

# WORLD OCEAN JOURNAL

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World Ocean Observatory

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VOLUME TWO

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ISLANDS



## ON THE COVER:

Namenalala Island at the heart of the Namena Marine Reserve, Koro Sea, Kubulau, Fiji.

The Namena Marine Protected Area (MPA) is located between the two main islands of Fiji: Viti Levu and Vanua Levu. Villagers of the Kubulau District on Vanua Levu own the traditional fishing rights of the Namena Barrier Reef. After witnessing first-hand the increased threats imposed by commercial fishing in the 80s and 90s, the chiefs of Kubulau imposed a complete ban on all fishing activity, thereby creating the Namena MPA. The area encompassed the entire reef surrounding Namenalala Island, a key area of marine biodiversity. Scientists have confirmed that the area is home to more than 1,000 species of invertebrates, 400 known corals, and 445 documented marine plants. From [dive-the-world.com](http://dive-the-world.com).

Credit: Stacy Jupiter, Wildlife Conservation Society, 2008, Marine Photobank.

## THIS PAGE:

The Cocos (Keeling) Islands from space. The Cocos Islands are in the eastern Indian Ocean, northwest of Australia. Comprised of coral atolls and islands, the archipelago includes North Keeling Island and Horsburg Island.

Credit: Jesse Allen and Robert Simmon for the NASA Earth Observatory.



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BLUE HALO INITIATIVE



The Waitt Institute aims to empower communities to restore their ocean by partnering with island governments to envision, design, and implement comprehensive, sustainable ocean policies based on science driven by community priorities.

FOGO ISLAND ARTS



A residency-based contemporary art venue located off the coast of Newfoundland , Canada. Artists-in-residence come to the island to do research; selected artists are invited to present their work in exhibitions at the Fogo Island Gallery. @FogoIslandArts

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Dr. Ayana Elizabeth Johnson is a marine biologist and Executive Director of the Waitt Institute. She is dedicated to ensuring healthy ecosystems and sustainable seafood for those who rely on the ocean for nutrition, livelihoods, and culture. @Ayanaeliza

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Founder and President of The TerraMar Project, Ghislaine has enjoyed a lifelong love and appreciation for the ocean. She is a successful businesswoman, holds a BA/MA from Oxford University, and is a qualified EMT, helicopter and deep worker submersible pilot.

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President Tommy Esang Remengesau, Jr., is the 8th President of the Republic of Palau. He helped lead Palau’s transition to an independent country in 1994. President Remengesau and his wife Debbie have four children and two grandchildren.

JUDITH SCHALANSKY



Judith Schalansky, born in Greifswald, Germany published her debut novel, *Blau steht dir nicht*, in 2008. She is the author of *Atlas of Remote Islands: Fifty Islands I Have Never Set Foot On and Never Will* which is reviewed in this volume.

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Lewis Pugh, a maritime lawyer, is the only person to have completed a long-distance swim in every ocean. Recently he undertook a series of swims in Antarctica to campaign for the Ross Sea to be set aside as a Marine Protected Area. @LewisPugh

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THE TERRAMAR PROJECT



Similar to the World Ocean Observatory, The TerraMar Project is a nonprofit ocean organization dedicated to building a global community of ocean advocates empowered to speak up for the ocean. They are using the power of their community to advocate for a strong ocean-specific Sustainable Development Goal at the United Nations, ensuring prominent placement for the oceans in the UN’s post-2015 agenda. @TerraMarProject

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WORLD OCEAN JOURNAL is a publication of the World Ocean Observatory, a not-for-profit organization based in coastal Maine. *World Ocean Journal* is a digital magazine on ocean culture and solutions to today’s ocean issues. Each volume includes essays, interviews, art, exhibits, and performances profiling the vital impacts of the ocean on our lives. This and future editions focus on a particular theme.

WORLD OCEAN OBSERVATORY is a major utility for ocean communication as a means to advance public awareness and political will, and is dedicated to providing information and education about the health of the ocean. It is our belief that the sea connects all things.

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EDITOR’S LOG

NISSOLOGY

The Study of Islands by Peter Neill

Islands are at the forefront of changing oceans – extreme weather, temperature, sea level rise, and more – and they provide visceral evidence of climate consequence and wisdom for us to live by. *Nissology* is a formal area of study and action with a nation-state political alliance: Alliance of Small Island States; a sustainable development action network: Small Island Developing States (SIDS); the International Small Islands Studies Association; research publications: *Shima*, the *Journal of Island Cultures*, and *Island Studies Journal*; an academic conference: *Islands of the World*; a web-based information source: Global Islands Network; a UNESCO-based regional program: Small Island Voices; several institutes: Island Studies, Island Institute, and Scottish Center for Island Studies; and many other academic programs and regional affiliations devoted to serious examination of the histories and traditions, merits and demerits particular to island life.

Volume Two of the *World Ocean Journal* evokes islands in many forms, not always predictable. We begin at the United Nations with a Keynote Address to the September 2014 *Healthy Oceans and Seas Forum* by Thomas (Tommy) Esang Remengesau, Jr., President of the Republic of Palau, a nation that has relentlessly advocated for all island nations through its Ambassador and policy efforts at the UN, and at major conferences on sustainable development, climate, and ocean issues worldwide.

In *Ocean Solutions* we look at the astonishing floating aggregation of plastic, the island of waste known around the world as “the Great Pacific Garbage Patch,” and international

efforts to recycle and reduce the devastating impact of such irresponsible and useless discard on marine life great and small. What follows is somewhat less conventional: Lincoln Paine’s review of *The Atlas of Remote Islands* by Judith Schalansky, reflections on the history of 50 islands the author has “never set foot on and never will,” followed by my short essay on *Thinking Like an Island*, which offers observations on islands as a state of mind, set apart in space and time.

In *Ocean Innovations* we look to Seasteading, the creation of modern floating communities engineered and socially designed to exist in the ocean alongshore as independent and self-sustaining entities that incorporate the advantages and values of successful island living. In *Ocean Portfolio* we celebrate the work of two visual artists-in-residence at Fogo Island Arts in Newfoundland, Canada, whose work is representative of the resourcefulness and creativity of Fogo Islanders, which provide a framework for the organization’s activities.

This volume offers a second *Ocean Solution*: the Blue Halo Initiative, a scaleable project which is empowering Barbudans to restore their coastal waters by developing a sustainable coastal policy which supports coastal livelihoods while building sustainable, healthy ecosystems. And finally, through the poetry of John Donne, we look to the individual as an island, both as *entire of itself* and as *part of the main* – Lewis Pugh, swimming alone in the cold Antarctic waters as a powerful statement, not of diminishment, but of the essential implication of the ocean for the survival of all mankind.



## Palau at The United Nations

# SMALL ISLAND DEVELOPING STATES

## THE STORY OF PALAU

Keynote Address of President Remengesau at the Healthy Oceans Forum  
United Nations, September 26, 2014

### PRESIDENT REMENGESAU:

Earlier this year, in February, Palau and Italy co-hosted the first Healthy Oceans and Seas Forum here at the United Nations. At that historic meeting in the ECOSOC Chamber, I called upon the international community to join the Pacific Small Island Developing States in adopting a Stand Alone Sustainable Development Goal on Healthy and Resilient Oceans.

I am much honored to stand before you, six months later, at the second Healthy Oceans Event, again with Italy as co-host, and this time joined by Monaco, for generations a true champion of the oceans. I like to think that his Serene Highness Prince Albert II was influenced in his decision to help by the memorable time he and I and our families had last year, diving in Palau.

Where, only a year ago, just a handful of countries called for a Stand Alone Oceans Goal in their General Assembly remarks, now we stand here with over eighty countries in vocal support and a Working Group Report to the General Assembly which recommends just such a transformative goal. We are on the brink of paradigm shift in oceans governance. Perhaps the free-for-all is coming to an end. And not a moment too soon.



Thomas (Tommy) Esang Remengesau, Jr, President of the Republic of Palau, delivering the keynote address to the General Assembly of the United Nations Healthy Oceans Forum. New York, New York. September 26, 2014.  
Credit: Staff Image, UN General Assembly

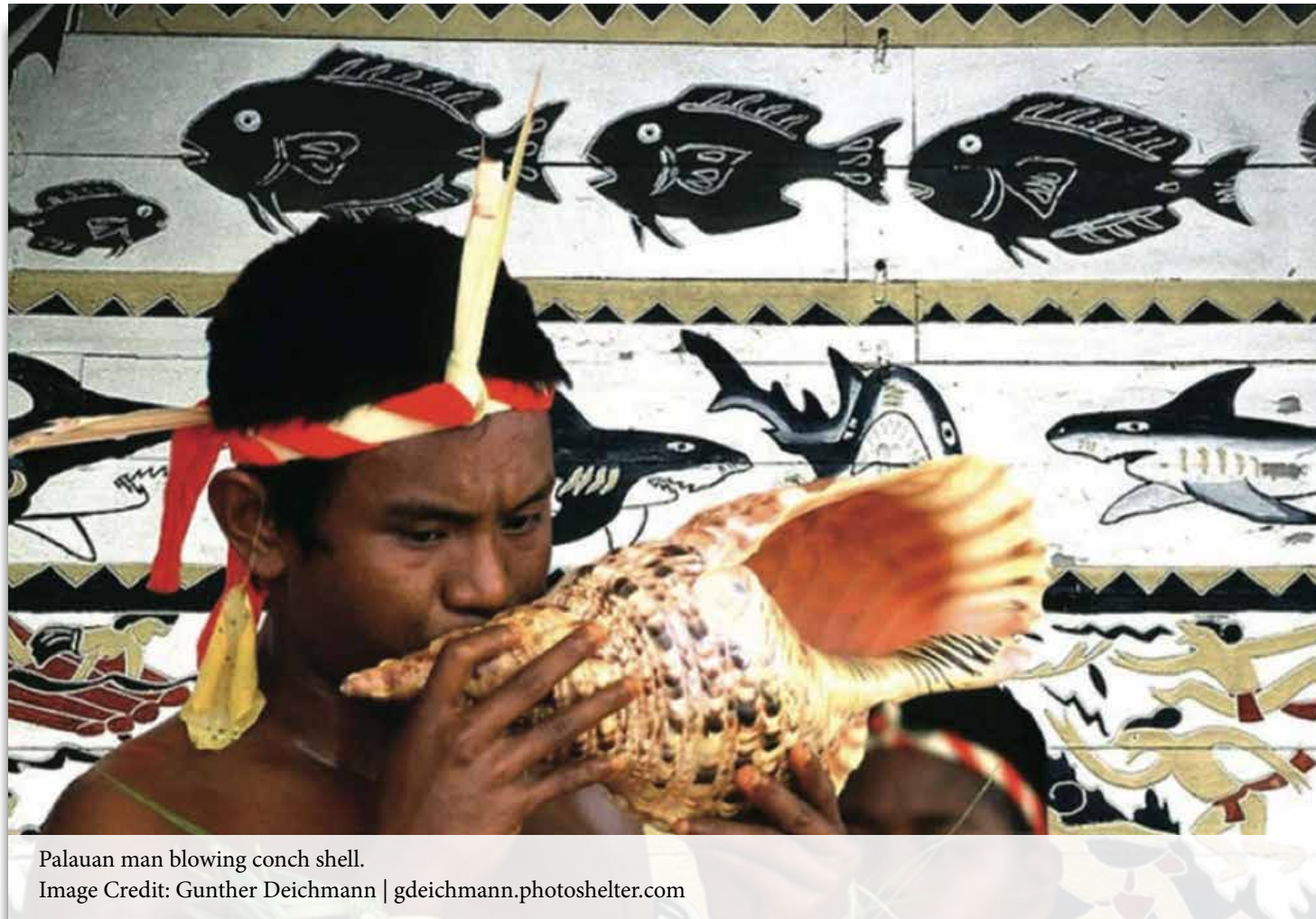
I humbly thank the nations of the world for hearing the voice of the islands. Even landlocked countries have stepped forth in their solidarity with a growing movement which recognizes that all of us who breathe and eat are reliant on the oceans for our very survival.

