

OUR IMPACT

on our oceans and a brighter future together

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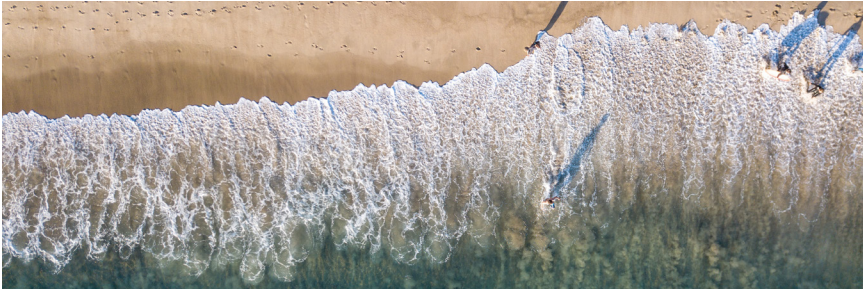
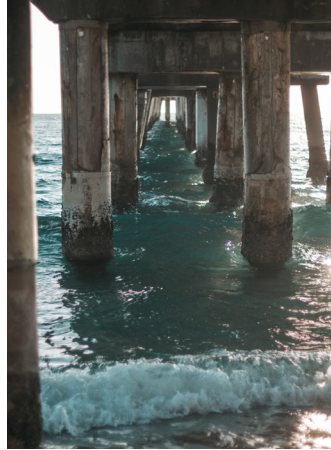
EDITOR'S LETTER

Our impact today matters.

Increasing human populations have resulted in increased human impact on ecosystems. Human activities have resulted in an increased extinction rate of species which has caused a major decrease in biological diversity of plants and animals in our environment. These impacts include increased pressure from fisheries including reef degradation and overfishing as well as pressure from the tourism industry which has increased over the past few years. The deterioration of coral reefs is mainly linked to human activities - 88% of reefs are threatened through various reasons as listed above, including excessive CO₂ (carbon dioxide) emissions. Oceans absorb approximately 1/3 of the CO₂ produced by humans, which has detrimental effects on the marine environment. The increasing levels of CO₂ in oceans change the seawater chemistry by decreasing pH, which is known as ocean acidification.

Oils spills also impact marine environment and shipping are major sources of negative impact upon our oceans. Luckily, there is hope as our readership has increased over the last year. Thanks to our avid readers we have been able to donate 20% of our precedings to organizations such as Oceana, The Ocean Conservancy, Sea Shephard Conservation Society, just to name a few. Through our combined efforts and the efforts of our readers who like to stay informed we will be able to leave a lasting positive impact for years to come.

ANNA SANCHEZ
EDITOR IN CHIEF OF OUR IMPACT



CONTENTS

6 to 13

HAWAII'S BEACHES ARE DISAPPEARING.

16 to 23

MICROPLASTICS IN SEAFOOD



HAWAII'S BEACHES ARE DISAPPEARING.

New Legislation Could Help... if it's Enforced.

