

2010 & 2012 SUMMARY REPORT



5GYRES

UNDERSTANDING
PLASTIC POLLUTION
THROUGH EXPLORATION, EDUCATION AND SOLUTIONS



Dear Friends of 5 Gyres,

This has been a watershed year for a growing organization with a giant mission. This past spring, we wrapped up our first global survey of plastic pollution in all 5 subtropical gyres, sailing over 30,000 miles across 5 oceans to document plastic in new areas of the world.

And despite discovering that a thin veneer of plastic pollution floats across a quarter of the planet's surface, we come to you with a message of hope and a focused plan to move toward solutions.

Our mission is simple, "To transform society towards sustainability by researching how waste affects our planet and people, and showing citizens, governments and corporations how to effect change." We do this through research, education and a focus on solutions.

Your continued contribution of time and resources help The 5 Gyres Institute to continue our work conserving our shared oceans.

Fair Winds and Following Seas,

Marcus Eriksen, PhD & Anna Cummins
Co-founders, The 5 Gyres Institute

UNDERSTANDING

PLASTIC POLLUTION

THROUGH EXPLORATION, EDUCATION AND SOLUTIONS

Our Oceans in Crisis

Our oceans are under grave attack from all flanks. Overfishing, acidification, global warming, urban runoff, and now a steady stream of petroleum-based plastics flowing into our seas threaten our delicate and precious marine ecosystems.

Virtually unheard of 10 years ago, the plastics issue has now entered the public sphere, drawing attention from major media networks, NGOs, government agencies, and even popular talk shows such as Oprah, Martha Stewart, and the Colbert Report. The focus however has centered upon only one of the five subtropical gyres – the “Great Pacific Garbage Patch” between California and Hawaii.

We began hearing the same questions over and over, “Are there garbage patches in other oceans? What about the Southern hemisphere gyres? What can we do to fix the problem?”

Our Work

We founded 5 Gyres to answer these, as well as several other key research questions about plastic marine pollution. We share our results with the world through high profile eco-adventures that highlight the research and promote solutions. And we invite the public to join our expeditions – scientists, filmmakers, journalists, artists, and interested citizens who will work side by side with us in our research and share their experiences back on land.

We’ve now been to all 5 subtropical gyres documenting the presence of plastic pollution, and discovering that this is truly a global issue. Many questions however remain – what is the ultimate fate of microplastics at sea? What potential impacts do plastics have on human health, as chemical-laden plastic particles are ingested by marine organisms and enter the food chain? Where are the plastic pollution hotspots that we can repair, and how do we apply solutions globally?

These questions, along with our deep commitment to realistic solutions, carve the future path of The 5 Gyres Institute. We hope you will join us on the voyage.

A Global Problem



Exploration in Search of Answers

Our Quest to Explore the Ocean's 5 Gyres

Recognizing a research gap in the science of plastic pollution south of the equator, 5 Gyres set sail to investigate. Our expeditions took us around the world. All oceans are connected by currents that circumnavigate the poles and cross the equator. We use computer models developed from decades of drifter buoy studies to predict the location and density of plastic in the five subtropical gyres. With our findings, we promote realistic solutions on land.

30,000 sea miles traveled from 2010-2012

NORTH PACIFIC SUBTROPICAL GYRE – JUNE 2012

The 5 Gyres Institute, in partnership with the Algalita Marine Research Institute, surveyed the aftermath of the Japanese tsunami. In over 7,000 miles of sailing, we discovered that the “Great Pacific Garbage Patch” is much larger than we thought, traversing the entire North Pacific. Working with government agencies and scientists around the world, we were able to collect data about invasive species, radioactivity of debris, pollutants on plastic, and validate ocean current models. The contributions to science and scientists were beyond expectations.



SOUTH PACIFIC SUBTROPICAL GYRE – SPRING 2011

The South Pacific Subtropical Gyre expedition was a 5000-mile journey island-hopping from Valdivia, Chile to Tahiti in French Polynesia. On Easter Island in the middle of the six-week voyage, we changed crew, bringing a new group of sailors, scientists, and journalists on board. We collected 48 samples, trawling every 50 miles along a 2424 nautical mile transect between Robinson Crusoe and Pitcairn islands. No previous research had been done on marine pollution in this region. Our results show a clearly defined garbage patch, the first discovered in the Southern Hemisphere.



“I was thrilled to join The 5 Gyres Institute on their expedition to the South Pacific Subtropical Gyre. The journey gave me a life-long memory and helped give me critical first hand knowledge - an experience that has proven invaluable with my mission to help humanity kick the single-use bag habit.”

– Andy Keller, Founder of Chico Bag

Gyre (jīr), A spiral oceanic surface current driven primarily by the global wind system and constrained by continents. There are 5 subtropical gyres in the world's oceans.