We cannot be complacent. While our supporters are many, the

issue is still in doubt. There are strong voices for a reduction in the number of goals, now 17, and for a consolidation of goals under fewer headings. To this I say no, and repeat the unanimous support for a Stand Alone Goal of the Pacific leaders who recently adopted the Palau Declaration.

We agree with the Global Ocean Commission which, in its recent,





Palauan man blowing conch shell.  
Image Credit: Gunther Deichmann | gdeichmann.photoshelter.com

authoritative report, argued that “A Stand Alone SDG on ocean sustainability would provide the kind of focused and accountable attention that the ocean needs, and help put the ocean front and center in the post-2015 development agenda”.

Our meeting today is designed to help pave the way to that goal. Let us not waiver. Let us not be complacent. I suggest to you that this opportunity will not come again.

The other theme of my remarks at our last Forum was our determination in Palau to protect our ocean by ourselves, until the world agrees to come along. For

generations, Palau’s Council of Chiefs has preserved marine resources by placing vulnerable reef areas off limits to fishing. This traditional conservation method known as a “bul” preserved the livelihoods and food security of the Palauan people in a simpler time. However, the modern leadership of Palau has come to understand that the “bul” is no longer a sufficient response to the growing outside pressures on the environment caused by modernization, overpopulation and industrialization. That is why Palau, over the past decade, has focused on mobilizing modern mechanisms to meet its needs and ensure a sustainable future. For example, we have declared and

met our Micronesian Challenge Commitment to effectively protect 30% of our near shore and coastal marine environment and 20% of our forests by 2020.

We have also created the world’s first shark sanctuary, prohibited the taking of sharks, certain reef fish, turtles, rays and marine mammals.

Finally, we are in the process of declaring the Palau National Marine Sanctuary, which will ban industrial fishing nationwide, while combining a massive no-take zone and a smaller highly regulated area for domestic fishing needs. We ask that you support this protected area and recognize that ocean protected areas, like many of those which



Palau’s Wooden Seal  
from the Palau Mission to the UN

Palau’s Rock Islands  
Image Credit: Patrick Colins

will be discussed here today by my esteemed colleagues from all points of the globe, are an integral and necessary part of our larger effort to ensure a sustainable fisheries economy in our region, and ultimately, the regeneration of all of the fish stocks in the world.

Ladies and gentlemen, earlier this month it was my honor to address the leader’s meeting of the Pacific Islands Forum, as the Chair of that important regional body was transferred to Palau from the Republic of the Marshall Islands. At that time, I observed that the key to this entire process of building a sustainable future will be partnership: partnerships between developing and developed

countries; partnerships with enlightened non-government actors; and partnerships with international funding agencies. Only through these strong partnerships will we be able to meet the challenges of a Stand Alone Sustainable Development Goal on Oceans, and the underlying work to be done to regenerate and clean up those oceans.

In that regard, and coming so close upon the heels of the successful Samoa conference, it is my pleasure to announce that one such bedrock partnership has just been formed. Italy has agreed to become the first country in the world to support with a significant financial contribution the early

stages in the development of our nationwide marine sanctuary. It is with this kind of early support that Palau, now not just one small island nation but as member of a community of leading nations like those here today, determined to regenerate are our oceans for the benefit of future generations.

I look forward to exchanging ideas with you today.

Thank you.



*Reprinted in partnership with The Terramar Project. Online at [TheTerramarProject.org](http://TheTerramarProject.org).*



## UNESCO GARBAGE PATCH STATE

UNESCO Recognizes the Ocean's Recycling Problem as a State  
by Ghislaine Maxwell. Image Credit: The Garbage Patch State.

The ocean has a recycling problem.

At age 8 I was glued to the television watching Jacques Cousteau highlight the mysterious beauty of the sea. The ocean became my passion. I began collecting shells, learned to scuba, fly helicopters, and ultimately how to pilot a deep-sea submersible—all to continue exploring the ocean. The general public thinks of the ocean as the same healthy vibrant home teaming with fish, big and small, and gorgeous colorful corals as it did when Jacques revealed it to the world. However, much of the damage to the ocean is not visible to the naked eye and is occurring below the surface or over the horizon. The unfortunate reality is the ocean has become tragically polluted, many species of fish in huge decline from overfishing, corals suffering cataclysmic damage from a heating, acidifying ocean and bottom trawling, tens of thousands of miles of the ocean covered with trash, and dead zones proliferating from humanity's runoff into the seas.

At the end of 2014, a study made headlines in nearly every major news outlet when it revealed the stunning amount of plastic floating in the world's oceans. Many did not realize how endemic the plastic pollution in the ocean had become,

and when researchers published their findings in the journal PLOS ONE after years of data collection and lifetimes of personal experience, people were shocked.<sup>1</sup>

At least 269,000 tons of plastic are floating in the sea, numbering more than 5.25 trillion particles. Grist characterized the amount as the equivalent of 2,150 adult blue whales.<sup>2</sup> MIT compared it to 38,000 African elephants, and Dr. Manus Erikson, co-founder of the 5Gyres Foundation and one of the researchers responsible for the study, compared it to stacking 2-liter soda bottles end-over-end to the moon and back—twice.<sup>3</sup>

At the time this study was released, many in the ocean conservation community were surprised by the figure. A regularly cited study from the National Academy of Sciences in 1975 estimated the flow of plastic into the ocean to be .1% of global production of plastic.<sup>4</sup> In 2010 alone we produced 275 million metric tons (MT) of plastic, so the amount that flowed into the ocean that year should have been roughly 275,000 MT, just about the same amount as recently discovered floating on the surface by the study.

But this National Academy of Sciences study was published four decades ago, while the *Undersea*

*World of Jacques Cousteau* was still airing on television, and consumption patterns have dramatically changed since then. Hardly anything can be purchased today without plastic involved in the packaging, casing, transport, or product itself. In fact, it's difficult to picture a time during the day when one isn't interacting with plastic.

Fortunately, a new study released in early 2015 in the publication *Science* provided updated figures to estimate the mass of annual plastic inflow to the ocean.<sup>5</sup> According to the abstract, this was estimated by: "Linking worldwide data on solid waste, population density, and economic status." Using the same 275 million MT of plastic produced globally in 2010, the new estimates range from 4.8 to 12.7 million MT flowing into the ocean annually, with a mean of 8.8 million MT.

That's just for 2010. According to a press release for the study, "The NCEAS (University of California at Santa Barbara National Center for Ecological Analysis and Synthesis) working group forecasts that the cumulative impact to the oceans could be as high as 155 million metric tons by 2025. However, the planet will not reach global "peak waste" before 2100, according to World Bank calculations."<sup>6</sup>

With so much plastic entering the ocean, why isn't this a better-known problem?

The ocean comprises 361 million square kilometers, or 71% of the Earth's surface. That is a huge area and the Global Ocean Commission, an ocean advocacy group comprised of former heads of state and senior government officials in addition to business leaders, cites only 15% of plastic stays on the surface. It's hard enough to find the plastic hiding in plain sight, but the vast majority requires scuba tanks or submersibles to see.

According to the Environmental Protection Agency, plastic bottles take 450 years to decompose, and other plastic products take varying amounts of time from 50 years to 600.<sup>7</sup> Therefore, the vast majority of plastic products ever produced are still in existence today. Over time, these items break down into smaller pieces from the beating they take from the elements in a process called photo-degradation and become known as microplastics, which look a lot like phytoplankton to fish.

One theory for plastic's

disappearing act is ingestion by marine creatures, which is supported by a Greenpeace study posted to the United Nations Environment Programme website which reveals up to 80% of sea turtle and sea bird species have consumed plastic.<sup>8</sup> Could plastic make its way up the food chain to the very apex—humans? According to a study published in *Nature* in 2013 investigating the transfer of harmful plastic chemicals to the fish that ingested them, the alarming answer is yes.<sup>9</sup>

Another possibility for the missing



The Garbage Patch State installation on display at the United Nations in New York.





A sign for the Garbage Patch State installation in Madrid, Spain.

plastic is the deep seabed. A recently published study in Royal Society Open Science sampled deep-water corals and sediments to depths up to 3,500 meters, with the majority of samples taken at the 1,000-meter range.<sup>10</sup> Microplastics were abundant in all coral and sediment samples, but due to the small sample size, global estimations could be made. It can be inferred, however, that plastics are impacting even the deepest marine habitats.

Out of sight, out of mind.

Fortunately, organizations such as the Garbage Patch State are shining a spotlight on the issue of plastic pollution, creating history in the process.

Started by the world-renowned artist Maria Cristina Finucci,

the Garbage Patch State was symbolically recognized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) during an official ceremony in Paris on April 11, 2013.

“Art is the bridge between the ‘real’ and the ‘ideal,’” said the Director-General of UNESCO, Irina Bokova, during the Garbage Patch State’s recognition ceremony.<sup>11</sup> “This is what makes art such a powerful force – it exposes the gap between the ‘real’ and ‘ideal,’ it reveals our strengths and weaknesses and it mobilizes us to act. The installation by Ms. Maria Cristina Finucci has all this power.

“Bags filled with water and plastic pieces, laid on the floor, reflected by a mirrored wall. The combination of shapes and colors is appealing –

but it is far more, it is an invitation to go further, to understand the world we live in.”

“This is a world under increasing pressure. From unsustainable behaviors from unrestrained forms of development. The ocean carries much of the burden.”

A federation of five “garbage patches” created by the great ocean gyres of the world, the Garbage Patch State has its own constitution and flag and with this official status from UNESCO, it is bringing the issue of plastic pollution and marine debris out of the obscurity of the ocean depths to the forefront on the biggest stages in the world.

During the 2013 Venice Art Biennale, the Garbage Patch State had a national pavilion sponsored by the Italian Ministry of the Environment and Protection of Land and Sea hosted by Ca’ Foscari University of Venice. In one of the most internationally acclaimed venues, the Garbage Patch State highlighted the ocean’s recycling problem with a pavilion composed of a tragically beautiful flood of colored plastic bottle caps harnessed by red nets pouring towards the Grand Canal. To further highlight the plight of the ocean, the Garbage Patch State immersed their audience in two different cubes featuring 360-degree videos of the overwhelming issue.

“Behind every piece of plastic in the Garbage Patch State there is a story,” says Ms. Finucci. “Someone made it, someone threw it away, a system failed to properly recover it before it was too late. My intent is to take something complex and

almost invisible and make it simple to grasp and bring it out into the open. To provide a direction for good behavior.”

