



Expedition renaming ceremony



RTW Leg4 Jamie Colman expedition



expedition leg2 Sophie Dingwall



RTW8 eXXpedition Emily Penn



RTW5 eXXpedition Sophie Dingwall



RTW Leg4 Jamie Colman expedition

AN INTERVIEW WITH EMILY PENN, FOUNDER OF EXXPEDITION



Emily Penn studying sample - credit: Eleanor Church, Lark Rise Pictures

1) Can you tell us about how eXXpedition started? What inspired you to start these voyages?

I've always loved our ocean and I learned to sail when I was a child. In 2008, I was hitchhiking from England to Australia for a job as an architect, which is what I trained in, but I wanted to get there without taking an airplane, so I ended up on a boat crossing the

Atlantic and Pacific Ocean. We didn't have any running water onboard for a shower, so we had to just stop the boat and go for a swim! One morning, I jumped in the water and found a toothbrush floating by. At the time, we were 800 miles from the nearest land. In fact, the closest people to us were the space station in orbit above our heads. And I remember thinking, this is the most remote part of our planet and there's a toothbrush, and then a cigarette lighter, and a bottle top and a comb floating by – and then we start to realise the fragments in between. Since then, my career has been dedicated to finding solutions to tackle ocean plastic pollution and has taken me all over the world facilitating science at sea, outreach and the implementation of solutions on land. In 2014, I co-founded eXXpedition – organising all-women sailing voyages with a focus on plastic and toxic pollution in the ocean.

2) When you're on an expedition, how do you analyse the water? What equipment do you use and what are you looking for?

During our at-sea missions, when we're on-board we use a manta trawl to assess microplastics in the surface of the ocean and a NISKIN bottle to collect sub-surface water from a depth of 25 m to understand how microplastics are sinking through the water column. We also collect sediment using a grab sampler when we are in coastal waters. The at-sea research is combined with land-based research - litter surveys, waste management assessments etc - to be able to investigate the situation in a holistic way.

In our water samples, the majority of what we find are microplastics: small fragments which have broken off from larger plastic items, however understanding the sources of these small pieces of plastic can be challenging, and the first step is to work out what type of plastic they are.

On-board during eXXpedition Round the World, we used a PerkinElmer Spectrum Two FTIR spectrometer, and this instrument allows us to do just that. The FTIR spectrometer uses infrared light to identify polymers, so we can work out whether the fragment is made of polyethylene, polypropylene or any other type of plastic. So far during our voyages we have found a high prevalence of polyethylene in surface waters; this plastic is used widely in food packaging, bottles, films and plastic bags.

We've recently published a scientific paper which is the first holistic assessment of plastic pollution in the Southern Caribbean. The full study – Source, Sea and Sink – a holistic approach to understanding plastic pollution in the Southern Caribbean comes from our research in the Caribbean on the first stages of our eXXpedition Round the World mission.



Processing a sample - credit: Eleanor Church, Lark Rise Pictures



Marine debris tracker attachment



Crew members studying samples - credit: Eleanor Church, Lark Rise Pictures



Crew members studying samples - credit: Eleanor Church, Lark Rise Pictures



eXXpedition science at sea



Crew members studying samples - credit: Eleanor Church, Lark Rise Pictures



Big waves over the bow - credit: Eleanor Church, Lark Rise Pictures

3) It can't always be easy to carry out research in all weather conditions, has there been a time when conducting your research was particularly challenging?

It's fair to say it's never easy but we've had a lot of practice! The combination of remote ocean sailing, scientific research at sea and bringing together crews of international multidisciplinary women with mixed levels of sailing experiences makes offshore sailing expeditions, extremely challenging feats to pull off! It is a delicate formula to get right. Happily, we seem to have found the right balance over the years! For us, no doubt, the greatest challenge we've faced is what we're facing right now with the global pandemic of covid-19. Like everyone around the world we worked hard to adapt to these changing times and the latter part of our circumnavigation was done through a series of 8 virtual voyages which used technology to bring the experience to our participants around the world.

4) Why have you used all female crews on your missions?

eXXpedition began as an all-women venture when I was learning about the potential toxic implications of chemicals used in the production of plastic, and other pollutants in our environment. I did a study on my own body to look at the chemicals we were finding in the ocean, these persistent organic pollutants and looked at 35 chemicals that were banned because they're toxic. It turned out that I had 29 of these 35 chemicals in my blood. And as a woman, having those chemicals inside your body when you're pregnant is really bad news and you can actually pass them onto your children when you give birth. It made me think wow, this is actually quite a woman centred issue so it felt right to tackle it with an amazing team of women. Plus, when we first set out with our tagline of "making the unseen seen", we originally thought it was about microplastics, these unseen bits of plastic in the ocean and the toxic pollutants as well. But then we started to realise that there were many more "unseens" that we were highlighting, and a lot of that was women in science, women in sport and exploration and sailing. And our project touches on so many different areas that don't typically have women at the forefront.

5) How can people get involved with your work?

The more time I spend at sea, the more I realise that the solutions to ocean plastic are on land. Every bottle, toothbrush or clothes peg polluting the ocean once belonged to someone. It's billions of micro-actions that have led us to this situation and it's billions of micro-actions that will get us out.

We're passionate about using technology to help solve the plastic crisis and on World Ocean Day last year, in partnership with SAP, eXXpedition launched the SHiFT Platform to help individuals and businesses find their role in solving ocean plastic pollution. Over 5,000 people a month from 133 countries use the tool to navigate hundreds of impactful solutions from sea to source and find the ones that are best for them to action.

From small individual changes to large global projects, solution examples range from high-tech to a return to basics. They include making DIY cleaning products, lobbying for more drinking water refill stations in their city, reducing plastic in the supply chain to going entirely packaging free. It even features innovative products like NONA's Recycled Ocean Plastic Clothes Pegs, which are made from retired fishing gear that may otherwise end up in the sea! Visit www.shift.how.

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