NORTH ATLANTIC SUBTROPICAL GYRE – JANUARY 2010

We met the vessel Sea Dragon in St. Thomas, V.I. in late January 2010 to begin the first of many 5 Gyres expeditions. A crew of 13 set out on a 1000 nautical mile journey to Bermuda, then eastward another 2000 miles to the Azores. The five-week expedition resulted in 35 samples, with one containing more than 680,000 particles per square kilometer. This sample had ten times more plastic than the average of all others, illustrating how the distribution of plastic pollution can vary significantly inside the gyres. One year later, our poster, titled “An Investigation of Plastic Marine Debris Across the North Atlantic Subtropical Gyre” was presented at the 5th International Marine Debris Conference in Hawaii.

SOUTH ATLANTIC SUBTROPICAL GYRE – FALL 2010

We sailed 11,000 miles across the South Atlantic Subtropical Gyre on three separate expeditions beginning in the Fall of 2010: Leg 1, Rio de Janiero to Ascension Island; Leg 2, Rio de Janiero to Cape Town; Leg 3, Namibia to Uruguay. These were the first expeditions to study plastic pollution in the South Atlantic, resulting in a robust data set of over 110 samples. We collaborated with the United Nations’ Safe Planet Campaign, ASR Limited, and research scientist Chelsea Rochman from UC Davis and San Diego State’s marine toxicology program. In addition to collecting samples to study the density and distribution of plastic pollution, we also collected foraging fish in our trawls. The purpose of collecting fish tissues and organs is to examine the role of plastic as a vector for the transfer of chemical pollutants in the marine foodweb.



INDIAN OCEAN GYRE – MARCH 2010

The Indian Ocean Gyre voyage was an unanticipated opportunity to travel across the northern region of the accumulation zone in March 2010, sailing from Perth, Australia to Mauritius aboard the Stad Amsterdam. Using the workshop onboard the 272 ft. Clipper Ship, we invented a new sampling device called the “Hi-Speed Trawl”, which collects surface samples at an unprecedented 8 knots. 5 Gyres was able to collect the first samples of plastic pollution in the Indian Ocean, and has since sold several new trawls to other scientists.



North Pacific Gyre



South Pacific Gyre



North Atlantic Gyre



South Atlantic Gyre



Indian Ocean Gyre



North Pacific Gyre



South Pacific Gyre



North Atlantic Gyre



South Atlantic Gyre

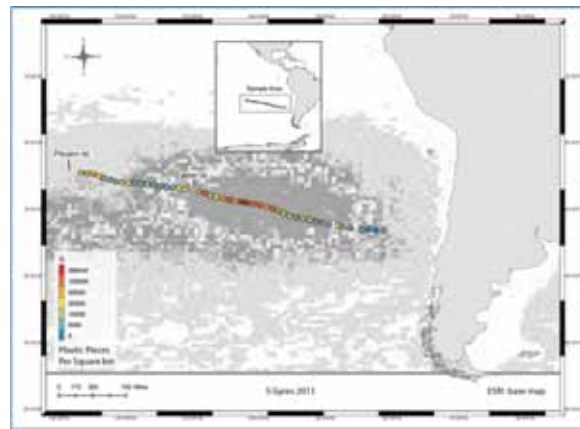


Indian Ocean Gyre

Key Findings: The Ocean's 5 Gyres

During our nine expeditions around the world, we've collected more than 400 research samples in over 30,000 miles of sailing and sampling. These expeditions are yielding results that will illustrate the global impact of plastic pollution in all five subtropical gyres. This data, once published, will provide a global baseline for future comparisons.

We discovered a new garbage patch in the South Pacific Ocean and will soon publish these results. Of the 48 samples collected, two contained no plastic, but 1000 miles later we entered the center of the gyre, finding nearly 400,000 particles per km². We also observed a difference in the amount of plastic pollution on the sea surface relative to sea state. In other words, as the height of the waves increased, plastic pollution was pushed downward.



Our three expeditions across the South Atlantic Gyre produced 110 samples in over 11,000 miles of sailing. These data will be available soon, and combined with data from our expeditions in all the other gyres, will serve as the first global baseline dataset of plastic pollution.

In 2012 we sailed through the Japanese Tsunami Debris Field to study how the material culture from modern society fares when swept out to sea. We sailed to and from Japan, also documenting plastic pollution in the western North Pacific Gyre for the first time.

We are now working to publish our data in peer-reviewed journals. With this new information we can more honestly and accurately engage stakeholders with the solutions that work.



“My adventure with 5 Gyres across the Atlantic was a life changing experience. I live, eat, and breath the ocean but was blind to the plastic steadily polluting our seas and bodies. Plastic particles filled the mouth of the trawls across the entire South Atlantic, from the beautiful Brazilian waters to the chilly grey coast of South Africa. I realized that I too have been a contributor to this problem, and have never looked at our oceans or plastics the same. I cannot thank the 5 Gyres team enough for the knowledge they have given me.

