

PLASTIC ORIGINS



HELP US MAP THE PLASTIC POLLUTION OF RIVERS



SURFRIDER
FOUNDATION EUROPE

SUMMARY

PART 1 – PLASTIC ORIGINS PROJECT

SURFRIDER EUROPE	03
PLASTIC ORIGINS PROJECT	04
PARTICIPATORY SCIENCE	05

PART 2 – CONTRIBUTE TO THE PROJECT

TWO TYPES OF CONTRIBUTION PLASTIC ORIGINS	07
▪ HELP US FROM YOUR HOME	08
▪ HELP US ON THE GROUND	10
• PROCESS OF THE MISSION	11
• BEFORE LEAVING	12
• PLASTIC ORIGINS APP	13
○ AUTOMATIC MODE	14
○ MANUEL MODE	15

PART 3 - CONTACTS

OUR TEAM	17
USEFUL LINKS	18

PLASTIC ORIGINS



PLASTIC ORIGINS PROJECT

HELP US MAP THE PLASTIC POLLUTION OF RIVERS



SURFRIDER FOUNDATION EUROPE

Surfrider Foundation Europe is an association created in 1990 by a community of surfers who wanted to fight against the pollution of their playground.

Today, the association is committed to three major themes: water quality, plastic pollution and climate change. Its head office, based in Biarritz, as well as its seven territorial offices (Paris, Brussels, Marseille, Bordeaux, San Sebastian, Barcelona and Hamburg) and its 46 volunteer branches in Europe enable it to carry out in-depth actions in twelve European countries.

The issue of aquatic waste is one of the reasons for the association's existence. It develops educational, awareness-raising, lobbying and research actions on this theme.

SURFRIDER IN A FEW KEY FIGURES

15 000
members

170 000
supporters

1 800
volunteers

46
volunteer offices in Europe



THE PLASTIC ORIGINS PROJECT

Context

All of the world's oceans and seas are now threatened by plastic waste. Their accumulation is caused by our inability to manage them properly on land and their very slow degradation. This plastic waste threatens marine ecosystems and causes significant economic and social problems. Although rivers have been identified as a major vector for the introduction of waste into the marine environment, at present there is very little knowledge about the quantity and composition of the waste transported by rivers.

General description

The Plastic Origins project developed by Surfrider Foundation Europe is a participatory science project aimed at mapping plastic pollution in rivers in France and Europe. The project uses an artificial intelligence algorithm to detect and count the wastes washed up on river banks. This mapping will make it possible to identify the territories most affected, to propose solutions to local actors and to measure the evolution of pollution over time.

OBJECTIVES ET RESULTS

Objectives

Surfrider Foundation Europe will bring the results of the project to national and European level to raise awareness and inspire policy makers to act.

Locally, you will be able to use this data to denounce the most polluted areas and highlight the need to act against this pollution.

Results and beneficiaries

The data collected will be accessible and downloadable by all from www.plasticorigins.eu.

Thanks to these results, we will know where to act and will be able to measure the effectiveness of our actions.

Credits

Most of the computer tools (websites, databases, artificial intelligence, etc.) used in the project were developed by volunteers.

This project would not have been possible without their precious help.



PARTICIPATORY SCIENCE

The method we propose to apply to measure plastic pollution of rivers is based on tests carried out by Surfrider and scientific studies.

It is inspired by a method used at sea by scientists for many years to study marine mammals, turtles and sometimes macro-waste. It is as follows: an observer, positioned at the front of a boat under way, takes the GPS coordinates of his position as soon as he spots what he is in charge of observing. We decided to reproduce this method in rivers to study plastic pollution. It allows us to collect data over large distances (from 500 meters to several kilometers) and thus to have a more exhaustive vision of the plastic pollution of a section of river. We no longer observe strictly speaking, we detect the waste using a camera and an algorithm.

The results allow us to generate an indicator equal to the number of wastes detected per kilometer of bank.



