No Plastic Oceans Project

www.noplasticoceans.org

Our oceans are increasingly polluted by plastic but as yet we do not have enough reliable information about that pollution to enable an agreed credible strategic plan to remediate the pollution to be put in place.

More than 8 million tons of plastic is dumped into our oceans every year (Plastic Oceans https://plasticoceans.org/the-facts/). It doesn't just float on the surface injuring and killing fish, seabirds and marine mammals. Sunlight causes degeneration of the plastic and much of it breaks down to micro particles, sinking to the ocean floor where it has been detected at 5,000m depth. Samples taken by scientists at the Scottish Association for Marine Science off the Western Isles found that 48% of creatures had plastic in them, at a depth of 2,000m. All organisms in our oceans are daily subject to plastic rain which is now found in every ocean organism from nano-plastic in zooplankton to plastic bags and ropes in whales.

Marine plastic pollution has impacted at least 267 species worldwide, including 86% of all sea turtle species, 44% of all seabird species and 43% of all marine mammal species. The impacts include fatalities as a result of ingestion, starvation, suffocation, infection, drowning, and entanglement (https://www.cleanwater.org). National Geographic reports that "some 700 species of marine animals have been reported so far to have eaten or become entangled in plastic" (National Geographic Magazine, June 2018 p.81).

Researchers at the Algalita Marine Research Foundation documented an increase in plastic debris in the Central Pacific Gyre five-fold between 1997 and 2007, where the baseline in 1997 showed plastic pieces outnumbered plankton on the ocean surface 6:1 (Charles Moore, Algalita Marine Research Foundation, presentation at California District Attorneys Association, Sept. 2006).

A report by the Ellen MacArthur Foundation, in partnership with the World Economic Forum in 2016 warned that, on current trends, there could be more plastics than fish in the ocean (by weight) by 2050 (https://www.ellenmacarthurfoundation.org/assets/downloads/news/New-Plastics-Economy_Background-to-Key-Statistics_19022016v2.pdf).

Every year between 8 and 14 million tons of plastic flow into our oceans and are broken down to micro (less than one fifth of an inch - or less than 5 millimeters) or nano plastic size that is ingested by marine creatures. Research evidence on ecotoxicity conducted at the University of Toronto has

demonstrated that “oysters exposed to tiny pieces of polystyrene … produce fewer eggs and less mobile sperm”.

A recent study by the Ocean Conservancy and the McKinsey Center for Business and Environment found that boosting trash collection rates to 80 percent in just five Asian countries — China, Indonesia, the Philippines, Thailand and Vietnam — could reduce ocean plastic waste by a whopping 23 percent over a decade (https://www.financialexpress.com/industry/plastic-pollution-8-countries-in-asia-are-responsible-for-63-of-total-waste-flowing).

Any action to reduce the amount of plastic flowing into our oceans requires reliable data. Currently there is very little reliable data on the amount and distribution of microplastics. The little data we have pertains almost entirely to the northern hemisphere and particularly the major shipping lanes. There is almost no reliable date from the Southern Hemisphere oceans.