By turning this message into art, the Garbage Patch State’s approach is simply brilliant. In the installation for UNESCO, Ms. Finucci arranged the art in front of a mirror, which obliged the viewer to see him or herself as they gazed upon the plastic debris... A powerful message indeed.

Although the population of the Garbage Patch State is officially zero, there are millions of casualties every year. Sea birds, sea turtles, marine mammals and fish—nearly all marine creatures feel the impact of marine debris. There are also few safe refuges from the insidious grips of plastic pollution, as even the most remote beaches have become *de facto* dumps as a result of their exposure to prevailing winds and currents.

All is not lost.

As bleak as the future may seem, organizations like the Garbage Patch State show there is hope. From edible algae-based packaging to innovations in recycling and processing, every day sees new solutions to this global epidemic and substitutes to the most common uses for plastic. UNESCO’s symbolic recognition of the Garbage Patch State shows the support of these endeavors at the highest levels of government, and each municipality that bans single-use plastic bags, Styrofoam packaging, and plastic bottles is a step in the right direction.



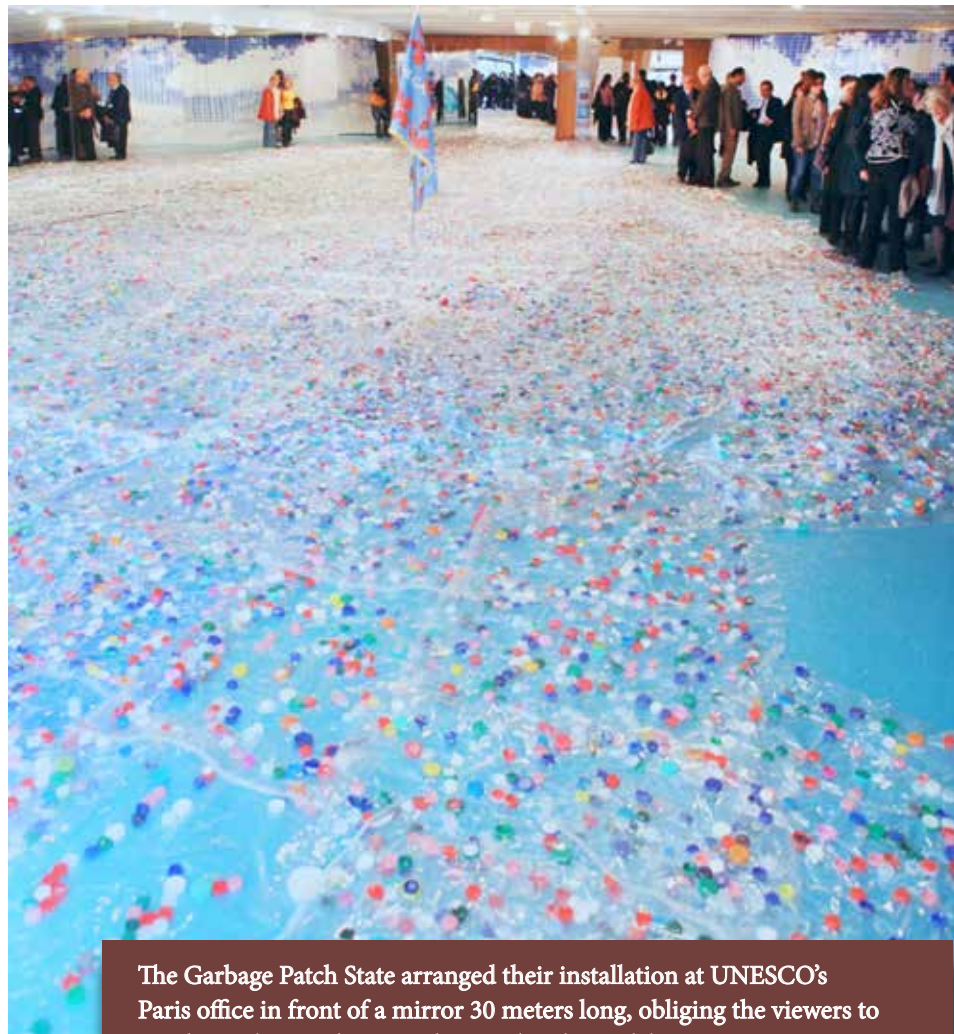
During the 2013 Venice Art Biennale, the Garbage Patch State created a flood of colored plastic bottle caps harnessed by red nets pouring towards the Grand Canal.

It’s incumbent upon everyone to do their part. A few examples of small changes in personal behavior that could have a profound impact across a community include using recycled multiple use bags, purchasing items at the grocery store that local recycling centers

will accept, refusing plastic straws in restaurants as they are almost never recycled, and urging lawmakers to take proactive measures against plastic waste.

A personal commitment to preventing plastic pollution can





The Garbage Patch State arranged their installation at UNESCO's Paris office in front of a mirror 30 meters long, obliging the viewers to see themselves as they gazed upon the plastic debris.



MARIA CRISTINA FINUCCI is a trained architect and artist whose research has encompassed painting, sculpture, architecture, design, video, and film. Her work and experiences synthesized into the transmedia series *Wasteland* which comprises all the actions connected to the Garbage Patch State.

To see more of Maria Cristina Finucci's incredible work and learn more about plastic pollution, visit the Garbage Patch State online at: [www.garbagepatchstate.org](http://www.garbagepatchstate.org).

go a long way; the fate of the ocean is in our collective hands. Also becoming part of the largest growing ocean community based around our joint ownership of our global commons – the High Seas, where the five gyres of plastic swirl and the Garbage Patch State exists, will amplify the voices asking for our oceans to be better managed and preserved.

UNESCO recognized the Garbage Patch State, and the United Nations can do even more by including the ocean as a stand-alone Sustainable Development Goal in their post-2015 agenda. These goals are

replacing the expiring Millennium Development Goals, which united public policy and funding with private philanthropy and passion in unprecedented ways to move the needle on such issues as extreme global poverty and malaria. In a similar fashion, a stand-alone goal for the ocean would be a game-changer in conservation and finally place the priority of the ocean in a position commensurate with its size and indispensable value to all life.

Together, we can stem the tide of the ocean's recycling problem.



The Garbage Patch State National Pavilion immersed their audience in two cubes featuring 360-degree videos of the overwhelming issue of plastic pollution in the at the 2013 Venice Art Biennale.

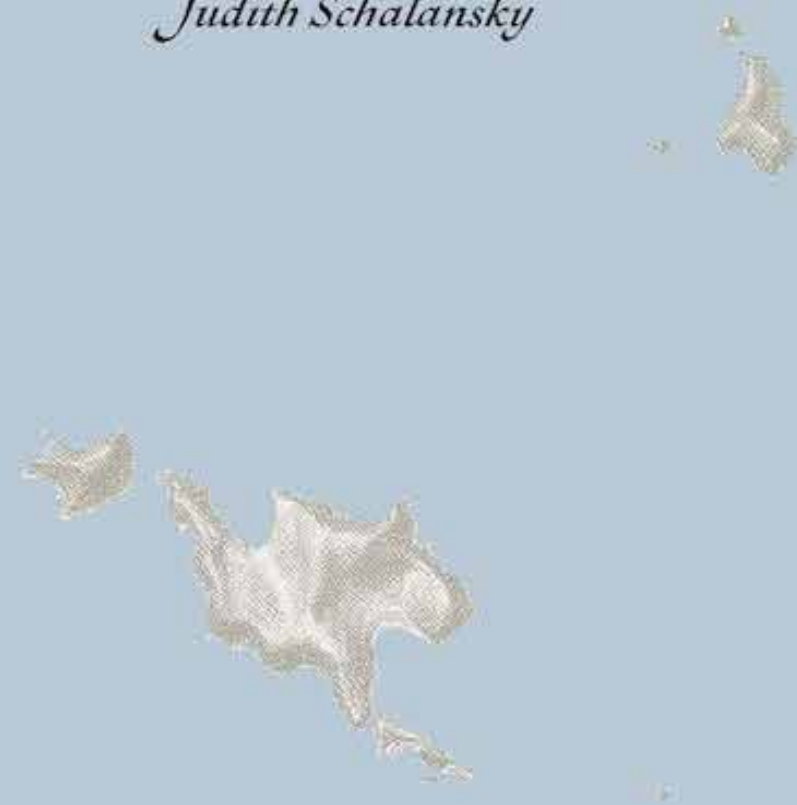
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# ATLAS OF *REMOTE* ISLANDS

Judith Schalansky



*Fifty Islands  
I Have Never Set Foot on  
and Never Will*



## BOOK REVIEW

JUDITH SCHALANSKY'S ATLAS OF REMOTE ISLANDS:  
*FIFTY ISLANDS I HAVE NEVER SET FOOT ON AND NEVER WILL*  
by Lincoln Paine

According to one estimate, there are upwards of 8.8 million islands in the world.<sup>1</sup> As Christian Depraetere, a leading practitioner of nissology (the study of islands) has put it, “islands are the rule rather than the exception.”<sup>2</sup> From a nissological perspective, the visible land of our bluewater orb constitutes nothing more than a sprawling archipelago, dominated by the big islands of America, Eurasia, Africa, Australia, and Antarctica to be sure, but a cluster of islands nonetheless. If this were not the case, ships would not be central to world trade. Perceptions matter, of course, but while we may scoff at the apocryphal British newspaper headline, “Fog in the Channel. Continent Cut Off,” the people of Easter Island (Rapa Nui) call their island *Te Pito Te Henua*, “the navel of the world.”<sup>3</sup>

In any case, the supercontinent Pangaea was an aberration, an accidental confluence of landmasses rather than an Edenic norm that came apart at the seams. Then again, in a geologically perfect world whose constituent elements were distributed in even layers like a spherical *pousse café*, there would be no bits “of the earth’s crust from the bottom of the ocean that just happened to shoot up above sea level, a veterbra of an undersea spine” like Macquerie Island between New Zealand, Australia, and Antarctica.<sup>4</sup> Without land, we would not exist. But we live in an imperfect world, some of whose more jagged contours Judith Schalansky has artfully delineated in her *Atlas of Remote Islands*.

Their pretensions to systematic coherence notwithstanding, all reference books are idiosyncratic, but Schalansky’s compendium of *Fifty Islands I Have Never Set Foot on and Never Will*—fifty out of millions? what gall!—is stunningly so. The presentation is impeccable. The islands are drawn to the same scale (1:125,000) and each, from the smallest (Tromelin, a 0.7 square kilometer “French” crumb in the Indian Ocean) to the largest (Russia’s uninhabited Rudolf Island, 297 sq. km.) sits in solitary splendor on its own right-hand page. The facing page includes the island’s latitude and longitude, scale bars showing its distance from three often equally remote landfalls, and a timeline of significant events since 1500—sometimes only one, never more than four—and a written sketch. She concludes

with a multilingual glossary of geographical terms, from the French *arête* (crest or ridge) to the Japanese *yama* (mountain), and an index of about 1,100 place names—points, bays, capes, peaks, settlements—and the names of the hundred or so people who haunt these pages.

