

onearth

A SURVIVAL GUIDE FOR THE PLANET • PUBLISHED BY THE NATURAL RESOURCES DEFENSE COUNCIL



Can the Cruise Industry Clean Up Its Act?

This billion-dollar Royal Caribbean ship boasts a state-of-the-art wastewater treatment plant and 21,000 square feet of solar panels. It also burns up to 7,200 gallons per hour of the world's dirtiest fuel.



SUMMER 2012
WWW.ONEARTH.ORG

PLUS

{ THE NATURE OF BREASTS
WHAT A BLIND SCIENTIST CAN SEE
WHAT'S IT ALL ABOUT, ALGAE?

FEATURES

28 Sea of Wonders

by Tim Folger

Jacques Cousteau once famously described Mexico's Sea of Cortez as "the world's aquarium." Now that it's near collapse, what can one small fishing village do to save it?

36 In Each Shell A Story

by Susan Freinkel

From the "arms race" among ancient mollusks to present-day ocean acidification, a blind scientist vividly interprets the world through his fingertips.

46 How Cool Is That?

by David Biello

Every Google search or Amazon purchase consumes power. Now Norwegian engineers hope to build the world's biggest, most energy-efficient data center—hundreds of feet underground.

POETRY

14 Flow

by Ben Howard

56 Cage

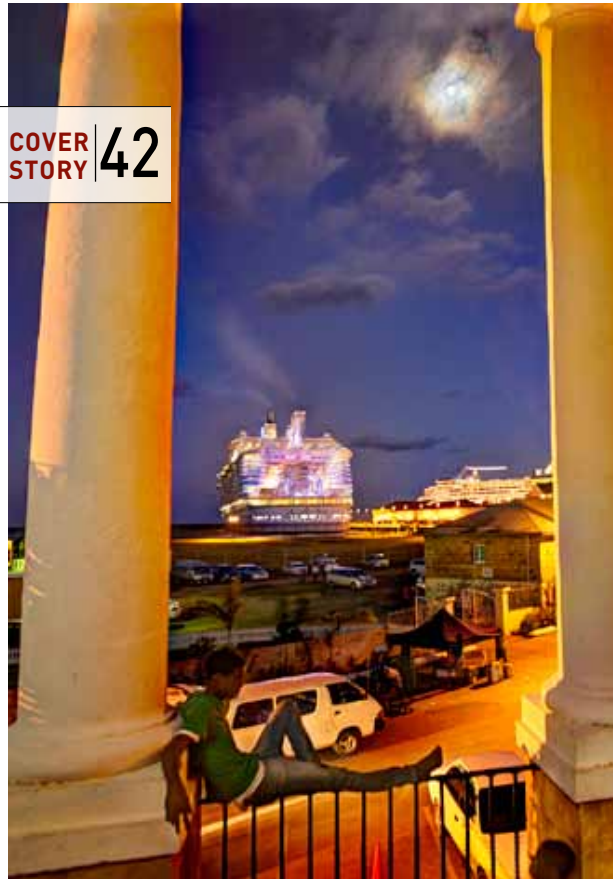
by William Heyen

ONEARTH ONLINE

VISIT ONEARTH.ORG

Read the digital edition of the magazine on your computer, e-reader, or tablet device, and access complete back issues at onearth.org/digital

COVER STORY 42



The residents of Falmouth, Jamaica, hoped that cruise ships like the Allure of the Seas would usher in a new era of prosperity. So far the reality hasn't quite lived up to the dream.

Dreamboat

by Michael Behar

In the bad old days, cruise ships used to dump garbage and raw sewage into the oceans without a second thought. Royal Caribbean, the world's second-largest cruise ship operator, wants its new mega-liners to show that the industry has cleaned up its act—but first they will have to stop burning the world's dirtiest fossil fuel.

Cover: Photographed for *OnEarth* by Tia Magallon.

DEPARTMENTS

8 FROM THE EDITOR

14 LETTERS

17 FRONTLINES

Algae-based biofuel makes for a slippery political football. Plus, under one vintner's careful stewardship, an ailing winery recovers.

