes to the ecological balance, the pollution of the seas is not only an environmental problem for humanity, but also a problem with a socio-economic dimension. Failure to solve this problem will result in the loss of natural habitats for both humans and other living things. Therefore, just as living next to a garbage dump is detrimental to one's health, turning 4/3 of the world into a garbage dump where 3 billion people live is an undesirable situation for current and future generations, even for their evil.



Invasive species "Mnemiopsis Leidy" in the Black Sea and the reef in the garbage

Problems to be Overcome in Order to Clean the Black Sea

- 1.** Failure to prepare comprehensively sustainable economic plans in the region as a result of the linear economic growth policy by the countries of the region.
- 2.** Since the Black Sea coastline has a generally agriculture-based economy (especially: Romanian pig industry and Turkish hazelnut fields) excluding a few metropolitan areas (Istanbul, Varna, Samsun, Odessa...), the use of insecticide and other pesticides mixed with the sea through air circulation is due to economic concerns, failure to impose sanctions.
- 3.** To get rid of the wastes of large industrial establishments and local citizens in the interior land, they throw their wastes into rivers flowing into the Black Sea such as the Danube, Don and Dnieper (20% of the pollution of this Black Sea comes from these rivers).
- 4.** The rarity of Technical Universities, which have marine sciences faculties that can understand the problems of the Black Sea and produce solutions, and independent institutes that can do sufficient research on this subject, make the countries of the region need the help of foreign countries in the research of the Black Sea. The reason for this is the indifference of the Black Sea countries, great budgets are allocated to marine sciences in the world and a lot of experts are trained on this subject, but the Black Sea is far behind the world in this regard. If the Black Sea had been studied and researched as well as the Mediterranean, the problems that are currently being fought in the Black Sea would have been solved without growing at the beginning.

5. Many uncontrolled or even unlicensed constructions are carried out on the Black Sea coast due to rapid urbanization, illegal construction and squatting, especially due to Turkey and Russia. Tons of construction waste is generated from the constructions. Research shows that more than 3.5 tons of waste is generated during the construction of a 185 square meter house. Instead of preserving the resulting construction waste due to its cost, it is dumped into the Black Sea by the construction owner because it is both cheap and has a low risk of being caught. In Turkey alone, an average of 50 trucks dump excavations into the Black Sea per day.

6. When the population living on the coast is calculated without taking into account the people living in the hinterland of the Black Sea, it becomes 18.5 million. 60% of the 18.5 million people live in rural areas. Rich Black Sea municipalities such as Istanbul, Odessa, Varna will not have problems in controlling the wastes of their administrative populations, but rural municipalities without adequate infrastructure will have inability to control and contain certain categories of waste. Even without taking into account the waste from the people living around the rivers flowing into the Black Sea, the wastes of about 10 million people flow into the Black Sea in an uncontrolled manner.

7. The Black Sea is one of the busiest seas in terms of maritime transport, and the busiest in the world in terms of oil transport. Although the countries with a coast to the Black Sea are members of agreements such as the Bucharest Convention and MARPOL, they lack the competent local port authorities to check the compliance of the ships anchored in their ports with the most common criteria of the agreements. In addition, there are no facilities in the ports of the Black Sea that can store lining and class wastes of ships. There are a total of 63 ports in the Black Sea, and besides, as a result of ship maintenance, substances such as heavy metals and toxic dyes are irresponsibly thrown into the sea. As a result of the lack of strict control from the Bosphorus, the ships that entered the Black Sea that could not meet the MARPOL standards, together with the indifference of the Black Sea oil tankers against oil spills, left the Black Sea empty within the scope of maritime law by the coastal states of the Black Sea, turned it into an uncontrollable marine garbage dump in the Black Sea.

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Not Only Unaesthetic but Also Deadly

By Maria MIHAILOV (Romania)¹¹

I have just returned from a one-week excursion to a village located in the extreme east of the Danube Delta, a territory interconnected with the Black Sea, and I cannot stop thinking about what my friend told me as we were lying on a beautiful virgin beach on the sea's coast. While scrolling down a social media app, she had stumbled upon an article stating that the Danube Delta and the Black Sea region rank among the top five most Instagrammable natural wonders¹² in the world. I was in awe, but before I could react, she added that it is such a shame the litter ruins this enchanting realm. She was right. Looking around, all I could discern were patches of land covered in shattered beer bottles and plastic gum wrappers thrown away by careless people. To take a swim, you would have to face the waste brought by the rivers that run across twenty- five European countries.

Over the last decades, pollution has become a substantial threat for the Black Sea, an enclosed territory prone to environmental degradation. In this essay, I intend to present an analysis about marine waste and explain why it is crucial to put an end to this rapid increase in pollution. I aim to focus on the issue of micro plastics, chemical pollutants, and their impact on the regional ecosystems.

Researchers define marine litter as any anthropogenic, manufactured, or processed solid material discarded in the coastal and marine environment or carried indirectly by rivers, sewage, storm water, waves, or winds. The rapid and perpetual increase in the volume of solid waste, and the slow degradation rate of most items, are gradually becoming a public health hazard and environmental concern in many countries.¹³ The unique ecosystem of the Black Sea is cluttered with tremendous loads of waste and toxic substances from the littoral countries and the rivers that discharge into it. Marine debris results from different human behaviors and activities, and the most prominent sources of waste are sea-based and land-based projects. Such activities include "waste released from dumpsites near the coast or river banks, the littering of beaches, tourism and recreational use of the coasts, fishing industry activities and ship-breaking yards".¹⁴ The central sea-based activities are offshore mining and extraction, illegal or incidental discarding at sea from shipping (example: transport, tourism), fishing, and controlled aquatic cultivation.¹⁵

The Black Sea is a semi-enclosed coastal basin with a low exchange flow with the Mediterranean Sea. It is supplied by twenty-five large rivers, the main ones being the Danube, Dnieper, and Don.¹⁶ Therefore, this region is prone to the accumulation of debris and toxic materials. During the summer-autumn period, 2017 - 2019, in line with the Bulgarian Ministry of Environment and

¹¹ **4th Place Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

¹² "What are the world's most Instagrammable natural wonders?" [Online]. Available: <https://www.saveonenergy.com/uk/most-instagrammable-natural-wonders/>

¹³ "Marine Litter" [Online]. Available: <https://www.unep.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/marine-litter>

¹⁴ "Marine Litter- the issue" [Online]. Available: <https://www.unep.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/marine-litter-issue>

¹⁵ "Our Oceans, Seas and Coasts" [Online]. Available: https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm

¹⁶ "Black Sea" [Online]. Available: https://en.wikipedia.org/wiki/Black_Sea#Drainage_basin

Waters monitoring program, volunteers classified discarded items from the Black Sea coast into eight categories according to the type of material: artificial polymer materials; rubber; cloth/textile; paper/cardboard; processed wood; metal; glass/ceramics and unidentified - resulting in a total of 167 sub-categories.¹⁷ Studies show that, on average, each of the rivers that connect to the Black Sea brings each hour between six and fifty pieces of litter.

Even though there are various types of waste, around eighty-five percent of the residue found in the Black Sea is plastic. Twenty percent represents plastic bottles, while plastic bags and containers account for ten and nine percent.¹⁸ "Plastic" is a highly used term in our modern- day vocabulary, and we need to clarify what it is and why it is affecting our surroundings. Plastic is a chemical compound, a polymeric material that has the capability of being molded and shaped, usually by the utilization of heat and pressure.¹⁹ Its physical properties- elasticity, hardness, lightness, transparency, and durability, make plastic a versatile prime matter, useful in most industries. With this rapid production rate worldwide, downsides of plastic usage have started to arise. One can wonder why such a helpful material can represent further grievances.