If the heart of the book is Schalansky’s beautifully executed cartography, the soul is in the text, especially the narrative captions, none more than about 400 words, drawn from a careful reading of innumerable though unnamed sources. A pair of faint gold slashes indicates a change from one writer or theme to another. “All text in the book,” she writes in her preface, a subtle and succinct meditation on cartography, art, and the human condition, “is based on extensive



Indian Ocean  
South Keeling Islands, Australia (aka South Cocos Islands)  
595 inhabitants



research and every detail stems from factual sources. I have not invented anything.”<sup>5</sup> The last claim gives me hope for Schalansky, but inspires little confidence in humankind as a going concern.

This is because the *t* says as much about people as it does about islands, even though the average population of the 31 inhabited islands is 1,095 and the median only 277. Nineteen of those she describes are uninhabited. Schalansky seems not to have made her choices to prove a point or advance an agenda. Her love of maps is rooted in an East German childhood spent poring over an atlas with “a map of the world, carefully positioned on a double-page spread so that the Federal Republic of Germany and the German Democratic Republic fell on two separate pages.” She only discovered “the provisional nature of the GDR” after unification, when she saw West German atlases that marked her homeland as “Soviet-occupied territory.... Ever since then I have not trusted political world maps, in which countries float on the blue ocean like vivid scarves”<sup>6</sup>—or like clusters of islands huddled on the land.

The randomness of Schalansky’s selections suits her subject. Only a small minority of readers will have heard of all these islands, yet what is striking is how many names are familiar. Some islands we know because our eye has chanced upon them repeatedly while looking for something else: Bear, Amsterdam, St. Paul, and Trinidad Islands, for instance. Others are known as the locus of events of wider historical interest: Howland, near where Amelia Earhart’s plane went down

on her failed circumnavigation; Norfolk, which served as a penal colony for Australia; Iwo Jima, site of one of the bloodiest battles of the Pacific theater in World War II; Diego Garcia, part of the British Indian Ocean Territory whose 2,000 native inhabitants were forcibly removed between 1968 and 1973 to give the United States a military base in the Indian Ocean.

Still others are known simply because they are named for someone of renown. These are the celebs of the island world, famous for being famous. Sometimes the relationship was complementary, and Schalansky notes that discoverers who put islands and their names on maps could become as famous “as if they had not merely *found* new worlds but actually *invented* them.”<sup>7</sup> Explorers, as givers of names, were well aware of this. In the words of HMS *Beagle*’s Captain John Lord Stokes, who named Port Darwin, Australia, after his former shipmate, “monuments may crumble, but a name endures as long as the world.”<sup>8</sup> At least sometimes: Alexander Selkirk gave his name to an island (also known as Más a Tierra, 630 km. from Chile) where he was marooned for four years, but in 1970 the Chilean government, ever alert to marketing opportunities, renamed it for his fictional *Doppelgänger*, Robinson Crusoe. In compensation, they gave Selkirk’s name to the still more remote Más Afuera, on which he never set foot.

Discoverers, their shipmates, and their sponsors might serve as the mapmaker’s muse, but the cartographer is essential to bringing the world into two-dimensional being. Playing on

the medieval mariner’s motto “to sail is necessary, to live is not,” Schalansky reminds us “only that which is written about has really happened.... Only when a place has been precisely located and measured can it be actual and real. Every map is the result and exercise of colonial violence.”<sup>9</sup>

Schalansky’s colonialism is not the narrow, geopolitical form familiar from history books, but the broader human project to control the world by defiance of the unknown and conquest of . . . what? Nature? Fear? Oneself? Mapmakers charted our progress as *terrae incognitae* became known and we drove “sea monsters and other creatures” from the darkest corners of the page.<sup>10</sup> She advances no grand theory to explain the ancient human drive to go in search of and colonize, when possible, even the smallest, remotest islands. She is less concerned with the Terra Australis Incognita of human ambition than with the outcomes of our restless urges, the deep and all-too-often toxic ambition to go our own way. John Donne’s meditation on the idea that “No man is an island” gets no play here, for that suggests the potentially beneficial, or at least benign, interconnectedness people have with one another.

There is a dark side to the human web, yet despite the wealth of contrary evidence, we remain inclined to associate much of this with the corruptions of, or resistance to, Western modernity, and to feel, as early European explorers did, that island societies preserved “the state of natural man, born essentially good, free from all preconceptions, and following, without suspicion and without



Arctic Ocean, Barents Sea  
Bear Island, Spitzbergen, Norway. 9 residents.



remorse, the gentle impulse of an instinct that is always sure because it has not yet degenerated into reason.”<sup>11</sup> The testimony Schalansky elicits from her sources can be read as counterblast to this enlightened naiveté and an indictment of the moral ease with which we degrade each other and our environment. It also makes the reader obliquely aware of the enormous effort required to lead honorable, respectful lives.

The difficulties islanders face are not unique to them, but many of these remote islands represent if not microcosms of human society, then at least controlled experiments whose subjects have followed corrupt, or corruptible, Pied Pipers to the hearts of darkness at the ends of the earth. For isolation—from the Latin, *insula*, island—can be a form of individual and collective torture, and there is no shortage of examples here. Whether inhabited or not, remote islands do not bring out the best in people, and the lines between proud self-sufficiency, arrogance, and depravity seem as arbitrary as the drawing of the prime meridian, or the printer’s gutter between West and East Germany. Hence the truth of the title she gives her introduction: “Paradise is an island. So is Hell.”<sup>12</sup>

Provisionality is an underlying theme in the majority of these miniature case studies, which invariably touch on the fragility of island life. The archipelago of St. Kilda, a clutch of islands forty miles from the Outer Hebrides, was inhabited for two thousand years, and is home to two ancient breeds of sheep. The St. Kildans were in intermittent contact with outsiders before the nineteenth century, when steamer service made

the main island, Hirta, readily accessible to tourists fascinated by this disconnected people. Yet they also introduced smallpox and other diseases that wrought havoc on the small population, while *tetanus infantum* claimed two-thirds of the islands’ newborn children. Faced with these perennial threats and diminishing agricultural yields, the last of the St. Kildans went into voluntary exile and evacuated the island in 1930.

On the far side of the world in the Solomon Islands lies Tikopia, first settled a thousand years before St. Kilda. Life here is precarious in the extreme, for the land is able to support no more than 1,200 people, a fact of which everyone is acutely aware and which has an enormous impact on society. Only the oldest sons may have children, for they must be fed from the land they own. “The younger sons stay single and are careful not to produce any children.... [T]he men practice coitus interruptus, and if this does not work, the women press hot stones to their pregnant bellies.”<sup>13</sup> There is no postponing the inevitable; unwanted babies are left to die.

Among history’s greatest mysteries, of particular interest to nissologists, is what prompted the migrations that led, over the course of 3,000 years, to the settlement of almost every island capable—if only barely, like Tikopia—of supporting life in Oceania. Necessity? Land hunger? Exile? Disinheritance? Exploration? The search for fish? Charismatic megalomania? What we do know for certain is that Melanesians, Polynesians, and Micronesians were every bit as susceptible to the destructive forces of greed, jealousy, and prejudice as anyone else. At

the navel of the world, the most remote of remote islands—2,000 kilometers (1,400 miles) from its nearest neighbor—the people of Easter Island divided themselves into twelve tribes, utterly denuded their island of trees, and saw their population plummet, from 10,000 to 4,000 today, only a hundred of whom are described as native.

With an area of only 4.5 sq. km. (1/36 that of Easter Island), Pitcairn is not an imposing neighbor. Polynesians once lived on the island, but by the time of its European rediscovery in the seventeenth or eighteenth century, they had either died off or moved on. It rose to outsize fame as the hideaway of Fletcher Christian, his nine fellow *Bounty* mutineers, and eighteen Tahitians, eleven of them women. Despite the miniscule population and the absolute certainty they could never leave—they burned their ship to ensure it—unrest was widespread and only one of the original men survived to greet the next ship to call at Pitcairn, eighteen years later. The population peaked at 233 in the 1930s, the same decade that Pitcairn gained international renown following the release of *Mutiny on the Bounty*, the most expensive movie made to that time, and winner of the 1935 Academy Award for best picture. (This was the third of five cinematic tellings of the story so far, starring Clark Gable and Charles Laughton; not the infamous 1962 version featuring Marlon Brando’s theatrics and to which Schalansky refers.)

The world gazed again on Pitcairn in 2004, when thirteen current and former islanders were tried on charges of rape and other sexual offenses, most of them involving

girls as young as ten, or even younger. The trial was a collision of British law (and imperial neglect) and a people who were without law as we know it, and one that laid bare a culture of rampant promiscuity in which carnal knowledge of a minor—twelve? fifteen? it’s unclear—was theoretically punishable by a hundred days in jail, though the crime was routinely ignored. And consent was often no more than apathy: “After a while I stopped saying no. There was no point to saying no. So I just lay there and let him get it over and done with. The quicker he did that, the quicker I was able to go.”<sup>14</sup> After three years of abuse, the future plaintiff left the island. She was fifteen.

The origins and circumstances of the Pitcairn islanders are unique, but living at a remove from society, whether on islands or in continental interiors, lends itself to indifference towards societal norms, and worse. In 1929, Dr. Friedrich Ritter and a patient, Dore Strauch, separated from their respective spouses and moved from Berlin to Floreana, one of the more demonstrably inhospitable of the Galapagos Islands. Eschewing clothing and other obvious trappings of twentieth-century society, they attracted a steady stream of emulous visitors and homesteaders and voyeuristic journalists eager to report on this highly evolved couple, whom the press dubbed—catchily but without irony—“Adam and Eve on Galapagos.” Three years later, they were joined by an Austrian “baroness” and her two young lovers armed with ambitious plans to erect a hotel for millionaires. Two years later, Strauch returned



Antarctic Ocean: Deception Island. South Shetland Island  
Uninhabited

to Berlin alone. Her doctor was dead, reportedly of food poisoning, the baroness and one of her lovers had disappeared, and the remains of the other was found several islands away. The mystery of what happened was never solved, but Schalansky does not exaggerate when she writes, “human beings travelling far and wide have turned into the very monsters they chased off the maps.”<sup>15</sup>

At its best, the discovery of remote islands results in a brisk failure, a leaving well enough alone: Step away from the island, and no one gets hurt. The whole venture can seem almost absurd, as in the case of Peter I Island, a massive heap of extruded rock 460 kilometers from Antarctica. Discovered in 1821 by a Russian explorer who

named it for Peter the Great, who died more than a century before, it was not landed on for another 108 years, by crew from a Norwegian ship. On the strength of this, Norway claimed Peter I Island and mapped it; Schalansky records the Norwegian names of twenty-four topographical features. But the Antarctic Treaty suspends Norway’s territorial claim to the 156 sq. km. basalt pile, which is neither habitable nor inhabited. So there it sits, named and all but unknown, an outsized drop of ink on even the smallest maps.

Five decades ago, the cartoonist Walt Kelly drew a poster for the first Earth Day captioned “We have met the enemy and he is us.” Nowhere is this more obvious than on islands. But islands are also the



canaries in the coal mine of global warming. In 2009, members of the cabinet of the Maldives, the most low-lying country in the world, donned scuba gear to convene an underwater cabinet meeting in an effort to illustrate the perils of global warming. The government of Kiribati seeks to buy land on Fiji so its people have a place to relocate when their land goes under.