Q&A The lead-up to the passage of the Farm Bill every five years marks a period of struggle between family farmers and Big Ag. John Hansen is a grizzled veteran.

24 THE SYNTHESIST

by Alan Burdick

What if the future of the car wasn't just about longer-lived batteries? Could electrified roads be the key?

26 LIVING GREEN

by Rob Walker

One man imagines a consumer world where the hot "brand" is made up of already-owned items.

54 REVIEWS

Facing enemies from cancer to premature puberty, can an evolutionary miracle—our breasts—stay the way that Nature intended?

64 OPEN SPACE

by Le Anne Schreiber

There's a time to throw away the field guides and learn instead from the evidence of your own senses.

INSIDE NRDC

10 VIEW FROM NRDC

by Frances Beinecke

12 THE DEANS LIST

by Bob Deans

58 DISPATCHES

Public health and coal-fired power, "facts" from Big Oil, and more.

cover story

Royal Caribbean says it
wants to clean up the notoriously
dirty cruise ship industry.
Can it be done?

BY MICHAEL BEHAR * PHOTOGRAPHS BY JEFFERY SALTER

dreamboat

Welcome aboard!



NOW ON DECK

Jamie Sweeting is charged with greening Royal Caribbean's *Allure of the Seas*, whose features, far right, include solar panels arrayed next to the smokestacks.

IT'S DAWN IN EARLY DECEMBER, AND I'M STANDING BAREFOOT on a deserted beach that overlooks Falmouth, a colonial-era port, population 7,800, on Jamaica's breezy northern coast, about 90 miles from the capital, Kingston. The air is deliciously cool and silky. Seabirds are pecking in the sand, scavenging for mole crabs at low tide. On the opposite side of the harbor, across shimmering blue water, there is a new \$220 million port development for cruise ships. Royal Caribbean International and the Port Authority of Jamaica partnered to pay for its construction. Opened in March 2011, it was built to accommodate the largest passenger ships in the world, *Allure of the Seas* and *Oasis of the Seas*. Owned by Royal Caribbean and costing \$1.4 billion apiece, they are sister ships—identical twins—five times the size of the *Titanic*, each carrying up to 6,300 passengers and 2,400 crew members.

When I first spot her, *Allure* is a pearly flyspeck on the horizon. But steaming toward Falmouth at 22 knots puts her on top of me in minutes. The ship, a skyscraper in repose, soars 213 feet above the waterline. Her port side, closest to shore, is near enough that I can make out sleepy-eyed passengers clutching coffee mugs on stateroom balconies. They're snapping photos,

fuels. Today, virtually every cruise ship is powered by this cheap, gelatinous sludge, which presents the single biggest hurdle to an industry that wants to call itself sustainable. As long as *Allure* guzzles this stuff, she will leave a colossal environmental footprint, regardless of all her shipboard innovations. International regulators recently adopted a tough new set of emissions standards aimed at slashing smokestack pollution from ships. But the industry, citing cost, is fighting these regulations, because they will likely force it to phase out bunker fuel. A fierce political battle is now under way.

JAMIE SWEETING, ROYAL CARIBBEAN'S VICE PRESIDENT OF environmental stewardship, is a foot soldier in that war. But his alliances are conflicted. While he is committed to cleaning up Royal Caribbean's fleet, he is also beholden to his employer, a public company that answers to shareholders who demand profitability. And Sweeting is not the one who will make the decisions about which fuels the company uses in the future.

Cruise industry executive is an unlikely role for Sweeting, who spent more than 13 years promoting ecotourism for Conservation International. "In 2007 Royal Caribbean approached me. They wanted to take



too, with cameras flashing like glitter in the twilight.

