THE PLASTIKI – BEHIND THE SCENES

ADVENTURE ECOLOGY

Adventure Ecology uses the magic and excitement of **unique field missions** to educate, entertain and raise awareness of environmental and social issues whilst driving **innovative real world solutions.**

Adventure Ecology's long-term vision is to create a **global, youth-based community** of change-makers that learn, share, speak and most importantly act to address our global sustainability issues in order to promote a greater respect, connection and responsibility for our Planet, its environment, species and people.

Adventure Ecology tells **adventurous stories** that educate, entertain and promote a new 'smart' thinking for a better 'Planet 2.0'.

www.adventureecology.com

HOW IT ALL STARTED

The Plastiki began her adventure nearly four years ago after taking inspiration from a report issued by UNEP called 'Ecosystems and Biodiversity in Deep Waters and High Seas' and Thor Heyerdahl's epic 1947 expedition, The Kon-Tiki. True to Adventure Ecology's values, a compelling and pioneering expedition was needed that would not only inform, but would also captivate, activate and educate the world that waste is fundamentally inefficient design.

With more efficient design and a smarter understanding of how we use materials, principally plastic, waste can be transformed into a valuable resource, in turn helping to lessen our plastic fingerprints on the world's oceans.

To undertake the Plastiki expedition Adventure Ecology was not only influenced by the principles of 'cradle-to-cradle' design and biomimicry but brought together a multi-faceted team from the fields of sustainable design, boat building, architecture and material science in order to foster a collection of new ideas and cutting edge technologies that allow the Plastiki to be a truly unique, one-of-a-kind expedition vessel.

WHAT'S THE PLASTIKI EXPEDITION PHILOSOPHY?

- It's about recognizing that waste is **fundamentally a design flaw** (it does not appear in nature)
- It's about re-thinking **waste as a resource**.
- It's about cyclical **'cradle-to-cradle'** philosophies rather than linear thinking when it comes to how we design our world.
- It's about a better understanding of the **lifecycle's and materials** used in our everyday lives.
- It's about being curious and open, being prepared to let go of assumptions in order to undertake a new '**Planet 2.0' way of thinking and acting.**
- It's about acknowledging that we don't have all the answers and that **nobody is as smart as everybody.**
- It's about being **collaborative and curious** so to engage multiple perspectives, skills, opinions and organizations.
- It's about constantly **learning, unlearning and re-learning**.
- It's about re-integrating back into the **web of life** by recognizing and reducing our human fingerprints on the natural world.
- It's about moving on from just articulating the problems and **inspiring action of the solutions.**
- It's about encouraging the world to reduce, reuse, recycle and **rethink more of the planets natural resources.**
- It's about delivering a spectacular global **"Message in a Bottle".**

WHY ARE WE DOING THIS?

- It is estimated that almost all of the marine pollution in the world is comprised of plastic materials. The average proportion varied between **60% and 80%** of total marine pollution.[1]
- In many regions in the northern and southern Gyres, **plastic materials constitute as much as 90 to 95% of the total amount of marine debris**.[2]
- Scientists estimate that every year at least **1 million seabirds** and 100,000 marine mammals and sea turtles die when they entangle themselves in plastic pollution or ingest it.[3]
- According to Project Aware, **15 billion pounds of plastic are produces in the U.S. every year**, and only 1 billion pounds are recycled. It is estimated that in excess of 38 billion plastic bottles and 25 million Styrofoam cups end up in landfill and although plastic bottles are 100% recyclable, on average only **20% are actually recycled**.

CREW BIOGRAPHIES

David de Rothschild: David is the founder of Adventure Ecology, an organization that harnesses the power of dreams, adventures and stories in order to inspire educate and activate individuals, communities and business's to start moving towards a smarter more sustainable 'planet 2.0' way of living and acting. In 2006 David spent over 100 days crossing The Arctic, becoming one of only 42 people, and the youngest British person, to reach both geographical poles. Prior to this, David had already become one of only 14 people to traverse the continent of Antarctica, and was part of a team that broke a world record for the fastest ever crossing of the Greenland Icecap. Accolades include, National Geographic Society 'Emerging Explorer', The World Economic Forum 'Young Global Leader' and UNEP 'Climate Hero'.