So far, we have described the waste visible to the human eye, macro litter, which causes "biodiversity degradation, entanglement, ingestion, and even mortality of marine species".²⁰ The problem amplifies when the residue that remains on the water surface tends to be mechanically broken down into microscopic particles by external forces such as UV radiation, wind, and waves. As a result, marine life often ingests them; then these particles make their way into our bodies through food and cause various adverse health effects. Experts have defined micro plastics as "synthetic polymer particles, being less than five millimeters".²¹ The micro particles present in the water likely originate from the slow deterioration of the floating or submerged plastics and the fragmentation of plastics decomposed to embrittlement in the beach environment. These infinitesimal residues have infiltrated inside the body of aquatic species, such as zooplankton, invertebrates, fish, sea birds, and marine mammals. The mechanical hazards presented after ingestion may be related to airway blockages (expected for larger particles), obstruction of feeding organs, or depletion in the feeding capacity.²² We can only infer what other catastrophic consequences may appear from here, because current research fails to provide an insight into how micro plastic contaminants interact chemically and physiologically with various organisms at different trophic levels.

What we know for sure is that various substances of concern, such as persistent organic pollutants (POPs) and heavy metals, are present in the marine environment through these plastic shreds.²³ The occurrence of micro plastics in our food chain industry exposes humans to plastic- associated toxins, which could significantly harm our health situation. The effects correlated with micro residue ingestion will depend on the number of particles; the size, shape, properties, polymer composition, and density of the particles; the duration of exposure; the rates of absorption and

¹⁷ Aytan, Ü., Pogojeva, M., Simeonova, A. (Eds.,) 2020. "Marine Litter in the Black Sea". Turkish Marine Research Foundation (TUDAV) Publication No: 56, Istanbul, Turkey. 361 p.

¹⁸ "The Black Sea is contaminated with plastic – but how can we reduce the damage?" [Online]. Available: <https://euneighbourseast.eu/en/east/eu-in-action/stories/black-sea-contaminated-plastic-how-can-we-reduce-damage>

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²¹ Arthur, C., J. Baker and H. Bamford (eds). 2009. "Proceedings of the International Research Workshop on the Occurrence, Effects and Fate of Microplastic Marine Debris". Sept 9-11, 2008. NOAA Technical Memorandum NOS-OR&R-30.

²² "Sources, fate and effects of microplastics in the marine environment: a global assessment" (Kershaw, P. J., ed.).

²³ "Micro plastics: Trouble in the Food Chain" (UNEP FRONTIERS 2016 REPORT)

desorption of contaminants; and the biology of the organism.²⁴ Potential adverse reactions to the chemicals ingested in high concentrations may include immuno-toxicological responses, reproductive disruption, abnormal embryonic growth, endocrine disturbance, and modified genes.²⁵ Altered genes could have unintended environmental consequences and may present a risk to the health of organisms.

To conclude, marine debris is not only aesthetically unpleasant while scrolling on Instagram, looking at your friends' vacation pictures, but it also leads to biodiversity degradation, habitat loss, injury, or mortality of marine species. Although micro plastics are a prominent issue for the environment, they constitute only a proportion of the total quantity of plastics in the ocean. Ergo, even if people were to prevent the discharge of macro plastic litter into the sea, the ongoing degradation of debris would likely result in a sustained increase in micro plastics. The constant accumulation of these materials is endangering the Black Seas' semi-enclosed habitat and calls for urgent responses from authorities, companies, and people.

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How can we help tackle marine litter in the Black Sea region?

By *Georgiana-Bianca DAN (Romania)*²⁶

The Black Sea is one of the most remarkable regional seas in the world. It is almost cut off from the rest of the world's seas, is over 2200 m deep and receives the drainage from a 1.9 million km² basin covering about one third of the area of continental Europe²⁷. Its only connection to the world's oceans is through the Istanbul Strait, a 35 km natural channel, as little as 40 m deep in places²⁸. This channel has a two-layer flow, carrying about 300 km³ of seawater to the Black Sea from the Mediterranean along the bottom layer and returning a mixture of seawater and freshwater with twice this volume in the upper layer.

Every year, about 350 km³ of river water enters the Black Sea from land in over twenty countries: Albania, Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Germany, Hungary, Italy, Macedonia, Moldova, Montenegro, Poland, Romania, the Russian Federation, Serbia, Slovakia, Slovenia, Switzerland, Turkey and Ukraine. Europe's second, third, fourth and sixth largest rivers the Danube, Dnipro, Don (indirectly via the Sea of Azov) and Dniester all flow to the Black Sea.

The pollution assessment of the Black Sea has been compiled in accordance with the requirements of the Black Sea Strategic Action Plan, signed by the ministers of the environment of Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine on 31 October 1996²⁹. It contains information on the sources levels and effects of pollution in the Black Sea, as well as the preventative and remedial measures that are being taken in the region. Its main conclusions are the following:

The Black Sea ecosystem has been seriously damaged as a result of pollution. There is clear evidence to relate the decline of shelf seas ecosystems to eutrophication caused by increased loads of nitrogen and phosphorus. Much of these loads arise from major river, notably the Danube but also from smaller sources in all Black Sea countries. According to current estimates, some 70% of the dissolved nitrogen and phosphorus entering the Black Sea comes from the six coastal countries, either through discharge to the major rivers (notably the Danube) or from direct sources³⁰. The remaining 30% originate from the 11 non-coastal countries that belong to the Black Sea basin. There is sufficient information to apportion individual responsibility for contribution to these loads among these eleven countries. Furthermore, in addition to the dissolved nutrients entering the sea, estimates for nitrogen compounds suggest that an amount equivalent to some 50% of the dissolved may be entering the system from atmospheric sources of indeterminate

²⁶ **5th Place Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

²⁷ <https://www.icpdr.org/main/danube-basin/black-sea>

²⁸ <http://www.blacksea-commission.org/>

²⁹ <https://wedocs.unep.org/bitstream/handle/20.500.11822/8348/-Marine%20Litter,%20an%20analytical%20overview-20053634.pdf?sequence=3&isAllowed=y>

³⁰ https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm

origin³¹. The dissolved load is particularly significant however, as it directly impacts the shelf zone systems which are critical to the health of the overall Black Sea Ecosystem.

The vision for the Black Sea is to preserve its ecosystem as a valuable natural endowment of the region, whilst ensuring the protection of its marine and coastal living resources as a condition for sustainable development of the Black Sea coastal states, well-being, health and security of their population. The "Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea" adopted in Sofia, Bulgaria, 17 April 2009 mention that "reliable funding is essential for the implementation of BS SAP"³². Domestic finances, both public and private, shall remain the major source of environmental protection funding in the Black Sea countries.

There are strong reasons for continuing the international financial assistance for the protection of the Black Sea environment. International assistance still plays an important catalytic role in overall regional cooperation. The expansion of the EU in the region has had a major impact, resulting in new opportunities for better environmental management and accessing environmental finances"³³.

The following recommendations can help reduce waste and prevent the Black Sea from becoming a dump.

Integrate riverine and marine litter prevention as an objective into efforts to improve solid waste management systems. Currently, there is little linkage between waste management at municipal level and the problem of marine litter, despite the fact that unmanaged municipal waste is one of the key sources of marine plastic pollution.

Enhance collection services, including waste segregation at source, through support for the necessary institutional and legal framework. The major challenge for waste management consists in the low coverage of collection services. Support is required in order to create the necessary framework for a large-scale extension of primary waste collection services, including the introduction of waste segregation at source. One key pre-requisite is to establish a mutual or formal obligation for citizens to participate in improved collection services. As communities (smallest administrative entities of a municipality) are responsible for primary waste collection, they require support for the organisation and the identification of adequate operator models for service delivery. Aspects, such as sustained financing and service arrangements, have to be addressed at regency level.

Promote institutional and individual capacity development. Strengthening the institutional capacities of local authorities charged with solid waste management is one important step for improving waste collection services. On a decision-making level, local authorities should become able to integrate marine litter into strategic planning processes. Exchange of experiences between different regencies and municipalities as well as the preparation of guidelines can help in this regard. At the level of individual professionals, expertise about waste management and planning processes can be enhanced.

