

Oceanic Microplastics, A Giant problem?

Interview with Elitza Germanov, researcher for Marine Megafauna Foundation Indonesia

While diving on my travels in Asia I saw the most astonishing under water scenes. Oceans so rich of life and colours it felt like someone dropped a big paint bomb under water. A different planet in another galaxy, home to the most amazing and majestic creatures you can imagine. One of my most memorable under water moments was diving with Manta Rays at Nusa Lembongan, near Bali, Indonesia. As we approached the bay where they were swimming we could see the enormous dark silhouettes sliding up and down under the surface of the water. As if giant Hang Gliders were circling the air above us.

Under the water surface I had a very humbling experience with these ancient Giants. Their grace is ballerina like, dancers floating through the water, calm and peaceful.

After a little research on these fascinating creatures I soon found out that, like with any other Ocean Giant there is an enormous pressure on their populations. Sold as a delicatessen or even for parts in traditional medicines, or accidentally caught as by catch the numbers are decreasing. But there might be another big risk for their future existence. The presence of plastics of all sorts in the global oceans that are digested by Manta Rays and all other ocean inhabitants. A big and world wide problem of a magnitude that we are only just started to understand.

Luckily I encountered Marine Megafauna Foundation Researcher Elitza Germanov who is doing absolutely fantastic work studying the effects of (and solutions for) the issue of plastics in the oceans in Indonesia. Read my interview with her here:

Aart Jan



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What is the core of the research you do in Indonesia at the moment?

I am studying about the effects of plastics in the marine environment, especially the very small ones (microplastics), on large filter feeding fish like manta rays and whale sharks.

What does your daily research life look like?

The first step to the project is estimating the amount of plastic marine pollution in feeding habitats of my focal species.

To do this the team, often composed of volunteer interns and local Indonesian University students, launches a boat and heads out to the areas where we know manta rays are often sighted feeding. We use a plankton net to sample the water in a standardised way so that we can estimate the amount plastic in the water on a given day.

“The issues with plastics in our oceans can be overwhelming. It is a wide scale problem that now stretches from pole to pole”

We also visually survey the site, counting and classifying the floating plastic debris we see. Over time we can get seasonal estimates. If manta rays are present at the time of sampling we enter the water with them, and using a smaller net we sample the water a bit closer to feeding manta rays. We also photographically identify each animal by taking photos of their bellies, which are unique to each individual. This way we can confirm if the feeding manta rays are “residents” or “visitors” passing through and begin to understand how plastic pollution in a localised habitat can impact species with large “home” ranges. This is one of my favourite parts of the research.

We then return back to the field lab to process the samples, which involves preserving them and then separating the plastic from the organic matter, such as plankton. We weigh, measure and classify all pieces of plastic to gain an understanding of the biggest polluters. So far film plastics, plastic bags and wrappers, are in the lead. So far our preliminary estimates are that manta rays could be ingesting as high as 40-90 pieces of plastic per hour of feeding. All manta ray photographs are uploaded to the global manta ray database - mantamatcher.org- the world’s largest depository of manta ray data. The database also has automated matching software speeding up the process of identifying the manta rays.

What is the core of the issue with plastics/microplastics in the oceans? In general and in Indonesia?

The issues with plastics in our oceans can be overwhelming. It is a wide scale problem that now stretches from pole to pole. Plastics do not biodegrade readily and can persist in the environment for decades or centuries. All the while they fragment into smaller pieces (microplastics) and are more easily ingested by even the smallest sea creatures. Some microplastics already start small, like those added as abrasives in our personal care products (microbeads), or small pellets or “nurdles” that are used in plastic manufacturing. These small pieces find their way to the oceans through our drains. Plastic is also a very good absorbent for toxic chemicals like pesticides and



Lembongan Field Lab

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industrial pollutants, concentrating these toxins in 100s of times higher concentrations than what is found in the surrounding waters. We know these toxins have negative impacts on living things but we do not yet know how they may travel through food webs and affect threatened species and even humans.

“Manta rays and whale sharks are iconic species that have high economic value for tourism in Indonesia and neighbouring countries”

Indonesia is particularly affected by plastic pollution in large part because of its geography and its lack of infrastructure for waste management. There are many coastlines in Indonesia and traditional waste disposal methods are to discard waste into the sea or riverbeds or burn and bury it. These methods of disposal release and estimated half to over a million metric tons of plastic waste into the ocean each year, placing Indonesia behind only China in terms of the volume of plastic released into the marine environment.



Microplastics



Macroplastics

What is your goal with your research and when would you be satisfied with the results?

I am using a “flagship” species conservation approach to tackling the bigger issue of marine debris. Manta rays and whale sharks are iconic species that have high economic value for tourism in Indonesia and neighbouring countries (e.g. Philippines, Thailand and Australia). These species are unfortunately listed as threatened on the International Union for the Conservation of Nature (IUCN) Red List and as such they get a lot of attention for conservation initiatives. Equally important, any additional threats to these species, such as marine debris, must be identified, investigated and improved upon urgently.

Through community involvement (e.g. educational presentations and outreach) we can raise marine debris as an issue that is potentially threatening local livelihoods. Surveys of stakeholders in villages located close to manta ray habitats reveal that over 90% of people view healthy manta ray populations as important to their livelihoods. The same people currently have very poor waste management habits and state lack of infrastructure as their main reason for these habits rather than a will to curb their pollution.