Jo Royle – Skipper: is internationally recognized as one of Europe's leading female ocean yacht skippers. She is one of the few sailors to have circumnavigated South Georgia in the Southern Ocean. Through her extensive sailing experience, which has taken her as far north as Iceland and south to Antarctica, Jo has been able to witness first-hand the effects of global warming, which have furthered her ambitions to help bring environmental issues to the forefront of the public conscience.

David Thomson – Co-skipper: David began his career in the field of racing sail making; this led him to be asked to sail with those whom he had made sails for. In 2003 David joined Steve Fosset's giant catamaran 'Playstation' in which they established 4 world records. In 2009, David successfully became a circumnavigator on his first round the world attempt as co-skipper in the 40 foot double-handed class in the Portimao Global Ocean Race.

Olav Heyerdahl: Olav is the grandson of Thor Heyerdahl whose 1947 'Kon-Tiki' expedition took the intrepid crew across the Pacific Ocean in a replica of an ancient Inca raft made from balsa wood and other native materials. Olav undertook the 'Tangaroa' expedition seeing him alongside a crew of five build an updated raft that included a centreboard and a steering technique called "Guarras". During his time at sea, Olav drew comparisons from today's Pacific and that of the Ocean his Grandfather crossed in 1947. Using the original Kon-Tiki log book and Thor's personal diary, the crew noted a number of significant oceanic changes; in the Humbolt current there was a new colossal path of garbage and marine debris, also, whilst the Kon-Tiki's most common meal had been tuna, the Tangaroa could only catch one tuna in their entire trip. Olav and his team completed the same route as his Grandfather as well as a return leg in only 70 days.

THE BUILD:

Adventure Ecology has worked with a number of experts in the field of boat building, architecture, sustainable design, engineering, materials, and innovative design technology, including:

Michael Pawlyn – Concept architect

Andy Dovell – Naval architect

Andy Fox – Boat builder

Nathaniel Corum – Cabin architect and sustainability consultant

Jason Iftakhar – Solar array designer and consultant

WHAT MAKES THE PLASTIKI DIFFERENT TO OTHER VESSELS?

Adventure Ecology is on a **mission to beat waste** by thinking smart and showcasing how **waste can be used as a valuable resource** through our use of the everyday, highly consumed and iconic 'pin up', the plastic bottle.

- The Plastiki is engineered almost entirely from **12,500 reclaimed plastic bottles** that provide 68% of the boat's buoyancy.
- The Plastiki is a modern vessel that has taken advantage of all available **sustainable design technologies** and cutting edge materials to achieve the project brief.
- A unique **recyclable plastic** material made from srPET makes up her super structure
- The mast is **a reclaimed aluminum irrigation pipe**
- The one-of-a-kind sail is hand-made from **recycled PET cloth**
- The secondary bonding is reinforced using a newly developed **organic glue** made from cashew nuts and sugar cane
- The Plastiki is **'off-the-grid'** relying primarily on renewable energy systems including; solar panels, wind and trailing propeller turbines, bicycle generators, a urine to water recovery and rain water catchment system and a hydroponic rotating cylinder garden.

WHAT ARE THE BOAT'S VITAL STATISTICS?

Length Over All	60ft
Beam	23ft
Weight	12 tons
Mast Heights	40/60 ft
No. of bottles	12,500 approx.
Average speed	5 knots

HOW DOES THE PLASTIKI SAIL?

The Plastiki's design and sail plan only permits her to sail with the wind just forward of her beam - she is a down-wind vessel.

In keeping with her design ethos she has no centreboards so her leeway is significant – in other words she sometimes goes sideways as well as forward.

We are predicting an average speed for the passage of approx. 5 knots

She cannot tack, she must always gybe (putting the back of the boat through the eye of the wind rather than the bows)

THE SYSTEMS:

These sources of energy will be efficiently controlled by the most up to date technology provided by technology partner HP.

