All hands on deck

Innovative citizen science projects are enabling boat owners to take part in essential marine and environmental research, says *Richard Madden*. Here's how you can help...

The SARAH initiative (right) tackles ocean pollution by asking yachts to use giant nets to collect plastic

GREAT FOR owners with limited time

MARINE PLASTIC POLLUTION

The International SeaKeepers Society's SARAH Initiative

M uch like *BOAT International*'s Yachts for Science initiative, the International SeaKeepers Society encourages superyacht owners to volunteer their vessels as platforms for ocean research and marine conservation. The non-profit organisation's DISCOVERY Yachts Programme provides access to the ocean for research, scientific discovery, community engagement, educational outreach and citizen science expeditions.

One of its many projects is SARAH (sample, aggregate, return, analyse and help), which targets marine plastic pollution as one of the most serious threats to the health of the oceans and a major hazard to marine biodiversity. Participating superyachts are asked to tow bin-like nets for 15 minutes at a time collecting plastics they encounter at sea. The crew and guests can then collect the contents in sample filters, which are sent to Florida International University. Once there, the plastics' chemical composition, density, type and size are recorded in its database. Yachts are encouraged to conduct as many net tows as possible during their travels. *seakeepers.org*
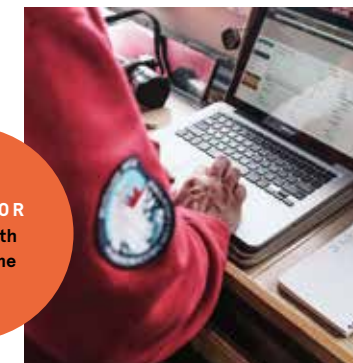
POLAR RESEARCH

Polar Citizen Science Collective

T he five founding members of the Polar Collective are expedition guides who believe that more can be done to get visitors to the polar regions to contribute scientific data for research. Launched in 2018, it has already created collaborations with scientific organisations and developed standardised procedures for the training of data collectors, distribution of data and feedback delivery.

Its aim is to encourage boat-based citizen science programmes using simple technology, by developing a range of scientific research projects. Many of these are simple to participate in, requiring basic online training with no equipment other than a smartphone. Existing 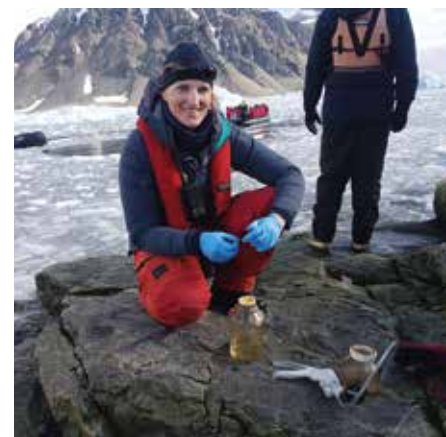research projects include ornithology, marine biology, microplastics, atmospherics, glaciology and sea ice. Contributors can help with projects as simple as cloud observations for 15 minutes twice a day, or can go further by undertaking marine phytoplankton research, which requires two to three days of pre-voyage training to become familiar with the equipment involved (which is provided free of charge). *polarcollective.org*
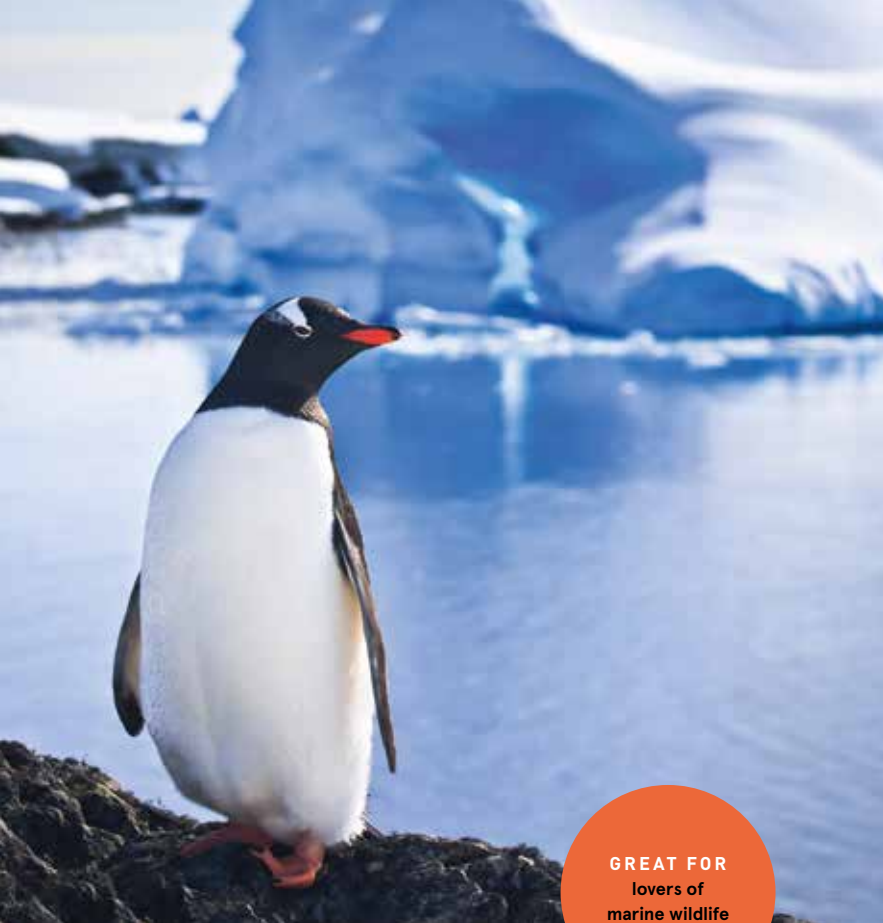

