



Ingles I – Skills Integration Project

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Title of the Project: Plastic Pollution Effects on the River Biodiversity: Cleaning of Plastics by The Interceptor Original Ship, in the Paraná City New Port

1 Introduction

In the city of Paraná there is no good management of plastic waste. Improper management of it poses a great danger to the biodiversity of the river and its surroundings. The risk is greater when inappropriate practices are conducted such as throwing away plastic waste in the Paraná River or in the streams that flow into it and that generate the water pollution.

The purpose of this presentation is to address the problem of plastic pollution in the Paraná River. We will also discuss a solution related to the cleaning of the river by extracting plastics in a part of the Paraná River.

First, we are going to show the area of the city that is the center of this work. Second, we are going to talk about the problem connected with the plastic pollution in the river. Next, we are going to mention the causes that give rise to this problem. After this, we are going to talk about the impact that the plastic waste pollution in the river in Parana city. Finally, we are going to describe our plan to approach this problem.

2 Problem Definition and Analysis

2.1 Description of the Context

Now, we are going to describe the area where the problem is located. This is the Paraná River, located in the city of Paraná, which is the capital of Entre Ríos.



By the river, we can find various areas. We can see Las Colectividades square, where events are usually held, given that it is very big. Following the tour, we find an ice cream shop and a disco. Next to it, there is a square called Las Provincias, which is across the public toilets, and opposite them is the Argentine Naval Prefecture and the Customs of Paraná.



On the coast of the river is the Sala Mayo convention center, which is a large place where events, presentations and exhibitions are held. There is also a promenade area along the river where you can enjoy the view, and which has viewpoints that are also used for fishing. Finally, we arrive at Breakwater one, which serves to reduce the waves or modify the course of the water and where the boats are moored.



All this area constitutes El Puerto Nuevo – the New Port – of the city of Paraná, from which we can observe the Curupí Islet, which is used for both tourist and fishing purposes. There are boats that cross people to it or just surround it.



2.2 Problem Statement

Now, we are going to discuss the problem we are going to analyze. The pollution of plastic waste in the Paraná River is worrying because, according to studies conducted, it is above the internationally admitted levels. In the city of Paraná, there is a sorting and treatment plant where all types of waste are treated, including plastic waste, but not all reaches this place. The waste that does not reach their destination is discarded in streams that connect with the Paraná River or in the same river. It is estimated that plastics take between 100 and 1000 years to decompose so plastic is considered a very slow decomposing material. In the long term the plastics waste become microplastics that are small particles. This significantly affects the river biodiversity, saturating it and causing damage that may be irreversible.





2.3 Description of scenes that help picture the problematic situation

Now, we are going to describe images that help picture the problem. These are two images showing the pollution in different areas of the Paraná River. This is not the photo of the Parana River. It is a photo of a creek near the river.



In the foreground, we can see the amount of garbage, especially plastics. It is a creek full of plastics waste.

To the right of the image, we can see a group of people with plastic bags, so we think they must be cleaning the creek. We cannot see any animals nearby.

This is a picture of the coast of the Paraná River. In it, we can see the pollution.



In the foreground, we can observe the Paraná River, where we can see the garbage generated by people on one of its coasts. In general, all this garbage is composed of plastic.

In the background of the image, we can see an island and some houses. The river is gray due to the contamination

produced by the waste.

2.4 Identification and analysis of causes or factors that give rise to the problem.

Now, we are going to talk about the causes of this problem. There are three main causes to water pollution by plastic in the Paraná River. The water of the Parana River is essential for biodiversity survival. That is the reason we should awareness of the negative impact that causes to the city population. These causes show us that the lack of awareness represent a permanent damage in the river.

One reason for this negative situation is uncontrolled production the plastic products. Currently, the plastic is the most widely produced material in the world. Most of the production of the plastics is used in disposable products, for example food and drink packages, and bags.

The continuous and excessive consumption of these plastic products is another reason we can mention. This consumption is constantly growing, generating plastic contamination. There are many items that end up accumulating in the river because most of them are non-biodegradable.

Another reason has to do with the lack of awareness of the government and the population in general. The plastic product is currently used in great quantities. Sustainable environmental policies are few so the plastic waste increases every day.



There is also a general indifference to pollution problems so the people are not aware of the damage that plastic waste causes to biodiversity.

