

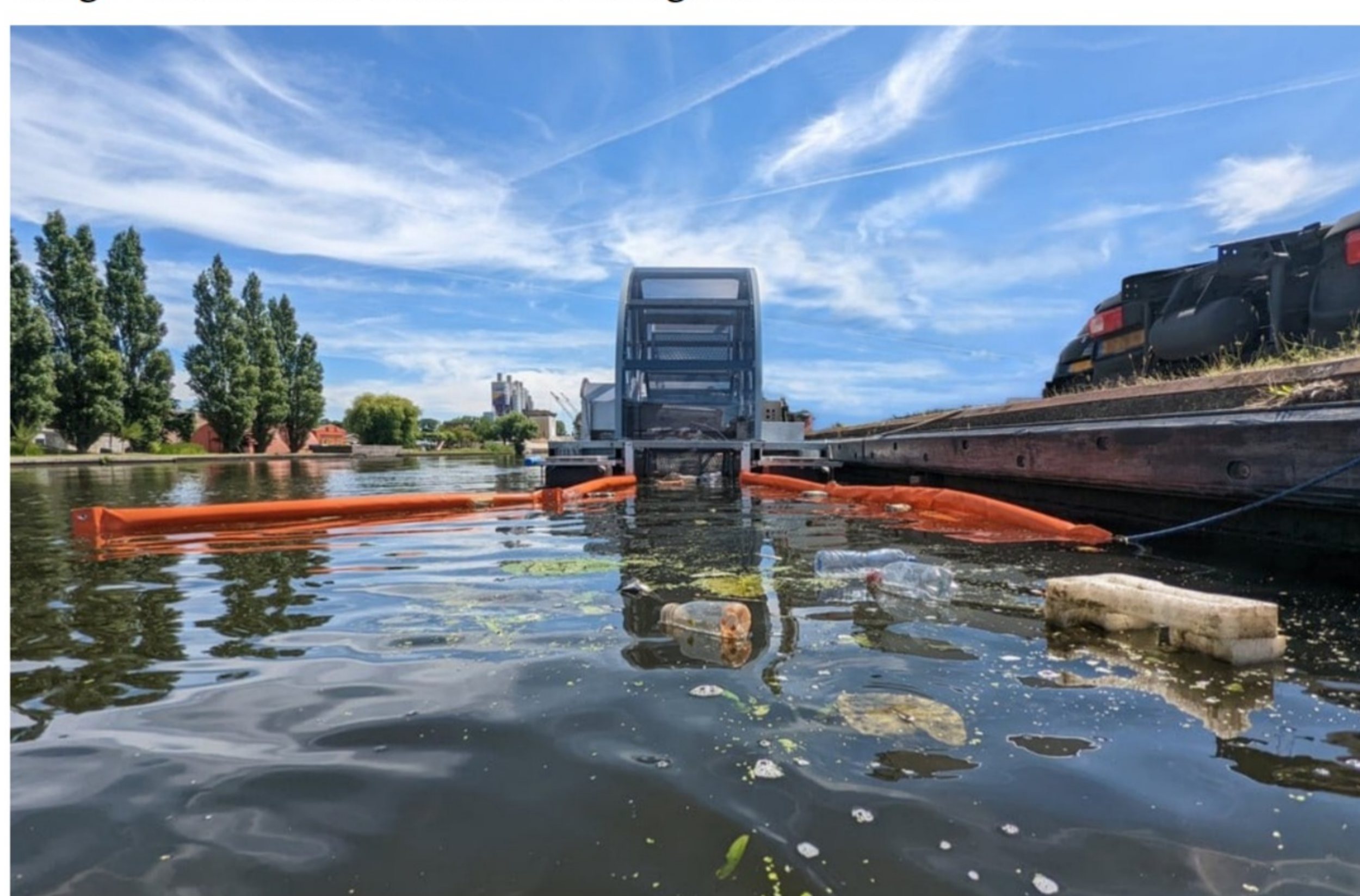


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Premium

Tackling plastic waste in inland waters with GPS sensors in plastic, cameras on bridges and AI. Noria believes in a strong decrease in litter



The CirCleaner at work capturing plastic.
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Casper Duin Thursday, April 25, 2024 at 9:00 AM

DELFT

Never before have the types and quantities of plastic in Dutch inland waters been made transparent on such a scale. The Delft scale-up Noria believes that their approach will soon result in eighty to ninety percent less plastic floating in the water.

It seems crazy. To prevent plastic in the water, Noria employees throw plastic into the water. But these plastic bottles are equipped with sensors that provide a lot of information about the behavior of plastic in the water, says Arnoud van der Vaart (37), founder of Noria with Rinze de Vries since 2018.

After promising results in Groningen, the two, together with their team, will now continue to work in North Holland thanks to a European subsidy project. At the end of 2016, De Vries took part in a competition by the Hoogheemraadschap Hollands Noorderkwartier (HHNK) to come up with a sustainable, fish-friendly way to stop plastic at the De Helsdeur pumping station in Den Helder. The drainage pumping station is the last funnel from the Noordhollandsch Kanaal on the way to the North and Wadden Seas and is therefore a hotspot for retaining and capturing floating plastic waste.