ORIGINALLY PUBLISHED BY PROPUBLICA AND WRITTEN BY: SOPHIE COCKE

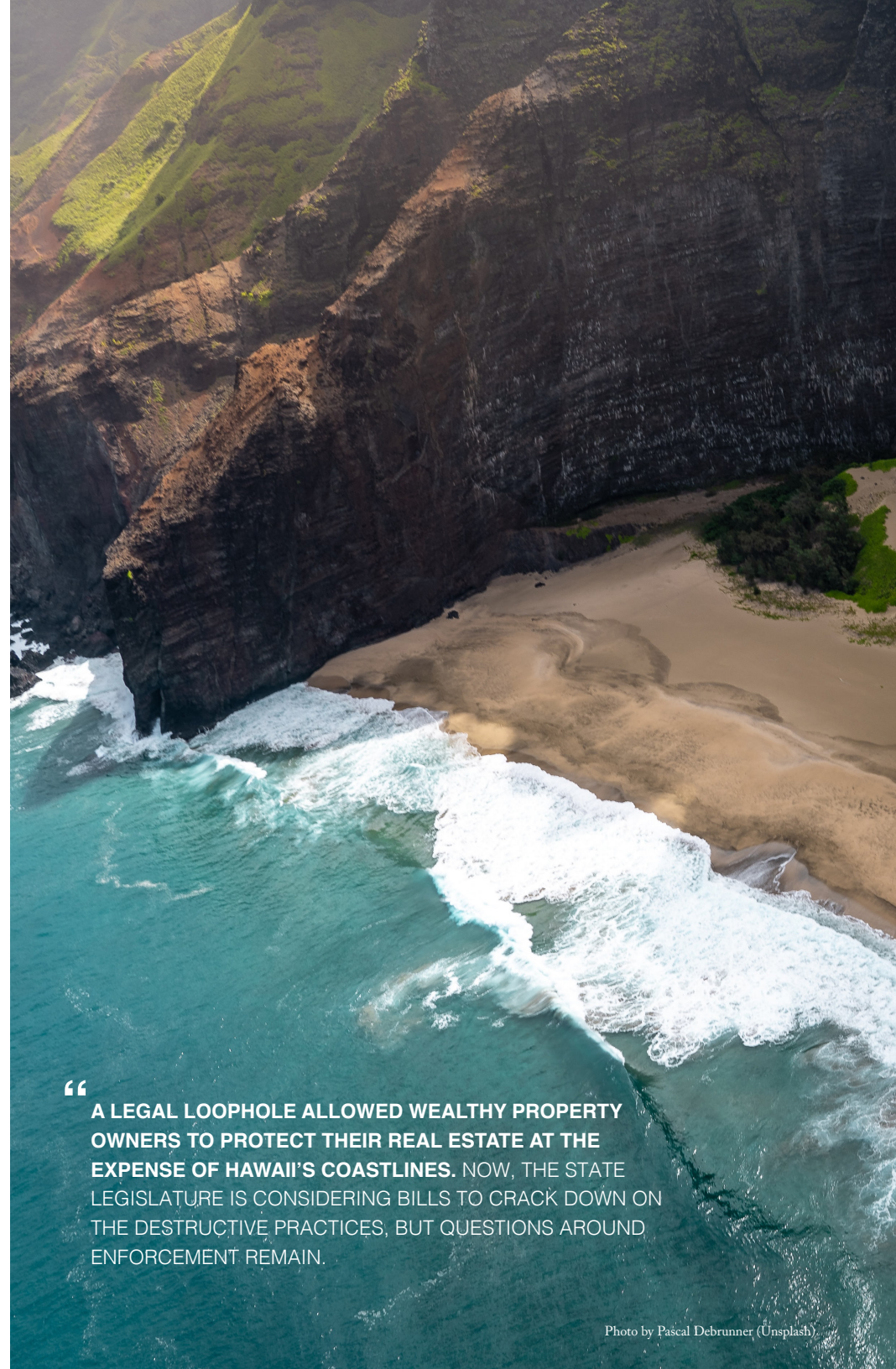
Hawaii lawmakers are considering bills this legislative session that could force oceanfront property owners to remove sandbags and draped heavy tarps that can significantly contribute to coastal erosion. Dozens of owners along Hawaii beaches have used loopholes in current environmental laws to leave emergency armoring in place for extended periods in order to protect homes, hotels and condos. Under the new legislation, they would face strict deadlines for removing them and higher penalties for installing them without permission.

Property owners are legally only allowed to keep the emergency protections in place temporarily, but officials with Hawaii's Department of Land and Natural Resources have liberally interpreted

the term "temporary," allowing walls of sandbags to remain in front of some properties for years, and even decades, after issuing repeated approvals or losing track of them, an investigation in December by the Honolulu Star-Advertiser and ProPublica found.

Coastal scientists warn that the structures can be just as damaging to Hawaii's beaches as seawalls, which have contributed to the loss of about one-quarter of the beaches on Oahu, Maui and Kauai. As waves hit an armored shoreline, they pull sand off the beach. In addition, the sandbags have blocked public shorelines, created eyesores along picturesque coastlines and littered beaches with heavy fabric and rope that gets torn and whipped around by waves.