We no longer strictly speaking observe, we detect waste using a camera and an algorithm.



Surfrider has, in the past, tested the installation of nets and booms in rivers. These techniques have proven to be inefficient and difficult to duplicate. Most of the plastic pollution circulates during flood periods, when it is not possible to install such systems (tree trunks and branches drifting in the water could destroy the equipment or endanger the operators).

Thus, the study of waste washed up on the banks seemed more appropriate, as these are indicators of the plastic pollution circulating in the watercourses.

Surfrider first became interested in the waste washed up on the banks by carrying out monthly collections in specific areas. The results provided interesting information on the composition of the waste found, but the method did not make it possible to follow the evolution of the pollution over time, nor to compare the pollution from one area to another. The zones chosen were much too different from one another to be compared (difference in bank slope, vegetation, hydromorphology). The development of vegetation on the study sites also affected the stranding of waste and our ability to compare data from one year to another.

OBSERVER BIAS

Finally, the project is based on artificial intelligence that allows to remove the "observer bias". Each observer brings an error of his own. The interest to make detection and not observation is to replace this variable error (that of the observers) by a constant and known error (that of the detection algorithm). It allows us to generate reliable and robust data through a participatory science project.



CONTRIBUTE TO THE PROJECT

**THE PLASTIC ORIGINS PROJECT WILL NOT BE A
SUCCESS WITHOUT YOU !**

The more you travel along the rivers to collect data,
the more accurate and extensive the map of plastic
pollution will be.

CONTRIBUTE TO THE PROJECT PLASTIC ORIGINS

You can help us in two different ways :

1st TYPE OF CONTRIBUTION :

FROM YOUR HOME



By labeling images to help us improve our waste detection algorithm with the trashroulette website.

THE WEBSITE :



www.trashroulette.com

(more information on the next page)

2nd TYPE OF CONTRIBUTION :

FROM THE GROUND



By walking, kayaking, stand-up paddling or drone and filming the banks of the river near you with the Plastic Origins application or a Go Pro.

MANUAL OR AUTOMATIC MODE :

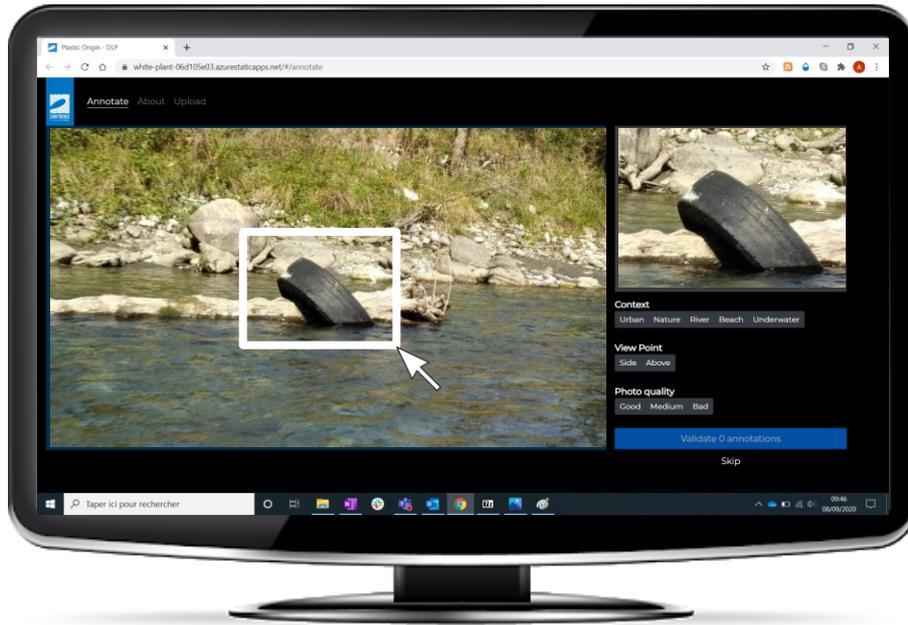


There are two modes of use, manual mode and automatic mode with the use of artificial intelligence.