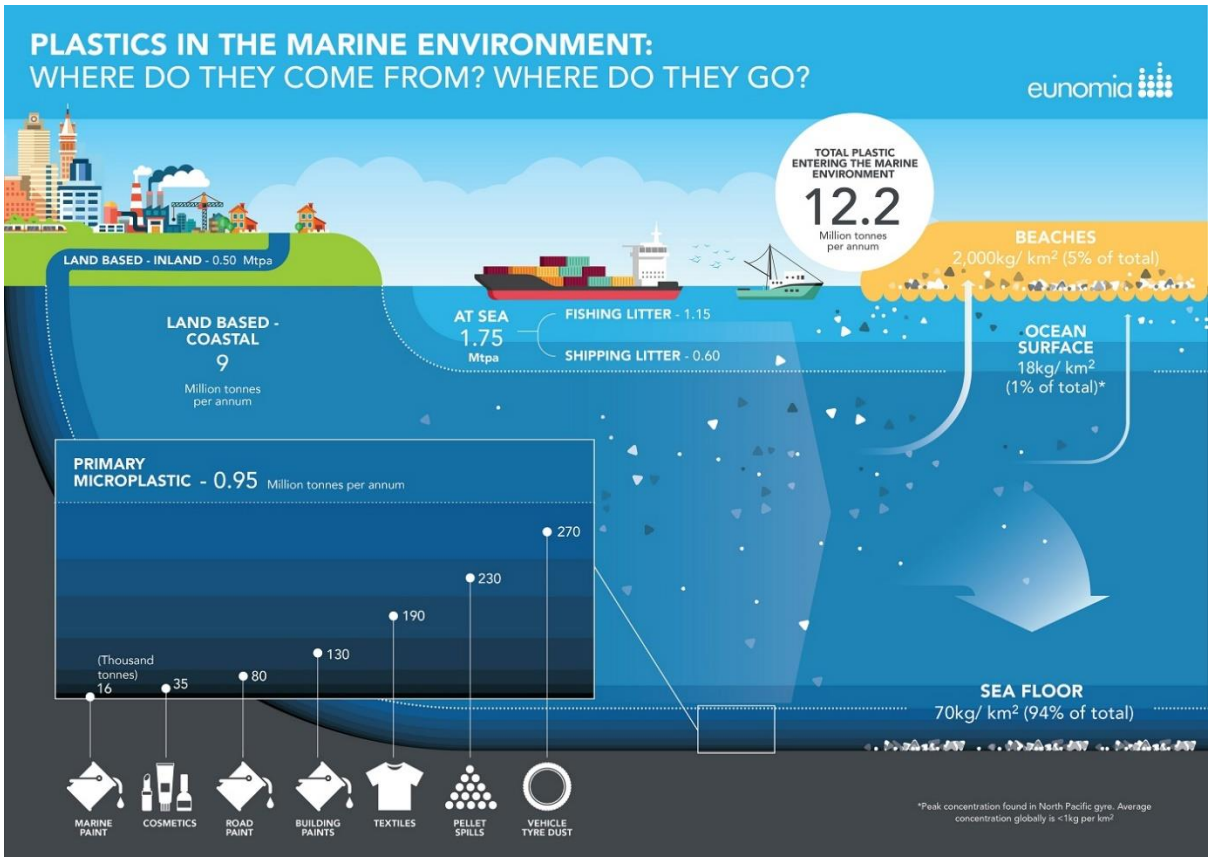


Figure 1: Plastics in the Marine Environment

Of the overall amount of plastic that is considered to be accessible (i.e. the plastic floating on the surface of the oceans and on beaches), a little over 1% is accounted for by floating plastic (Figure 1). The relative amounts of oceanic plastic (Figure 2) are:

- Floating - 268, 000 tonnes (0.27 million tonnes);
- Beach – 1,418,000 tonnes (1.4 million); and
- Sea Floor – 25,270,000 (25.3 million).

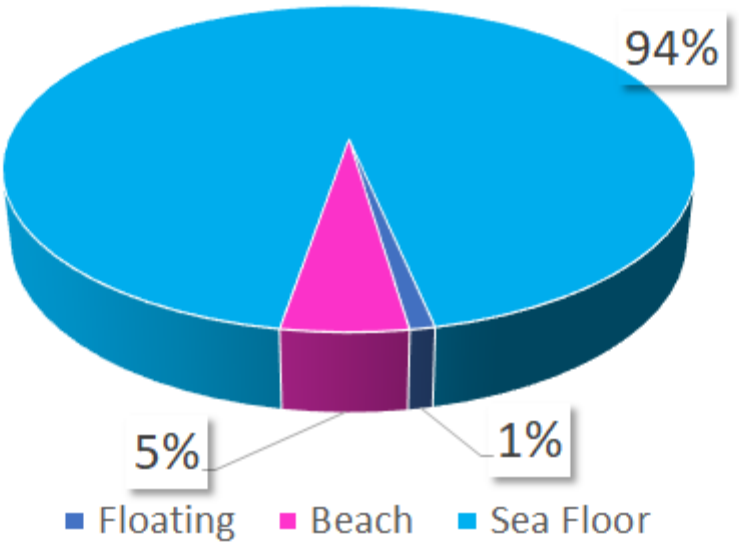


Figure 2 Percentage of Oceanic Plastics

The potential solutions to save our oceans and save us must begin to be deployed without further delay and cannot hope to have a significant impact without the support of people around the world. Therein Jon Sander's 11th solo circumnavigation of the globe has the potential to raise awareness of the problem facing us and unite people and organisations in finding and implementing solutions.