The Polar Collective studies phytoplankton in Antarctic fjords (below) as well as melting sea ice (above) to monitor the Antarctic ecosystem

GREAT FOR getting owners, crew and guests involved

M ost of us are conservationists at heart, and those of us who love the oceans have nothing to gain from leaving them in a worse state than we found them. Quite the reverse. Knowing exactly what each of us can do to help can be difficult, however. And I don't just mean behavioural changes like recycling, avoiding single-use plastics and reducing our carbon footprints.

For those who design, own or sail yachts, the question is more proactive. What can be done to contribute to the understanding of our oceans and thereby help improve their health? One answer is to build research yachts, the most high-profile example being Norwegian billionaire Kjell Inge Røkke's REV Ocean. When it launches in 2021, the 182.9 metre, built by Vard, will be the largest research and expedition vessel on the planet.

For most of the superyacht community, however, the answer is more mundane, but perhaps even more powerful. "Just one per cent of money donated for philanthropic purposes is directed towards ocean conservation," says Nina Jensen, CEO of REV Ocean. "Owners could drastically change that by contributing to ocean conservation initiatives through recognised organisations such as the WWF. For the areas they are travelling to, they should contact local institutions and scientists and contribute either with vessel time, by lending equipment or by funding local projects, all of which I'm sure would be a positive addition to the yacht experience."

BOAT International's Yachts for Science programme was showcased at our annual ocean conservation event, Ocean Talks, at London's Royal Geographical Society in June. It brought together scientists looking for berths to conduct their research projects and superyacht operators able to facilitate their needs. Initial results have been extremely encouraging, and a number of successful matches between owners and scientists have already been made.

But even when scientists themselves are not on board, there is still much that can be done to contribute to the data collection that is the raw material of scientific understanding. The options on the following pages range from readily available smartphone apps that can be used by both crew and guests to data-collection equipment of varying degrees of technological sophistication, which can be deployed after minimal training. Here, we present some of the options out there.

ABOVE AND BEYOND

If you'd like to do more to help, you can offer to host a scientist on board your boat. Email **yachtsforscience@boatinternationalmedia.com** to volunteer your yacht for 2020.