Yet not everyone believes in sea level rise, much less that the earth—the earth under their very feet—is in peril. The outlook for the Papua New Guinean atoll of Takuu (Mortlock Islands) is especially dire, and the people seem torn between an attachment to life as it should be, indifference in the face of inevitable and catastrophic change, and a grudging willingness to consider leaving for the safety of Bougainville Island, 220 kilometers to the southwest. Traditionally reluctant to admit outsiders—missionaries, anthropologists, and others—they have in recent years eased restrictions on foreigners, so if nothing else the people’s last days as Takuu islanders will be well recorded.

What about the rest of us, cosmopolitan denizens of coastal islands and vast landmasses? We are in grave danger of following the isolationist creed of our insular counterparts. The difference between them and us is that as a species, humans have no practical alternatives to where we live, no fallback territory just over the horizon. Yet having exhausted our curiosity about oceanic islands, we are now launching ourselves towards celestial islands—planets, moons, asteroids—in search ultimately of refuge from the hard work of being ourselves and the acknowledgment that none of us

is an island. It is no coincidence that many of the most celebrated manned spacecraft have been named for ships of exploration that island-hopped their way to fame: *Discovery*, *Endurance*, *Columbia*, and *Challenger*, *Mir* and *Vostok*. Yet in plotting our way to what we once called the heavens, the realm of an imagined paradise, we have grown too sure of ourselves. Maps of the universe harbor no monsters, and few unknowns. The possibility that some dusky corner of space should be marked “Here be dragons” is left to the authors of science fiction, who invariably let humanity win.

If celestial explorers find themselves crashing back to earth, they can console themselves that the airstrip on Easter Island is “so enormous that a space shuttle could touch down on it in an emergency.” But, Schalansky continues, “The end of the world is an accepted fact, and Easter Island is a case in point with its chain of unfortunate events that led to self-destruction; a lemming marooned in the calm of the ocean.”<sup>16</sup>



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## THINKING LIKE AN ISLAND

by Peter Neill



The Bajau are a small refugee community found off the coast of Malaysia. They live their entire lives on the ocean in wooden huts built on stilts. They subsist on fish, octopus, and lobster all caught from handmade boats. Credit: Ng Choo Kia

Discussing solutions to challenges on land and sea, we speak often of patterns of consumption. We are a society organized around apparently insatiable consumption – of our natural resources, of the products derived from those resources, even of our heroes who we use up and discard with abandon equal to changing fashion – and it is this drive that has created such stress on our terrestrial and marine environments. Our social needs and financial system enable the extremes, for example, fishing tuna to exhaustion to meet immediate lucrative demand with no concern for limits or the inevitability of extinction.

Some argue this is the result of evil capitalism. I will leave that discussion for another time, another

place. But think of it this way: we approve investment in research and development of pharmaceutical products that treat disease; we disapprove of similar investment in such products that compromise the health of our children. It seems to me that the problem lies not so much in the financial system itself, but rather in the investment and consumer decisions and their consequences that either heal our sick or poison our fields, streams, and ocean. It's all about values.

How, then, do we shift our priorities, change our behaviors, and alter our patterns of consumption so as to sustain the resources that remain and assure our future survival? I suggest that we start *thinking like an island*.

Assume the satellite perspective and look down upon the earth to view an ocean world in which float islands, be they atolls, nations, or continents. If you now descend and join those island communities, you will discover people whose lives are defined by different limits, different needs, different utilities. Islanders are by definition more reliant on things to hand: water locally drawn, food locally raised or harvested from the sea, local skills required to make and fix things for themselves. They are more or less connected to a mainland that may provide fuel, additional supplies, even law enforcement, doctors, and priests, but they know that fog or storm may cancel that connection at any moment and they will be required to fend for themselves. I have no interest in

romanticizing island life; it is hard, challenging, often lonely, not always united in politics and beliefs, and forever formed by natural forces that are omnipresent in changing weather and wave.

Nonetheless, these circumstances demand different standards for living. Islanders must focus first on first things, on utilitarian needs not frivolities, on the essential requirements of individuals, families and neighbors. Islanders re-use and re-cycle things; they run machines longer on precious little fuel. They invent and create; islands are good places for artists and makers. They police and govern themselves. They teach and coach children they know. Islanders choose to limit themselves to the circumference of the land and to the quality of the life so defined by the omnipresent maritime beauty and enduring community they have found and built there. Many times, islanders choose to stay because they reject the way of living known on another shore. They are not ocean-bound; indeed, now, given the Internet, they can communicate and exchange goods, services, and ideas worldwide.

What are the characteristic values evident in such places: independence, self-reliance, practicality, frugality, ingenuity, respect for work, success within limits, cooperation, community. What if we suddenly drew invisible lines in urban places and applied these same values there? What if we looked at our cities, our regions, even our nations as islands? What if, as citizens, we all start acting like islanders, applying such values individually, locally, and nationally in our purchases, our institutions, our expectations of governance, our life choices? What if we abandon the rigid, mis-valued ideologies that paralyze us and engage instead in a fulsome exercise of island living? Do we have to wait for our leaders to tell

us what to do? Why can't we do this for ourselves? And do it now?

The global recession has brought home to nations and individuals alike the painful bankruptcy of systemic over-consumption, driven by credit, as an unsustainable model for the future. Only the most vested interests hold on to the delusion that all will be as it once was. There are signs among some countries and some executives that the application of such values to governance and business development can be a successful, competitive, and profitable way to behave in the world marketplace. There are signs that citizens of nations whose resources have been exploited and consumed, whose destroyed environments can no longer sustain water and food supplies, are demanding, sometimes violently, the attention or replacement of politicians complicit in the old model. There are signs that we are beginning to think and act as if we understand that earth, too, is an island. Such signs are not enough.

We must do more, and quickly.



Anacapa Island, Channel Islands National Park, California.



Floating City, Ca Ba Island, Vietnam  
Claire Fackler, NOAA | Marine Photobank



Tenerife, Canary Islands, Spain



ISLANDERS ARE BY DEFINITION  
MORE RELIANT ON THINGS TO HAND...



...Water locally drawn, food locally raised or harvested from the sea, local skills required to make and fix things for themselves. They are more or less connected to a mainland that may provide fuel, additional supplies, even law enforcement, doctors, and priests, but they know that fog or storm may cancel that connection at any moment and they will be required to fend for themselves. I have no interest in romanticizing island life; it is hard, challenging, often lonely, not always united in politics and beliefs, and forever formed by natural forces that are omnipresent in changing weather and wave.

~ From *Thinking Like an Island* by Peter Neill.



## CAN MAN-MADE FLOATING ISLANDS SAVE THE OCEAN?

The Seasteading Floating City Project by Joe Quirk

What if the way to save the ocean is to live on it?

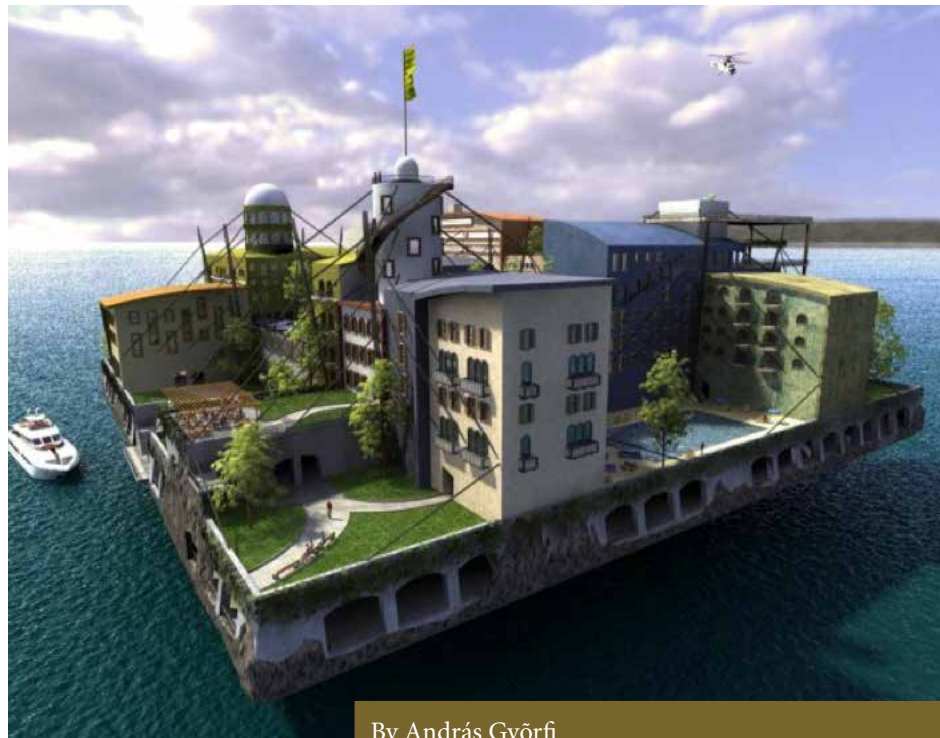
The solution to restore our abused oceans may be counterintuitive. A diverse international community of marine biologists, nautical engineers, aquaculture farmers, maritime attorneys, security personnel, investors, environmentalists, and artists has initiated the *seasteading movement*, a campaign to homestead the high seas by building buoyant cities that float on the ocean.

You might well ask: *Why on earth?*

Start from the realization that we don't live on Planet Earth. We live on Planet Ocean. Planet Ocean is more than twice the size of Planet Earth, and many believe we can save Planet Earth by building cities on Planet Ocean.

### HOMO AQUATICUS

What if every baby born added a small improvement to the ocean environment? What if the wealthier each baby got, the healthier the oceans became? What if accelerating the rate by which the poorest billion people became prosperous could fuel a mass restoration of the ocean? What if cities built in the twenty-first century could serve as a giant clean-up system for the planet?



By András Györfi

Seasteads will be designed to be modular, so the components of floating urbanization can fit together like a jigsaw puzzle to suit the community's needs.

What if the increase in human population could restore the seas instead of polluting them?

The solution is cyclical metabolism. It's not a new idea. The ocean and has been doing it for billions of years. A quarter of the carbon dioxide we produce is absorbed by the ocean, almost half the oxygen we breathe comes from the ocean, a large amount of the nutrients modern people consume have their origins in the ocean, and every molecule of water that passes through our bodies spends 98% of its time in the ocean. The ocean

powers all life, and it can power all civilization. Here's how:

### FEED THE WORLD WITH GREENHOUSE GAS

Ricardo Radulovich, an agricultural water scientist from Costa Rica, plans to transform greenhouse gas and ocean pollution into food for the poor. His plan is massive seaweed farms which can transform the nutrient and carbon pollution humanity has dumped into the oceans into edible sea crops. The more carbon seaweed pulls out of the ocean, the more carbon the ocean pulls out of the atmosphere.

Life utilizes the carbon cycle, and so should civilization.

Seaweeds are some of the most productive and nutritious plants in the world, representing three large groups, red, brown, and green, and at least 11,500 species, containing a much healthier nutritive profile than wheat, corn or soy, and an astounding diversity of varieties. Most people don't know they eat various forms of algae all day -- from the creamer in your morning coffee, to the make-up or sunscreen you put on your skin, to the toothpaste that cleans your mouth, to the medications or vitamins you take as tablets or capsules, algae permeates your body. Marine algae is in ice cream, milk, sausages, salad dressings, muffins, and mayonnaise. It's even in baby formula and pet food.