2.5 Identification and description of the consequences

Now, we are going to talk about the consequences of this problem. There are three main consequences to water pollution by plastic in the Paraná River. An improper management of plastic waste affects the river and city biodiversity. The continuous deterioration of waste quality has a negative impact. This deterioration not only affects the river biodiversity, but also the health of the population.

The main consequence of this situation is that the microplastics are being consumed by fish in the Parana River. The microplastics are consumed by many fish, including commercially important species. As a result, they move to different trophic levels so they are dangerous and uncontrollable.

Another consequence has to do with the fact that water polluted by plastic is not suitable for consumption. There are many poor people who cannot drink water from the river because it is contaminated with plastic waste. These are harmful for their health.

Another consequence is contaminating of the food chain by fishing in the polluted water. As a result, this transmits toxins in food and damages health through its consumption. This happens because many fish consume microplastics. Also, this affects the people who make a living from fishing because they cannot sell contaminated food.

3 The Way Forward

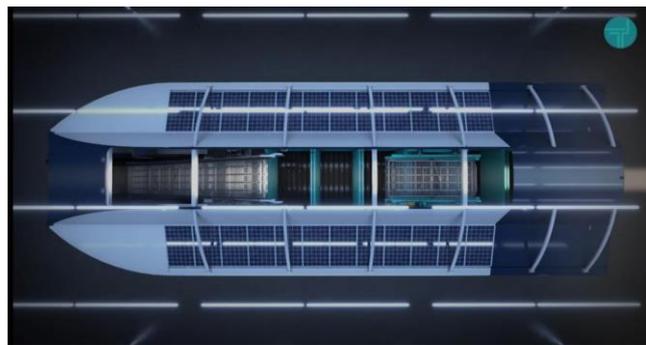
3.1 Problem approach

Now, we are going to introduce a solution to the problem we have just presented. Plastic contamination in the Paraná River is caused by several factors mentioned before. The problem will continue if plastic waste continues to reach the river. Because of this, we are going to introduce our solution, which is the Interceptor Original.

The Interceptor Original is the first river cleaning technology developed by Ocean Cleanup. It was developed by Boyan Slat and introduced in October 2019. The Interceptor Original is a sustainable technology.



It collects energy by means of solar panels and store energy in lithium batteries. These batteries allow you to operate continuously day and night autonomously. Intelligent on-board software monitors system performance, energy use and component status.



To implement this solution, first, it is necessary to carry out certain studies of the river. After this, the results obtained are studied. Finally, the solution can be implemented. Its operation has 5 steps, which are the following:

1. **"Barrier:** River waste flowing with the current is guided by the barrier towards the opening of the Interceptor. Thanks to the Interceptor's catamaran design, the water flow path is optimized to pass through the system, carrying the plastic onto the conveyor belt."



2. **"Conveyor belt:** The current moves the debris onto a conveyor belt, which continuously extracts the debris from the water and delivers the waste to the shuttle."



3. **“Shuttle:** A shuttle automatically distributes the debris across six dumpsters. Using sensor data, the containers are filled equally until they reach full capacity.”



4. **“Dumpsters:** The Interceptor can store up to 50m³ of trash before needing to be emptied. This means it is capable of operating even in the most polluted rivers all over the world.”



5. **“Empty and recycle:** When the interceptor is almost full, it automatically sends a text message to the local operators to come and collect the waste. Operators then remove the barge, bring it to the side of the river, empty the dumpsters, send off the debris to local waste management facilities, and return the barge back into the Interceptor.”



Source: The Ocean CleanUp. “The Interceptor Original”
<https://theoceancleanup.com/rivers/interceptor-original/> (accessed Sep. 29, 2022).

3.2 Strengths and Weaknesses of the Proposal

We are going to refer now to the positive and negative aspects of our proposal. The main positive aspects that the proposed solution gives us is that, when the garbage floats in the river, it encounters a barrier on the surface of the water that guides the garbage towards the opening of the interceptor so it does not affect the biodiversity of the river. Also, thanks to automated operation of the interceptor, no dangerous manual work is required.

The negative aspects we find to this solution is the economic problem. The state needs to invest in this technology and its subsequent maintenance. Several interceptor parts need maintenance from time to time for the interceptor to work optimally.

4 Conclusion

4.1 Final Statement

In conclusion, the use of the Interceptor Original in the Paraná River may be useful because it may help clean the river. Plastic pollution in the river is a serious problem. Lack of awareness and care has led to water that is not suitable for consumption. We must raise awareness of the fact that plastic waste affects biodiversity in the river and the health of the population.