Raise awareness at the political level and among citizens. Marine litter is currently hardly recognised as a relevant problem by decision-makers and among citizens. Disposing of waste in an

³¹ https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm

³² <https://www.pan-europe.info/old/Archive/conferences/2005%20Annual%20Conference/4.%20Emma%20Gileva.pdf>

³³ <https://www.unep.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-programmes/black-sea>

unmanaged way is a commonly accepted daily practice. Public health and ecosystems would benefit from changing behaviour. Increasing access to environmentally sound waste collection and treatment needs to go hand in hand with public information. In light of the big gap in terms of waste collection coverage and efficiency, active citizen engagement for environmentally sound waste disposal at collection points or the use of waste banks would also contribute to preventing marine litter.

Improve service quality and frequency. Advisory services should stress the importance of improving collection services and provide options for enhancing operations and future investments to achieve such goals. They should consider an efficient use of available equipment. Furthermore, they should integrate capacity development of local waste collectors that could be tasked to enhance waste collection at community level in combination with regular monitoring and reporting assignments. The role and participation of the private sector in the waste collection process would need to be clarified.

Establish sustainable financing mechanisms for waste collection. One of the key obstacles for extending the waste management services are the current lack of funds for necessary investments and sustained operations. Waste management plans can demonstrate alternative scenarios for financial requirements depending on the service levels to be achieved. Such plans would also provide adequate measures to realise the required revenues or subsidies in order to achieve financial sustainability. There is, however, a complex balance between the improvement of services, the required financing and the actual capacity of the population to sustain such a system. In addition, rapid extensions need public and political support, both not easily acquired. The development of systems, which promote decentralised, community-based collection systems, is one possible approach. Additional funding for operational costs might come from the introduction and implementation of Extended Producer Responsibility mechanisms for packaging waste. Such mechanisms would require action at national level and a close dialogue with the private sector, including the consumer goods industry, the plastics industry and retailers.

Install waste traps or other means of removing plastics in strategic locations. Even if it is generally preferable to avoid plastics from entering the water system, the removal of floating debris through waste traps can prove feasible as a short-term measure and immediate alleviation of the massive pollution in waterways. The application is however limited to specific locations within the drainage and waterway system and cannot be the only solution to the marine litter problem. Waste traps have also a shredding effect on hard and soft plastics, further accelerating the fragmentation of plastics. However, suited locations can also serve to establish a monitoring system and to enhance knowledge about the local transmission factors of plastic leakage.

Regularly assess plastic waste leakage into waterways and the ocean and monitor marine litter. Several monitoring approaches can be applied to get a picture on the extent and sources of plastic pollution as well as its impacts on the marine environment. It requires cooperation between different public stakeholders, scientific institutions, civil society and the private sector. Applying the approach to estimate plastic leakage used in this study is also an option. It can help to demonstrate the dimension of the problem, identify key sources of marine pollution and show the effect of various planned or implemented measures.

Promote separate collection of plastic bottles. Awareness raising and the extension of waste collection go hand in hand. The separate collection of plastic bottles could serve as a tangible example for marine litter prevention. Waste collection operators could sign voluntary agreements

with commercial entities, hotels, restaurants, university entities and others to separate plastic bottles. After their separate collection, plastic bottles could be directly sold to existing recycling intermediaries in order to reduce costs for transport and access to the landfill. To increase awareness raising and sensibility for waste as a resource, municipalities and waste management operators can install permanent public communication units. Cooperation with Environment Centres, NGOs, private initiatives and also Imams can be envisaged for sensitisation towards waste and resource management rather than littering the environment. At national level, the creation of a deposit refund system for plastic bottles and other beverage packaging can be considered.

Further improve waste collection. While waste collection has been significantly improving, it is not yet ideal. In some areas, waste collection coverage and efficiency still need to increase drastically and wild dumpsites need to be closed to protect public health and prevent marine litter. In Annaba, this is for instance the case for Sidi Salem where an open dumpsite is located close to the beach. Waste management operators need to provide sufficient collection containers, especially for larger housings, and ensure their protection and maintenance. In order to achieve a sustainable collection system, they should strive for improving cost recovery, e.g. through payments from markets, shops, hotels, restaurants, universities etc. for waste collection services (initiating the polluter-pays principle). Realistic financial contributions from households would also be necessary. Extended producer responsibility mechanisms should also be used as an instrument for financing efficient and sustainable waste management.

Reducing plastic leakage into waterways and the ocean for protecting biodiversity and human livelihoods is a major challenge. However, suitable approaches to address this challenge exist, which would simultaneously bring needed improvements in municipal solid waste management services and support the transition towards a circular economy. Assessing plastic leakage into waterways and the ocean can represent a first step for municipalities and regions. It can serve as a basis for broader stakeholder dialogues and the identification of appropriate prevention measures. Further steps involve implementing these measures and monitoring their effects. Local action should also be accompanied by global exchange of experiences amongst committed municipalities and other stakeholders from public administration, the private sector, civil society and scientific institutions.

The complexity of the Black Sea and the development of the region present an enormous challenge to scientists, politicians and societies. There are gaps in knowledge and monitoring data bigger than the immediate objectives to be achieved by the BSERP. A basin-wide study of pesticides and POPs is a task for the future. Urgent efforts are needed by the Black Sea countries and the international community to enable the full implementation of comprehensive instruments like the Strategic Action Plan and other measures of policies and law enabling pollution to be controlled and abated.

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The crying voice of the waves

By Emanuela-Maria GRIGORESCU (Romania)³⁴

I am not a marine biologist. I am not a scientist. I do not even study sciences at all at my high school profile. I am just an eighteen-year-old girl who wishes the best for the planet we live on. I have no studies in ecology, but I have feelings for the trees, for the grass, for the bugs and the birds, for the sun and for the sea.

These are the reasons for which I have chosen to take part in this essay competition. I think the idea of youth shouting out powerful messages about pollution, about the fragility of marine ecosystems, about climate change and marine debris to the whole world is worthy of everyone's attention and respect.

Though my essay may not be scientific, as I do not intend to approach areas of interest that are beyond my knowledge, I hope that it will be at least a reaction to what happens in the world these days, and especially in the Black Sea.

I was born and I live in Romania, in the town of Câmpulung. If someone would decide to look for my hometown on a map, he would discover that it is situated in the center of the country, just south of the Carpathian Mountains, therefore not at all close to the Black Sea. But I do not remember a single summer without me going to the sea. I have seen its waves, I have felt its gentle, soft touch so many times. But for nothing in the world would I give up a week by the Black Sea.

What did I witness these almost two decades by the Sea?

To be sincere, at a first thought, the Sea is the same. Nothing looks like it has changed during the years, but I needed to dig deeper both in memories and in research to be able to discover that the changes of the Black Sea are not to be regarded with superficiality.

I began my humble research by googling: "Știri despre Marea Neagră", which means "News about the Black Sea". I was surprised to find out that most of the top results were not about pollution, not about debris, not about climate change, but about political and military actions. Nevertheless, these are some of the titles that I have found regarding my subjects of interest:

Dolphins in the Black Sea, decimated by pollution. Experts warn that their numbers have dramatically fallen³⁵;

The Black Sea, used for decades as a junkyard of the Eastern European countries, has become the most polluted in Europe³⁶;

³⁴ **6th Place Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

³⁵ Delfinii din Marea Neagră, decimați de poluare. Experții avertizează că numărul lor a scăzut dramatic - [Stirileprotv.ro](https://stirileprotv.ro/divers/delfinii-din-marea-neagra-decimati-de-poluare-expertii-avertizeaza-ca-numarul-lor-a-scazut-dramatic.html) (<https://stirileprotv.ro/divers/delfinii-din-marea-neagra-decimati-de-poluare-expertii-avertizeaza-ca-numarul-lor-a-scazut-dramatic.html>)

³⁶ BBC: Marea Neagră, tratată zeci de ani ca un coș de gunoi al țărilor din Est, a ajuns cea mai poluată din Europa (<https://www.digi24.ro/>)

*The Black Sea region is drastically affected by plastic and microplastic pollution*³⁷.