Allure typifies an emerging breed of larger and more lavish megaliners. It has two dozen restaurants, a shopping mall, four swimming pools (including one with a surfable wave), a 3-D movie theater, a casino, a sprawling fitness center and spa, a miniature nine-hole golf course, rock-climbing walls and zip lines, a comedy club, an ice-skating rink, volleyball and basketball courts, and nurseries for children, whose whereabouts can be pinpointed anywhere onboard with special "geo-tracking" bracelets. You can get your teeth whitened and your wrinkles Botoxed, and then catch a live symphony or a Broadway musical. *Allure* also boasts the world's first "living park" at sea—a 21,000-square-foot open-air botanical esplanade with more than 12,000 plants and trees.

To get a closer look at *Allure*, now docked, I stroll along Falmouth's waterfront boardwalk. Her decks are brimming with passengers. There is a live spectacle under way on the stern. Theatrical music blares. Colored lights flash. And then acrobatic divers leap from elevated platforms through spouting fountains into a shallow oval pool. Although the music is loud, I can hear a guttural purr emanating from the ship's engines. A dozen smokestacks clustered on the uppermost deck of this floating city are venting black plumes over the town.

Despite all the posh trappings, *Allure* is surprisingly planet-friendly, flush with the greenest gadgetry on the high seas. However, her engines still burn bunker oil, also known as bunker fuel, the dirtiest of all fossil

sustainability to the next level," he says. "I wasn't interested, but they were relentless. I took the job because I believed I could do more for conservation working within the industry than outside it." Some of his peers at Conservation International "thought I was Darth Vader, who had turned to the dark side," he says. (He isn't the first green-credentialed exec on the cruise line's roster. William Reilly, former head of the Environmental Protection Agency and chairman emeritus of the World Wildlife Fund, joined Royal Caribbean's board in 1998.)

I meet Sweeting at Port Everglades, *Allure's* home port, in Fort Lauderdale, Florida, to get a guided tour of the ship while she's berthed between cruises. The amenities are sweeping and seductive, and after two hours onboard I admit to Sweeting that I'm reluctant to leave. In an interview with the *Washington Post*, Tor Olsen, captain of the sister ship, *Oasis*, said, "Our hope, of course, is that people don't get off, because this ship itself is the destination." The late writer David Foster Wallace once described a cruise as a "hypnotic sensuous collage." That about sums it up.

Midway through our tour, Sweeting and I stop for coffee in "Central Park," *Allure's* homage to the Manhattan landmark. Born in England, Sweeting, 40, has wavy blond hair and dark blue eyes. His looks are boyish—those of a surf bum—and his manner affable. He orders a cappuccino and then informs me that *Allure* is one of the greenest cruise ships ever built.

Raw sewage is perhaps his favorite topic—and one that directs us below deck, amidships, to *Allure's* \$5.5 million wastewater treatment plant. Royal Caribbean, which earns \$7.5 billion in annual revenues, is budgeting \$150 million to install similar systems throughout its 40-ship fleet. The wastewater system, large enough to cover a tennis court, collects effluent, transfers it to bioreactors with fecal-eating bacteria, and then filters and disinfects it. The outflow is sparkling clean, odorless, and allegedly potable. “I’ve had engineers that will drink it!” Sweeting says.

Our next stop is a windowless, refrigerated hold where four crew members are plucking anything recyclable from heaps of garbage. “You are standing in the largest cold-storage trash facility at sea,” Sweeting announces. Bottles, cans, plastic, and paper are parceled into bins and delivered to a shoreside recycling service. Used cooking oil is stored and later sent to a biofuel producer. Sweeting says, “Of the waste that goes ashore from *Allure*, about 95 percent avoids landfills. We are recycling, repurposing, reusing, or donating. There isn’t a hotel chain in the world that can claim to be doing a lot of the things we’re doing.”

In the engine room, Sweeting gives me earplugs. It’s impossible to talk above the roar, so he shouts, mouthing muffled words inches from my head. He gestures toward *Allure's* six engines, which use a new, more efficient type of fuel injection. On most ships, engines turn a driveshaft to spin a propeller. *Allure* is markedly different. Her engines produce electricity, acting essentially as fuel-powered generators. This electricity not only runs various onboard systems, from critical equipment to cafés and casinos, but also drives the ship’s three azimuth

3-D computer simulations to determine the most efficient route, speed, and engine configuration for each leg of an itinerary.