- Solar panels.
- Wind turbines.
- Trailing sea turbines.
- Bicycle generators.
- A vacuum water evaporator for desalination.
- A urine-to-water recovery system and rain water catchment.
- A separating toilet and waste storage with evaporative technology for weight reduction.
- Hydroponic Vertical Garden.
- The electrical system is based around a bank of six 12 volt batteries.

WHAT MODERN ELECTRONIC SYSTEMS DOES SHE HAVE ABOARD?

Wireless, solar powered instruments that show the wind's strength direction and the boat's speed.

GPS position fixing devices.

Inmarsat satellite communication systems for voice and data – calls and emails and internet access for weather information.

Electronic charts for navigation.

HP notebook PCs for monitoring biometrics data, tracking power consumption, navigation, video editing, blogging and more

HP IPAQ smartphones for personal blogging

HP media drives for data capture

WHERE DOES THE ELECTRICITY FOR THESE SYSTEMS COME FROM?

- Two wind turbines mounted on the back of the boat.
- Solar panels fixed to the roof of the cabin.
- Solar panels on gimbals at the back of the boat that can be angled towards the sun.
- A hydro-generator that can be trailed behind the boat.
- The boat will be self-sufficient using these forms of renewable energy that will continuously charge the bank of storage batteries onboard.

HOW WILL THE CREW WORK THE BOAT?

On a watch system – they will take turns in teams of 2, changing the watch every few hours day and night.

The on watch crew will be responsible for steering, keeping a lookout, navigation and changing sails as required.

There will also be a rota of cleaning and cooking to keep the ship a happy ship.

HOW WILL WE BE ABLE TO FOLLOW HER PROGRESS?

The team will be using a satellite based tracking system called X Tracker which will transmit the vessel's exact position, course and speed every few hours to an online viewer that will show Plastiki's position and track on a chart-based graphic

Theplastiki.com will showcase this information and content from the crew, captured and created using HP technology, including biographies and crew updates.

WHAT WILL THE ROUTE BE ACROSS THE PACIFIC?

During the voyage, the Plastiki will explore a number of environmental hotspots such as, **soon to be flooded island nations**, damaged **coral reefs** and the challenges faced by our **acidifying oceans** and **marine debris**, in particular plastic pollution, in our oceans.

However, because the Plastiki has limitations on her sailing abilities it is extremely difficult and indeed unrealistic to pre-determine her exact route or ports of call as this will be totally dependent on weather systems and wind direction, neither of which are predictable for a period greater than 5 days in advance.

An onshore weather router who knows the boat's capabilities will be liaising with the crew aboard Plastiki in order to help realise the stops en route that are envisaged but they simply cannot be guaranteed.

What is definite is that Plastiki will be leaving from San Francisco and finishing in Sydney

It remains the ambition to stop at the Line Islands and Tuvalu, however these cannot be confirmed until the boat is actually approaching these ocean areas.

HOW LONG WILL THE VOYAGE TAKE?

Approximately 3 months

WHAT WILL THE CREW EAT?

A stove is fitted for cooking hot food, this uses bottled gas.

Meal times will provide a social focus for the day with the crew eating at least one meal per day all together.

Some fresh food will be grown on a vertical garden that will hang from the back (mizzen) mast.

With no refrigeration onboard there will be a reliance on food that is nutritional but that can be kept in a suspended state – such as dehydrated and tinned food.

Fishing tackle is also being carried to supplement the diet with fresh fish.

WHAT WILL THE CREW DRINK?

Enough fresh water will be carried onboard for the entire voyage based on around 4ltrs per person per day.

Water will also be caught from special drains on the cabin roof when it rains – one tropical shower can fill the tanks again.

WILL THE CREW SHOWER?

Definitely when it rains!

Otherwise it will be seawater showers with a minimalist fresh water rinse to avoid salt sores.

Personal hygiene will be of great importance living in such close quarters.

WHERE WILL THEY SLEEP?

The cabin has 6 bunks where the crew can sleep.