One may be deceived after reading these articles, but I have decided that, after understanding the causes of the pollution, it is even more important to know how we can help prevent it, how we can help tackle marine litter and enjoy a cleaner, healthier Black Sea.

Firstly, I wanted to know what is, in fact, marine litter.

I found this definition: *Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment.*³⁸

I interpreted it this way: **Marine litter consists in any kind of man-made object that does not naturally belong to the sea but is there because of human negligence.** Though I must admit that “dumping trash into the sea” would be a more direct way to explain it.

Why does humankind need to rely on such destructive practices? Not only that we should not discard waste instead of recycling it, but is it necessary destroying such a unique ecosystem as that of the Black Sea?

A few years ago, I saw a documentary that completely changed my perspective of the sea. While a soothing wave movement was played in the background, the narrator said:

‘Take a deep breath... And another one... One more... If it weren’t for the ocean, you couldn’t have done this. For one of three breaths, we must thank the ocean.’

Since that moment, I admire the sea, I feel part of it, and, alongside the whole planet, I long for it to be protected and respected as it deserves. It sustains our life, and we dispose trash in it? We pollute it in such a destructive way that even its amazing power of restoration cannot cope anymore?

*Every hour, each of the rivers flowing into the Black Sea brings between 6 and 50 pieces of litter into the sea. On average, some 85% of the litter found in the Black Sea is plastic.*³⁹

So, the general statement - *Plastic pollution is one of the greatest threats to ocean health worldwide*⁴⁰- is also applicable in the case of the Black Sea.

One might think: ‘I do not live on the coast of the Black Sea. How can plastic pollution affect me? And why do I have to react if I am not directly involved?’

(<https://www.digi24.ro/stiri/externe/ue/bbc-marea-neagra-tratata-zeci-de-ani-ca-un-cos-de-gunoi-al-tarilor-din-est-a-ajuns-cea-mai-poluata-din-europa-1223624>)

³⁷ Ministrul Mediului: Regiunea Mării Negre este afectată în special de poluarea cauzată de plastic și microplastic (<https://www.economica.net/>)
(https://www.economica.net/ministrul-mediului-regiunea-marii-negre-este-afectata-in-special-de-poluarea-cauzata-de-plastic-si-microplastic_192422.html)

³⁸ Marine litter | UNEP - UN Environment Programme (<https://www.unep.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/marine-litter>)

³⁹ The Black Sea is contaminated with plastic – but how can we reduce the damage? | EU Neighbours <https://www.euneighbours.eu/en/east/eu-in-action/stories/black-sea-contaminated-plastic-how-can-we-reduce-damage>

⁴⁰ 7 Ways To Reduce Ocean Plastic Pollution Today | Oceanic Society <https://www.oceanicsociety.org/resources/7-ways-to-reduce-ocean-plastic-pollution-today/>

The answer is simple. There is no such thing as “not involved”. We are all affected by the pollution of the Black Sea. The consequences fall on all of us, and this is why:

Litter that settles on the surface of the water is washed far away from the coastline by tides and forms large islands of waste in the heart of the sea. This litter tends to decompose into small particles and is often ingested by marine life; it then makes its way into our bodies through food and leads to various adverse health effects.⁴¹

It may sound discouraging, but there are solutions, if only we are eager to accept that our own comfort and well-being comes hand-in-hand with the well-being of the Sea.

Before thinking of ways to remove marine litter, there is something more we can do and that is even more efficient: PREVENT.

Prevention is a term widely used not only in marine ecology, but in any field of study: from medicine to waste management.

How can I, as a young person living in a country by the Black Sea, help prevent such a major problem as pollution?

I can think twice before buying something: Do I really need it or not? Is there a better option for the environment?

I can reduce or even cut out the single-use plastics from my daily activities. I can recycle if not every kind of material that I use, at least the plastic.

Now, let us suppose that it is too late for prevention, as it is in some respects for the Black Sea. If we prevent pollution now, the effects will be visible in the years to come. But what about the already existing pollution, the one that our fore comers did not prevent? Is there anything I can do to tackle the already existing marine litter?

We should all be aware that the so-called “garbage islands” in the middle of the Sea are major threats to the marine ecosystem. But their removal is not in our hands, as enormous amounts of money need to be invested. For the responsible authorities, this is not only the “right thing to do”, but a duty.

It is not just the ecosystems that are affected, but also many communities that rely on the Black Sea. Fishermen and their families make their living from the resources of the Sea. If there is less fish, less marine wildlife, what is their future? It is true that nets, hooks, and other fishing objects are part of the marine litter. That only means that ecological education, alongside proper spaces to deposit the fishing tools should be offered to fishermen communities by the authorities. As in many cases, proper education and affordable resources are the key for success.

Also, seen from the bigger picture, what about the tourism economy? Who will come and visit a seashore full of plastic bottles, who will take a boat ride through floating single-use plates and cups?

Still, what can I do?

⁴¹ See note 5.

The answer may be simpler than expected.

I can take part in public or youth initiatives to collect marine litter or, if I do not live near the seacoast, I can help collect the garbage from a river. Everyone of us can do that. It is not hard; we just have to accept that every hand comes in help.

Many of the rivers, in Romania for sure, but probably also in the other neighboring countries, end up in the Black Sea. For example, the river that goes through my town, Râul Târgului, flows into Râul Doamnei, which flows into Argeş, then into The Danube and, eventually, into the Black Sea. This means that if a plastic bottle is thrown into Râul Târgului in Câmpulung, it may easily end up in the Black Sea. That is why it is so important to find the source of the pollution and then try and clean that source. We can all do that. I have done it many times, by taking part into projects which target the removal of the trash in or near a local river. Me and my classmates have participated in such initiatives since secondary school and continue to do it in high school. Our hope is that if people see us, they will understand the message and try imitating our example for a cleaner river, a cleaner sea, a cleaner planet.

Therefore, it is not the bad intentions of people that stand in the way of a cleaner Black Sea, but the lack of knowledge about these important problems. Everyone should understand that we are all affected by the pollution of the Black Sea and that we should all care about it. Marine litter is an important problem, but as anything else, it can be treated if we act in time and with the right spirit.

With this essay I am trying to make people aware of what I discovered by researching the issue of marine pollution. I have started by knowing probably not more than an average person, but by digging deeper I found out things I never had any idea about. Now I can start reacting by taking the right choices regarding my ecological behavior.

My mission has now turned into spreading the word about everything I discovered, so that more and more people start caring about our beautiful, unique, extraordinary Black Sea.

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Saving our Sea: New ways to reduce Marine Pollution in the Black Sea

By *Ana-Maria ZARNOIANU (Romania)*⁴²

‘The sea is eternal movement and love, eternal life’ - Jules Verne

I simply adore the Black Sea, this unique perfect beauty. I adore it for its endless beauty, as it is flawless in all weathers: rain, hurricane, wind, sunshine or overcast sky.... I adore its hugeness, the way it perfectly blends with the sky, its infinite shade of blue. I am always amazed to see the sun bathing in its waves.

The sea encompasses a wide array of feelings and senses ranging from the salty taste, the sand castles, the splash of the surfboard, to joy, youth, memories, eternity, wisdom, grace and...love.

Essentially, it is life and death together, as it engenders life, whole worlds, as well as meaningfulness, while at the same time being capable of destruction, as a true master of the earth, crowned by mermaids, seagulls and sailors, Queen of the Universe. Long before we were born by the will of God, the transparent, unpredictable, alluring sea was already there.

