



CTA-096-Sunscreen Bad Planet

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Is Your Sunscreen Bad for the Planet? Here's How to Choose an Ocean-Safe Formula

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by KARI MOLVAR

Photographed by Josh Olins, *Vogue*, May 2017

In the spring of 2005, Craig Downs, Ph.D., a forensic ecotoxicologist in Virginia, received an unusual phone call from the National Park Service. “They wanted to figure out what was happening to the bay around Trunk Bay in the U.S. Virgin Islands,” he says. Specifically, “they wanted to know what was killing all the coral reefs.” Curious, Downs, who is the executive director of Haereticus Environmental Laboratory, flew down with a team of researchers to investigate the nearshore habitat. They were stumped until a local Rastafarian overheard their conversation and made a passing comment. “He told us, ‘It’s the tourists,’” says Downs. “On a single day, about 2,000 to 5,000 people visited the beach and when they left, the surface of the water would look like an oil spill—it had an iridescent sheen.” After pulling samples and testing for toxicity, Downs discovered that chemicals in sunscreen—generously slathered on by snorkelers, divers, and beachgoers—had washed off in the water and stood out “like a burning red flag.”

That was 12 years ago. Since then, Downs has devoted his research efforts to pinpointing which ingredients pose a serious threat to marine life worldwide. A growing body of evidence indicates that those found in chemical sunscreens—specifically oxybenzone, among others—might be dangerous to wildlife. “We did studies under controlled conditions and we were horrified at what we found,” says Downs. “It helped explain what we’re seeing in the wild.” Besides acting as an endocrine disruptor, oxybenzone can damage coral DNA and might lead to what Downs calls “reef zombies” or corals and other reef organisms that look “healthy but are actually sterile and dead—so they cannot reproduce.” Such UV-absorbing compounds can also contribute to coral bleaching, which occurs when the life-sustaining algae that normally lives on coral vanishes, due to changes in ocean temperatures, stress, or pollution. “And once those reefs die, we’ve found they’re not coming back,” notes Downs. “They’re just crumbling to dust.”

Granted, numerous factors can impact marine life beyond sunscreen, such as climate change. But the rapid decline of reefs has become an unmistakable global problem, evident everywhere from the Florida Keys to Hawaii and the South Pacific. “It’s safe to say that oxybenzone and sunscreen pollution threatens coral reefs where Westerners go to visit,” says Downs, adding that “about 90 percent of the reefs in the Caribbean have disappeared since 1980.”

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This matters not only for preserving reefs in areas that depend on tourism, but to prevent widespread coastal erosion.

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The issue has become urgent enough that parts of Mexico have gone so far as to ban products with oxybenzone (which studies have shown is also damaging to sea urchin, fish, and mammals) and other threatening chemicals from its eco-reserves. Hawaii state senator Will Espero, meanwhile, is among the group of American legislators who have proposed similar measures. (One proposed bill in his state calls for a warning label on sunscreens that reads “The use of oxybenzone in nearshore waters poses serious hazards to coral and reef health.”) Eco-conscious companies are taking matters into their own hands, formulating sunscreens and hydrating lotions that are (hopefully) less detrimental to the underwater environment.

Among those aqua-warriors is Autumn Blum, a cosmetic chemist (and certified diver) who launched Stream2Sea, a line of biodegradable sunscreens as well as hair- and skin-care items. The idea, she says, came to her after a diving trip to Palau three years ago. “We were showering on deck, with fragrant suds running right overboard, putting leave-in conditioner in our hair, slathering on chemical-based sunscreens, then jumping back in the ocean to repeat the process,” she recalls. Simple habits like this can take a toll—it’s estimated that 14,000 tons of sunscreen lotions end up in coral reefs each year. “When I got back to the U.S., I searched for products that wouldn’t harm underwater ecosystems,” says Blum. “I was surprised to see sunscreens labeled ‘reef-safe’ containing ingredients I knew were not, in fact, safe.” So Blum decided to create her own solution.

