County Clerk

From: Patricia Cadiz <pbc5@mac.com>
Sent: Friday, December 10, 2021 8:08 PM
To: County Clerk
Cc: Mike J. Molina; Yuki Lei Sugimura; Tamara A. Paltin; Alice Lee
Subject: Bill #136

[You don't often get email from pbc5@mac.com. Learn why this is important at http://aka.ms/LearnAboutSenderIdentification.]

Aloha Kathy,
Please direct me to a link where I can read the full text of bill #136, relating to TVRs in the Apartment District, or tell me how I can see it.
I asked four council members a question about it on Nov 3rd. The only reply I received was that it was deferred and more work was needed. Now I read that it was passed on second reading on Nov 19.
Thank you in advance,
Patti Cadiz
Sent from my iPhone

County Clerk

From: jpalmer10@hotmail.com
Sent: Monday, December 13, 2021 4:05 PM
To: County Clerk
Subject: Maui Sunscreen Ordinance 5306

Dear Maui County Council Members,
I strongly support Sunscreen Ordinance 5306. We are aware that multiple stressors threaten the marine ecosystem, but this non-mineral sunscreen threat is something we can address immediately unlike other issues that take time. FDA has placed these products in Non-GRASE until the sunscreen industry can prove their products are safe and effective. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.

Mahalo for your kokua

John Palmer Reef Education Volunteer
Kahalu'u Bay Education Center
Kailua Kona Hawaii

County Clerk

From: Jonathan Menton <konamenton@gmail.com>
Sent: Monday, December 13, 2021 3:21 PM
To: County Clerk
Subject: Sunscreen Ordinance 5306

Aloha!

I believe it is our kuleana to support Sunscreen Ordinance 5306. Non-mineral sunscreen is a threat to the marine environment, and we should not wait until it's too late to be good stewards of the environment!

Mahalo,
Susan Menton

County Clerk

From: Kathleen Clark <kclark@kohalacenter.org>
Sent: Monday, December 13, 2021 3:21 PM
To: County Clerk
Subject: Mineral Sunscreen Ordinance SUPPORT

Aloha mai kākou,

I strongly support Ordinance 5306. While we are keenly aware that multiple stressors threaten the marine ecosystem, but it is essential that we take all sensible steps to reduce the local stressors that we can. Sunscreen pollution is something we can address immediately unlike other issues that take more time. A healthy ocean is essential to life as we know it. The benefits it provides our communities, coastlines and economies are priceless. This ordinance moves in a positive direction and says that we understand the value of the healthy marine systems and we will do what we can to protect them so that future generations can still know their benefits.

Additionally, the FDA has placed chemical sunscreen products in Non-GRASE until the sunscreen industry can prove their products are safe and effective. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention. Finally, there are many safe options that are widely available including mineral sunscreens and sun protective clothing.

Mahalo for your time and consideration.

Kathleen

—

Kathleen Clark
Marine Stewardship and Education Specialist
The Kohala Center
808-887-6411 office
808-885-6707 fax

P.O. Box 437462
Kamuela, Hawai'i 96743
kohalacenter.org | Facebook | Instagram

The Kohala Center is an independent, community-based center focused on research, education, and 'āina stewardship for healthier ecosystems. By turning ancestral knowledge and research into action, we cultivate conditions that reconnect us with our place, water, food, and people, so that communities in Hawai'i and around the world can thrive—ecologically, economically, culturally, and socially.

County Clerk

From: Robert Culbertson <dancingcloudrefuge@gmail.com>
Sent: Tuesday, December 14, 2021 12:00 AM
To: County Clerk
Subject: Sunscreen legislation - support for Ordinance 5306

Aloha Councilmembers!

I strongly support Sunscreen Ordinance 5306. I am aware that multiple stressors threaten the marine ecosystem, *but this non-mineral sunscreen threat is something we can address immediately* unlike other issues that take time. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.
Let's turn the tables on industrial policy while we keep our reefs and keiki safe!