Walking along the shore feels sublime, I like to wear the foamy wave on my feet, to listen to the peace and quiet of the evening, to solve celestial equations, raising the sea to the power of infinite blue.

And since I love it so dearly, I wish I weren't able to see the delicate seahorses hiding behind the red algae, the dolphins playing in the petrol film at the surface of the sea, fluorescent fish swallowing plastic particles they mistake for food, I wish we stopped wasting millennia.

The sea is our ultimate goal, but the closer we get to it, the more we destroy it and are dragged even farther from touching it than before.

Water and Earth are two blending elements, they can't live apart from one another, this is why we can feel all the suffering sea animals go through, although we, people voluntarily inflict it on them, as we torture and, in the end, kill them.

Our planet is a planet of water, since it covers 3 quarters of the Earth's surface. Water is a unique resource, absolutely indispensable to life, which makes it stand out among other natural resources. It is key to creating our physical and chemical environment. Without water, there is no life. Thus, people all around the world attach great importance to the reduction of water waste and its pollution.⁴³

This is why I strongly believe that the two ways in which we can reduce pollution of the sea water,

⁴² **7th Place Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

⁴³ Handbook on River and Black Sea Pollution

thus saving its sea life are LOVE and CAUTION. Only when you love, do you add what is missing and remove what is harmful, doing your best to help and prevent disasters from happening. We do care about our peers, we take care of each other, but what about the world around us, what about the sea? I nourish the belief that the sea can be saved by combining love and respect, by trying to keep it clean for the generations to come.

Who ultimately suffers the consequences of the changes that the marine environment has undergone is precisely the marine flora and fauna. Shrinking habitats inevitably lead to their extinction. But there is still worse: we have been killing innumerable fish species by excessive fishing, performed in order to get something that can be obtained in a dozen other harmless ways. If we truly want to stop walking down this dangerous road, our attitude towards the environment and our peers needs to undergo a dramatic change.

If only I could protect the Sea from the garbage we throw everywhere around us. This clean, crystal clear water is full of plastic, pieces of wood, paper, oil and so many other pollutants, as the waves carry them away from where they have been 'unintentionally left'. A lot of sea animals, such as the whales, seals, turtles, fish are hurt or even killed when they are caught in the middle of the floating heaps of rubbish.

Also, we need to save the Black Sea from uncontrolled fishing, at all costs. WE may have one chance today, but none tomorrow!

Our seas have turned into real landfill sites, our garbage is slowly but surely suffocating all sea life. Harmful industrial and agricultural waste is dumped into the sea, killing all forms of life. Our own life and safety are threatened by the rubbish contaminating our food and water and by medical waste being brought to the shore.⁴⁴

To prevent this garbage from poisoning our seas, we can collect and destroy it. I think that by introducing more dustbins and by putting up posters warning about the dangers of littering, we could contribute to the reduction of sea water pollution levels. If people keep on throwing garbage even after that, the best way to deal with this problem is to apply fines.

More and more plastic waste is floating on the sea water, among ships and boats. This waste could be recycled and turned into new items. We, the people living on this planet should become aware of this problem and should join our efforts in order to 'fish' out all the garbage, according to some well-established protocols between coastal states and last, but not least, volunteering should be encouraged. Marine waste has acquired a cross-border dimension: once it gets into the water, it no longer belongs to one owner. Thus, dealing with this situation becomes difficult and mostly dependent on regional and international collaboration.

All countries must introduce laws regarding the way waste is disposed of. Since 80% of marine waste is produced on land, proper treatment and better implementation of laws could significantly contribute to higher sea water quality. At the same time, alterations should be made to laws concerning wrapping practices, considering the high amounts of plastic they use. 'These plastic items break up into small particles which are swallowed by sea animals. We are talking about zooplankton which is then ingested by the fish which ends up on our plates and we unknowingly consume these toxic products.' (Tania Zaharia, researcher, Constanta)

⁴⁴ Combating marine litter - European Commission

The starting point in combating marine waste is the same as the first step taken in dealing with waste in general and that is prevention. How can we do away with waste? Do we really always need plastic bags when we go shopping? Can some of our products as well as our production methods be conceived in such a way as to completely eliminate the use or the creation of plastic? Of course, they can.⁴⁵ Education both in schools and outside it, aimed at certain target groups (fishermen, tourists) is the key to prevention.

The next step is taking the necessary measures before garbage even reaches our sea, by better waste management, the reduction of the amount of waste produced, as well as by encouraging recycling (especially when it comes to plastic waste), better treatment of residual water and a more effective use of resources; naturally, all of these steps entail extra government funding for specific projects.

Being all closely connected to the sea and nature in general, we, people, desire to live in an environment in which we all take responsibility for the protection and preservation of something we have not created ourselves, but were blessed with through God's infinite generosity.

It goes against nature for us to break this balance, to destroy, to stuff with pollutants something that takes care of us, and the Sea takes care of our dreams, our holidays, economy, us. It is this sea that has engendered some of the most memorable moments of our childhood or life. In its absence, our memories would lack colour and clarity.

By harming our seas, we could harm ourselves and we must stop destroying this Divine Creation. So long as we can still dive into the Black Sea, we only need to try to save it.

From me to you, I want to be able to breathe in the salty scent of the sea breeze.

All I am asking for is a chance for ourselves, a chance for Water, a chance for the Sea!

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Saving Our Sea

By *Melisa-Naomi BALINT (Romania)*⁴⁶



Black Sea Environmental Issues

Geographically, the **Black Sea** is very isolated from the oceans and almost a third of Continental Europe belongs to its catchment area. Therefore, coastal water pollution and the quality and quantity of drained rivers are the main factors determining its overall ecological status.

The Black Sea is very sensitive to anthropogenic impacts due to its large water drainage basin and its limited connectivity with the planet's ocean. The pollution of the Black Sea and the overuse of its resources over the last 50 years has resulted in a drastic deterioration of water quality and the ecosystem.

The adverse effects on the environment are mainly caused by two factors, as follows:

1. The state of the upper level of the Black Sea;
2. Pollution of the sea by industrial facilities located on the seafont and pollutants floating downstream.

The water layers in the sea differ in their salinity. In particular, the upper layer, at a depth of 100-150 m, is less salty (its salinity is 1.8%, while the salinity of the planetary ocean is 3%) and, respectively, is lighter in weight than the lower layer, which it extends from about 150m to 2,200m in depth. The layers do not mix with each other. That is why there is a weak vertical circulation of water in the Black Sea and the layers are barely mixed. According to scientists, for hundreds of

⁴⁶ **8th Place Winner** of the Regional Essay Competition for the Youth "Saving our Sea: new ways to reduce marine pollution in the Black Sea" within the framework of the Project "Pilot innovative solutions for fighting marine litter in the Black Sea", co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

years, it is necessary to change the water cycle in the Black Sea: the bottom water must be replaced by a new water from the Mediterranean Sea. According to estimates, the complete vertical circulation takes 130-140 years. The vertical circulation is kept more by the upper layers of water, which is why at a thickness of 50 m of the layer, water is rich in oxygen. The amount of oxygen below 50 m is reduced and at a depth of 200 m it is almost insignificant. This is the depth at which hydrogen sulfate is formed as a result of the vital functions of the body. Its quantity increases with depth: at a depth of 150 m - 0.47 cm³ / l, and at a depth of 200 - 5.8 cm³ / l. Thus, in the Black Sea there is life only in a relatively thin layer on the surface, while at a greater depth, it is a layer containing hydrogen sulfate, where living organisms cannot survive. These two layers also include the Bosphorus, the narrow strait that connects the Black Sea to the Mediterranean Sea. About 300 cubic km of salt water from the Mediterranean Sea enters the Black Sea each year through the lower flow of the strait, while 600 cubic km of less salt water flows from the Black Sea through the upper flow into the Marble Sea and then into the Mediterranean Sea.