Micro and Macro Plastics?

In this project we seek to measure the mass of microplastics generally defined as starting at the lowest size of 0.33 mm (based on typical neuston net mesh size of 0.33 mm) and an upper boundary of approximately 5.0 mm. Mesoplastic has a lower limit of 5.00 mm, and no defined upper limit although a typical plastic bottle at 200mm is generally accepted as the upper boundary of mesoplastic. Thereafter we have macroplastic with an unlimited upper boundary. Figures 3a and 3b show the most reliable data for the distribution of marine plastic debris. The data set is particularly sparse in the southern hemisphere, a situation the No Plastic Oceans voyage seeks to remedy.

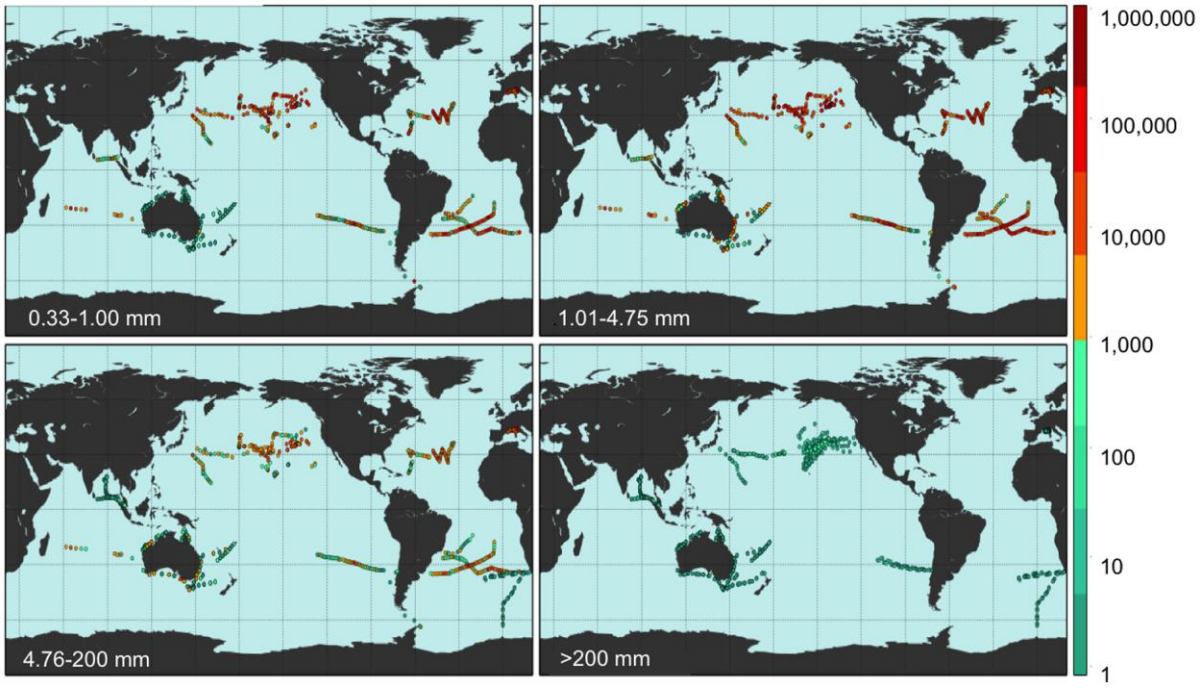


Figure 3a: Field locations where count density was measured. Count density (pieces km^2; see colorbar) of marine plastic debris measured at 1571 stations from 680 net tows and 891 visual survey transects for each of four plastic size classes (0.33–1.00 mm, 1.01–4.75 mm, 4.76–200 mm, and .200 mm). (Source: PLOS ONE | DOI:10.1371/journal.pone.0111913 December 10, 2014)