Once the ship is under way, specially tapered propellers and a slick, non-toxic hull coating reduce drag, while fore-and-aft sensors govern a trim system that makes real-time adjustments to *Allure's* course. “The [software] can operate any combination of its six engines, making only the power the ship needs,” Sweeting says. “We are at a point where we are producing the optimal amount of energy for any given itinerary.”

ROYAL CARIBBEAN, WITH CELEBRITY AND ITS OTHER SUBSIDIARIES, is the world’s second-largest cruise operator (after Carnival), valued at \$6 billion. The conglomerate is spending hundreds of millions of dollars to shrink the environmental impact of its fleet. From what I’ve seen, much of what happens on board *Allure* is cleaner and greener than what occurs in a typical American city. “This ship has a 30 percent lower carbon footprint per person per day than a ship built about a dozen years ago,” Sweeting notes. But this shift is hardly an industry-wide trend. With the exception of Royal Caribbean and Norwegian Cruise Lines, most cruise companies only dabble in efforts to green their fleets. There are about 300 cruise ships of at least 1,000 gross tons worldwide, with 22 new vessels set to debut between now and 2016. And yet, only a few will boast bow-to-stern sustainability. Why?

Truth is, most cruise lines don’t make meaningful investments in green technology because they don’t have to. The MARPOL (marine pollution) convention, adopted in 1973 by the 170 member nations

Sweeting says, “Of the waste that goes ashore from *Allure*, about 95 percent avoids landfills. We are recycling, repurposing, reusing, or donating. There isn’t a hotel chain in the world that can claim to be doing a lot of the things we’re doing.”

thrusters. (Azimuths are small, self-contained electric motors that can rotate 360 degrees, eliminating the need for a rudder.) When *Allure* is cruising, her propellers face forward, pulling rather than pushing the ship through the water, saving about 20 percent in fuel.

The ship further reduces its energy demands through waste-heat recovery, which leverages the high temperatures created by combustion in the engines to make hot water for the galleys, swimming pools, passenger cabins, and laundry. There’s also a \$750,000 photovoltaic array spanning 21,000 square feet atop *Allure's* 19th deck. It produces enough electricity to power the ship’s shopping district and central promenade.

We take an elevator topside, to the passenger staterooms. All are outfitted with low-flow sinks and showers. “Our guests use about 20 percent less water on our ships than they would at home,” Sweeting tells me. LED and CFL bulbs are ubiquitous. Smart air conditioners make automatic adjustments based on the weather.

We finish the tour on the bridge. The view is tremendous. Fort Lauderdale’s sugary beaches splay north and south. Inside, the navigation officer, in a crisp white uniform, is hunched over a computer console. He’s inputting data to software that performs something called voyage optimization. “There is a lot of pressure on the captain to get to a port on time—and human nature has often been to get there fast,” Sweeting explains. With voyage optimization, the captain no longer has to gun it for two days because there’s a headwind. Instead, the software considers variables such as wind and tides and currents, the ship’s displacement, and weather forecasts, and then performs

of the International Maritime Organization (IMO) and covering all seagoing vessels, is lax at best. It permits ships to dump raw sewage into the open ocean. The same is true for gray water—the runoff from showers, galleys, and laundry. There is no limit on garbage tossed overboard as long as it’s diced into inch-size morsels, doesn’t include plastic, and is dumped three nautical miles from land. Bilge water gets a pass, too, provided its oil content falls below 15 parts per million.

The United States, Canada, and the European Union have tougher domestic laws, but they’re enforced only in near-shore waters, which in the United States means just three miles from the coast. A ship can circumvent MARPOL by flying a flag of convenience—registering itself in a country with substandard regulation that is not a signatory to the convention. Once it’s in international waters, it can defile the environment with impunity.

“They will tell you that they don’t dump. And they probably don’t, except when they do,” says Jackie Savitz, a scientist and senior campaign director for the not-for-profit advocacy group Oceana. “The hard question is, when does it happen? If you are not following them around all the time, you may never know.”