There are many cities and thousands of industrial enterprises in the Black Sea basin. Biological or chemical waste from this region flows first into the river and then into the Black Sea. Rivers that cross 20 European countries flow into the Black Sea. Chemical compounds used in agriculture, fertilizers, plant growth regulators, oil (as a result of transportation and processing) and other substances enter the Black Sea through rivers. The transfer of large amounts of nutrients through rivers (eutrophication) has led to the great flowering of phytoplankton, which in turn has prevented the penetration of sunlight into aquatic plants. The introduction of large amounts of nutrients (eutrophies) caused by rivers caused phytoplankton, which in turn inhibited sunlight in algae. Eutrophication has caused severe degradation of what was previously considered a rich ecosystem; the organisms on the seabed were destroyed; and the composition of marine flora and fauna species has changed. The commercial value of marine species has also declined. For example, where 26 commercial species were recorded in 1960, today only four species have commercial value. In addition to eutrophication, reasons for sea degradation include chemical pollution (including oil spills), overexploitation of marine fauna and invasive alien species.

Marine and municipal waste is another problem for coastal waters. Uncontrolled dumping of municipal waste in riverbeds or adjacent coastal areas causes pollution of the beach and coastal waters. In turn, it causes risks to the environment, to high life.

Currently, the Black Sea faces four categories of problems:

- Increasing eutrophication / nutrient content
- Negative changes in marine life
- Chemical pollution
- Biodiversity / habitat change, including the introduction of non-native species. residuals are still relevant in the coastal area.

Pollution (both solid and liquid waste) of the oxide layer in the Black Sea. This is considered the first and most important environmental issue for the Black Sea region.

Black Sea pollution falls into the following categories:

- a) Pollution caused by various chemicals (nutrients, crude oil and petroleum products, persistent synthetic pollutants;
- b) Radioactive pollution;
- c) Pollution with solids;
- d) Biological pollution, which means the introduction of non-native marine organisms (non-native

or invasive).

How do oil and petroleum products get into the sea?

These harmful substances reach the sea through: land waste (industrial or domestic wastewater that is either not treated at all or is not properly treated); bringing by rivers and streams; pollution that reaches the sea brought by rainwater, deep water from agricultural land or land used in animal husbandry, vessels or offshore platforms; air pollution (smoke, dust or gases from any part of the Earth).

Plastic waste from the sea degrades very slowly. They can stay in the sea or on the beach for decades. Plastics threaten marine life in the following ways: they cause the death of some vertebrates (fish) and some invertebrates (arthropods) in the sea, because they remain trapped among the waste. If swallowed by marine vertebrates, it causes digestive problems and starvation. The seabed is affected by the materials that settle on it.



Some disease-causing bacteria find a suitable habitat with increasing amounts of nutrients and can live in water longer. These bacteria can cause the spread of disease among humans or dolphins swimming in contaminated water.

How can you help tackle marine litter in the Black Sea region?

I believe that the way I can stop the fight against marine litter is to explain to them the causes that can be exacerbated by the lack of interest that most people have in the environment. Also, another thing that I think would help a lot is to give fines or even some punishments to be decided at the moment depending on how badly it was polluted and also what was thrown away, however these ideas proposed by me would they must be taught in schools or for school principals or organizations dealing with such things to be interested in informing teachers and students in every school. All people should understand that pollution of water, seas or oceans is an excessive increase in global warming, which brings the presence of disasters, climate change to the extinction of plant species, birds, insects, animals and fish.

The pollution of the Black Sea and the overuse of its resources over the last 50 years has resulted in a drastic deterioration of water quality and the ecosystem. The adverse effects on the environment are mainly caused by two factors, as follows:

1. The state of the upper level of the Black Sea;
2. Pollution of the sea by industrial facilities located on the seafront and pollutants floating downstream.

These being the majority of the causes that marine litter creates and which in my opinion should

be brought to light and reported and a way can be found to be remedied.

Here are some ways we can dispose of selective waste in an environmentally friendly way, but also in marine litter:

- 1) I use environmentally friendly biodegradable detergents and cleaning products.
- 2) I hand over the household waste to the recycling / sanitation companies for recycling.
- 3) Toxic products must not be discharged into the sewer system.
- 4) I selectively dispose of waste and contact the sanitation company to dispose of significant amounts of construction waste / other landscaping work.
- 5) I keep clean in all public places.

Why is marine litter prevention important?

Our planet is a planet of water, $\frac{3}{4}$ the Earth's surface is covered with water. Water is a unique and indispensable natural resource that distinguishes it from other natural resources. Water is the key factor in creating the physical and chemical environment, the formation of climate and weather. If there is no water, there is no life. Fresh water available to living organisms is a very small part (only 0.014%) of the planet's water resources. Thus, throughout the world, special importance is given to the rational use of water and its protection from pollution. Water is an indispensable resource in agricultural and industrial production. From my point of view, I think that environmental education classes would be necessary from schools, with the help of some guides as represented below:

Eco-tourist guide:

In order to have an eco-responsible behavior, we must change our mentalities and habits at individual and group level.

Beach holiday instructions:

- 1) I keep the beach clean and use the specially arranged places for garbage storage
- 2) I take care not to throw / spill anything in the sea water, in lakes or any watercourse
- 3) I have a civilized behavior at the beach and I respect the installed signs
- 4) I consider water as a blue gold
- 5) Swimming only in the indicated places
- 6) I protect marine species
- 7) I only use boats that do not pollute / with low fuel consumption.

Eco-citizen's guide: "For a healthy environment"

Eco-instructions for the home:

- 1) Reduce consumption and avoid water waste
- 2) Reduce consumption and avoid energy waste
- 3) I selectively reduce and dispose of the amount of waste respecting the environment

Environmental problems caused by water pollution Unwanted health consequences are caused by both direct contact with seawater (swimming, washing, fishing, etc.) and the transfer of toxins to the long food chain (water-plankton-fish-human being or water-soil-plant-animal-human being).

Romania ratified the Bucharest Convention by Law no. 98 of 16 September 1992, which entered into force on 15 January 1994. The Convention is accompanied by the Protocol on the protection of the marine environment of the Black Sea against pollution from land-based sources, the Protocol on cooperation in combating pollution by oil and other harmful substances of the Black

Sea marine environment against landfill pollution, Protocol on the Conservation of Biodiversity and the Natural Environment of the Black Sea to the Convention on the Protection of the Black Sea against Pollution, Protocol on Dumping of Pollution.

The new Plan focuses on four major issues, namely eutrophication, changes in marine biocenosis populations, chemical pollution, including that caused by petroleum products, changes in marine populations and habitats.

The Danube River is the collector and emissary to the Black Sea of all discharges / pollutant emissions from riparian countries, affecting the quality of the waters of the Danube and its Delta, but also the coastal area of the Black Sea. Thus, the state of Romanian coastal and marine water quality is mainly determined by the Danube River, which transports significant quantities of pollutants from the entire Danube basin, significant local pollution sources located on the Romanian Black Sea coast and sources located on the Ukrainian coast. Black Sea (consequence of the predominant NS direction of sea currents).

In conclusion, everything starts from education. Without education and guidance in this regard, without well-defined laws and sanctions, things will not change much. The power lies in us as responsible citizens!

“The sea, the unifying greatness, is man's only hope. Today, more than ever, an old expression has a literal meaning: we are all in the same boat.” **Jacques Yves Cousteau**

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The old Black Sea and the young girl

By Laura ZARA (Moldova)⁴⁷

The rays of the sunset, which entered the car, heralded the end of a hot July day. My fingers were twitching uncontrollably, squeezing the soft material of the back seat with all my might, and then relaxing. My eyes were searching restlessly for the horizon, behind the trees and buildings. The fatigue of the 6-hour drive on some not-so-good roads had quickly turned into an enthusiasm I had never seen before. “Hey kids, look! our mother had told us in a tone of exaltation, from here you can see the SEA! Make a wish!”