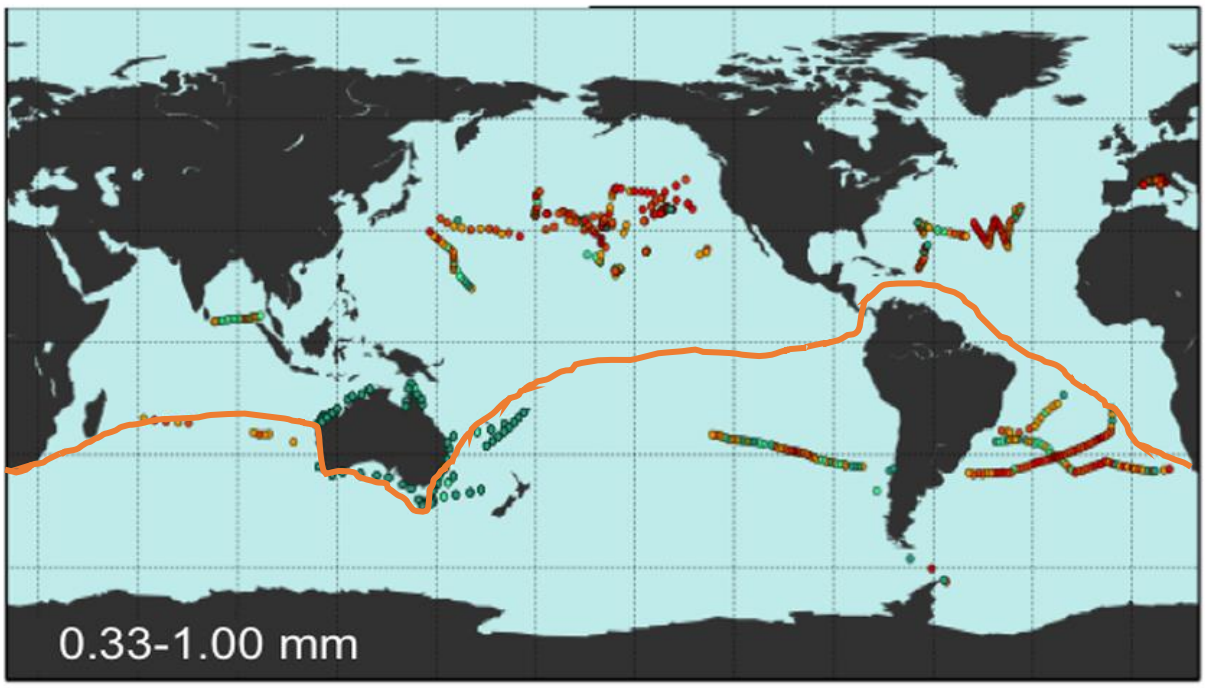


Figure 3b: Field locations where count density for microplastics size 0.33–1.00 mm has previously been measured (dots) with track for ***No Plastic Oceans*** voyage (orange line).

Project Description

The principal goal of the ***No Plastic Oceans*** circumnavigation is to bring global attention to the presence of plastic in our oceans, the impact of oceanic plastic pollution on marine life and the manner in which plastic is infiltrating our food chain.

The secondary goal is to collect reliable data from the Southern Hemisphere oceans to supplement data available for Northern Hemisphere oceans. A study using an 11-year data set in the North Pacific estimates a weight of 21,290 metric tons of floating microplastic (Law K, Moret-Ferguson S, Goodwin D, Zettler E, DeForce E, et al. 2014). The distribution of surface plastic debris in the eastern Pacific Ocean was mapped from an 11-year dataset (Environ Sci Technol: doi: 10.1021/es4053076). Reliable and detailed information for the Southern Hemisphere oceans is needed.

We seek sponsors and partners who can help leverage this voyage to heighten global public awareness of the issue.

The project will extend over two years with the initial six months devoted to building and integrating all sponsor and partner efforts, preparing Perie Banou II for the voyage, building global contacts and drop-off points for water samples. The six to 18 months period will be the voyage where Jon will collect water samples every day and periodically drop them off at pre-arranged ports for despatch to marine institutions for analysis. Throughout the voyage Jon's progress will be monitored every day through on-board cameras streaming live images. The final period 18 to 24 months will target follow-up releasing results of the water born plastic pollution and leveraging Jon's appearances, articles and media footage to heighten global attention to the presence of plastic in our oceans and the implications for the future of our planet if remedial action is not taken.