WHAT WILL BE THE TOUGHEST PART OF THE TRIP?

From a sailing point of view it will be crossing the ITCZ (Doldrums) which are positioned between 2 and 6 degrees north of the equator.

The Doldrums are where southern and northern hemisphere weather rotations collide and negate each other.

Mostly there are very light winds here which will make for very slow progress but there are also some very volatile cloud formations and under any one of them could be gale force winds that can appear in just minutes so great vigilance is required of the crew.

USEFUL PLASTICS FACTS:

The world gets through a massive 230 million tonnes of plastic in a year.[1]

More than 90% of plastics are not recycled. [2]

We recycle less than 10% of plastics in the UK.[3]

The UK plastics industry is worth 17.5 billion, and employs 220,000 people.[4]

On average, 20% of the space in your bin will be taken up with old plastic (but that's only 7% of your rubbish by weight).[5]

15 billion pounds of plastic are produced in the U.S. every year. Only 1 billion are recycled.[6]

Approximately 200 billion litres of bottled water is consumed each year. [7]

Four out of every five of these bottles – some 27 million tonnes of plastic, which could have been recycled– end up in landfills.[8]

[1] Plasticity: 100 years in the makinhttp://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx

[2] Plasticity: 100 years in the making. http://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx
[3] Plasticity: 100 years in the making. http://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx
[4] Plasticity: 100 years in the making. http://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx
[5] Plasticity: 100 years in the making. http://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx
[6] Project Aware. http://www.projectaware.org/english/templates/info.aspx?id=707
[7] UNEP. www.unep.org/pdf/tunza/Tunza_6.3_EN.pdf
[8] UNEP. www.unep.org/pdf/tunza/Tunza_6.3_EN.pdf

Enough oil to fuel 100,000 cars is used, just to make a year's worth of plastic water bottles in North America alone.[9]

4% of all the oil we extract is turned into plastics and another 3 – 4% is burned to fuel the process. [10]

For every litre of water poured into a bottle, another two litres are used in its manufacture. [11]

If everyone in NYC gave up water bottles for one week, they would save 24 million bottles from being landfilled. One month on the same plan would save 112 million bottles, and one year would save 1.328 billion bottles from going into the landfill.[12]

Most of the marine pollution in the world is comprised of plastic materials. The average proportion varies between 60 to 80% of total marine pollution.[13]

In many regions, plastic materials constitute as much as 90 to 95% of the total amount of marine debris.[14]

Scientists estimate that every year at least 1 million seabirds and 100,000 marine mammals and sea turtles die when they entangle themselves in plastic pollution or ingest it. [15]

Broken, degraded plastic pieces outweigh surface zooplankton in the Central North Pacific by 6 to 1.[16]

The Great Eastern Pacific Garbage Patch is approximately twice of size of Texas. This "plastic soup" is garbage from North America and Asia that has been sucked in by currents into the Pacific Gyre and is now trapped in the upper water columns of the Pacific Ocean.[17]

---

[9] UNEP. www.unep.org/pdf/tunza/Tunza_6.3_EN.pdf
[10] Plasticity: 100 years in the making. http://www.sciencemuseum.org.uk/visitmuseum/galleries/plasticity.aspx
[11] UNEP. www.unep.org/pdf/tunza/Tunza_6.3_EN.pdf

[12] http://thefuntimesguide.com/2007/08/plastic_bottle_lids_and_caps.php.
[13] Gregory, M.R., Ryan, P.G. 1997. *Pelagic plastics and other seaborne persistent synthetic debris: a review of Southern Hemisphere perspectives*.. In Coe, J.M., Rogers, D.B. (Eds.), Marine Debris- Sources, Impacts, Solutions. Springer-Verlag, New York, pp.49-66.
[14] United Nations Environment Programme: www.marine-litter.gpa.unep.org
[15] Project Aware http://www.projectaware.org/english/templates/info.aspx?id=707
[16] The Algalita Foundation. http://www.algalita.org/

[17] The Algalita Foundation. http://www.algalita.org/

PLASTIKI PARTNERS:

About International Watch Co. Ltd: Official Partner
IWC Schaffhausen has been setting standards in technological development and highly complicated Haute Horlogerie for more than a century. The International Watch Company, founded in 1868, has established a world reputation for itself as a Swiss watch manufactory with a long heritage and a passion for ingenious inventions, innovative solutions and technical refinements. IWC Schaffhausen is committed to taking responsibility toward the environment and has been certified a CO2-neutral enterprise.