Sweeting doesn’t deny that pollution from solid waste, raw sewage, and bilge oil was endemic in the 1990s, with companies fined millions of dollars for violations. But that’s not the case today, he maintains. “Did we at Royal Caribbean make mistakes in the past?” he says. “Yes. We plead guilty and have addressed that. We’re not perfect. But we are committed to being better tomorrow than we are today.”



ACCORDING TO SWEETING, "WE WILL GET TO A POINT WHERE YOUR average American will have less of an environmental footprint going on vacation on one of our ships than if they stayed home." It's all very impressive until the conversation turns to fuel. *Allure* can devour up to 7,230 gallons of bunker fuel an hour, or as much gasoline as your car would consume if left idling for an entire year. Burning this cheap by-product of petroleum refining releases nitrogen oxides, sulfur oxides (SOx), and carbon dioxide. Sulfur oxides, and the particulate matter that accompanies them, can lead to emphysema, bronchitis, heart disease, and cancer. It takes just 15 motoring cruise ships to expel the same amount of SOx that every car in the world would emit if running at once.

When ships idle in port to generate electricity, they rain poison onto anyone in the vicinity. SOx emissions from cruise ships may lead to 30,000 deaths a year worldwide, according to the EPA and a 2007 report from the College of Marine and Earth Studies at the University of Delaware, published in the journal *Environmental Science & Technology*.

IMO member nations recently ratified new rules that will oblige ships to either install smokestack scrubbers or burn low-sulfur alternatives to bunker fuel, specifically marine diesel. A global mandate



LAST TREE STANDING These former red mangrove wetlands in Falmouth, Jamaica, will be the site of a new market and a sewage treatment plant.

will commence in 2020. Until then, the IMO has designated "emission control areas" close to densely populated coastal communities. These include the coastal waters of North America, parts of the Caribbean, and the North and Baltic seas. Within these areas, SOx restrictions are more stringent than those stipulated for open-ocean cruising. In August, the EPA will begin enforcing the new pollution standards for all ships operating within 200 nautical miles of the U.S. coastline. Environment Canada will do the same for its coasts. In 2014, the mandate will be extended to waters encircling Puerto Rico and the U.S. Virgin Islands—prime cruising territory. (See "Cleaner Oceans," right.)

Cruise operators are fighting the impending regulations. Bunker fuel goes for about \$700 a ton. Marine diesel is a far cleaner alternative, and nearly every cruise ship could burn it with only minor adjustments to its engines. But it costs twice as much. Cruise lines claim they'd go bankrupt if they were compelled to use it.

ILLUSTRATION BY BRUCE MORSE

NRDC CLEANER OCEANS



RICH KASSEL

Senior attorney in NRDC's New York office and an expert on transportation fuels and emissions issues

What do you think of the cruise ship industry's claim that it can't afford to use cleaner marine fuel?

Whenever industry has to change what it's been doing for years, we hear complaints about the cost. But as we've seen many times before, spending a bit more on cleaner fuels is a great investment in public health. According to the Environmental Protection Agency, every dollar spent to reduce pollution from ships will create as much as \$34 in health benefits. Cleaner ships will translate into fewer asthma emergencies, heart attacks, and lung ailments, especially among children and the elderly. And what's the argument for using dirty fuels when you're visiting Alaska, the Caribbean, Hawaii, or other popular cruise destinations? People want to see blue skies, not plumes of black smoke.

Most of the large vessels at American ports are container ships, not cruise ships. What steps are being taken to clean up these vessels?

In 2010 the International Maritime Organization adopted a U.S.-Canadian proposal to create an Emission Control Area (ECA) that will stretch 200 nautical miles from most of our coastline. Starting this summer, ships will use fuels with a much lower sulfur content, immediately reducing sulfur levels by one-third. By switching to these cleaner fuels and installing pollution-cutting devices, this program will avoid 14,000 premature deaths a year in the United States and save up to \$110 billion in health costs by 2020. Unlike the cruise ship industry, the container ship industry has been a supporter of the ECA program and is going full steam ahead to its complete and timely implementation.