“**A LEGAL LOOPHOLE ALLOWED WEALTHY PROPERTY OWNERS TO PROTECT THEIR REAL ESTATE AT THE EXPENSE OF HAWAII'S COASTLINES. NOW, THE STATE LEGISLATURE IS CONSIDERING BILLS TO CRACK DOWN ON THE DESTRUCTIVE PRACTICES, BUT QUESTIONS AROUND ENFORCEMENT REMAIN.**”



“ IF YOU ARE IN PLACES WHERE THE BEACH IS THE CENTER OF THE COMMUNITY AND IT’S THE VERY LIFEBLOOD ... LOSING THAT WILL HAVE A DEVASTATING IMPACT ON THE LOCAL ECONOMY, ON LOCAL BUSINESS, ON JOBS, ON PEOPLE WHO LIVE IN THOSE COMMUNITIES,...



Photo by Fabian Wiktor (Pexels)

Property owners on Oahu’s North Shore have taken some of the most dramatic steps. There, famous surfers and wealthy homeowners all along the treasured coastline have installed what are known as burritos — heavy, black material anchored by sand-filled tubes — to protect their homes from being sucked into the ocean. Many of the owners, including 11-time world surfing champion Kelly Slater, installed the protections without first obtaining the state’s permission. Slater paid a \$2,000 fine and told the news organizations that without the arming people “would have lost properties outright.”

Bills introduced in the House and Senate set a hard deadline of three years for removing current and newly authorized emergency protections. The Senate bill, introduced by Sen. Chris Lee, D-Hawaii Kai-Waimanalo-Kailua, also increases fines for homeowners and contractors who install structures without the state’s permission.

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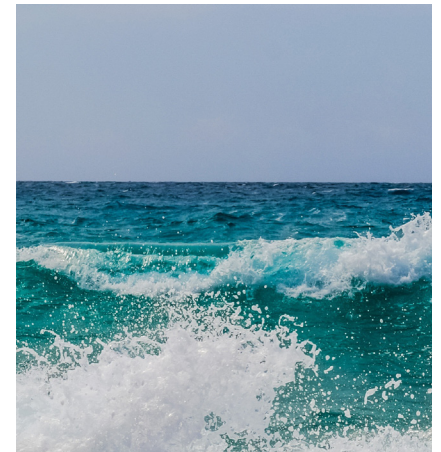


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“ ... HOMES AND OTHER STRUCTURES NEED TO BE MOVED BACK ALONG PROPERTY LINES OR REMOVED ALTOGETHER, IF THE STATE IS GOING TO SAVE BEACHES, SCIENTISTS SAY.

Photo by Karson (Unsplash)

Lee said his bill, which cites the news organizations’ reporting, makes clear that the temporary fixes that property owners have enjoyed aren’t going to become long-term solutions, causing permanent damage to the state’s beaches.

“If you are in places where the beach is the center of the community and it’s the very lifeblood ... losing that will have a devastating impact on the local economy, on local businesses, on jobs, on people who live in those communities, to say nothing of the families who will lose that beach for their kids,” Lee said. Whether stiffer fines will act as a deterrent, however, will depend on whether state officials actually enforce

the penalties. The Department of Land and Natural Resources has been exceedingly lenient when it comes to enforcement against illegal sandbags and burritos, the news organizations found. Although penalties of up to \$15,000 are permitted, state officials issued fines of just \$2,000 to half a dozen North Shore homeowners who installed unauthorized protections in recent years. One contractor who installed an additional six unauthorized barriers was fined a total of \$500.

Alarmed by the loss of Hawaii’s beaches, the state adopted a “no tolerance” policy more than two decades ago that forbids shoreline armoring. Property owners can

still apply to the state for permission to build a seawall, but it’s an expensive and difficult approval process. The project must undergo an environmental review, public hearing and approval from the board that oversees the Department of Land and Natural Resources.

By contrast, property owners who want to install emergency sandbags and burritos are able to bypass that entire process. All they need is the director of the Department of Land and Natural Resources to sign off on the approval after showing that their property is imminently threatened and that erosion is within 20 feet of a structure.