A researcher (left) in a Siberian Arctic river uses a Secchi Disk to measure water transparency
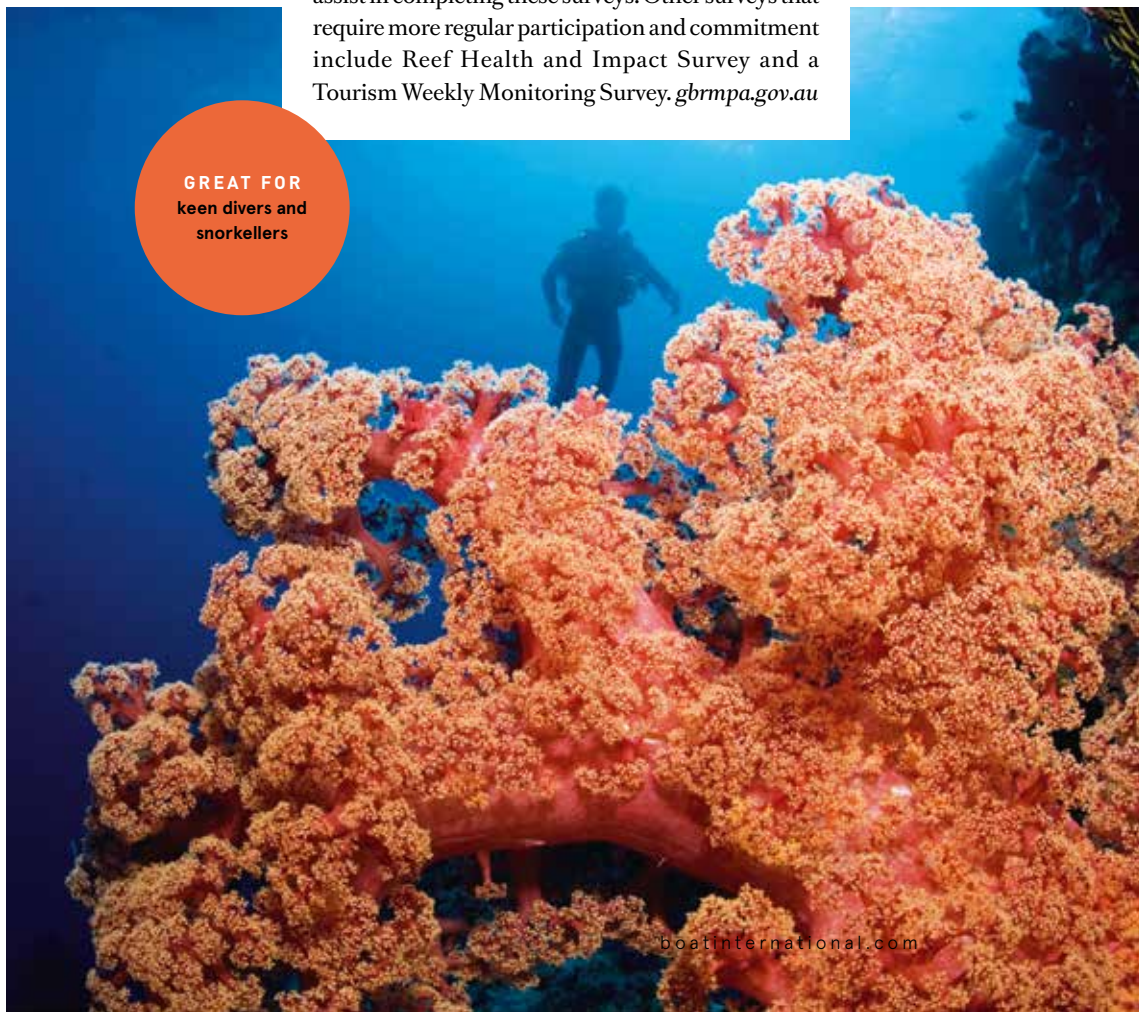
GREAT BARRIER REEF CONSERVATION

Eye on the Reef

E ye on the Reef is a monitoring and assessment project that enables anyone who visits the Great Barrier Reef to contribute to its long-term protection by collecting valuable information about reef health and marine animals.

The app has been built specifically to empower anyone with a smartphone to join this network of citizen scientists and contribute GPS-tagged observations. This can be anything from wildlife (including protected species) to threats such as crown-of-thorns starfish, marine pollution, coral bleaching and special events like coral spawning.

The Rapid Monitoring Survey is an underwater monitoring database recording more specific keystone species and crucial reef health observations. An online multimedia training course is available to assist in completing these surveys. Other surveys that require more regular participation and commitment include Reef Health and Impact Survey and a Tourism Weekly Monitoring Survey. *gbrmpa.gov.au*

GREAT FOR
lovers of marine wildlife

WILDLIFE ENCOUNTERS

WWF Wildcrowd

T he WWF has partnered with Apple to create Wildcrowd, a new mobile and web app, to crowdsource data collected during wildlife encounters. Wildcrowd can be used anywhere, but its initial aim is to record sightings of marine species and to help establish protected areas in the Antarctic Ocean.

Naturalists and field guides working in the polar tourism industry, including crew and guests on superyachts, can record sightings (photos and GPS locations) of whales, penguins, seals and seabirds. This will help scientists better understand specific locations of species, population changes, the interaction between predators and prey and how the changing climate is impacting critical feeding habitats.