To understand

"After that competition, which Rinze won, he started developing and testing the very basic solution he had in mind to remove plastic from the water," says Van der Vaart, who grew up in Middenmeer. "Based on this idea, we founded the company Noria together in 2018. Much is still left of his original idea. And now we are going to perform it at exactly that location, at De Helsdeur. That's special. We are now years further. The Noria company is much more than just a solution for removing plastic from the water. It is not a matter of simply blocking or removing plastic waste. We want to understand the problem."



Rinze de Vries and Arnoud van der Vaart, founders of Noria.
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"We want to know where the waste comes from. Where does it go, what is the influence of wind and water currents and embankment on the transport of the waste? This is the only way to prevent it from entering the sea in a sustainable and very affordable way."

GPS

And so Noria itself throws plastic into the water to identify the most effective capture locations. "We provide these plastic objects with GPS sensors. A total of twenty units in Alkmaar and Zaandam. We do this at different times of the year to monitor the difference in seasons. This gives us an idea of the paths of plastic, possible stuck locations, and the 'travel time'. These GPS tests will be done in the summer and winter seasons of 2024 and 2025 respectively. It is basically a tube with the same properties as a bottle, such as how high it is in the water. We can see where the object is located hourly. In this way we can much better understand and substantiate whether or not a plastic object, for example, goes to De Helsdeur."



Using a camera and artificial intelligence, the amount of waste that passes under a bridge is counted.
© Photo Noria

Floating litter or plastic will be monitored in various places in the province this summer with cameras on bridges and structures. Artificial intelligence (AI) takes care of the analysis of the images. "For example, AI is used to count how much waste passes under a bridge."

Cameras

Cameras will be installed under the Kooy Bridge in Den Helder to monitor the outflow of floating litter/plastic into Den Helder. To closely monitor floating litter and plastic in urban areas, cameras will be installed under the Huiswaarder Bridge in Alkmaar this summer. A camera will be installed in Avenhorn that will monitor the influx of possible floating litter/plastic from the Markermeer to inland waters of North Holland (HHNK area, ed.).

According to Van der Vaart, camera expansion in Zaandam may follow in the long term. "To test the quality of the camera counts in an additional urban area. This is not yet 100 percent certain."



Artificial intelligence can be used to determine exactly what floats in the water.
© Photo Noria

The types of plastic that end up in the water also provide information. "What do we like most? This goes from coarse to increasingly precise. In cities where people recreate, we see more fast food and cigarette filters. Sometimes you can relate it to a new construction project in the city, such as styrofoam that ends up in the water due to the wind. Often there is no full knowledge that there are easy options to prevent it from blowing away. We are not in favor of tracking down the 'perpetrator' or punishing them. Prefer a more positive approach. Let's see together what we can do about this."

Paddle wheel

Noria's second step is to remove the waste found. For example, a collection system for plastic, the so-called CirCleaner, is expected to be installed at De Helsdeur at the beginning of next year. This is a small paddle wheel that rotates against the current with two long catch arms that catch the floating plastic and direct it to the clearing machine.

The waste from the CirCleaner is then immediately analyzed by Noria on location or in the workshop at the office in Delft. "The waste is on a conveyor belt. Using AI, images of waste are analyzed to identify items such as cigarette filters, cans, PET bottles, plastic bags and Styrofoam. This takes place parallel to the installation of the CirCleaner because that is where the waste comes from. Thanks to artificial intelligence, we can do it smarter, faster and more affordably."

It is information that helps with the third step: structurally preventing plastic from ending up in the water. Van der Vaart thinks that a combination of measures will ultimately result in an approach that stops the discharge of plastic into the sea and the mudflats. "Right now it's no one's problem. There is no law or regulation on who owns this problem. While it is a problem for all of us. At the same time, I see that steps have been taken in the past five to six years. There is increasing awareness, partly due to research into the negative health effects of plastic in our bodies. Something that we should not want with each other."

Naive

If it were up to Van der Vaart, the plastic problem would be solved in its entirety in the future. "Then we will indeed ensure that we no longer do this work. Isn't that naive? Then I would like to be naive. Zero is not the goal with removing it from the water, that is prohibitively expensive. I believe more that you can tackle eighty to ninety percent of plastic waste affordably in the short term. The last percentages are the most expensive. That is why we also use artificial intelligence. Manual counting is not feasible in terms of time and money. To my knowledge, the types and quantities of plastic floating in the water have never before been mapped out on such a scale in our country."

Noria likes to be a driving force. "Our role is actually to show, based on data, which quantities and which types are involved. We want to think about how you can do something about this preventively, but ultimately it is up to water boards, municipalities, provinces, The Hague, Europe and also the producers of litter. Our goal with that? That they make choices based on our insights that make it less easy or impossible to get these waste flows into the environment."