– Mary Osborne, Pro Surfer, Surf Ambassador, and Host

The Science of Solutions

5 Gyres Research Innovations

We recognized a gap in the scientific literature about plastic pollution in the southern hemisphere, so we decided to investigate it ourselves, but with what equipment?

The traditional manta trawl used by oceanographic institutions was too big, so we designed a 60% smaller version. We also observed that most studies of plastic pollution will use a trawl every 50-100 miles for a very short duration. Since the time between each sample site is lost time, we invented the hi-speed trawl. This trawl, used in conjunction with the manta trawl, allows us to sample the sea surface continuously from one continent to another, an unprecedented feat. When canoeists, kayakers, and ocean rowers asked, “How can we help?”, we built the Kayak Trawl. Together, our inventions have increased our ability to monitor this issue worldwide.

Citizen Science and the Travel Trawl

The goal of citizen science is to provide the public with the means to make a valuable contribution to ocean conservation. People may join an expedition or do the research themselves on their own vessel. We’ve invented new equipment and modified our procedures for easy use. Soon we will have an online map of the world to upload citizen science data. This map and database will enable citizen scientists to see how their data compares with others around the world.



Innovations in Research



Answers into Action

Education

Our school programs have reached more than 50,000 students directly through classroom presentations, youth leadership training, curriculum resources, and unique research and public awareness campaigns. We've reached thousands more people nationwide visiting museums, aquariums and public events with our traveling exhibit on plastic pollution.

SCHOOL PROGRAMS & YOUTH LEADERSHIP

We bring students together, from elementary grades to universities around the world, giving lectures and teaching public speaking, hands-on activities, and providing leadership training to engage youth in action oriented solutions for their communities.

EDUCATION KITS & CURRICULUM

Our solutions-based education kits for students and teachers are designed as a self-guided tool to teach others how to do what we do. The kits contain images, videos, presentations, solutions cards, project ideas, and actual ocean samples containing plastic and plankton from one of the five gyres.

WASTE TO WAVES EXHIBIT

This traveling exhibit on plastic waste, built from recycled materials, visits aquariums, museums, science centers, boat shows, and any public venue around the world.

Worldwide Education





Global Solutions

Solutions

5 Gyres aims to be an “Honest Broker”, inviting community and business leaders, grass-roots and government agencies, to bring objectivity and good science to the table when discussing solutions.

PRODUCT PARTNERSHIPS

We designed our way into this problem, and we can REDESIGN our way out. We want to build better products, introduce Cradle-to-Cradle systems to keep materials in the loop, and establish long-term partnerships with the companies that care above the bottom-line. See our list of Sponsors on our Partners & Supporters webpage.

COMMUNITY ACTION

We work to clean up the world, but more importantly to prevent future waste. We work with schools, families and community organizations to find solutions that fit specific needs. These range from organizing environmental cleanups to school transitions to zero waste. Communities and schools are healthier, happier and save money with smart alternatives. We lead communities in efforts to eliminate wasteful products and practices.

POLICYMAKING

We work with legislators and grassroots organizations to promote regulatory measures when they are appropriate. Examples of our work may include providing testimony to policy makers, scientific information and gyre samples to organizations, or public awareness campaigns to challenge industry strong-arming. We strongly promote “Extended Producer Responsibility” encouraging industry to consider the complete lifecycle of what they consume.

Communicating Our Work

Communication

Communications permeate everything we do. We engage contemporary media, including radio, television and print, in order to share our research findings and solutions. Our presence in social media is building our reputation as a reliable source of the latest information on plastic marine pollution.

The 5 Gyres Institute contributes to legislative solutions when they are appropriate. Our vision of “Zero Waste” compels us to consult with stakeholder groups and grassroots organizers on common sense strategies to solve plastic pollution issues, such as Extended Producer Responsibility (EPR), encouraging manufacturers to plan for the full life-cycle of the waste they generate. 5 Gyres understands that to facilitate positive change, we must stay current. We constantly evolve as new science brings new strategies, especially in the digital era of organizing.

5 Gyres also researches, authors and publishes articles in major media that strive to create an honest playing field by refuting misinformation and rhetoric. There is no tolerance for green-washing or stealth advocacy by industry-funded NGOs. We aspire to serve as a beacon for truth and transparency for like-minded associations.

GRAND CANYON NATIONAL PARK BOTTLE BAN

Our work with Change.org generated a petition in Fall 2011 that leveraged a victory in the Grand Canyon by receiving over 100,000 electronic signatures and creating 20 high profile media hits to encourage park officials to eliminate waste from plastic water bottles. This helped to stop the single largest littered item in the Grand Canyon itself, accounting for 30% of the park’s waste stream.