- Manual mode is preferred when there is little waste
- Automatic mode is to be preferred when there is a lot of waste



HELP US FROM YOUR HOME



www.trashroulette.com

LABELING IMAGES

Image labeling is an essential step in the creation of an artificial intelligence model.

To build and improve our waste detection model, we need a very large number of photos of riverbanks where waste is visible.

The labeling of these images consists in surrounding the waste(s) with a rectangle (see example above).

Once labeled, these images will feed the algorithm that learns to recognize the waste.

TO PARTICIPATE

You must have access to a computer and have internet access.

You can do this mission at any time and make it last as long as you want. For an effective contribution, count between 20 and 40 minutes.

Log on to www.trashroulette.com

Follow the tutorial and start labeling the images.

If you want, you can drop your own photos with plastic waste on them. Any photo with waste on it can be uploaded to the platform. It can be waste seen somewhere other than near a river, the goal is to train artificial intelligence.

SELECT WASTE

1. View the photos in the main window.
2. When you move your pointer over the left insert, you will see a zoom effect on the insert next to it. This will help you better identify the waste in the photo.
3. Use the mouse to draw a rectangle on the waste to select it.
4. Check the corresponding boxes below to provide context, viewpoint and quality of the photo.

HELP US FROM THE GROUND

ORGANIZATION OF THE MISSION



ORGANIZE THE EXCURSION

Check the weather

Locate on a map the shoreline you intend to explore. Few hours prior to your outing, check the weather and the flood risk.

Keep one side all along

For the data to be interesting, you will have to choose and hold on to one bank (the right or left bank - the right bank is to your right when you look in the direction of water flow, towards the estuary).

Count waste in the water, on the shoreline and in the trees

Consider the waste that is in the water up to halfway up the river, the waste on the 5 meters of the bank and the waste suspended in the branches of trees near the water.

Film at 4m from the edge and over 500 meters

For the automatic mode, film at least 500 meters continuously. The video must be taken as close to the shore as possible. We recommend being within 4 meters of the shoreline.

THE TWO MODES OF USE

There are two modes of use, the manual mode and the automatic mode with the use of artificial intelligence.

- The manual mode is to be preferred when there is little waste.
- The automatic mode is to be preferred when there is a lot of waste.

SEND DATA

Send us your video by clicking on the "sync" button in the application, preferably while connected to a wifi, or upload your GoPro video to the page:

www.plasticorigins.eu/sign-in

You will be able to view the results of your campaign at www.plasticorigins.eu.

Data processing can take a few hours to several days depending on the size of your videos.

Please be patient!

BEFORE LEAVING

THE PREPARATION

To take part in this mission, you must be able to swim and be in optimal safety conditions.

Surfrider cannot be held responsible in case of accident, loss or damage of your equipment.

THE EQUIPMENT

Make sure you have the right equipment:

- A smartphone with the Plastic Origins application installed
- A Go Pro with GPS option (GoPro Hero 5 and higher) in 1080p and 24 frames per second format
- A boat if you wish to carry out the mission on the water. If you are part of a Surfrider branch, the head office can help you to finance the rental of kayaks

Test your equipment before going into the field and make sure that the batteries in your devices are fully charged.