It is unrealistic to think that the research will be able to completely reverse the clock and provide us with a pristine pre-plastic marine environment; however, seeing local businesses, governments and individuals adopt a more aware attitude and take actions to stem the flow of plastic marine debris will be considered as a win.

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What is the most important obstacle in the way of that goal?

Human attitudes are to me the biggest obstacle in the way. I am often up against resistance to change with the perceived notion that change is not important, too hard, or not worthwhile (too late). Yet, I see a glimmer of hope with very person who shops conscientiously and reduces their waste and consumption, and with grassroots projects, businesses and public initiative working towards the same goal.

What is your most fantastic experience so far concerning Mantas and other marine life out there?

Before I was even involved in manta ray conservation, in fact it was my second time ever seeing manta rays, I chanced upon a mass aggregation of manta rays in the Komodo National Park, Indonesia. There were upwards to 100 manta rays in the water at that time. Many were feeding, others were cruising together in large groups or gracefully cleaning amidst the coral heads. It was perhaps the turning point for me and led me down the path I am on now.

And the most disturbing?

Similarly, it involved a large group of manta rays feeding. The disturbing part was that mixed in with the thick soup of zooplankton, which is what manta rays feed on, was a large amount of plastic debris. Together with the other divers we tried to catch all the big pieces we saw coming up to the surface with fistfuls of plastic drinking straws, plastic single use water cups and wrappers and films of all sizes. It really saddens me that we are doing this to our marine environment and the animals that have been living on this earth millions of years before us are now suffering.



Elitza in action

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“Unlike many other fish, manta rays are one of the few marine species that appear to be as curious about humans underwater as we are about them”

How would you describe the Manta Ray as a creature?

Manta rays are gentle giants with no inherent ability to cause any harm. Their main form of self-defense is simply through their speed and agility and perhaps intimidation from their large size.

They are very graceful in the water and watching them take turns cleaning at a coral head is one of my favourite pastimes. They are also extremely intelligent. Scientific proof for this comes from their relatively large brains. Furthermore, unlike many other fish, manta rays are one of the few marine species that appear to be as curious about humans underwater as we are about them.

How could we change our daily behaviour in our own countries to create a positive change in the plastic issue?

Lead by example is my motto. I always carefully consider what I am purchasing and if a more sustainable alternative exists. Plastic in our lives is now unavoidable, but much of it is unnecessary. For the complete “newbie” you could start by always bringing your own shopping bags, refillable water bottle and saying no to plastic straws in your drink. You can read household product labels carefully and avoid purchasing ones with microbeads. You can support local farms and businesses that do not excessively use plastic packaging. Cooking at home or eating in the restaurant rather than using Styrofoam take away boxes and single use plastic cutlery is another example.



Microplastics sampling

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But isn't the Western Waste Management good enough to prevent plastic ending up in the ocean?

Well yes, the waste management of western countries is better on average, even though some are doing a lot better than others. But the Western usage is a lot higher per capita as well and thus still leading to plastic waste in the environment.

And how could we change our behaviour positively while traveling in Indonesia.

The simple tips above are extremely important in Indonesia. Lobbying for less plastic can begin with asking for no plastic bag or straw and for a place to refill your water bottle (tap water is not potable).

Could you describe MMF as an organisation?

MMF is a global organisation, but we also act locally, with the aim of saving ocean giants from extinction. We work closely with the communities that are stakeholders of the marine habitats that we work in. We understand that when working in the developing countries, capacity building is extremely important to ensure our aims are carried forward. We also strive to align ourselves with other organisations that have similar conservation goals and offer support in any way we can.

How can we support MMF's work/your work, financially or in other ways?

There are many ways to get involved in conservation and help our efforts. If you have a special skill set or are a SCUBA diver we are often looking for dedicated team members to join us. We also have research trips that are open to the public. By joining on these trips you get first hand experience in conservation and you help us offset the costs of these expeditions. You can also support us by participating in our Adopt-A-Giant program. Your perk is getting to name a manta ray or a whale shark and receiving status updates on that individual each time it is seen.



The team

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Any tips or must sees while in Indonesia?

Indonesia is in the heart of the Coral Triangle Region, our highest marine biodiversity on the planet. So dipping your head underwater, whether it be snorkelling or diving is a must. However, make sure you choose a responsible and eco conscious operator, which has clear codes of conduct on how to minimise impacts on the marine environment. Visit marine protected areas and when you interact with locals be sure to tell them how important protecting this precious region of the marine environment is for the entire planet.

“If you have children get them outdoors as much as possible. Help them to cultivate a sense of wonder for our natural world”



Any last words?

Spend time in nature wherever you are. If you have children get them outdoors as much as possible. Help them to cultivate a sense of wonder for our natural world. We will always work to protect what we love.

More information:

More on Elitza and MMF

<http://www.marinemegafauna.org/marine-megafauna-foundation/students/>

<http://www.marinemegafauna.org>

Tips and solutions

<https://www.nrdc.org/stories/10-ways-reduce-plastic-pollution>

<http://www.freshplaza.com/article/160888/Sustainable-reusable-bag>

<https://www.theoceancleanup.com>

<http://www.plasticsoupfoundation.org/en/>

<http://plasticwhale.com>

mantamatcher.org