Stream2Sea sunscreens feature non-nano titanium dioxide coated with alumina “because of its exceptional stability and safety,” says Blum. She avoided nano-size particles (which help physical UV-blockers absorb better on the skin) and clear zinc technologies that could potentially be toxic to aquatic species. All of her formulas have passed numerous independent, clinical ecotoxicity tests, and Blum hopes her small-batch company will inspire the next generation of SPF’s. “We’re setting a new standard for safety,” she says. Downs, for his part, is working on a certification program for marine-friendly sunscreens. “We’ve had more than 10,000 emails from people asking, ‘What can I use?’” he says. Here, the experts offer seven pointers to keep your skin—and the seas—healthy.

Know Your Labels

The active ingredients in chemical sunscreens tend to be the most problematic, says Downs, though preservatives, such as parabens, can also pose an environmental threat. Try to avoid oxybenzone (the most common compound found in some 3,500 sunscreens worldwide), octinoxate (which is even more toxic than oxybenzone, but usually found in lower concentrations), and octocrylene. See the Haereticus Environmental Laboratory’s comprehensive list for all potentially harmful ingredients.

Not All Mineral Sunscreens Are Created Equal

Zinc oxide and titanium dioxide aren’t entirely worry-free options. When those ingredients are uncoated and nano-size (less than 35 nanometers in diameter), they can enter the cells of invertebrates and cause oxidative stress in sunlight. “This blows up the cells so they die,” says Downs. Your best bet is to go for coated, non-nano ingredients

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larger than 150 nanometers. At that point, “the toxicity drops off and there’s very little threat,” adds Downs. While the non-nano claim is not FDA regulated, look for brands that have data to back it up on their websites.

Shop for the Simplest Formulas—Even With Organic Sunscreens

Plant-based oils added to sunscreens, like eucalyptus and lavender, can be dangerous to invertebrates, notes Downs. Beeswax can contain industrial insecticides that, when emulsified in beauty products, can unleash these chemicals on your skin and in the water. A good rule of thumb: the simpler the formula, the better.

Rub It In—Don’t Spray It

Opt for SPF lotions and creams instead of sprays, which are more likely to stick to the sand than your skin, says Downs. When the tide comes in, this chemical-covered sand is then carried out into the ocean, which can lead to additional contamination. Also troubling: When it rains, this sunscreen residue can seep underneath the sand, where sea turtles often lay eggs.

Seeing Is Believing

Apply mineral sunscreen in small sections and really rub it in—this helps the product last longer on your skin and minimizes whitening, says Blum. “We also believe that a little whitening is a good thing—you can see where your sunscreen might be missing and when you don’t see it anymore, you know it’s time to reapply.” (Or consider the ’80s-inspired, colorful zinc formulas that intentionally stand out and are currently enjoying a comeback among globe-trotters like Elisabeth von Thurn und Taxis, who writes about her favorite sunscreens in the May issue of *Vogue*.)

Rely on Multiple SPF Methods

While it’s never smart to skip SPF entirely, you can be strategic about how you put it on, says Manhattan dermatologist Ellen Marmur, M.D. Rub it on your face, the front and back of your neck, ears, hands, and legs (which is the “number one site of malignant melanoma among women,” she points out). Then pull on sun-protective clothing to cover the rest of your body. “Everyone who snorkels or surfs or even just goes to the beach must own at least one long-sleeved sun shirt or rash guard with a UPF—UV-protective fabric—of 50-plus,” says Marmur. “It should not be a V-neck and ideally will have a thumbhole to hold the sleeve over the top portion of your hands, too.” Her favorite options? “Surfers have the coolest gear,” she notes, so look to sustainable surf brands like Patagonia and Kassia + Surf.

Take a Break for Your body—And the Bay

“We all want to spend an entire day outdoors doing what we love,” says Marmur. But paddling in and seeking shade for the midday hours of intense sun from 11:00 a.m. to 2 p.m. is a good thing for your skin that also helps cut down on the amount of sunscreen that will end up in the water. “So plan to go out early or a bit later than usual,” says Marmur.

Is Your Sunscreen Poisoning the Ocean?

By PEGGY ORENSTEINAUG. 19, 2017

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Credit Maggie Chiang

One of the perks of being a Californian is that Hawaii is a quick, often affordable getaway: Without the need to escape frosty weather, we're free to visit during summer, when the surf lays down flat and the price of hotel rooms plummets.

So for three decades, I've returned, year after year, to Big Island, swimming at the same bare-bones beach, which locals identify only by the number on a nearby highway mile marker. I measure my life by those trips, as surely as watermarks measure the tide. In my 20s, obsessing over career moves and noncommittal men, I escaped there with a girlfriend. Later I honeymooned there with my husband. These days we travel with our teenager, who swims confidently away from us, out to sea.