While increasing Antarctic tourism poses some risks, the WWF also recognises that the sector can be invaluable to scientists, so the data is being shared with other citizen science projects, researchers and policymakers. *wildcrowd.net*

Yacht guests and crew can record sightings of penguins and other animals on their travels via Wildcrowd (left) or report on the health of the Great Barrier Reef (right)

GREAT FOR
keen divers and snorkellers

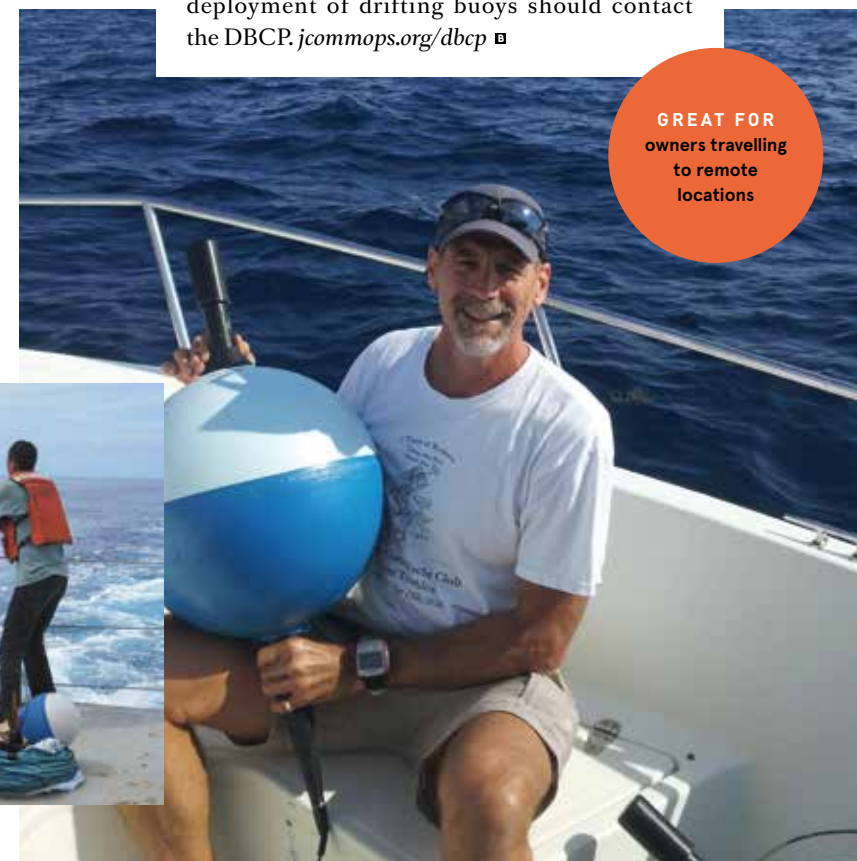**GREAT FOR**
keeping it simple

MARINE CONSERVATION

Secchi Disk

S ince 2013, the Secchi Disk Foundation has been conducting the world's biggest citizen science study of marine phytoplankton with data collected by mariners all around the globe. Phytoplankton account for more than 50 per cent of all photosynthesis on Earth and produce 50 per cent of our oxygen while removing 100 million tonnes of CO_2 from the atmosphere every day. However, concentrations have declined by 40 per cent over the past 50 years because, living at the surface, phytoplankton are sensitive to changes in sea temperature. As the foundation stone for the entire marine food chain, their abundance is also critical to the survival of other marine creatures, from fish and crabs, to whales, seabirds and polar bears.

The Secchi Disk is a 30-centimetre-diameter object attached to a tape measure and weighted to make it sink. You can make your own, or buy one from secchidisk.org. It is one of the oldest and simplest marine scientific tools and measures the clarity of seawater by indicating the amount of phytoplankton at the surface. The data is then passed on to the Secchi Disk Foundation via a free mobile app. The active participation of sailors and owners is vital to the study and the more that take part, the more valuable the database will become. *secchidiskfoundation.org*

Drifting buoys

T he Data Buoy Cooperation Panel (DBCP) is an international database co-ordinating the use of drifting buoys to observe atmospheric and oceanographic conditions in areas where few other measurements are taken. The buoys provide measurements such as sea-surface temperature, surface current velocity, air temperature and wind speed and direction. Drifting buoys also have a long history of use in oceanography, principally for the measurement of currents.

The DBCP is working to build up the resources necessary to maintain 1,250 buoys around the world. The network is unevenly dispersed owing to difficulties in deploying buoys in remote areas (especially the Antarctic Ocean). As the buoys follow ocean currents, they can also drift out of certain zones quickly or clump together in other convergence zones.

Most drifting buoys are deployed by commercial ships and research vessels, but more boats are needed to be part of this global effort to re-seed and maintain the network. Drifting buoys are easy to deploy, and no cost is involved other than storage at sea. Anyone interested in helping in the voluntary deployment of drifting buoys should contact the DBCP. *jcommops.org/dbcp* ◘

Superyachts can help deploy drifting buoys, to measure sea-surface temperature and other local data, especially in more remote regions such as the Southern Ocean

GREAT FOR
owners travelling to remote locations