Sincerely,
R.A. Culbertson

County Clerk

From: Lynn Ryan <lynnr8@gmail.com>
Sent: Tuesday, December 14, 2021 1:25 AM
To: County Clerk
Subject: Support for Ordinance 5306

To Maui County Council members
I am writing in support of ordinance 5306. The non mineral sunscreen threat is something we can address immediately. The assurance of safety for all rests on the industry.
Our coral reefs face Assault thru increasing ocean temperatures, and increasing levels of trash and micro-plastics from improper disposal and stormwater runoff. Without addressing these types of global threats to coral reefs, our marine ecosystems will still continue to face peril.
But right now we can do something effective, Yes on ordinance 5306. Until the sunscreen industry can Prove that their products are safe for humans and Marine life, say no to non mineral sunscreens.
Sincerely,
Lynn Ryan RN
75-6016 Ali'i Dr #134
Kailua KonaHI 96740
Lynnr8@gmail.com

Sent from my iPhone

County Clerk

From: John Cranshaw <johncranshaw@gmail.com>
Sent: Tuesday, December 14, 2021 6:14 AM
To: County Clerk
Subject: New Sunscreen Ordinance

To: Maui Council County Members

I strongly support Sunscreen Ordinance 5306. We are aware that multiple stressors threaten the marine ecosystem, but this non-mineral sunscreen threat is something we can address immediately unlike other issues that take time.

The FDA has placed these products in Non-GRASE until the sunscreen industry can prove their products are safe and effective. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.

Mahalo nui loa,

John Cranshaw

County Clerk

From: Ann and John Seed <annandjohnseed@gmail.com>
Sent: Tuesday, December 14, 2021 1:52 PM
To: County Clerk
Subject: Sunscreen Ordinance 5306

Maui County Council Members:

We are in favor of passage of Sunscreen Ordinance 5306. Hawaii's coral reefs are a precious resource and it is our (and your) responsibility to protect them.

Mineral based sunscreens, those with only zinc oxide and/or titanium oxide as active ingredients, have been deemed safe and effective by the FDA. Sunscreens containing cinoxate, dioxybenzone, ensulizole, homosalate, meradimate, octinoxate, octisalate, octocrylene, padimate O, sulisobenzone, oxybenzone, and avobenzone have not been deemed safe and effective by the FDA because of inadequate data to support safety.

We urge you to act responsibly by voting in favor of Sunscreen Ordinance 5306.

Sincerely,

Ann and John Seed

HAWAI'I LAND TRUST

ph: 808.791.0729
126 Queen St., Ste. 306
Honolulu, Hawaii 96813
www.hilt.org

HEARING OF THE COUNCIL OF THE COUNTY OF MAUI

ATTN: CHAIR ALICE L. LEE & VICE-CHAIR
KEANI RAWLINS-FERNANDEZ

Testimony in Strong Support of Communication No 21-560

Dec. 17, 2021, 9:00am

Aloha mai kākoku Chair Lee, Vice-Chair Rawlins-Fernandez & Members of the Council of the County of Maui,

Hawaiian Islands Land Trust, d/b/a Hawai'i Land Trust ("HILT") is Hawai'i's islands-wide land trust that is both a Hawai'i 501(c)3 nonprofit, and a nationally accredited land trust. HILT'S mission is to protect and steward the lands that sustain Hawai'i, and to perpetuate Hawaiian values by connecting people to 'āina. Mahalo for the opportunity to provide testimony in strong support of Communication No. 21-560 and its accompanying resolution.

HILT is working to support the successful close of the final phases of the Save Hana Coast joint land protection effort lead by Hana based non-profit organization, Ke Ao Halii. With the successful partnership between Ke Ao Halii, HILT, the County of Maui, and the State Legacy Land Conservation Program (LLCP), we were able to permanently protect 27 acres of the Mokae I lands in March 2020 and 30.34 acres of the Makaalae lands in November 2021. Now, project partners are working to close the final phases of this effort to protect the entire stretch from Hamoa Beach to Waioka Pond.

HILT strongly supports Communication No. 21-2560, which will allow project partners to close the funding gap to complete this landscape level protection effort.