It's great that the United States is making progress on cleaning up container ships. Is there any movement in that direction in other countries?

Some northern European ports will adopt similar ECA requirements in 2015. This means that many ships leaving Hong Kong, the Chinese city of Shenzhen, and other large Asian ports for U.S. and European markets will be carrying both high- and low-sulfur fuels. We'd love to see the Asian ports adopt ECAs, too, because that would protect people on both ends of the world's supply chains. Given that pollution levels in coastal cities in Asia dwarf those in the United States, this would be a great step forward.



FLOATING CITY
Passengers on *Allure* can ride a zip line over “Central Park” and sip a latte at the first ever ship-borne Starbucks.



Mega-liners,
typically defined as
ships larger than
100,000 gross tons,
now account for
about one-seventh
of the global cruise
ship fleet, or
42 vessels

One response has been a threat simply to sail outside of emission-control areas. The corporate environmental compliance officer at Norwegian Cruise Lines, Captain Minas Myrtilidis, tells me, “Our industry has assets that can move [and] it’s something we will take into consideration. We are a business and we have to be able to make a profit.”

The Cruise Lines International Association, the industry’s largest advocacy group, is trying to broker a compromise that is strongly supported by Royal Caribbean. It proposes that ships be permitted to burn bunker fuel on certain portions of their routes so long as average emissions for the entire journey meet IMO limits. “When we’re 200 miles out in the ocean, I don’t think our emissions are affecting anybody,” says Myrtilidis. That’s ludicrous. Sure, coastal dwellers won’t be inhaling SO_x fallout. But other emissions—carbon dioxide and nitrogen oxides—harm the planet no matter where they’re discharged. And according to Marcie Kever, a project director at Friends of the Earth, “Each cruise ship contributes on average five times the amount of CO₂ as a container ship.”

Policing how fast cruise ships travel could offer a solution. Peter Lockley, an editor at Fathom, a U.K.-based research and consulting firm to the maritime industry, suggests “slow steaming,” which, he says, “is the easiest way to make deep emissions cuts, up to 30 percent.” But cruise lines aren’t keen on the idea, maintaining that because bunker fuel is viscous and must be kept very hot to remain fluid, operating at low speeds would allow it to solidify and gum up engines.

Not so, argues Jacob Sterling, head of climate and environment at Maersk, the world’s largest container ship operator. When Maersk tested slow steaming on 110 of its vessels, dropping speeds from the usual 24 knots to between 12 and 16 knots, it discovered an easy fix to the viscosity problem. “Every 24 hours, you speed up briefly to clean out the system,” he says. Now the company has implemented slow steaming on at least three-quarters of its fleet, cutting bunker fuel consumption by about 10 percent and saving about \$300 million a year. It’s not unheard-of for a slow-steaming ship to achieve a 20 percent reduction in CO₂ and to decrease pollution from nitrogen and sulfur oxides by the same amount. Nevertheless, cruise lines reject slow steaming because they say it would disrupt the standard dawn-arrival, dusk-departure schedule, with ships reaching ports of call at odd hours of the day or night.

So what other ways are there to mitigate emissions?

Royal Caribbean has installed smokeless gas-turbine engines, which can slash emissions by more than 90 percent, on eight of its ships. But because these can burn only costly marine diesel, the company typically limits their installation to vessels that operate in places where low-sulfur emissions are already mandatory, such as Alaska’s Inside Passage. Royal Caribbean is also testing smokestack scrubbers on two of its smaller ships. However, “I have not seen any scrubber that is reliable,” says Gildas Bonamy, an engineer and head of environmental strategy at STX Europe, the world’s fourth-largest shipbuilder, based in Oslo.

Last year Maersk conducted a trial with rapeseed-based biofuel. But biofuels are outrageously expensive. “The 30 tons on our container ship costs around \$3 million,” notes Sterling. For the same quantity of bunker fuel, you’d pay about \$23,000. There are engines that can burn liquefied natural gas. At the moment, however, even the world’s largest cruise ships cannot carry enough of it to fuel a typical weeklong voyage. And refilling en route isn’t doable, either. “The availability of liquefied natural gas in ports is not there,” Bonamy says.

