



UNIVERSIDADE FEDERAL DO OESTE DO PARÁ – UFOPA
PRÓ-REITORIA DE PESQUISA, PÓS-GRADUAÇÃO E INOVAÇÃO TECNOLÓGICA – PROPPIT
PROGRAMA DE PÓS-GRADUAÇÃO EM SOCIEDADE, NATUREZA E DESENVOLVIMENTO (PPGSND)

EXAME DE SELEÇÃO DE DOUTORADO – PPGSND – EDITAL 2018 PROVA DE LÍNGUA INGLESA

CPF do candidato:

Obs1: Esta prova tem cinco questões as quais deverão ser respondidas em português. (cada questão vale dois pontos)

INFORMAÇÕES IMPORTANTES:

- 1- É **obrigatório** informar o número do **CPF** no canto superior esquerdo **em todas as folhas de resposta utilizadas**;
- 2- Responda usando **somente informações retiradas do texto** apresentado abaixo. Informações usadas na resposta que não constem no texto serão desconsideradas.
- 3- As respostas deverão ser escritas utilizando **caneta com tinta azul ou preta**.

TEXTO BASEADO NO SEGUINTE ARTIGO:

THE PLASTIC OCEAN

Scientists know that there is a colossal amount of plastic in the oceans. But they don't know where it all is, what it looks like or what damage it does.

By Daniel Cressey
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Kamilo beach, on the tip of Hawaii's Big Island, is a remote tropical shore. It has white sand, powerful waves and cannot be reached by road. It has, in fact, much that an idyllic tropical beach should have. But there is one inescapable issue: it is regularly carpeted with plastic.

Bottles, fishing nets, ropes, shoes and toothbrushes are among the tons of waste washed up here, thanks to a combination of ocean currents and local eddies. A study in 2011 reported that the top sand layer could be up to 30% plastic by weight¹. It has been called the dirtiest beach in the world, and is a startling and visible demonstration of how much plastic detritus humanity has dumped into the world's oceans.

From Arctic to Antarctic, from surface to sediment, in every marine environment where scientists have looked, they have found plastic. Other human-generated debris rots or rusts away, but plastics can persist for years, killing animals, polluting the environment and blighting coastlines. By some estimates, plastics comprise 50–80% of the litter in the oceans. "There are places where you don't find plastic," says Kara Lavender Law, an oceanographer at the Sea Education Association in Woods Hole, Massachusetts. "But in terms of the different marine reservoirs, we've found plastic in all of them. We know it's pervasive."

Newspapers tell stories of the 'Great Pacific garbage patch', a region of the central Pacific where plastic particles accumulate, and volunteers participate in beach clean-ups across the globe. But in many ways, research lags behind public concern. Scientists are still struggling to answer the most basic questions: how much plastic is in the oceans, where, in what form and what harm it's doing. That's because science at sea is hard, expensive and time-consuming. It is difficult to



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comprehensively survey vast oceans for small — sometimes microscopic — plastic fragments, and few researchers have made this their line of work.

But now interest is picking up. “There have been more publications in the last four years than the previous four decades,” says Marcus Eriksen, director of research and co-founder of the 5 Gyres Institute in Santa Monica, California, which works to fight plastic pollution. Scientists and environmentalists know that there is a lot to do. Last May, the United Nations Environment Programme (UNEP) passed a resolution at its Nairobi meeting, stating that “the presence of plastic litter and microplastics in the marine environment is a rapidly increasing serious issue of global concern that needs an urgent global response”.

WHERE DOES IT COME FROM?

In 2014, a team at the US marine park Papahānaumokuākea, off the northwest coast of Hawaii, removed a fishing net from the reserve that weighed 11.5 tonnes — roughly equivalent to a London bus. Nets and other fishing equipment that have been lost or discarded at sea are thought to make up a large fraction of marine plastic. An estimate² from UNEP suggests that this ‘ghost’ fishing gear makes up 10% of all marine litter, or around 640,000 tonnes.

There is much more than that. Global production of plastics rises every year — it is now up to around 300 million tonnes — and much of it eventually ends up in the ocean. Plastic litter is left on beaches, and plastic bags blow into the sea. The vast quantities of plastics dumped as landfill can, if sites are not properly managed, easily wash or blow away. Some sources are less obvious: as tyres wear down, they leave tiny fragments on roads that leach into drains and on into the ocean.

HOW MUCH IS OUT THERE?

In a paper published last year, a team led by Jenna Jambeck, who researches waste management at the University of Georgia in Athens, estimated how much waste coastal countries and territories generate, and how much of that could be plastic that ends up in the ocean⁵. The group reached a figure of 4.8 million to 12.7 million tonnes every year — very roughly equivalent to 500 billion plastic drinks bottles. But her estimate excluded the plastic that gets lost or dumped at sea, and all the plastic that is already there.

To get a handle on this, some researchers have gone trawling, using fine-meshed nets to see what plastic they can catch. Last year, oceanographer Erik van Sebille of Imperial College London and his colleagues published one of the largest collections of such data⁶. They combined information from 11,854 individual trawls, from every ocean except the Arctic, to produce a ‘global inventory’ of small plastic pieces floating at or near the surface.