Cyclical metabolism can clean the seas. Humans eat food and create sewage. Algae eat sewage and create food humans eat. Why are we ignoring this symbiosis? Ricardo and others propose that massive algae farms could be stationed near polluted coastal waters all over the world to gobble up the products of untreated sewage, creating biomass we can use to feed and fuel the world. As algae farms profited and scaled up in size, wildlife would return to the purified waters.

Ocean farming wouldn't just restore the oceans. It would restore the land.

### RESTORATIVE FARMING

Seventy of the world's available fresh water is used for agriculture, and roughly a third of all land is used for agriculture. Algae farms

require no fresh water, soil, or pesticides, and on the ocean they can expand to any size. Unlike land crops, algae grow and harvest year-round. Algae don't suffer from droughts or floods. They grow in a stable, year-round environment. All they need to ramp up to colossal proportions is carbon pollution and nutrient pollution, two things agriculture is producing in colossal quantities.

Corn and cow farms produce unhealthy food and pollute the oceans. Algae and fish farms produce healthy food and clean the oceans. The transition from agriculture to aquaculture will transform our corn farms into algae farms, and our cow farms into fish farms. This will free up the fresh water for the world's poor, and we can give the world's farmland back to the song birds.

"There is the possibility of producing seaweeds, fish, shrimp, oysters, and many other products, directly at sea, without needing a single drop of fresh water," says Ricardo Radulovich. "So the possibilities are many, and we are barely beginning to exploit them. The area available to produce at sea is enormous. The amount of water available to produce at seas is enormous. So we shouldn't be at all worried that we're going to run out food, or we're going to run out of water. Of course if we keep producing only on land, that may happen. It is happening already. But the sea represents the next agricultural landscape. We have to change our frame of mind."

By mixing seaweed flour with wheat flour, Ricardo is working to



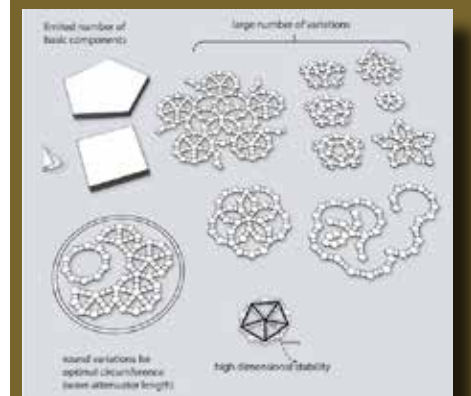
By András Györfi

Since floating components can be shuffled and recombined according to the choices of the residents, buildings would never need to be demolished, only moved.



By Emerson Stepp

"I designed by seastead to be visually appealing yet at the same time able to withstand the harsh atmosphere that comes with maritime architecture," said the architect.



By DeltaSync

By designing the platforms as squares and pentagons, an endless series of neighborhood arrangements are possible.





By DeltaSync

All the components of city life are already floating in service to ocean industries, and they can be combined in any way the residents choose, and changed at will.



By DeltaSync

The nutrient pollution that land-based cities release into the ocean can be absorbed by algae farms and transformed into food and fuel.



By DeltaSync

Once economies are based on cyclical metabolism, the Blue Economy will be underway, and civilization may achieve harmony with nature.

end malnutrition in the developing world. The Bill and Melinda Gates Foundation helped Ricardo found the *Sea Gardens Project*, which teaches the poor how to grow floating farms which can be scaled up to any size. Soon Ricardo hopes to demonstrate how microcosms can work profitably on an industrial scale. Algae farms will continue to scale up in size, detach, move out, and lay the agricultural foundation for an ocean city.

#### THE FOUNTAIN OF LIFE

Imagine a city built in a lifeless desert that transforms the wasteland into a garden. Imagine if this city could provide an endlessly renewable abundance of food, fuel and fresh water that would not have existed had the city not been built. All the desert residents have to do to access this bounty is to reach a thousand feet below the desert surface.

Such a city-sized horn-of-plenty sounds like something out of a fantasy. Yet the technology is old news. It was demonstrated during the Carter Administration, yet the innovation was abandoned because unsustainable fossil fuels and agriculture were cheaper. Today, as demand for energy, food, and water increases, national governments and venerable corporations are already working to build these energy powerhouses that could support cities.

To understand, imagine this desert city not fixed on land, but floating on the ocean. Such floating cities could provide a virtually endless fountain of food, fuel, and fresh water.

#### OCEAN THERMAL ENERGY CONVERSION (OTEC)

The ocean is the largest solar panel in the world. Lockheed Martin estimates that each day the tropical oceans absorb three times the amount of energy that the world currently consumes. Incredibly, the ocean's stored energy can be tapped. We each use a form of this technology every day. Consider your refrigerator, air conditioner, or the engine in your car. Much of the energy that powers our daily lives works on the simple thermodynamic principle that a machine containing a difference in temperatures can create energy.

Now think big. In the tropics, the water at the surface of the ocean is very warm. The water at the bottom of the ocean is very cold. If we send a thousand-foot pipe down into the deep, we have a temperature difference, from the bottom of the pipe to the top, of 20 degrees Celsius. This temperature differential can drive a gigantic steam engine to produce a massive amount of electricity.

Ocean Thermal Energy Conversion, or OTEC, is a clean and renewable energy source. It's environmentally sustainable, and it's capable of providing massive levels of energy that can not only power an ocean city, but create enough extra power to fuel the land-based nations of the world.

"Pipe" dream? In 1979, Lockheed Martin constructed the first floating OTEC off the Hawaiian coast, which produced clean, green electricity. It worked! Soon after, the oil crisis ended, oil became inexpensive, and no more OTEC



By Vincent Callebaut

Biomimicry is the means by which cities could be based on nature's structures. This city design is based on the lily pad, which is solar-powered and environmentally restorative.

plants were built.

OTEC isn't a futuristic technology. It's an old technology that was shelved. The Office of Energy Efficiency and Renewable Energy (EERE), which leads the U.S. Department of Energy's task force, reports, "Some energy experts believe that if Ocean Thermal Energy Conversion can become cost-competitive with conventional power technologies, it could be used to produce billions of watts of electrical power."

Ted Johnson, a former Director of Renewable Energy at Lockheed Martin declared, "Water will be the next oil." Ted Johnson's new company, Ocean Thermal Energy

Corporation, of which he became Vice President in 2011, has projects planned in several tropical island nations.

Imagine if Saudi Arabia was the size of an ocean, but to access the energy, we don't need to drill into bedrock, only dip a pipe into water.

#### OTEC CORNUCOPIA

If you go fishing on the high seas, you may be disappointed. Most of the world's ocean is a lifeless desert where the nutrients that sustain life sink below where sunlight can reach to power photosynthesis. Organic matter sinks. For billions of years nature has been depositing all the ingredients

necessary to sustain life on the ocean floor, which holds a virtually inexhaustible amount of fertilizer. In fact, the rich concentration of nutrients is suspended in seawater only 500 meters below the surface. Nearly half of all wild seafood is harvested from less than one tenth of one percent of the ocean surface. These are the rare places blessed with natural upwellings from the deep ocean floor. Once sunlight and algae get a hold of that rich fluid, marine ecosystems flourish, each like an oasis of life in a vast desert.

Patrick Takahashi, a Hawaiian biochemical engineer, asks, "Why are we relying on natural upwellings covering one tenth of





By DeltaSync

“Any coastal city can environmentally and economically pay for itself with an offshore floating city,” says Rutger de Graaf, co-founder of DeltaSync.



By DeltaSync

DeltaSync envisions that technological lessons learned by small cities in shallow waters will be applied to larger cities on the high seas.



By DeltaSync

“Growing algae to produce biofuel can be 10 to 20 times more productive compared to corn or sugarcane,” reports DeltaSync.

one percent of the ocean?” One hundred percent of the ocean floor is covered in the elixir of life. If OTEC plants allow us to double the amount of upwellings to, say, two-tenths of one percent, we double the amount of wild sea life we can create and harvest. A sizable platform will be needed to stabilize OTEC pipes. If we build a city on it, we have a self-sustaining ocean city and aquaculture farm. By accessing the unused nutrient wealth of the deep oceans, these floating metropolises would increase the number of ocean ecosystems without foreseeable limit.

OTEC plantships could also end wars for water. If you think the potential bounty of clean energy and renewable seafood is too good to be true, consider that OTEC plants create fresh water as a byproduct. Producing energy by evaporating sea water and condensing the resulting vapor means you are left with clean drinkable water.

Now compare agriculture to aquaculture. Agriculture supported by oil requires fresh water, produces CO<sub>2</sub>, and drains excess nutrients into the sea, creating “dead zones” that harm marine life. Aquaculture supported by OTEC plantships will be supported by sunlight, produce fresh water, and absorb nutrients from the sea, creating ecosystems of bustling life.

Will immigrants move to floating OTEC cities that host aquaculture farms?

BLUE JOBS FOR THE

BOTTOM BILLION

According to Lockheed Martin, “each commercial OTEC plant would create 3,500 to 4,000 direct jobs. With the potential for thousands of OTEC plants, the economic impact would be enormous.”

Consider the potential for the *blue economy*. In 2009, 700 million poor and oppressed people told a Gallup poll they want to leave their countries forever and find freedom and prosperity for their children. That’s more than twice the population of the United States. Existing countries refuse to absorb them. Seasteads will require them to survive economically. To coax people to floating cities, better opportunities will have to be offered. Imagine millions of *blue jobs* causing a mass immigration comparable to the gold rush.

Infected with this vision, The Seasteading Institute has researched the potential for permanent floating cities on the sea since it was founded in 2008 by Peter Thiel, co-founder of PayPal, and Patri Friedman, grandson of economist Milton Friedman and a third generation political theorist.

After five years of research, we commissioned the Dutch aquatic engineering firm DeltaSync to produce and design a feasibility study for a small floating city. In 2014, the Seasteading Institute was proud to release of our long-awaited Floating City Project report. Our key findings are:

1. A market for a residential floating city exists,
2. A practical design can be built to



By Vincent Callebaut

“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.” Buckminster Fuller

as described in our Design and Implementation Concept report.

Buildings should be no more than 3 stories tall. Structures can take up to 80% of the platform, leaving at least the other 20% for walkways, gardens, and outdoor space.

Designs should allow for fluidity in rearranging a sea-city, and should incorporate sustainable energy practices, such as solar, wind, wave, and tidal power. Designs should consider wave action and withstand severe ocean storms.

Rutger de Graaf, co-founder of DeltaSync, estimates that with 13% of the human population living on water, humanity will achieve harmony with nature, with any size population. According to DeltaSync’s figures, this would be achieved if we cultivate less than one percent of the ocean.

If you’d like to join the *Blue Revolution* to build a sustainable floating civilization for 9 billion people by 2050, become a member of the growing Seasteading Institute, and contribute your talents to this effort to restore Planet Earth by living on Planet Ocean.

Floating cities are the next frontier. To get involved, or for more information, visit [Seasteading.org](http://Seasteading.org).

match the market’s price point, 3. The Seasteading Institute can secure a deal with a host nation willing to grant a floating city substantial political independence.

We conclude that the first floating city with significant political autonomy could be established by 2020.