I wanted to close my eyes and make a wish, but I hesitated, I was afraid that if I clip, the sea will disappear. I had in my eyes that sparkle of a child who sees the sea for the first time. I could not feel the numbness of my legs, I was no longer hungry, I had suddenly forgotten that I could not even swim. I wanted to jump into the waves that seemed so welcoming, to catch the playful sunbeams on the water, to feel the sand on my skin just like I had seen in the movies... *Smell the sea and feel the sky.*⁴⁸

Since I was a child, I was a realistic person and I was looking for logical connections in almost all situations. To my questions about the names of the seas, my older brother always had answers:

“- Why is the Red Sea called Red?

-Because it is red.

Why is the White Sea called White?

Because it is white.

-But the Black Sea, why is it called the Black Sea?

-Because it is black.”

So for me, it all made sense... until then.

The stretch of water was really big, so big that my eyes, although I was always told they were big, couldn't cover everything. But the sea was not black, on the contrary, an impeccable blue, a royal blue. I was still admiring the sparkle of the water only from the car window. I come back to reality when the car turns right and the view disappears, hidden behind some trees. And so I started believing that the sea can cure all bad moods, the waves can wipe away all the worries, seashells bring good luck, the toes in the sand ground my soul.

I wish it lasted forever. But the beauty of the first impression of the *Wine-Dark Sea*⁴⁹ did not last long.

Although I didn't know exactly what the seaside and the sea should look like, I knew for sure that something was wrong. Normally, because I didn't know how to swim, I preferred to swim on the shore, where the water did not pass above the level of my head, and I was quite tall at the age of

⁴⁷ **9th Place Winner** of the Regional Essay Competition for the Youth “Saving our Sea: new ways to reduce marine pollution in the Black Sea” within the framework of the Project “Pilot innovative solutions for fighting marine litter in the Black Sea”, co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

⁴⁸ Quoted Van Morrison

⁴⁹ A historical novel by H.N. Turteltaub

10.

Many of the objects I was treading, which I thought were one-color stones or rare shells, turned out to be pieces of sand-polished glass and sand, or pieces of plastic well camouflaged under the sand. Initially, I gathered them happily, thinking that I was creating a unique collection of souvenirs, until I inspected them more carefully and was left with a deep disappointment.

At other times, the plastic bags floating on the water, even at greater distances than I could travel, which my father and brother told me about swimming far with life jackets, proved to be a real impediment.

My first experience with the Black Sea was not exactly as I would have imagined. As the day went on, I saw more and more garbage and that disgusted me deeply. I started judging the people who lived in the area because, I thought, they were responsible for the sea pollution. It seemed so unfair to me.

These people had the sea but did not bother to take care of it, while others, like me, come from places where people would be happy at least with a lake ... That's how I felt then, that's how I thought as a child, because being from the Republic of Moldova, I did not have access to the sea.

I was wrong.

Dear version of me, the 10-year-old one, who saw the sea for the first time. I am writing to you. I am still you, but for over a time, for over 7 years. I grew up and I want to answer those questions that were grinding you deeply. Be prepared, I hope you really understand how things are with the Black Sea pollution, but don't worry, I'll explain in simple words, so I can be sure you understand.

The first signs of ecosystem damage appeared in the 1960s. In the following years, the ecological situation in the region has worsened. *Pollution of water resources is caused by sewage discharges and untreated water discharges municipal and industrial waste as well as mismanagement and dirt. Rivers flowing through cities and other geographical settlements are a major source of chemical pollution and waste for the seas and oceans.*

Rivers are highways for our plastic garbage. The best example I can give is the river in my country, the Nistru River, which flows into the Black Sea.

The Nistru River connects between the Republic of Moldova and the Black Sea, thus influencing, to a greater extent or lower, on the quality of the Black Sea environment. For this reason, the Republic of Moldova submits more and more effort through various projects and programs, to solve the problems related to protection and conservation of the Black Sea.

The Republic of Moldova participates in the program cooperation in the Black Sea basin in the context European Neighborhood and Partnership Policy, which aims to achieve a partnership stronger regional development to promote economic and social - sustainable development of regions of the Black Sea basin.

Then we could assume that the situation is under control in my country, and if all 17 countries whose waters flow into the Black Sea would follow the same idea, the problem would be solved, right? Well, the problem is a little more ingrained, it's about the attitude of each of us, it's about

the community, each member of society, because, like dominoes, every action has huge consequences.

Before a piece of plastic reaches the open water, before it sinks to the bottom the ocean is probably stored somewhere on our shores. *Every year, up to 8 million tons of plastic end up in the ocean. This is equivalent to throwing the contents of a truck garbage in the ocean every minute, according to the United Nations Environment Program.*

Each of us should be informed and aware of the solutions that could minimize the problem as much as possible. Although there are some major solutions, at the level of administrative organization of a state, such as: *the development of an efficient collaboration between the Republic of Moldova, Ukraine and Romania for monitor water flow, improve weather / flood forecasting and ensure early warning for all lowland countries; updating river basin management schemes so as to take into account consider the effects of climate change (declining water resources, increasing demand for water); creation of new structures for water management (eg new dams; dams; lakes accumulation etc.); training / educating water users on reducing water requirements; use of re-circulated water for certain activities; promoting the efficient use of water; reduction of pollution sources, etc., assessment of the water requirements of the main crops, in the context of changes climate (intersectoral studies with the agricultural sector)...*

There are also small actions that we can take, actions that, disrespected, have brought us here where we are today: Purchasing reusable products and avoiding excess packaging can reduce the amount of waste and protect rivers from pollution; designing and implementing solutions for water collection and use fluvial; training / educating water users on reducing water requirements; use of re-circulated water for certain activities; promoting the efficient use of water; reduction of pollution sources, etc.

On this note, dear little Laura, as you can see there are many things you need to learn, many things you do not yet fully understand, it is important to try to help, to encourage, to care, to be involved. Although you are just a person and it is very difficult to be aware of the impact you can have, it is important to at least try. Even if the main causes of Black Sea pollution are land waste, air pollutants, waste intentionally or accidentally discharged from ships and pollutants brought into the sea by rivers... And all seem beyond your power, does not necessarily mean that it is.

Have confidence in the day when you will be able to tell again and again to another generation your first interaction with the Black Sea and how much the situation has changed, how brilliant the old Black Sea is now.

With all my love, Laura from today, who is now felling a little low so decided to take a backpack, phone, a bottle of water and feel on her own skin once again the sea breeze, to throw myself in the waves in mid-September, cause the cure for anything is salt water, sweat, tears or the sea.⁵⁰ By the way, I still believe that the sea can cure all bad moods, the waves can wipe away all the worries, seashells bring good luck, the toes in the sand ground my soul.

Please don't be indifferent, every little action counts, remember this and don't forget to tell everyone this.

Finally, remember, when you are hopeless you look at the sky, but *the sea is just a wetter version*

⁵⁰ Quoted Isak Dinesen

*of the sky.*⁵¹

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⁵¹ Quoted unknown author

We care... even if “it’s not that bad”!

By Maria BURLACU (Romania)⁵²

"It's not that bad", they have kept repeating this phrase over the years. But how bad does a situation have to get before we actually do something about it?

The Black Sea... It is the expanse of water in the geomorphological basin called the Pontic, one of the basins of the Tethysian tectonic complex. It is located between Europe and Asia, having as riparian states Russia, Ukraine, Romania, Bulgaria, Turkey and Georgia, so it is of great economic and geostrategic importance. Unfortunately, it is also endangered due to the river intake loaded with nutrients containing nitrogen and phosphorus, contaminated with industrial and mining waste. But what do these all mean? Like it's been said in the past... **"It's not that bad"**.