They estimated that, in 2014, there were between 15 trillion and 51 trillion pieces of microplastic floating in the oceans, with a total weight of 93,000 to 236,000 tonnes. But these numbers present scientists with a problem. This estimate of total surface plastic is just a small fraction of what Jambeck estimated entered the ocean every year. So where is all the rest? “That’s the big question,” says Jambeck. “That’s a tough one.”

Researchers are trying to find answers. Jambeck is now working with a mobile-phone app called the Marine Debris Tracker, which offers a way to crowdsource vast amounts of data as users send in information about rubbish they encounter. She is also working on a project for UNEP to build a global database of marine-litter projects.



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WHAT HARM DOES IT DO?

Researchers know that marine plastic can harm animals. Ghost fishing gear has trapped and killed hundreds of animal species, from turtles to seals to birds. Many organisms also swallow pieces of plastic, which can accumulate in their digestive system. Lab studies have demonstrated the toxicity of microplastics, but these often use concentrations that are much higher than those found in the oceans. A study by fish ecologists Oona Lönnstedt and Peter Eklöv, exposed perch larvae to ‘environmentally relevant’ concentrations of microplastics. The larvae ate the plastics – they even seemed to prefer them to actual food – which made them grow more slowly and fail to respond to the odor of predators. After 24 hours in a tank with a predator, 34% of plastic-dosed larvae survived, compared with 46% of those raised in clean water.

Lönnstedt, at Uppsala University in Sweden, was disturbed by photos of the transparent larvae clearly showing the small plastic spheres in their guts. “It’s awful, so of course I feel strongly about it,” she says. “People who say plastics won’t be an issue in the oceans need to take a look at the evidence again.”

But some scientists question the implications of the work. Alastair Grant, an ecologist at the University of East Anglia in Norwich, UK, says that the levels of plastic that gave adverse effects in Lönnstedt’s paper — 10–80 particles per litre — are still orders of magnitude higher than the vast majority of field measurements. Most reports are less than 1 particle per litre, he says. “The evidence I can see at the moment suggests microplastics are probably within safe environmental limits in most places.”

WHAT SHOULD WE DO?

Despite the lack of comprehensive data about ocean plastics, there is a broad consensus among researchers that humanity should not wait for more evidence before taking action. Then the question becomes, how? One controversial project has been devised by The Ocean Cleanup, a non-profit group that by 2020 hopes to deploy a 100-kilometre-long floating barrier in the Great Pacific garbage patch. The group claims that the barrier will remove half of the surface plastic there.

But the project has met with scepticism from researchers. They say that plastic in the gyre is so dilute that it will be tough to scoop up, and they worry that the barrier will disturb fish populations and plankton. Boyan Slat, chief executive of The Ocean Cleanup, welcomes the criticism, but says that the barrier project is still in an early phase, with a prototype currently deployed off the Dutch coast. “We’re using this test as a platform to investigate whether there’s any negative consequences. The only way to find out is to go out and do it,” he says.

In a paper published earlier this year¹², van Sebille and his colleague Peter Sherman showed that it would be much more effective to place clean-up equipment near the coasts of China and Indonesia, where much of the plastic pollution originates. “The closer to the plastic economy loop you intervene the better it is,” van Sebille says. “We’ve got to stop it in the treatment plants, in the landfills. That is the point to intervene.” Eriksen likens the situation to addressing air pollution, where people have long realized that filtering the air is not a long-term solution. Filtering the oceans seems similarly implausible, he says. “What we’ve seen worldwide is you go to the source.” That means reducing the use of plastic, improving waste management and recycling the materials to stop them from reaching the water at all.



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RESPONDA ÀS QUESTÕES ABAIXO, EM PORTUGUÊS:

Questão 01: a) Qual o assunto inevitável em respeito à praia de Kamilo? (1,0 ponto); b) Quais tipos de objetos são encontrados lá? (1,0 ponto)

Questão 02: Em que focam as reportagens nos jornais? (1,0 ponto); b) O que falta fazer e saber a respeito do problema detectado? (1,0 ponto)

Questão 03: a) Descreva o inventário global que buscou quantificar os pedaços de plástico flutuando na superfície dos oceanos (técnica usada/ quantas vezes, e onde) (1,0 ponto); b) o que estimaram através deste inventário (0,6 pontos); c) qual o problema que surgiu após realizar esta estatística? (0,2 pontos); c) Qual foi a estimativa do grupo de Jambeck para a quantidade de plástico lançada nos oceanos pelos países que têm áreas litorâneas? (0,2 pontos).

Questão 04: a) Como a presença desse plástico poderia prejudicar a vida dos animais marinhos? Cite dois exemplos específicos. (1,0 ponto); b) Qual foi o resultado do estudo realizado pelos ecólogos sobre a ingestão de plástico por peixe? (0,5 pontos); c) que crítica foi feita a este estudo? (0,50)

Questão 05: Um grupo sem fins lucrativos propôs um método controverso para retirar o plástico dos oceanos. a) Qual foi o método proposto e o que o grupo afirma que poderá realizar através do uso do mesmo? (0,5 pontos); cite duas críticas feitas a este método. (0,5 pontos); c) Segundo dois pesquisadores, qual seria a solução mais eficaz no que tange à fonte geográfica do plástico que entra nos oceanos? (0,5 pontos); d) cite três ações às quais poderíamos recorrer para evitar que o plástico chegue até os oceanos. (0,5 pontos).