FLOATING NATION 2020

In DeltaSync’s vision, the city will be composed of solar-powered platforms shaped like squares or pentagons with 50-meter sides. These platforms can be connected and arranged in numerous branch-like structures. The design features apartments, terraced housing, office space, and hotels. Eleven connected platforms could host about 250 full-time residents with an additional 50 hotel beds. This would cost \$393 per square foot of gross space, but since 20% of each platform is reserved for green space, the report estimates that private space will cost \$504 per square foot (\$5425/sq. meter.)

Thousands of potential residents from at least 67 countries and many income levels have filled out

our survey letting us know what they want from a floating city with political autonomy. The market demand for the first floating city is vigorous and growing. If such a small floating *seastead* prospers and attracts residents, DeltaSync believes the city could expand and move out into deeper water. Their long-term plan includes the construction of floating breakwaters made from modular units. This would allow the floating city to expand and enlarge to protect the city from waves. Once our floating city moves into international waters, it would be a true *seastead*, by which we mean a floating nation.

Now that we have laid the engineering, legal, and business groundwork for our floating city, we need artists to make it beautiful.

ARCHITECTS NEEDED

In 2015, The Seasteading Institute in partnership with DeltaSync announced *The Floating City Project Architectural Design Contest*. We are inviting architects, students, engineers, and designers to create designs for a small city with at least 10 platforms



### FOGO ARTS:

Fogo Island Arts is a residency-based contemporary art venue that supports research and production of new work for artists, filmmakers, writers, musicians, curators, designers and thinkers from around the world. Since 2008, FIA has brought some of the most exciting emerging and renowned artists of today to Fogo Island, Newfoundland, Canada to take part in residencies and to present solo exhibitions at the Fogo Island Gallery. Combining contemporary art, iconic architecture and social innovation in a singular setting, FIA is a world-class institution that is uniquely rooted in community.

Located off the coast of Newfoundland in Canada, Fogo Island Arts was established in 2008. Artists-in-residence come to the island to do research and selected artists are invited to present their work in exhibitions at the Fogo Island Gallery, which is located in the Fogo Island Inn. Exhibitions are accompanied by publications produced in collaboration with international imprints, including Sternberg Press (Germany) and with public institutions globally.

Two artists-in-residence are featured in this volume's Ocean Portfolio: Edgar Leciejewski and Kate Newby.



**Fettgerüst (detail)**  
Edgar Leciejewski from *Tones*, 2014.  
Colour print. Image courtesy the artist.



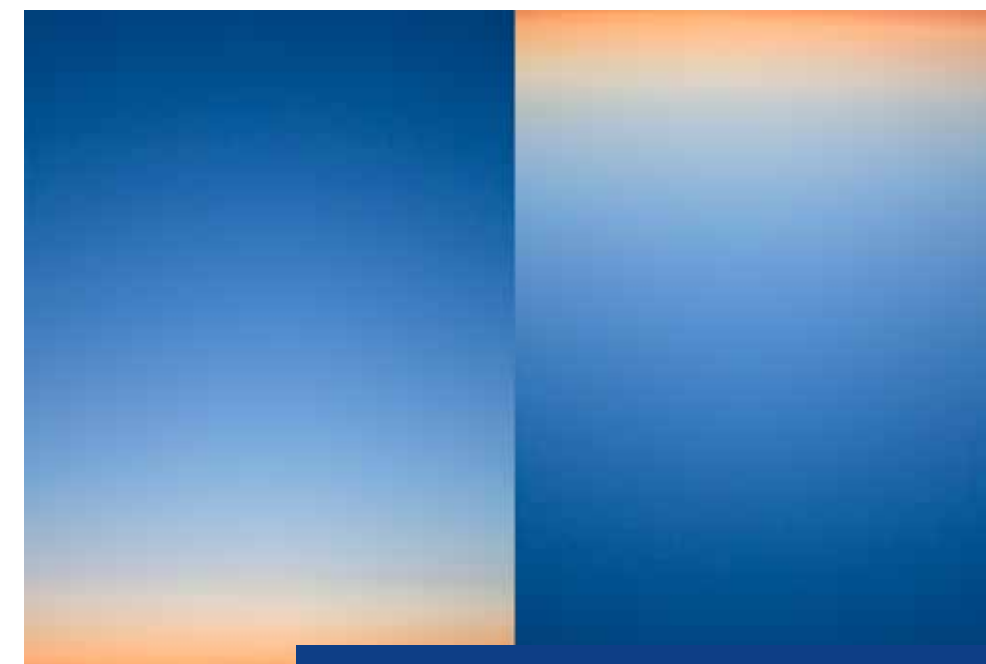
**Fettgerüst**  
Edgar Leciejewski from *Tones*, 2014.  
Colour print. Image courtesy the artist.

### EDGAR LECIEJEWSKI

explores the various social and scientific uses of photography. His work employs an experimental, analytic approach to the medium of photography by using various techniques and media. Besides content-related issues and the reflection of his own work, he is interested in issues such as the rhetoric of the photographic series, the photographic genre, the composition, and how as much time as possible can fit in a single photographic image. His pictures are repositories of time that allow for the slowing down of the act of seeing. Leciejewski's work has been exhibited amongst others at Witte de With Center for Contemporary Art Rotterdam, Schirn Kunsthalle Frankfurt, Kunsthalle Wien, Museum der bildenden Künste Leipzig. Leciejewski lives and works in Leipzig, Germany.

Edgar Leciejewski spent six months as a Fogo Island artist-in-residence in 2014. His show *Tones* brings together new work stemming from his time on the island, including large-scale collages, photographs of natural elements, and precarious sculptures composed of objects found on the shore. Taken together the works in the exhibition are a collection and an archive of time shown in modern images, raising questions on how we contemplate ideas of nature.

LEARN MORE:  
[www.edgarl.de](http://www.edgarl.de)



**Fettgerüst (detail)**  
Edgar Leciejewski from *Tones*, 2014.  
Colour print. Image courtesy the artist.



**Fettgerüst (detail)**  
Edgar Leciejewski from *Tones*, 2014.  
Colour print. Image courtesy the artist.



KATE NEWBY  
“LET THE OTHER THING IN”  
JUNE 27 - SEPTEMBER 8,  
2013 AT FOGO ISLAND  
GALLERY

On a low-lying platform, the artist places groupings of kiln-fired rocks and sticks she made while living on the Fogo Island. Newby assigns each group a title, suggesting a system is at work. The artist derives this from a similar preference Fogo Islanders have for assigning names to places, landmarks and things.

All photos: © Guy L’Heureux

KATE NEWBY is based between Auckland, New Zealand, and New York, USA. In 2013, she had solo shows at the Fogo Island Gallery, Newfoundland, Canada; La Loge, Brussels, Belgium; and Hopkinson Cundy, Auckland. This year she will be included in group shows at Arnolfini, Bristol, UK; Hopkinson Mossman, Auckland Slopes, Melbourne, Australia.  
LEARN MORE:  
<http://buff.ly/1deQUtN>



**Installation View**  
Kate Newby, Let the other thing in, 2013.  
Photo: Guy L’Heureux. Courtesy of Fogo Island Arts.



**Off-Site installation, Shoal Bay.**  
Kate Newby, Let the other thing in, 2013,  
Photo: Guy L’Heureux. Courtesy of Fogo Island Arts.



Images from Kate Newby’s exhibit *Let the Other Thing In*, 2013.  
Photo: Guy L’Heureux. Courtesy of Fogo Island Arts.



**Exterior View**  
Kate Newby, Let the other thing in, 2013.  
Photo: Guy L’Heureux. Courtesy of Fogo Island Arts.



# USING THE OCEAN WITHOUT USING IT UP

The Blue Halo Initiative is Developing a Plan to Manage the Waters Around Barbuda for This and Future Generations. A Project of the Waitt Institute; Funded by the Waitt Foundation



Blue Halo is empowering Barbudans to restore their coastal waters by developing a sustainable coastal policy based on science, supporting coastal and fishing livelihoods, involving stakeholder participation, and including creation of sanctuary zones to replenish fish populations and restore a healthy ecosystem.

Imagine a scalable project, being tested in real time on a small Caribbean island, centered on the values and goals of its community. Imagine this project improving livelihoods while simultaneously sustaining and protecting the health of the local ecosystem and its resources. This and more is happening on Barbuda, an island nation in the Eastern Caribbean, part of a three-island state including Antigua and Redonda. Barbuda is home to approximately 1,500 people, is highly dependent upon fishing, has a strong community awareness of the need to improve its sustainability and management practices, and has a government fully on board with the Blue Halo concept. A small village community unencumbered by tourism and known for its pink sand beaches and stunning turquoise waters, Barbuda is a natural paradise: the coastal and marine environment

is home to a great diversity of species and mangroves. According to the UN Rio+20 report, in 1980 approximately 11% of Barbuda was covered in wetland, which included 36% mangroves. Coral reefs and seagrass beds were in abundance. Today those systems are under severe stress. Like many small island developing states (SIDS), Barbuda will feel the severe impacts of global CO2 emissions long before more developed, larger nations will. Their geography makes them more vulnerable to extreme weather, sea level rise, climate change, and threats to fisheries on which this small island community so heavily depends.

Blue Halo is an ocean zoning initiative, a collaborative partnership between the Barbuda

Council, Codrington Lagoon National Park, Barbuda Fisheries Division, the people of Barbuda, the Office of the Prime Minister of Antigua and Barbuda, and the Waitt Institute. The goal of the Initiative is to manage ocean resources sustainably, resulting in improved fishing catches, healthier ecosystems, and stronger, more sustainable ocean-based livelihoods. The approach is to develop zoning, implementation, monitoring, financing, and enforcement plans for the waters within 3.45 miles from shore that are under jurisdiction of the Barbuda Council, accommodating multiple activities while supporting ecological integrity and productivity, and working to ensure sustainable fishing for future generations of Barbudans.

FROM DR. AYANA ELIZABETH JOHNSON, KEYNOTE SPEAKER AT THE 2015 BLUE VISION SUMMIT, WASHINGTON, DC:

It is based on the perspective I have gained from reading the scientific literature, and from my time at NOAA, Scripps Institution of Oceanography, the Waitt Foundation, and at gatherings like these, that over the last two years I have led the creation of the Blue Halo Initiative. This is now the primary focus of the Waitt Institute. We partner with governments and communities as they envision, create, and implement sustainable ocean management.

Our recipe for ocean conservation has three main attributes: it's comprehensive, it's science based, and it's community driven. Community driven isn't just a

term we use. We really mean it: In Barbuda, there were 7 rounds of community consultation, an additional 5 rounds with fishers, 22 meetings with the Barbuda Council (island governing body), two stakeholder committee meetings, 75 one-on-one stakeholder interviews, and I lived on the island for 8 months over one and a half years.

The Blue Halo Initiative is not just about conservation in the sense of setting areas aside and keeping people out. It can't be. It's about enabling thriving coastal economies. It's about a triple bottom line of using ocean resources in a way that

is sustainable, profitable and enjoyable. It's supposed to be fun. Beyond food security, a lot of what motivates me is the vibrant coastal cultures that need healthy oceans: fish fries, fishing with your parents, swimming in clear waters. Without healthy oceans, not only are livelihoods and food security threatened, but cultures are. Ocean conservation is about cultural preservation.