IWC has cut 750 tons of annual CO2 emissions in half since 2001, and aims to reduce emissions to 100 tons by 2010. It used environmentally responsible building techniques for new production wings at its headquarters in Schaffhausen, Switzerland, in 2001, significantly reducing CO2 emissions and keeping overall energy consumption constant for five years. **www.iwc.com**. IWC Schaffhausen has supported Adventure Ecology and David de Rothschild as official Partner since 2007. " As a company which holds the environment dear, IWC is very proud of David de Rothschild and of the fact that, with our support, he is using his adventurous voyage to show the consequences of the modern way of life and providing an impetus for innovative suggestions of how to solve the ecological problems of our age," states Georges Kern, CEO of IWC Schaffhausen.

About Hewlett-Packard Company: Official Technology Partner
HP and the environment
For decades HP has been an environmental leader, driving company stewardship through its HP Eco Solutions program, which spans product design, reuse and recycling as well as energy and resource efficiency. HP influences industry action by setting high environmental standards in its operations and supply chain, by providing practical solutions to make it easier for customers to reduce their climate impact and through its research on sustainability solutions that support a low-carbon economy. More information is available at http://www.hp.com/ecosolutions. HP, the world's largest technology company, simplifies the technology experience for consumers and businesses with a portfolio that spans printing, personal computing, software, services and IT infrastructure. More information about HP (NYSE: HPQ) is available at http://www.hp.com/

About Inmarsat: Global Satellite Communications Sponsor
Inmarsat plc (LSE: ISAT) is the leading provider of global mobile satellite communications services. Since 1979, Inmarsat has been providing reliable voice and high-speed data communications to governments, enterprises and other organizations, with a range of services that can be used on land, at sea or in the air. The company's services are delivered through a global network of more than 400 distribution partners and service providers operating in 100 countries. For the year ended 31 December 2008, Inmarsat plc had total revenue of US$ 996.7 million (2007: US$576.5 million) with an EBITDA of US$531.2 million (2007: US$388.1 million). For more information, please visit www.inmarsat.com.

About Kiehl's: Supplier
Kiehl's was founded as an old-world apothecary in New York's East Village neighbourhood. Its unique and extensive background represents a blend of cosmetic, pharmaceutical, herbal, and medicinal knowledge developed and passed on through the generations. The spirit of discovery and the exhilaration of exploration have been espoused by Kiehl's extended family from the company's earliest days. Kiehl's is humbly honoured to support the eco-adventurous Plastiki Expedition team since 2008 and to welcome them into the Kiehl's heritage. In 1988, Kiehl's proudly supported a successful ascent without oxygen of Mt. Everest's East Face. In 2002, the company sponsored the Antarctica Expedition of Mt. Vinson and in 2005, Kiehl's supported the "Greenland First Ascent" expedition, the inaugural climb of peaks rising from the island's ice covered glaciers where a team returned from their journey with first-hand accounts of the effects of global warming. In addition between 2003-2007 Kiehl's supported the annual Kiehl's Badwater Ultra-marathon, a 135-mile non-stop footrace through Death Valley. Kiehl's believes in minimizing environmental impact by utilizing minimal product packaging and 100% PCR materials whenever possible and initiating a world-wide recycling program in freestanding stores. Kiehl's products are available at www.Kiehls.com, freestanding stores, as well as through select specialty retailers worldwide.

IWC SCHAFFHAUSEN — Official Partner
hp — Technology Partner
inmarsat — Global Satellite Communications Sponsor
Kiehl's SINCE 1851 — Expedition Supplier