To date, HILT recently secured an additional $100,000.00 in private funding support from a foundation supporting shared values of protecting Hawai'i's agricultural lands. This amount will be used to directly lessen and leverage the County's contribution.

We mahalo the County Council for its consideration of this request and are humbled and equally emboldened in how our shared values and partnerships provide direct reprieve to address the complex environmental and community resilience issues that we collectively face statewide. Mahalo nui loa for your public service and for the opportunity to submit testimony. We look forward to working collaboratively to protect our most special places throughout the County of Maui.

Mālama pono,

Shae Kamakaala
Director of 'Āina Protection, shae@hilt.org, 808-940-0639

RECEIVED
2021 DEC 15 AM 8:13
OFFICE OF THE COUNTY CLERK

County Clerk

From: Cynthia Urry <cwurry@yahoo.com>
Sent: Wednesday, December 15, 2021 7:00 AM
To: County Clerk
Subject: Sunscreen Ban

To the County Clerk of Maui ,

I strongly support Sunscreen Ordinance 5306. We are aware that multiple stressors threaten the marine ecosystem, but this non-mineral sunscreen threat is something we can

address immediately unlike other issues that take time. FDA has placed these products in Non-GRASE until the sunscreen industry can prove their products are safe and effective.

Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially

harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of

prevention.

It's bad enough there are so many factors like global warming and our severe storms runoff are damaging our reefs, we need to do our part .

Please save our reefs now before it's too late!

Mahalo ,

Cyndy Urry
resident

County Clerk

From: Cindi Punihaole <cpunihaole@kohalacenter.org>
Sent: Wednesday, December 15, 2021 8:28 AM
To: County Clerk
Subject: Testimony CC21-557

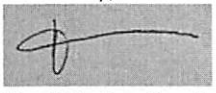
Aloha Honorable Alice L. Lee, Chair, Keani Rawlins-Fernandez Vice Chair, and Councilmembers

We on Hawai'i Island are so proud of you. Historic Ordinance 5306 shows us that Maui County continues to lead in efforts to protect the environment and our keiki. It is troubling that this Ordinance may be amended before its effective date by the Mayor. We are in complete support of Ordinance 5306 without modifications.

On September 24, 2021, the Food and Drug Administration (FDA) issued a proposed order concerning nonprescription sunscreen drug products. In the proposed order, two mineral products **zinc oxide and titanium dioxide are deemed generally recognized as safe and effective (GRASE),** and fourteen products are deemed **NOT GRASE**. Of the fourteen products, **twelve products do not currently contain sufficient data to support positive GRASE classification**. The twelve products that require additional data are avobenzone, cinoxate, dioxybenzone, ensulizole, homosalate, meradimate, octinoxate, octisalate, octocrylene, oxybenzone, padimate O, and sulisobenzone.

The Maui County Council shouldered the responsibility to prohibit the sale, use, or distribution of non-mineral sunscreens (nonprescription drugs) that have questionable effects on the health of humans and marine life based on scientific data. As with any other drug, the **Precautionary Principle** should apply.

Sincerely,



Cynthia Punihaole Kennedy
Director
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P.O Box 437462
Kamuela, HI 96743
808 895-1010 mobile
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County Clerk

From: Patti Henry <patticns@charter.net>
Sent: Wednesday, December 15, 2021 10:33 AM
To: County Clerk
Subject: Sunscreen Ordinance 5306

You don't often get email from patticns@charter.net. Learn why this is important

I strongly support Sunscreen Ordinance 5306. We are aware that multiple stressors threaten the marine ecosystem, but this non-mineral sunscreen threat is something we can address immediately unlike other issues that take time. FDA has placed these products in Non-GRASE until the sunscreen industry can prove their products are safe and effective. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life. The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.