BACK IN JAMAICA, IT’S HARD TO ESCAPE THE OTHER IMPEDIMENT TO THE greening of the cruise ship industry. Mega-liners—typically defined as ships larger than 100,000 gross tons—now account for about one-seventh of the global cruise fleet, or 42 vessels. Most cruise ships currently under construction are of similar size. And these monster ships require deeper and larger ports.

In Falmouth, to accommodate *Allure* and *Oasis*, wrecking crews had to smash a quarter-mile-wide opening in an offshore barrier reef. They dredged coral, both living and dead, as well as the rock substrate, and trucked it inland to a two-square-mile dump site—a clear-cut area on the outskirts of town that was once a thriving red mangrove swamp. Now all that’s left is 35 million cubic feet of pulverized coral and rubble. When I visit the site with Roland Haye, a Jamaican environmental activist, he tells me, “As a boy, I used to play Tarzan here and see crocodile. It was a winter home for great heron and swan.” He points out broken conch shells, dismembered starfish, bits of sea sponge, and severed lobes of brain coral.



COLLATERAL DAMAGE Roland Haye of the Trelawny Environmental Protection Association stands atop rubble dredged from Falmouth’s coral reef.

Royal Caribbean and the port authority worked with Jamaica’s National Environment and Planning Agency (NEPA) and others in an attempt to save the reef. In what was billed as the largest coral relocation in history, scuba divers pried loose some 145,000 chunks of living coral and transplanted them to “donor sites” nearby. But Diana McCaulay, chief executive officer for the Jamaica Environment Trust (JET), who monitored the 18-month project, deemed it a mismanaged folly. She told me that divers used the wrong type of adhesive to affix the transplanted coral. At times, dredging began before coral was removed, choking the reef with silt and making it impossible for divers to work. Some of the dead coral became backfill foundation for the new pier, even though it could still have provided habitat for a range of organisms.

Haye tells me that moving part of the reef to make room for larger ships removed a natural barrier that had protected the coastal highway from heavy surf. Now waves crash directly onto the blacktop, snarling traffic and leaving this part of the coast defenseless when the next hurricane barrels ashore. Royal Caribbean isn’t entirely to blame. Local

statutes are sometimes substandard, and NEPA doesn't always have the muscle or money for enforcement. Sweeting says that Royal Caribbean will generally follow EPA rules when operating in a country with inadequate environmental policies and, moreover, that it will "go above and beyond compliance" with local laws. But this practice generally applies only to how the cruise line behaves offshore. In the case of Falmouth, it was the Port Authority of Jamaica that directed the pier construction.

There is an economic toll as well. After watching the 1,187-foot-long *Allure* maneuver into its berth, its 20-foot-tall propellers churning up the seabed and turning pellucid water into pale mud, I count perhaps a couple of hundred disembarking passengers trickling into the pier complex. Its perimeter fence encloses a modern shopping plaza whose glitzy retailers, such as Bijoux and Philip Stein, pay rent to Royal Caribbean. Most of the passengers wander amid these shops; fewer exit the gates into old-town Falmouth. Local artisans, whose craft market is across the street, are not allowed inside to sell their wares. This makes perfect sense if you're Royal Caribbean. Every penny a passenger spends in Jamaica is a penny less earned by the cruise line. And Falmouth isn't an aberration. The same thing is happening at other cruise-ship stopovers in the Caribbean—and even in Charleston, South Carolina.

When Royal Caribbean and the Port Authority of Jamaica held public meetings in Falmouth to unveil their plan for the new port, the audience was mostly receptive. Townsfolk were told that disembarking passengers would enrich the local economy. They weren't told that at

Falmouth's economy. For tourists who vacation on the island, it's five times that amount—at least 35 cents per dollar.

Today, with *Allure* in port, the town is only a little busier than when the cruise docks are empty. Sweeting believes that will change. "We're still very early in the Falmouth story," he says. "Now that the tourists are there, entrepreneurs are realizing there are real opportunities to develop attractions and amenities, and they're starting to invest."