Along the way, I've amassed a library of books on identifying the psychedelic-hued fish, eels, octopuses, rays, turtles, nurse sharks and coral that live beneath the waves, keeping lists of what I'd seen on each trip. Gradually, and especially in the last five years or so, the variety and numbers on those lists have contracted.

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At first I thought it was my imagination, but this summer there was no denying it: I felt, abruptly, like I was snorkeling through an underwater desert. Most of the coral had turned white, a sign that it was in danger of dying. Entire species of fish had vanished, and those that remained — like Hawaii's tongue-twisting state fish, the humuhumunukunukuapua'a — were sparse, barely a classroom's worth, let alone a school.

According to the Hawaii Department of Land and Natural Resources, the fish population of what I have come to consider my reef had, depending on the areas surveyed, declined between 43 and 69 percent between the late 1970s and 2008. The state created a long-term ["coral bleaching recovery plan"](#) to prevent further damage and promote regrowth after specific events, like the spreading mass of warm water in the Pacific Ocean in 2014 that came to be known as "the Blob," or the high ocean temperatures that killed 50 percent of coral on some reefs off Big Island in 2015. But there is something in addition to climate change that may be damaging reefs, something more immediately and individually controllable: sunscreen.

Up to 14,000 tons of sunscreen enter the world's reefs annually, according to a 2015 paper [published](#) in the journal Archives of Environmental Contamination and Toxicology. Most of it — including products by Aveeno, Banana Boat, Coppertone, Hawaiian Tropic and Neutrogena — contains a chemical called oxybenzone to deflect UV rays.

Even in minute doses, the researchers found, oxybenzone rapidly bleaches coral and slows new growth: A single drop in 4.3 million gallons of water — about six and a half Olympic-size swimming pools — is enough to be deadly. In a [2008 study](#) published in Environmental Health Perspectives, researchers applied the recommended amount of sunscreen to volunteers' hands, then immersed them into plastic bags containing water and coral samples from the Atlantic, Pacific and Indian Oceans, as well as the Red Sea; the samples were completely bleached within 96 hours.

Octinoxate, octocrylene and a few other alphabet stews common to chemical sunscreen have also been found to be toxic to coral. Nor do you have to put a BullFrog-slathered toe into the ocean to be part of that destruction. Those convenient aerosol dispensers, in addition to being a total rip-off, spew chemicals all across the sand, where the tide scoops them up. Even if you never buy a plane ticket, your morning shower rinses the oxybenzone from yesterday's family picnic straight down the drain and, potentially, out to sea. Ditto flushing the toilet, since oxybenzone is detected in urine within 30 minutes of application.

In January, Will Espero, a state senator in Hawaii, [introduced a bill](#) to ban sunscreens containing oxybenzone in the state, but it stalled at the end of the legislative session. The Consumer Healthcare Products Association, a Washington D.C.-based trade group, opposes the effort as a matter of public health, pointing to other factors, primarily climate change, as the real culprits in reef decline.

True enough, in a sense — banning chemical sunscreen won't address the effects of climate change, coastal runoff or overfishing. Still, it can make a difference: Bleaching has been more severe in heavily touristed areas — Hawaii, the Great Barrier Reef, the United States Virgin Islands among them — and the stress of background pollutants makes even remote reefs less resilient to larger threats.

It's a cruel irony that protecting yourself and your kids from skin cancer has come at such a cost to the ocean. The good news is that there are alternatives. Mineral sunscreens — whose active ingredients are titanium dioxide or

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zinc oxide — are one option. Admittedly, they can be a little gloppier to apply and sometimes leave that telltale white cast on your skin. But that's what selfie filters are for. You could also opt for those rad-looking, long-sleeve "rash guards" that surfers wear.

On our last day at the beach, as we rinsed our masks and fins by the parking lot, a young couple with an eager-looking little boy stopped us. "Is this the place that has the great snorkeling?" the woman asked. My husband and I looked at each other. We opened our mouths. We closed them. We half-shrugged. I'm sure they thought we were crazy, but we just didn't know how to respond.

For additional reading see [The WFCRC Document Gallery](#) for articles about:

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