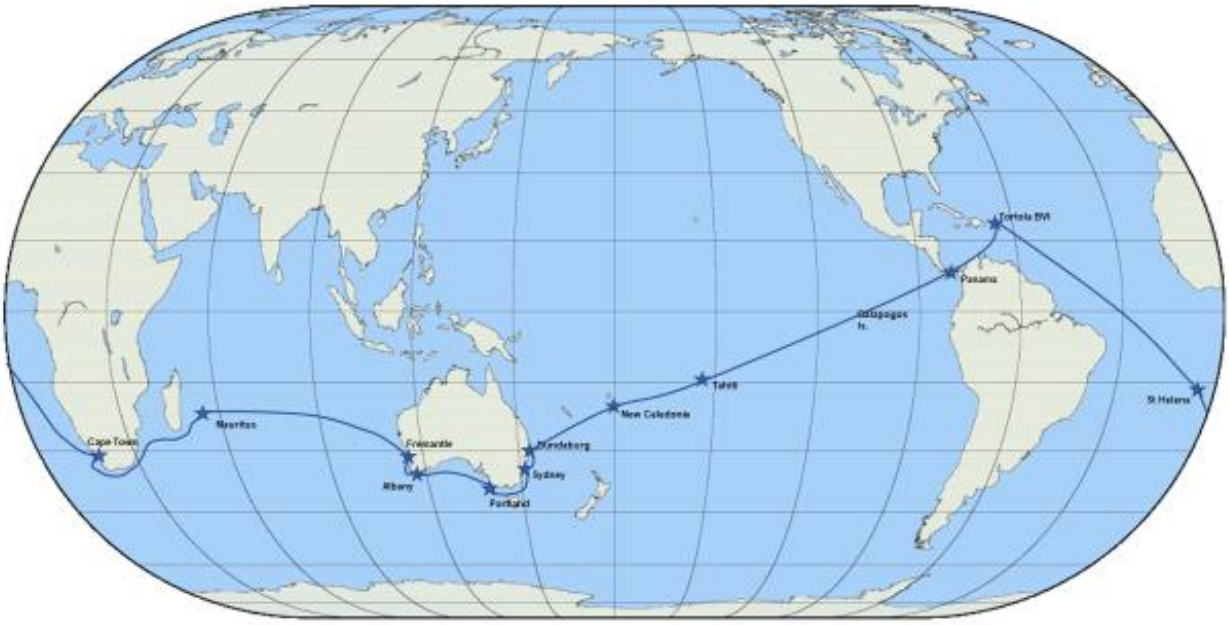
Title of Project

"No Plastic Oceans Project". www.noplasticoceans.org

Route

The voyage will commence from Fremantle, Western Australia(latitude of 32°3'21.74"S and longitude of 115°44'49.85"E or -32.05604 and 115.74718) sailing on a westerly route around the Cape of Good Hope thence northwest to St Helena thence Ascension Island and the Azores thence east to Gibraltar (if sponsor arrangements so require). Sailing west to the Caribbean, St Martin and St Bath, Panama Canal (avoiding the hurricane season), Galapagos Is., to Tahiti (via Trade winds) thence New Caledonia, Fiji and Tonga. Tonga to east coast of Australia and thence, depending on the time of year and sponsor requirements, to Perth either via Torres Strait or via Sydney and the Great Southern Ocean.

Route Map



Project Focus

The primary focus of the project is research with a secondary focus of education. Dissemination of the research results will contribute significantly to raising global public awareness of the threat posed by plastic pollution of our oceans.

Project Leader Information

Being the only person in history to have completed 10 solo circumnavigations of the globe Jon Sander's ability to undertake and complete this voyage goes without question. His most recent solo circumnavigation of the world was completed in January 2018.

Jon Sanders was born in 1939. He is an Australian citizen resident in Perth, Western Australia. Jon became the first person to sail single-handedly twice around the world, non-stop and unassisted, sailing *Perie Banou* from Fremantle on 6 September 1981 and arriving home again at Fremantle on 31 October 1982. The double circumnavigation broke records for the longest single-handed voyage at 48,510 miles, and the longest period alone on board a yacht at 419 days, 22 hours and 10 minutes. In recognition of his historic voyage Sanders was invested by Prince Charles with an OBE for services to yachting at Government House in Perth in April 1983. Locally, he was presented with an Epic Achievement Award during the Citizens of the Year Awards and an Advance Australia Award for 'special contribution to yachting'. In July 1983, he was awarded the Chichester Award by the Duke of Edinburgh. The Chichester Award is the world's most prestigious personal yachting trophy, being first presented to Sir Francis Chichester for his solo circumnavigation of the world in 1967. Jon was the ninth recipient of the award. In December 1985 Jon was elected a Fellow of the Australian Institute of Navigation.