The approvals, which are allowed under the department’s administrative rules, are designed to mitigate hazardous situations during an emergency. But property owners have instead been able to rely on them for providing long-term protections, while rarely taking any steps to permanently alleviate their situation, which is only



Photo by Wendy Wei (Pexels)

expected to grow worse with sea level rise brought on by climate change. Ultimately, homes and other structures need to be moved back along property lines or removed altogether, if the state is going to save beaches, scientists say. But that's rarely happening.

Sam Lemmo, who oversees the department's Office of Conservation and Coastal Lands, has reasoned that the sandbags and burritos deter property owners from building illegal seawalls.

In December, after the news organizations published their story, Lemmo said he was looking to amend the department's administrative rules relating to emergency permits. However, the department has refused to specify what those changes might entail.

Rep. David Tarnas, D-Kaupulehu-Waimea-Halaula, who chairs the House Water and Land Committee, said his bill aims to provide the department with guidance. The measure instructs the Land Board, which oversees the Department of Land and Natural Resources, to adopt a three year deadline for the emergency structures and make clear the penalties for noncompliance. All they need is the director of the Department of Land and Natural Resources to sign off on the approval after showing that their property is imminently threatened and that erosion is within 20 feet of a structure.

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Photo by Olga Subach (Unsplash)

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Tarnas said he was particularly worried about the situation on Oahu's North Shore. "We have to do something to protect those beaches," he said. "Those are valuable assets and public trust resources."

A spokesman for the Department of Land and Natural Resources declined to comment on the two bills other than to note that officials have some comments and concerns, but he didn't specify what those were.

Meanwhile, six of the North Shore burritos expired on Jan. 25, according to government records. Officials with

the Department of Land and Natural Resources said they have not renewed the emergency permits, but they wouldn't say whether they have required the homeowners to remove them, or if they are facing any fines.

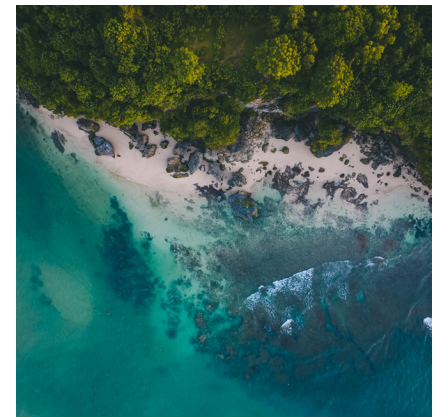


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OUR IMPACT TODAY MATTERS

Photo by Julia Kuzenkov (Pexels)

MICROPLASTICS IN SEAFOOD:

How much are people eating?

ORIGINALLY PUBLISHED BY ENVIRONMENTAL HEALTH PERSPECTIVES
WRITTEN BY: WENDEE NICOLE

With discarded plastics making up more than 80% of the trash that accumulates in some locations, microplastics (MPs) have become ubiquitous in the environment.

Generally defined as synthetic polymers less than 5 mm in diameter, MPs have been found in fish, shellfish, crustaceans, mollusks, and even mammals.

In a systematic review and meta-analysis recently reported in Environmental Health Perspectives, investigators estimated the

level of MP contamination in seafood and, consequently, how much people may ingest each year.

It is not clear whether MP consumption harms human health, although particles may carry potential hazardous plastic constituents, microorganisms, and adsorbed chemicals. “In order to assess whether the uptake of microplastics via food can indeed pose a risk to our health, first we need to quantify this exposure, and, second, determine whether this exposure is high enough to have a detrimental effect,”

“
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Photo by Mael BALLAND (Unsplash)

says lead study author Evangelos Danopoulos, a doctoral student at Hull York Medical School in England. “Systematic reviews and meta-analyses can play a key function in the risk assessment process.”

The systematic review included 50 primary peer-reviewed papers—all field studies that sampled mollusks, crustaceans, fish, and echinoderms for MP contamination—and 19 studies were used in the meta-analysis. The authors developed a novel risk of bias (RoB) quality assessment tool to evaluate all aspects of experimental design, execution, and reporting for each paper. Among other inclusion criteria, studies must have sampled commercially relevant seafood species and used one of four validated procedures to assess the chemical composition of MPs.