So by saying these are your ocean resources, what to do you want to do with them? How do you want to balance all the demands on ocean space? By asking "What do you want your ocean to look like? and how can we help you get there?" this was the result. As of August, 2014, 33% of the coastal area out to 3 nautical miles is now marine reserves. There is no way that percentage would have been so high if we'd come in with an agenda to protect a certain area. We provided data to the community, we listened to stakeholder priorities and concerns, and we made policy recommendations, but every line on this map was drawn by local people, mostly the fishermen. Anchoring zones have been established and use of net is prohibited on or near the reefs. Nursery habitats are now protected, parrotfish and urchins are protected too.

And as of February, 2015 we have expanded the Blue Halo Initiative to Montserrat and Curaçao. Many more island communities have expressed interest in partnering with us and we hope to continue to expand our work across the Caribbean and then globally.







“THE STATE OF CARIBBEAN REEFS AND FISHERIES IS DIRE, BUT THE POLICY SOLUTIONS ARE SIMPLE. MY HEART SOARS TO THINK THAT IF OTHER ISLANDS TAKE SIMILARLY BOLD STEPS SOON, WE WILL SEE REEFS RECOVER, FISHERS’ LIVELIHOODS IMPROVE, ECOSYSTEMS BECOME MORE RESILIENT TO CLIMATE CHANGE, AND THE CARIBBEAN COASTAL WAY OF LIFE THRIVE.”

Dr. Ayana Elizabeth Johnson,  
Executive Director of the Waitt Institute and  
coordinator of the Barbuda Blue Halo Initiative



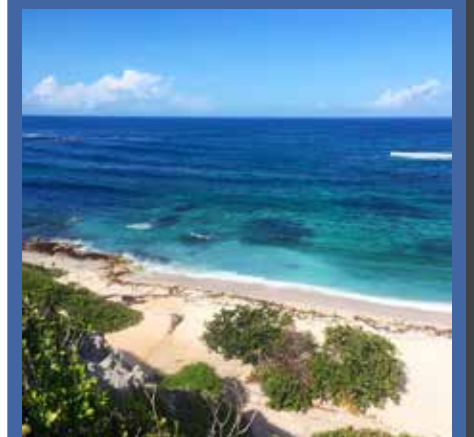
Pictured: Dr Ayana Elizabeth Johnson with then Antigua and Barbuda Prime Minister, Baldwin Spencer. Image Credit: Waitt Institute



Measuring conch in Barbuda



Barbuda’s new ocean laws help ensure that conch, an environmentally and economically important species on Barbuda, will be around for many generations to come.

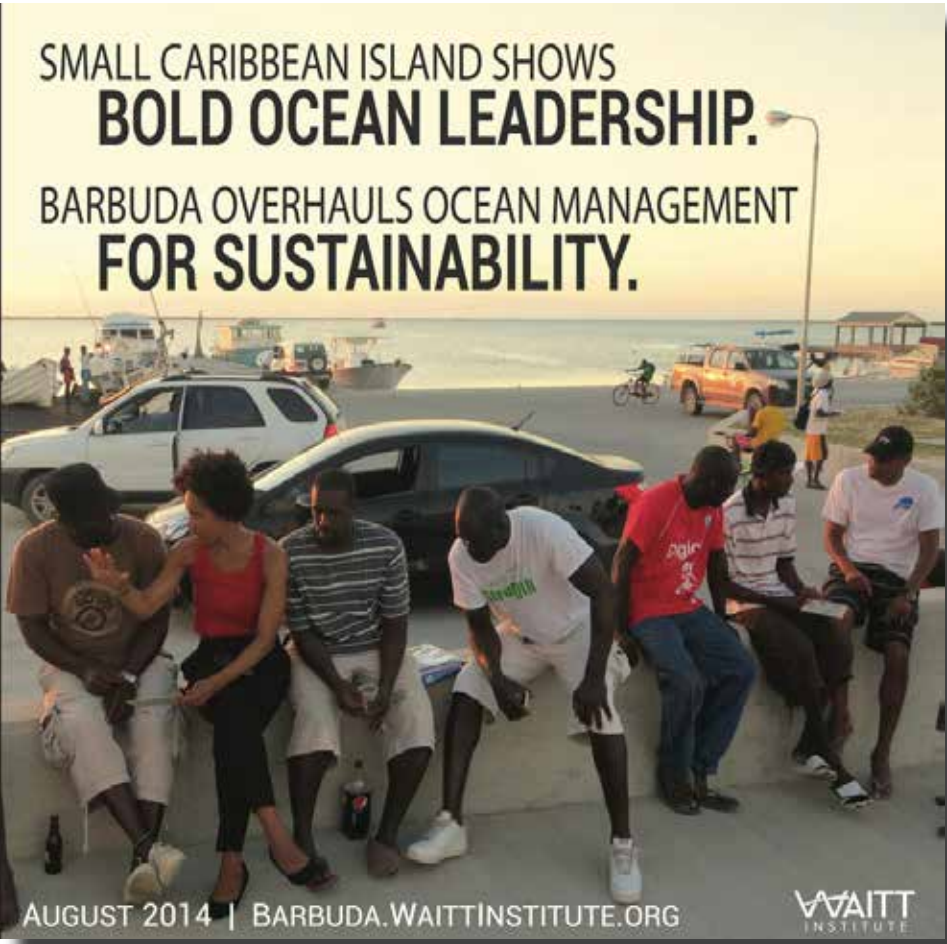
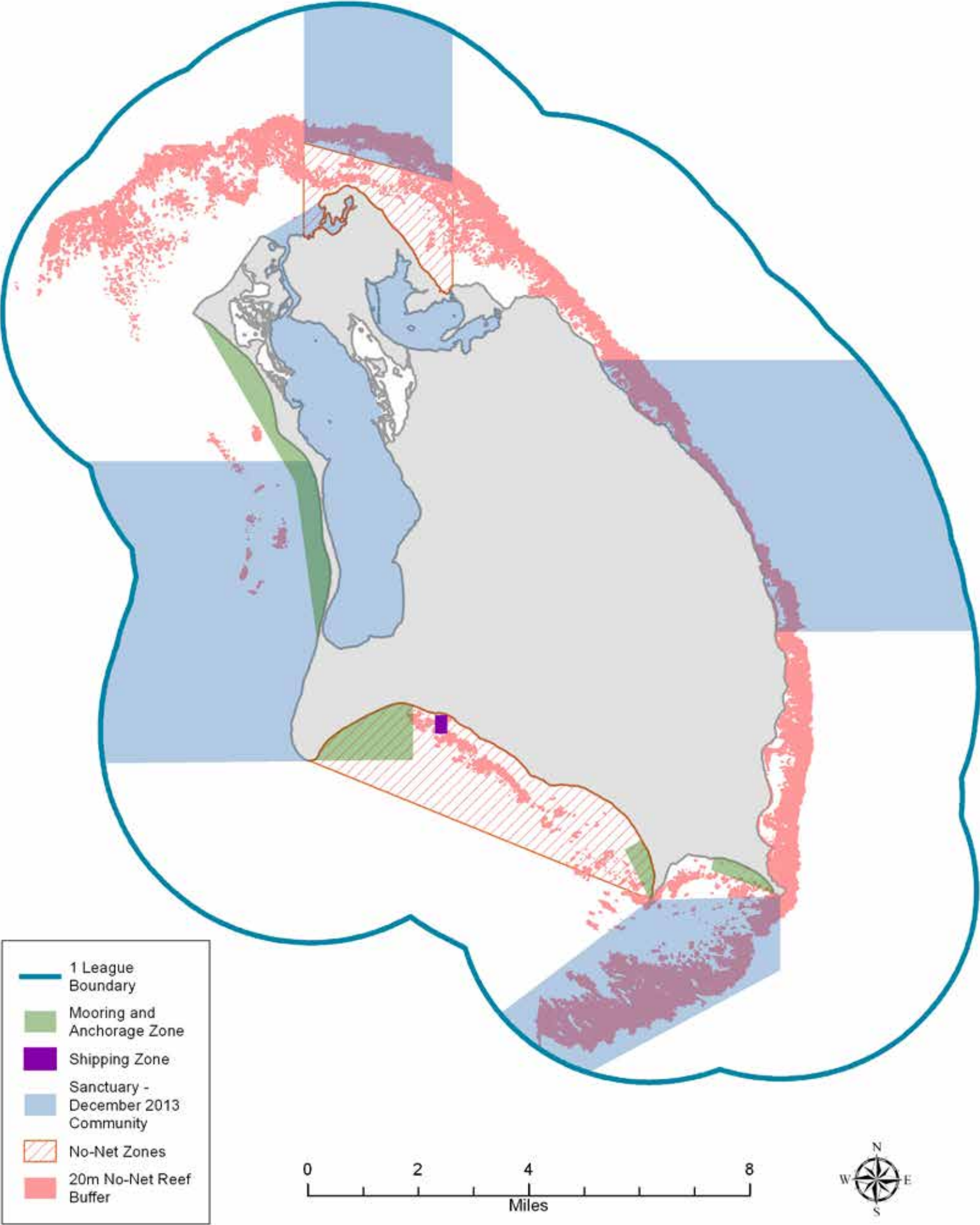


Ocean zoning: An approach to managing the ocean that balances all uses and helps ensure sustainability.



Barbuda Blue Halo Initiative Ocean Zoning Diagram

Comprehensive Ocean Zoning + Sustainable Management of Fisheries



The Waitt Institute will continue to work closely with the government and people of Barbuda over the next three years to support implementation of the regulations. This will include setting up a long-term scientific monitoring program, training local staff in marine ecology and field research techniques, recommending enforcement approaches, providing needed equipment, and working with schools to develop an ocean education curriculum.

To learn more about the Blue Halo Barbuda Initiative and the Waitt Institute, please visit: [www.WaittInstitute.org](http://www.WaittInstitute.org).



New fishing regulations and coastal zones passed last summer protect 33% of Barbuda's coastal area.



Winding through mangroves gives students firsthand experiences with one of Barbuda's most unique assets: the Frigatebird Sanctuary.



*Build partnerships, think bigger, ditch the ego, triage, and shout about what's working.* Dr. Ayana Elizabeth Johnson, Blue Vision Summit keynote.




### NO MAN IS AN ISLAND

Lewis Pugh and the 5 Swims in Antarctica for 1 Reason Expedition  
Ross Sea, 2015

No man is an island,  
Entire of itself,  
Every man is a piece of the continent,  
A part of the main.  
If a clod be washed away by the sea,  
Europe is the less.  
As well as if a promontory were.  
As well as if a manor of thy friend's  
Or of thine own were:  
Any man's death diminishes me,  
Because I am involved in mankind,  
And therefore never send to know for whom the bell tolls;  
It tolls for thee.

John Donne (1572 - 1631)  
Devotions Upon Emergent Occasions,  
Meditation XVII  
1624



*Lewis Pugh, ocean advocate, pioneer swimmer. Pugh is best known for being the first to swim across the North Pole in 2007 to highlight the melting of Arctic sea ice. He has received a number of awards, was named Young Global Leader by the World Economic Forum, and appointed UN Patron of the Oceans. In February 2015 he launched the 5 Swims in Antarctica for 1 Reason Expedition, swimming in sub-zero Antarctic waters to help save the Ross Sea from irreversible damage.*

*Photographs by Kelvin Trautman @kelvintrautman*

