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Evaluation of the Several-Year Monitoring of Macroplastic Pollution of *the Coastal Part of the Durrës District*

ENKELEJDA BUDA[1]*, RIGERS BAKIU[1], NADJANA CORO[3]

[1]*Laboratory of Aquaculture and Fisheries ,Faculty of Agriculture and Environment, Department of Aquaculture and Fisheries Management, Agricultural University of Tirana, Durres city, Albania;

[2]Department of Aquaculture and Fisheries Management, Faculty of Agriculture and Environment, Agricultural University of Tirana, Koder-Kamez Tirana, Albania;rigers.bakiu@ubt.edu.al; +355694769532

Abstract

Plastic pollution has now become one of the most important environmental problems. The Mediterranean basin has the highest density of plastic waste in the world. Albania, as a member of the Mediterranean area, is not excluded from the impact of plastic pollution, where the plastic pollution also extends to the beaches. The purpose of the study is to provide an overview of several years of monitoring for the evaluation of the pollution on the beaches with macroplastics in the area of Plepa, the area of the Rinia Sector and the area of Ishmi, Durrës. The methodology followed is based on the DeFishGear Project Methodology. The results show that the beach of Sector Rinia is clean, but other beaches are contaminated with macroplastics.

Keywords: macroplastic, microplastic, pollution.

1. Introduction

The World Wildlife Fund has published a report on the management of untreated plastic waste. In this report, it is emphasized that Albania is one of the most problematic countries, with the highest percentage of untreated plastic waste, 73%. Albania is (WWF, April 2019)[4] in one of the top 4 countries with the highest rate of untreated plastic waste in the Mediterranean, along with Montenegro, Egypt and Libya. Plastic is known for its uses that bring convenience to life,in our daily lives, in health, in agriculture, in tourism, in almost every field, it has a great influence. But along with the ease of use it has brought problems all over the globe. Plastic is a material that does not degrade easily and plastic waste has become a very big concern. Microplastic particles have been found from the bottom of the Mariana Islands to the top of Mount Everest. It is now known the very large negative impact it brings to the aquatic biota of the seas and oceans, killing and drowning thousands of seabirds, fish, mammals or of other marine organisms every

year, in coastal waters and on land. The fact that plastic waste is associated with additives that are often dangerous for human health, causing problems in the skin, lungs, immune system, hormonal system, nervous system, etc., makes scientists raise the alarm about these effects. that are bringing destruction to our aquatic and terrestrial ecosystems. This study includes a period of several years of monitoring of three coastal points of the sand area on the coastline of the Durrës district in Albania.

2. Materials and Methods

The methodology is used the same in DeFishGear[3] project. One sampling unit will be used : 100 meter stretch from strandline to the back of the beach. Two section of a100 meter stretch and widths 10 meter, on

*Corresponding author: Enkelejda Buda; E-mail: ebuda@ubt.edu.al
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the same beach should be monitored in order to identify the start and end point of each sampling unit permanent reference point can be used and coordinates by GPS. There are no upper size limits to litter recorded on beaches. Litter items with a lower limit of 2,5 cm in the longest dimension will be monitored. The collection of data and samples were taken in the area that includes the prefecture of Durrës. These data were collected over several years. The surveys period are in: 2015 - 2022 years. The quality of beaches from plastic pollution in the Durrës area is determined by the CCI Index (Alkalay R, 2007),[1] which determines the degree of pollution of a beach. The purpose is to see the quality of the coast in the area of Durrës as determined by the CCI Index (Alkalay R, 2007) where, thanks to the collection of plastic in the coastal area of the district of Durrës, the assessment of plastic pollution in this area is made.

The calculation of the CCI is presented in the equation:

$$\frac{\text{Total plastic part no. in Z lines}}{\text{Z x2[m] x beach width [m]}} = \text{Parts /m}^2$$

The evaluation is :0–0.1 parts/m² -very clean-no litter is seen ; 0.1–0.25 parts/m² –clean-no litter is seen over a large area0.25–0.5 parts/m² –moderate-a few pieces of litter can be detected; 0.5–1 parts/m² -a lot of waste on the shore; More than 1 part/m² -extremely dirty-most of the shore is covered with plastic debris. K=20 insert into equation and the values CCI are as follows: According to the CCI scale: values from 0 to 2 indicate very clean beaches, 2-5 clean, 5-10 moderately clean, 10-20 dirty and > 20 extremely dirty.[1]

3. Results

Results are shown in the table as follows:

Table 1: Date, position measured, coordinates and area of the sampling in Plepa, Durrës.