The family of the sturgeon. Under threat of extinction.

The Beluga. Under threat of extinction.

The Herring. Under threat of extinction.

The Dolphin. Under threat of extinction.

The Monk Seal. Extinct.

And these are just a few of the numerous species whose habitats have been destroyed due to pollution.

"It's not that bad."

All the countries surrounding the Black Sea that depend on it from multiple points of view are affected by the pollution with heavy metals⁵³, which can generate serious health damage to the human body⁵⁴, by the pollution with organochlorine pesticides from agriculture⁵⁵, by the pollution with petroleum products and domestic water. All these types of pollution contribute to the eutrophication of the aquatic system and its irreversible transformation. **Is it bad enough now?**

Marine litter was not an imminent danger at the beginning, because there were not large enough quantities to affect the sea so severely, but over the years, the excessive and increasing discharge resulted in the destruction of habitats, the ecosystem and pollution of the water. These have led to the disappearance of several species of fish, plants and other living creatures due to the “dead”

⁵² **10th Place Winner** of the Regional Essay Competition for the Youth “Saving our Sea: new ways to reduce marine pollution in the Black Sea” within the framework of the Project “Pilot innovative solutions for fighting marine litter in the Black Sea”, co-funded by the European Commission under Grant Contract ENI/2020/421-957, coordinated by the BSEC PERMIS.

⁵³ S.M. Konovalov, Anthropogenic impact and ecosystems of the Black Sea, Bull. de l'Institut Oceanographique, Monaco, no. Special 15, 1995, pp. 53-83.

⁵⁴ E. Vespremeanu, Bianca Simion, Oceanografie medicală. Editura Universității din București, 2002, p. 133.

⁵⁵ L.D. Mee, Cum să salvăm Marea Neagră. Un ghid al Planului Strategic de Acțiune pentru Marea Neagră, Constanța, 2000.

water layer on the seabed, a layer formed exclusively because of pollution⁵⁶ and due to the lack of vertical marine currents.

The Black Sea risks becoming a dead sea in the real sense, because this dead water, through a certain mechanism, "ingests" oxygenated water from the surface, where fish and invertebrates live, and the fact that it is a closed basin makes the situation worse, as there is no possibility for natural cleaning of the water.

Reports show that the marine medium would need multiple decades in order for the natural balance to be restored to the way it was 50 years ago, but only if pollution was stopped and the resources of the Black Sea were not to be exploited.

Another report of the European Council shows that the thousands of tons of heavy metals, radioactive debris from Chernobyl, the Bistroe canal and excessive fishing have caused an ecological disaster. This report also shows that 21 out of the 26 species of fish with commercial value known in the Black Sea have gone extinct in the last decades⁵⁷.

It's important to combat pollution and overexploitation in order to save the species that still have a chance at survival, to save the ecosystem and to reestablish the natural balance of the Black Sea.

But I personally believe that we could also save the species that are already on the way to extinction, and with a bit of optimism, bring back the ones that have disappeared from our sea.

This year I had the privilege of going with my family on vacation in Tenerife, where we visited "The Animal Embassy", Loro Parque. At Loro Parque, a large number of animals are rescued. The Orcas are taken from Sea World, an aquarium known for abusing its animals, and one of the whales was saved after she was abandoned and hurt at just 2 years, near another zoo in the Netherlands. But what truly amazed me was the campaign ran by Loro Parque that saves endangered species and even extinct ones from some areas. They went to Bolivia, where only 4 individuals of a certain species of parrots were left. They took them, set up a special habitat for them, and a year later they released 14 parrots of that same species. In addition to that, they recreate habitats even for different kinds of corals and shellfish for breeding, conservation and then rehabilitation.

Yes, this is how I believe the Black Sea could be saved, through rehabilitation of the species, through marine reservations and through the decrease of pollution under the impact of a strict coastal legislation. I think that if we had enough resources to rehabilitate the species that have gone extinct from our sea, we would have a chance of bringing back the lost balance of the Black Sea. But this should be done after the prolonged reduction of the current pollution of the sea and by founding marine reservations to rebuild the initial ecosystems.

The Danube deposits by itself sixty thousand tons of phosphorus and three hundred and forty tons of inorganic nitrogen annually, and the addition of polluting factors (excessive fishing, erratic urbanization, en masse tourism and waste overflowed in the water) have led to the situation in which the Black Sea finds itself in today.

In the last few years, for many people the pandemic was a disaster. Our socialization, travelling,

⁵⁶ Studii ale Institutul Național de Cercetare-Dezvoltare Marină Grigore Antipa.

⁵⁷ M. Băcescu, M.T. Gomoiu, N. Bodeanu, A. Petran, G. Muller, V. Manea, 1965, Studii asupra vieții marine în zona litorală nisipoasă la nord de Constanța. Ecologie marină, vol. I, Editura Academiei Române, București, pp. 7-138.

vacations and trips have been limited. Even though for us it seemed that the world was stuck in place, nature followed its course and it had a lot to gain. In China, the reports show that pollution was reduced by even thirty percent in some parts of the country. The sun was finally visible in the sky and the air was clean. In Venice, next to the Cagliari harbor, there have even been sightings of dolphins and swans swimming in areas in which they hadn't been seen for a long time. These facts prove that there truly is a possibility for change, quite a fast one actually, but only if everybody contributes and decreases pollution.

A first solution would be the effective reduction of excessive pollution, mass tourism which causes discharge of oil and petroleum, the establishment of rules when it comes to fishing and designation of the endangered species as protected by law, and punishment for discharging wastes in the Black Sea, as well as a total cessation of it.

Keeping these rules for a longer period of time would surely help to clean the waters and ensure a clean ecosystem, fit for the beings in the Black Sea.

This action could determine the rehabilitation of the species that have gone extinct as a result of pollution, such as the monk seal, mentioned above, of which one hundred and forty individuals can be found in Greece and Turkey. Different associations would most likely want to participate in this action, since it gives them a chance of studying these species up close and even the opportunity of saving an entire ecosystem.

There could also be campaigns in schools, high schools and universities for bringing together volunteers that can mass-collect wastes and even gaining funds to ensure a financial stability for these associations and for scientists that could support these activities. I have never participated in a campaign for the Black Sea before, other than creating a poster, but undoubtedly, if I were to be presented with the occasion, I, as much as many other people I know, would definitely join such a campaign, because we want a healthy planet.

Another important role in all of this could be taken by the marine biologists and maybe even students of the university of marine biology, because saving the Black Sea has become a necessity. Everything could take a turn for the better, the sooner we start.

I believe we have all the odds in our favor to make a change for our sea. If we were to work together and make an effort, if we were to support each other, change would certainly be in our hands. A better future is not as far as it seems. All these problems, like many others, have called for the development of concerns for coastal zone management, which aims to: *“solve present and future coastal problems in order to ensure a sustainable balance between economic uses and better environmental quality. This can be achieved by using in-depth analyzes of natural processes and socio-economic development.”*⁵⁸

I know that on an international level there have been plenty of debates and manifestations that took place in Bucharest that resulted in “The Convention on the Protection of the Black Sea against Pollution” which contained three important protocols (control of pollution sources on land, control of landfilling, joint support actions in case of accidents), followed by the "Ministerial Declaration on the Protection of the Black Sea", Signed at Odessa and the "Strategic Action Plan for the rehabilitation and Protection of the Black Sea", elaborated at the Istanbul Conference in 1996. **But it's not enough!** We need to be united in complying with chapter 17 of Agenda 21, and the

⁵⁸ Coastline, EUCC, nr. 3, 1993, p.16

governments of the riparian states need to work side-by-side and take priority action for protection and sustainable development, and I am sure that only through joint cooperation we will succeed in rescuing the Black Sea basin. This way, the coming generations will be able to enjoy the beautiful area in which we live.

It's bad! It's very bad! But not for long, because we can all save the Black Sea.

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