The studies measured contamination in terms of MP particles per gram of organism wet weight or per individual organism. Over half the reviewed studies sampled mollusks, reporting a range of 0–10:5 MPs=g. Mollusks collected in Asia tended to be the most contaminated. In addition,



Photo by Jirayu Koontholjinda (Unsplash)

mollusks collected directly from fishing waters were more contaminated than those purchased from markets. The reasons for this finding are not entirely clear, Danopoulos says, but one possibility is that harvested mollusks are sometimes put through a flushing process known as depuration before they are commercially available.

For crustaceans, the range was 0:14–8:6 MPs=g, but there were many gaps in the study data. Among fish, anchovies had a range of 0.35–2.3 MPs/individual, and sardines had 0.23–4.63 MPs/individual. Four studies analyzed larger fish; two reported the absence of MPs, one did not find contents that were significantly different from the control samples, and only one found MPs, reporting a content of 2:9 MPs=g. However, the authors rated the latter study



“... AN ANALYSIS OF MP CONSUMPTION FROM ALL DIETARY SOURCES... ESTIMATED **HUMANS COULD BE EATING UP TO 5 G PER WEEK.**”

Photo by Caroline Attwood (Unsplash)

as having a high RoB, meaning it was not rigorously conducted, according to the RoB matrix. One study on echinoderms found 0.82 MPs/individual or 1 MP=g in edible tissue.

The investigators estimated a maximum human uptake of MPs from seafood to be a maximum of 53,864 particles annually. They based this calculation on global

consumption estimates of 15.21 kg=person per year for fish, 2.65 kg=person per year for mollusks, and 2.06 kg=person per year for crustaceans (echinoderms were not listed in the consumption data set they used).

The authors acknowledge that seafood consumption varies widely by country, depending on geography and culture.

Given the variation in MPs' sizes, the authors did not attempt to estimate the total mass consumed.

“The most striking finding for me was that every single study identified the presence of microplastics in [at least part of] their samples,” Danopoulos says. With samples coming from four phyla comprising more than 20 families collected from all around

the world, living in different habitats and different environmental compartments—all were found to be positive, at some level, for MP contamination. “Microplastics contamination is indeed ubiquitous,” he says. He also notes that the most abundant polymers identified in seafood (polyethylene and polypropylene) are the ones that have been most heavily produced in the last 15 years. “This is an interesting analysis,” says Thavamani Palanisami, a senior lecturer at Australia’s University of Newcastle. “The maximum uptake ... is very high and could be due to methodological issues. Nevertheless, if I am a fish eater, I would be worried [about] even one MP in my diet.” Palanisami, who was not involved in the current study, recently published an analysis of MP consumption from all dietary sources in which he estimated humans could be eating up to 5 g per week.

“This is the first systematic review of the literature on microplastics in seafood, which is important in its own right,” says Dave Love, an associate scientist at the Johns Hopkins Bloomberg School of Public Health who also was not involved in the study. “If regulatory agencies were to



Photo by Anna Seeley (Unsplash)



Photo by Malidate Van (Pexels)

inspect seafood for microplastics—which they do not currently do as part of routine testing—there would need to be expert guidance on where to set the bar or the numbers of microparticles per gram of tissue allowable. Before that, however, we probably need more health effects studies to decide if microplastic exposure warrants any regulatory action.”

Danopoulos and colleagues also recently published systematic reviews of microplastics exposure from salt and drinking water. They estimated potential human exposures via salt at 0–6,110 MPs/year.⁶ For drinking water, they estimated that people might be consuming up to 458,000 MPs/year for tap water and 3,569,000 MPs/year for bottled water, based on average water consumption.⁷ “The results of all three systematic reviews,” Danopoulos says, “can be used in an aggregate exposure framework from all three mediums, which will give us an estimate of high confidence on human microplastics exposures.”



Photo by cottonbro (Pexels)



“ THE SEA, THE GREAT UNIFIER, IS MAN'S ONLY HOPE.... ”

- JACQUES YVES COUSTEAU

OUR IMPACT



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