Jon Sanders became the first person to single-handedly triple circumnavigate the world, non-stop and unassisted, on *Parry Endeavour* in a journey that took from 25 May 1986 to 13 March 1988. The trip is estimated to have taken 657 days, 21 hours, 18 minutes and 10 seconds to complete. The

Parry Endeavour voyage was endorsed as an Official Australian Bicentenary Activity and sought to commemorate the achievements of Captain James Cook in navigation and scientific discovery. 33 Guinness World Records ratified twelve records as set or broken by Sander's triple circumnavigation, including the first person to single-handedly complete five circumnavigations of the world and he set a record for the longest distance sailed continuously by any vessel at 131,535 km.

In honour of his triple-circumnavigation, the Royal Perth Yacht Club awarded Jon Sanders the inaugural James Cook Award, a gold medallion for sailors who have performed 'rare and exceptional feats of seamanship and navigation'. Jon was made a Curtin University Fellow in April 1988. In March 2017 Jon's achievements were recognised by the Cruising Club of America with the award of the Blue Water Medal (without date), presented at the New York Yacht Club. In October 2018 Jon was inducted into the Australian Sailing Hall of Fame. In an acceptance speech for one of his many awards, Jon noted, "I have completely crossed the Indian Ocean 15 times, the Atlantic 11 times and the Pacific 12 times...cleared the Cape of Good Hope 10 times and Cape Horn five times…." With Jon's 10th solo circumnavigation of the world in 2017-18 the tally of crossings has increased.

Project Details

This voyage and the associated research and dissemination of results are an important step in raising global public awareness of the deteriorating state of our oceans and the potential risk this presents not only to marine creatures but also to human populations.

Current information on plastic pollution in our oceans focuses mainly on macro-plastics with data collected primarily from heavily trafficked shipping routes. The voyage will follow less frequently travelled routes where data is sparse.

The levels of microplastic pollution in the water samples will be objectively assessed using a protocol set down by Curtin University's Western Australian Organic and Isotope Geochemistry Centre led by John Curtin Distinguished Professor Kliti Grice, a Fellow of the Australian Academy of Science and an internationally renowned organic geochemist. The results of such studies can be lost in scientific journals but in this case the participation of Jon Sanders making his 11th solo circumnavigation of the globe – never before achieved in the history of our planet – has the potential to raise public awareness.

Goals and Objectives

The primary goal is to attract global public attention to the threat posed by plastic in ocean waters. The objectives that flow from this goal are to (1) measure the presence of micro-plastics in ocean surface water; (2) disseminate those results in conjunction with credible marine institutions; (3) bring the threat of micro-plastic pollution to the attention of the public worldwide.

Timeframe

Departure is projected to be October 2019. The duration of the voyage is minimum 8 months and maximum 12 months. There will be six ports of call where samples will be disembarked and new sample containers boarded. Each port will be an opportunity to re-supply and review the status of the vessel as well as conducting such maintenance and repairs as may be required to ensure the vessel continues in the most seaworthy condition possible.

Summary of Outputs and Results

The ***No Plastic Oceans*** project will:

- Collect credible data on the levels of micro-plastics in surface water on a specified route encompassing the globe as the basis for a scientific paper on the levels of micro-plastics in surface water on a specified route encompassing the globe.
- Stream real time vision of the voyage from the vessel.
- Heighten awareness of the general public of the current and potential problems presented by the continuing proliferation of plastics in our oceans.
- Produce a series of journal articles in newspapers and magazines.