No.	Name of the beaches	Date of Monitoring	GPS Coordinates	Items number	CCI	Evaluation of purity
1	Përroi i Agait Plepa, Durrës	03/03/2015	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	452	4,5	clean
2	Përroi i Agait Plepa, Durrës	2016[3]	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	590	5,9[3]	moderate
3	Përroi i Agait Plepa, Durrës	05/10/2017	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	480	4,8	clean
4	Përroi i Agait Plepa, Durrës	15/02/2018	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	420	4,2	clean
5	Përroi i Agait Plepa, Durrës	20/04/2018	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	280	2,8	clean
6	Përroi i Agait Plepa, Durrës	12/06/2018	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	220	2,2	clean
7	Përroi i Agait Plepa, Durrës	09/01/2019	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	800	8	moderate
8	Përroi i Agait Plepa, Durrës	18/04/2019	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	988	9,88	moderate
9	Përroi i Agait Plepa, Durrës	05/07/2019	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	303	3,03	clean
10	Përroi i Agait Plepa, Durrës	10/10/2019	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	676	6,76	moderate
11	Përroi i Agait Plepa, Durrës	02/07/2020	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	630	6,3	moderate
12	Përroi i Agait Plepa, Durrës	01/09/2020	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	536	5,36	moderate

13	Përroi i Agait Plepa, Durrës	01/03/2022	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	693	6,9	moderate
14	Përroi i Agait Plepa, Durrës	01/06/2022	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	837	8,3	moderate
15	Përroi i Agait Plepa, Durrës	01/09/2022	N 41º19'36 N 41º17'05" E 19°25'58 E 19°30'58''	507	5,07	moderate

Table 2. Date, position measured, coordinates and area of the sampling in Sektori Rinia, Durrës, period of time, 2019

No.	Name of the beaches	Date of Monitoring	GPS Coordinates	Items number	CCI	Evaluation of purity
1	Sektori Rinia,Durrës	09/01/2019	N 41º23'47" N 41º21'05" E 19°25'52,6º E 19°30'05"	238	2,3	clean
2	Sektori Rinia ,Durrës	18/04/2019	N 41º23'47" N 41º21'05" E 19°25'52,6º E 19°30'05"	256	2,5	clean
3	Sektori Rinia ,Durrës	05/07/2019	N 41º23'47" N 41º21'05" E 19°25'52,6º E 19°30'05"	205	2,0	very clean
4	Sektori Rinia ,Durrës	10/10/2019	N 41º23'47" N 41º21'05" E 19°25'52,6º E 19°30'05"	218	2,1	clean

Table 3. Date, position measured, coordinates and area of the sampling in Ishmi Area, Durrës District

No.	Name of the beaches	Date of Monitoring	GPS Coordinates	Items number	CCI	Evaluation of purity
1	Ishëm, Durrës	15/07/2020	N 41°32'43" N19°36'0" E19°36'0" E 19°30'58"	2976	29,7	very dirty
2	Ishëm, Durrës	03/09/2020	N 41°32'43" N19°36'0" E19°36'0" E 19°30'58"	3098	30,9	very dirty
3	Ishëm, Durrës	01/03/2022	N 41°32'43" N19°36'0" E19°36'0" E 19°30'58"	3999	39,9	very dirty
4	Ishëm, Durrës	01/06/2022	N 41°32'43" N19°36'0" E19°36'0" E 19°30'58"	5775	57,7	very dirty
5.	Ishëm, Durrës	01/09/2022	N 41°32'43" N19°36'0" E19°36'0" E 19°30'58"	5652	56,5	very dirty

4. Discussion

From the data monitored for the area of Përroi i Agait in Plepa Durrës, we have fluctuations in the values of macroplastics in this area in 2015 and in 2017 it comes out clean in the classification regarding the level of pollution with macroplastics, while in other years so years 2016, 2018, 2019, 2020, 2022 - it changes classification, passes to a higher level of pollution - enters the moderate category. The factors that influence this fluctuation in the level of pollution in this area are many, starting from the largest amount of waste thrown into this stream by the residents of the area around which this stream passes. The waste collection system in rural areas leaves much to be desired, so that a large part of the waste ends up in this small estuary in the Plepa area. However, in some periods this area comes out clean. The areas are often the tourist operator of the area and the municipality themselves to clean it, but this must be done on a continuous basis.

The area of the Sektori Rinia in Durrës is clear of plastics. This comes from the fact that this beach is mainly frequented by the residents of the area or by vacationers from the Durrës area, which are not many. Therefore, the level of pollution is low.

The area of Ishmi is different, where the level of plastic pollution is high. It enters the classification - very dirty. In fact, this area is a semi-rural area which is located near the discharge of the Ishëm river, where the level of plastic waste has been high.

Conclusion

We will recommend following some steps to reduce the impact of plastic pollution :

- To make a better investment in the infrastructure for the management and recycling of plastic waste, where so far it is not significant.
- The chemical industry should reduce plastic packaging as much as possible by using other suitable alternatives.
- The waste disposal site should have a separate bin for plastics.
- To make a better education of the population on its awareness of the way of throwing away waste and the consequences of plastic waste pollution in the environment.

5. References

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