Strategies for Change





On the Horizon

The Present and Future for The 5 Gyres Institute

For the past 3 years, we've collected substantial scientific evidence that plastic pollution is a global issue, present in the surface waters of the world's oceans. With this information, we're now focused on being a catalyst for change and a thought leader working towards a zero waste closed loop system planet wide by 2050. We will do this by engaging industry, waste management professionals, NGOs, schools, and business partners in realistic, land-based solutions.

SPRING 2012 - INTERNATIONAL YOUTH SUMMITS

5 Gyres worked with teachers and students at the Island School in the Bahamas and the American Embassy School in India for weeks of lessons and learning, culminating in two Youth Summits about solutions to plastic pollution.

SUMMER 2012 - GREAT LAKES EXPEDITION

In collaboration with SUNY FACE University aboard the Flagship Niagara, we conducted the first survey of plastic pollution in the Great Lakes.

2012 TO 2013 - PLASTIC POLLUTION HOTSPOT

There are many communities in the developing world that are impacted with plastic beyond their capacity to manage waste. It is our intention to establish a base of operations in a community near one of these plastic pollution hotspots and execute a plan for long-term, sustainable conservation.

2013 - BAY OF BENGAL EXPEDITION

One plastic pollution hotspot in the world is in the Bay of Bengal. In collaboration with the Planetary Coral Reef Foundation, we will sail from Sri Lanka to Bali to quantify plastic pollution in those waters.

SPRING 2013 - THE LAST STRAW SOLUTIONS TOUR

We will bring our "Waste to Waves" traveling exhibit on plastic pollution to display in museums, aquariums, and public venues along the California Coast. At each stop we will engage schools, communities, and NGOs in hands-on solutions to reduce the flow of plastics to our oceans.



2010 - 2011 Accomplishments

RESEARCH EXPEDITIONS

North Atlantic Subtropical Gyre – January 2010
Indian Ocean Gyre – March 2010
South Atlantic Subtropical Gyre – 3 Expeditions – Summer through Fall 2010
South Pacific Subtropical Gyre – March 2011
North Pacific Subtropical Gyre - July 2011
Japan Tsunami Debris Field in the N. Pacific Gyre – June 2012
Great Lakes Expedition – July 2012

LECTURES

Charleston Aquarium – Charleston, SC – February 2011
Charleston College – Convocation – Charleston, SC – February 2011
Central Oregon Community College – February 2011
Wings World Quest – New York, NY – April 2011
Blue Visions Summit – Washington DC – May 2011
United Nations Safe Planet – Full Fathom Five – New York, NY – May 2011
Bluemind Conference – San Francisco, CA – June 2011
Burning Man – Black Rock Desert, NV – September 2011
TEDx, Pasadena – Pasadena CA – October 2011
American University – Washington DC – October 2011
New England Aquarium – Fall Lecture Series – Boston, MA – October 2011
Colorado Ocean Coalition – Conference – Boulder, CO – November 2011
GreenFest LA – Los Angeles, CA – November 2011
University of New Orleans – New Orleans, LA – 2010
Los Angeles Bioneers – Los Angeles, CA –
Museum of Natural History, Cleveland, OH – August 2011
William and Mary College – March 2012
EarthWatch Institute – Oxford – December 2011
Earth University – Costa Rica – February 2012
Cape Eluthera Institute – Lecture & Youth Summit – Bahamas – March 2012
American Embassy School – Lecture & Youth Summit – India – April 2012
Rio de Janeiro +20 Summit – Panel Presentation – Summer 2012

CAMPAIGNS & PROMOTIONS

Ban the Bag Campaign – Los Angeles - 2011
Plastic Facts Solutions Card – November 2011
5 Gyres Plastic Bottle Ban Petition – Grand Canyon National Parks – December 2011

INTERNATIONAL ACTIVITIES

Presentation to Minister of the Environment – Easter Island, Chile – April 2011
UN Press Conference – Rio De Janeiro, Brazil – August 2011
Two Oceans Aquarium – Cape Town, South Africa – November 2011
Greener Upon Thames (NGO) – Initiated Plastic Bag Campaign – London - December 2011
Plastic Soup Foundation (NGO) – Plastic Soup 3 Days Conference – Amsterdam – December 2011
EarthWatch Institute – Presentation – Oxford – December 2011
University of Tokyo Agriculture and Technology Symposium – Tokyo, Japan – June 2012

5 Gyres People, Partners, Sponsors & Supporters

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Pangaea Explorations
Planetary Coral Reef Foundation
Plastic Pollution Coalition
Plastic Awareness Coalition
Surfrider Foundation
UN Safe Planet Campaign

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Solving the plastic pollution crisis



through exploration, education & solutions



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