Royal Caribbean recently hosted a workshop on *Oasis* with experts in sustainable tourism. From the gathering emerged a permanent working group of the Global Sustainable Tourism Council, a body of U.N. agencies, tourism boards, travel companies, and tour operators. "We put forth criteria, now out for public review, to have a common international standard of what destination stewardship should look like," Sweeting tells me. "Having a destination be sustainable not only in terms of economics, but in terms of social and environmental well-being, is essential to our business. We've got to have destinations where locals benefit from tourism. Everyone knows what it's like to go to a place where communities feel disenfranchised. You get the impression that they don't want you there, and then you don't want to go back. For our business, we need guests to have a fantastic time."

AT SUNSET ON MY PENULTIMATE EVENING IN JAMAICA, I SIT ON THE top steps of the Falmouth courthouse with Esther Figueroa to watch the darkening crimson sky. Figueroa is a Kingston-born filmmaker

Townsfolk were told that disembarking passengers would enrich the local economy. They weren't told that at least 20 percent of passengers, steeped in amenity bliss, would prefer to remain aboard or stray only as far as the gated shopping complex.

least 20 percent of passengers, steeped in amenity bliss, would prefer to remain aboard or stray only as far as the gated shopping complex, where storefronts would be done up in colonial facades designed to replicate Falmouth. Those wishing to avoid the bustle and grit that engulfs a real port city can now get the "Falmouth Experience" instead.

One afternoon, while a Carnival ship is docked, I try to weasel my way inside, but a security guard at the gate turns me away. At Royal Caribbean's small Falmouth branch office, a staffer agrees to let me peruse the pier. But I'm not left alone for long. William Tatham, the Port Authority's vice president of cruise shipping and marina operations, taps me on the shoulder before introducing himself. He takes me to a newer section of the pier, where construction crews are busy with expansion. "We're going to build an artisan's village, a coffee warehouse, and a rum experience where people can see how rum is made," says Tatham, who then adds some historical context. "This port was where more slaves were brought into Jamaica than any other."

When I walk through the old craft market across from the pier terminal, those I speak with are disgruntled and angry. Have had told me, "This is the last port of call for most ships, so when tourists get here, they don't have much to spend." What's left is either frittered away in the pier shops, which are on real estate owned by Royal Caribbean, or shelled out for pre-booked land-based tours, whose operators share revenues with the cruise lines. Royal Caribbean says that 30 percent of disembarking passengers visit Falmouth; another 40 percent leapfrog the town to take prepaid excursions elsewhere in Jamaica. Just seven cents of every dollar a cruise passenger spends is retained in

and activist who co-wrote, co-produced (with JET's McCaulay), and directed the 2009 documentary *Jamaica for Sale*. The film tracks the Falmouth port construction through its early stages, when demolition crews began removing the reef. Now she is back in Falmouth to film a series of mini-exposés that she's been uploading to YouTube. But officials won't let her inside the port complex, so she's shooting from our vantage atop the courthouse steps.

Figueroa doesn't have many good things to say about the port. "This type of development excludes and disenfranchises the majority of Jamaicans," she says. "It destroys anything indigenous and makes us beggars and cargo cultists, worshipping a ship."

And yet the cruise ship industry isn't going away. In 2012, at least 20 million people will take a cruise, more than double the number who did so just eight years ago. Sweeting insists it will be impossible to sustain that kind of explosive growth if Royal Caribbean leaves a trail of mindless environmental destruction in its wake. "We need to ensure that our destinations are as thriving and vibrant and intact 10 to 20 years from now as they are today," he tells me. "I'm not a particularly religious man, but there is one parable in the Bible that is applicable: first take the plank out of your own eye, and then you will see clearly to remove the speck from your brother's. We think we are doing a good job in a lot of areas, but we still have a ways to go. So if you're an environmentalist and you've got issues with us, then bring it on." 🌱

OnEarth contributing editor Michael Behar writes about adventure travel, the environment, and innovations in science and technology. He lives in Boulder, Colorado.