The ***No Plastic Oceans*** project will contribute to raising public awareness of the current and potential problems presented by the continuing proliferation of plastics in our oceans and therein contribute to support for further scientific research on the subject, public awareness and behaviour change towards pollution of our oceans, public participation in small-scale local projects to clean-up and prevent plastic pollution of our oceans and waterways,

Project Members

Project Leader: Jon Sanders, AO, OBE, CitWA, FAIN

Project Role/Relevant Skills: Skipper and solo circumnavigator. Jon was inducted into the Single-Handed Sailor's Hall of Fame in Newport, Rhode Island, USA in 1991, awarded the Blue Water Medal (without date) by the Cruising Club of America in 2016, the Chichester Award by the Royal Yacht Squadron (1983), the James Cook Award and inducted into the Australian Sailing Hall of Fame in 2018. Jon is a fellow of the Australian Institute of Navigation (date), a fellow of Curtin University and a recipient of the Centenary Medal, Order of the British Empire and made an officer of the Order of Australia.

His records include:

1970 First solo circumnavigation of the globe sailing east to west mostly sailing through tropics.

1981-82 Double non-stop solo circumnavigation of the globe sailing west to east via Southern Ocean.

Triple non-stop solo circumnavigation which the Guinness World Book of Records cites this as "the longest distance sailed non-stop by any vessel". (71,023 nautical miles)

First-time singlehanded (solo) sailing records include:

- Five non-stop circumnavigations of the globe (in the years 1981-1987)
- Five Cape Horn roundings (one east-west and four west-east)
- Five Cape Horn roundings during non-stop circumnavigate ons
- Four roundings of the five southernmost capes
- One circumnavigation using the east-west route
- Four circumnavigations using the west-east route
- Circumnavigate non-stop via Cape Horn west about and east about.
- First person to circumnavigate Antarctica solo and non-stop and unassisted

Other voyages and transits include:

- Indian Ocean (16 times)
- Atlantic Ocean (13 times)
- Pacific Ocean (13 times)
- Australian seaboard, west-to-east and east-to-west (47 times)
- Cape Horn (five times)
- Cape of Good Hope (12 times)
- Panama Canal (seven times)
- Suez Canal (four times)

Jon has also competed in seven Sydney to Hobart Yacht races, the Parmelia Race Plymouth to Perth and the Cape to Rio de Janeiro three times.

Project Co-ordinator: Stephen Davis

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Telephone: +61(0)409557151

Project Role/Relevant Skills: Project Co-ordinator. Sailor and member of RPYC. Advisor to Heads of Government and major project manager for more than 30 years.

Project Logistics: Morgan Flower

Email: morgan.flower@yahoo.com.au

Telephone: +61(0)421331159

Project Role/Relevant Skills: Project Logistics and in voyage communications. Sailor and member of FSC and RPYC.

Budget Details

Vessel Preparation

Insurance

En Route Support

Communication

Water sampling

Contingency

Funding Sources

Direct funding

In-kind (equipment sponsors)

Expected Outcomes

Output

- Water sample analysis for micro and nano-plastics across the Indian, Atlantic and Pacific Ocean.
- A technical report by a reputable marine research institution on the results of the voyage to be published online.
- A journal article to be published in a widely circulated and reputable sailing magazine.
- Ongoing dissemination of the results of the voyage to be publicised in schools in conjunction with Jon Sanders.
- Heightened awareness by the general public of the current and potential problems presented by the continuing proliferation of plastics in our oceans.

Attachments

Vessel Certification

Insurance

Health Report Jon Sanders

Partner Organisations

Royal Perth Yacht Club – providing pen facilities and hardstand for vessel. Co-ordinating partner yacht clubs which will serve as staging locations to drop off and return water sample to Curtin University.

Fremantle Sailing Club – providing voyage planning advice, communications co-ordination.

Curtin University – (i) providing technical advice on sample collection; (ii) conducting laboratory analysis of water samples; (iii) drafting and publishing report of water testing

Communication – providing shore to vessel communication and co-ordinating 24 hour voyage communication. Fremantle Sailing Club

Real time Voyage Plotter – providing real time vessel location and online display. CientSAT and Nebo.

Media – advising a communication strategy for Australia and international media. TBA

Safety – (i) devising safety and rescue plan; (ii) voyage monitoring. Royal Perth Yacht Club and Fremantle Sailing Club.

Boat-cam – providing cameras to capture vision of the voyage to the web. One Story film makers.

Vessel preparation management – Boats Services Australia.

Contact

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