PRECAUTIONS

To carry out your mission in optimal conditions :

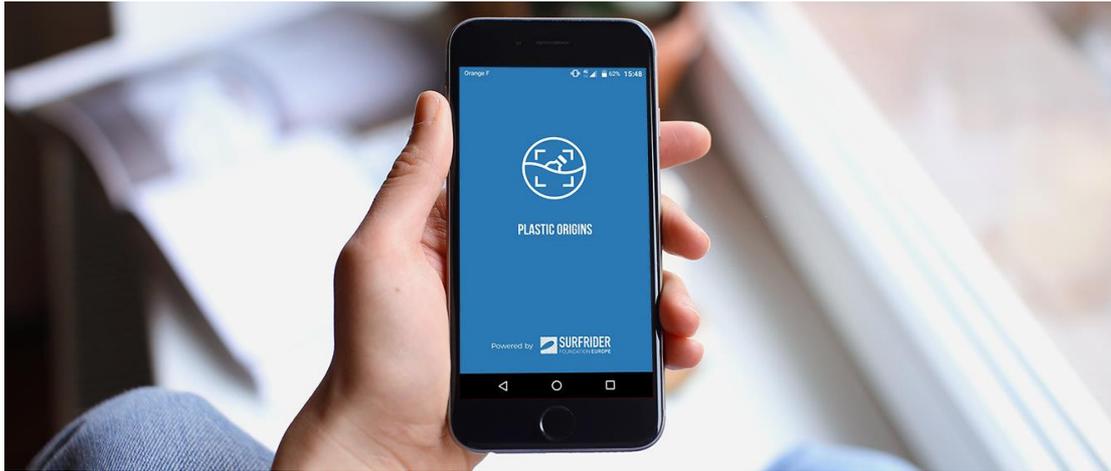
- Do not go alone
- Protect yourself (helmet, suit)
- Protect your equipment (waterproof pouch)



ONLINE TRAINING

We offer 30-minute online training sessions twice a month.

For more information, please send us an email at plasticorigins@surfrider.eu or complete [this form](#) with your availabilities.



PLASTIC ORIGINS APP

CREATE YOUR ACCOUNT

Your account will allow you to save your data and to be able to download them on the platform after your release.

START A NEW FOLLOW-UP

When you arrive on the field, you can start a new follow-up. Activate your geolocation so that the waste is associated with a GPS coordinate.

CHOOSE THE MODE

You will have the choice between two modes, the automatic mode and the manual mode.

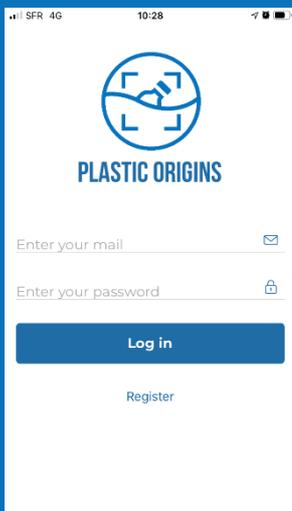
Use of the automatic mode: preferably on the water in a boat, when there is a lot of waste.

Use of manual mode: on foot on the shore or in a boat, when there is little garbage.

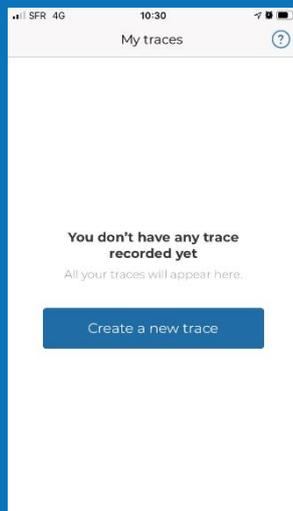
DOWNLOAD THE DATA

Once your outing is over, connect to a wifi and download your videos. The anonymized data is sent to the servers.

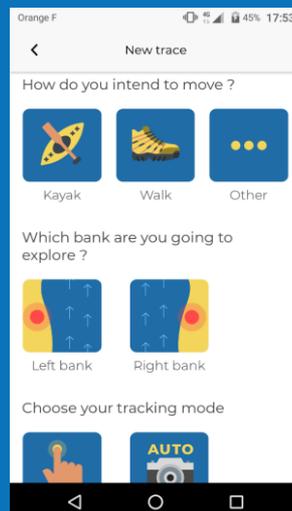
1



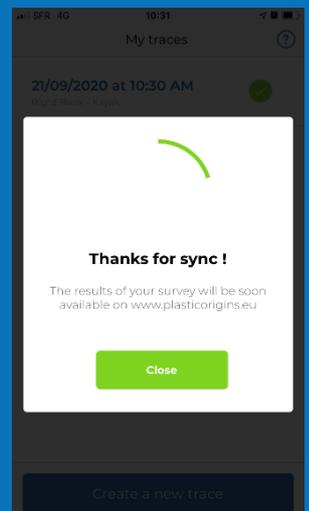
2



3



4



AUTOMATIC MODE



USE OF THE APPLICATION - AUTOMATIC MODE

TO PARTICIPATE



You will have to walk along the river near you and film the banks. You will be able to proceed on foot, by kayak, Stand Up Paddle or with the help of a drone.



You must be in possession of a smartphone and have installed the Plastic Origins application or be in possession of a GoPro with the GPS option.



Your data collection can last a few hours if you decide to film the banks on foot or by drone, or several days if you want to descend a river in several stages.



Afterwards, transfer the videos from the application, preferably using a wifi. If you used a gopro, deposit the documents on the link " <https://www.plasticorigins.eu/sign-in> " (available early 2021).

FILM THE BANKS

The collected data will be sent to a server.

Thanks to artificial intelligence and GPS data, the waste will be detected and associated with a GPS coordinate.

We will thus be able to determine the exact position of the waste and thus map and measure plastic pollution in rivers and streams.

For the automatic mode, film at least 500 meters continuously. The video must be taken as close as possible to the bank. We recommend to be less than 4 meters from the bank.

WASTE DETECTION BY AI



The detection of the waste is carried out by the AI in a second time

MANUAL MODE

USE OF THE APPLICATION - MANUAL MODE

TO PARTICIPATE



You will have to walk along the river near you and film the banks. You will be able to proceed on foot, by kayak, Stand Up Paddle or with the help of a drone.



You must be in possession of a smartphone and have installed the Plastic Origins application.



Your data collection can last a few hours if you decide to film the banks on foot or by drone, or several days if you want to descend a river in several stages.



Afterwards, transfer the data from the application, preferably using a wifi.

FILMING THE BANKS

The collected data will be sent to a server.

Using your information and GPS data, the waste will be detected and associated with a GPS coordinate. We will then be able to determine the exact position of the waste and thus map and quantify plastic pollution in rivers.

FROM THE APPLICATION



The use of the camera does not count as waste. This photo will be used on the trashroulette.com platform.

MANUAL MODE OF THE APPLICATION



CONTACTS

**REMEMBER, THE PLASTIC ORIGINS PROJECT WILL
NOT BE A SUCCESS WITHOUT YOU !**

You are welcome to join us during our online training sessions or contact us for more information!



OUR TEAM

DO YOU HAVE ANY QUESTIONS? CONTACT US!

For scientific or technical questions, if you wish to contribute to the development of digital tools or to the Plastic Origins project (outside the PACA region), please contact :

You wish to benefit from an in-depth training on waste pollution monitoring or to get involved in the other participatory science projects proposed by Surfrider, contact :



Antoine Bruge - abruge@surfrider.eu



Clément Moreno – cmoreno@surfrider.eu

You wish to contribute to the Plastic Origins project in the PACA region / You are a local community and you wish to set up actions to fight against plastic pollution on your territory, contact us:

To learn more about the influencing actions implemented by Surfrider, please contact :



Jennifer Poumey - jpoumey@surfrider.eu



Cristina Barreau – cbarreau@surfrider.eu



USEFULL LINKS

CHECK SURFRIDER ACTIONS

www.surfrider.eu

SUPPORT PLASTIC ORIGINS

www.plasticorigins.eu

www.trashroulette.com

TAKE PART IN A PLASTIC ORIGINS TRAINING COURSE

plasticorigins@surfrider.eu

PROTECTING THE OCEAN SINCE 1990

#WeAreSurfriderEurope

www.surfrider.eu