Patti Henry

County Clerk

From: Jessica Rosado <jessicarosado@kiheicharter.org>
Sent: Wednesday, December 15, 2021 12:40 PM
To: County Clerk; Jadda Miller
Subject: Bill 135

November 17, 2021

Dear Maui County Council,

I am writing to you today to initiate my support for Bill 135. I support Bill 135, for the reason that sunscreen has many harmful ingredients such as Octisalate and Octinoxate. It's important that we keep our coral and health safe. Our community's health impacts everyone, including the government. In order to help ban non-reef-safe sunscreen, we must spread the word. Our health, coral, and community are in danger. By banning the use of non-reef-safe sunscreen, we can change many things that are negatively affecting and impacting our society, coral reefs, and health, this Bill will do just that.

Mahalo for your time,

Jessica Rosado 7A, Kihei Charter

County Clerk

From: Bagshaw, Jeff W <jeff.w.bagshaw@hawaii.gov>
Sent: Wednesday, December 15, 2021 2:26 PM
To: county.clerk@mauicounty.legistar.com
Cc: County Clerk
Subject: Please find attached written testimony and supportive documents for Dec 17th 2021 Council meeting
Attachments: testimony 17 Dec 2020.docx; Science of the Total Environment 647() 1305-1313 [2019] conc tissue fish org UV filters wild fish.pdf; EST_UVF-Dolphins _es400675y 2013 - Copy.pdf; Marine Pollution Bulletin 153() 111012 [2020] Cocci sunscreen ingred in loggerhead turtles molecular markers.pdf; Avobenzone vs Oxybenzone comparison.pdf

Please submit my testimony for item 21-5567 for December 17th, 2021. Also find three supporting scientific publications and a pdf I created to provide a basic explanation of how two of the chemical compounds in question work.
Mahalo

Jeff Bagshaw
Communications and Outreach Specialist
State of Hawaii
DLNR/DOFAW Maui Nui Branch
Jeff.w.bagshaw@hawaii.gov
(808)264-7891c
(808)873-3986o

No. 21-557

Aloha Mayor Victorino and Maui County Council members:

I urge you to not delay, alter or make amendments to Ordinance 5306 (Bill 135) banning the sale of petrochemical sunscreen products in Maui County. We all remember the awful bleaching event of September/October 2015 when average sea water temperatures held steady at 88 degrees F for eight weeks. We lost an average of 30% of all our reefs across the state in just two months. Two or three more such events and our reefs will be largely gone. Some areas fared better than others, some will never look the same again. No one argues that our reefs face numerous problems, many we can't solve in Hawai'i alone. But delaying actions we can take now and here is like telling a heart patient to do nothing to change their lifestyle because they have some genetic markers against them. We know future bleaching events are coming, it's a matter of when, not if. And we know from past events that reefs that are healthiest to begin with have better chances of some recovery. Preparing for the next event begins today, not months from now.

I grew up in "tornado-alley." Ask people there today if they think it was wise for their local governments to delay enacting stricter building codes because they thought they didn't have adequate data, that stronger storms were coming and they didn't want to increase short-term building costs.

This isn't just about reefs for pretty fish to see when snorkeling. Its also about our food resources, its a matter of environmental justice.

Testing chemical toxicity in a lab setting is the only way to accurately assess effects on some marine organisms. But for skeptics that doubt that time-tested method, here are three studies of data taken from wild animals that show these compounds bioaccumulate, they move up the food chain and are stored in the liver and other organs:

- A 2020 study published in the journal Elsevier showed four common sunscreen agents in blood samples from juvenile Loggerhead sea turtles caught off the coast of Italy. Loggerheads eat invertebrates. Humans in Hawai'i eat invertebrates such as crab, lobster, tako, and opihi.
- A 2018 study published in Elsevier showed several fish species form a freshwater lake in China had high concentrations of these compounds in liver and gill tissues. Fish eat algae, invertebrates and smaller fish. Humans in Hawai'i eat limu, invertebrates and fish.
- A 2013 study published in Environmental Science and Technology showed that petrochemical sunscreen compounds were present in liver samples from 70% of wild Francisana dolphins off the coast of Brazil, showing that these compounds bioaccumulate through the food web. Dolphin species everywhere eat fish. Humans in Hawai'i eat fish.

People who make the choice to not wear sun-protective clothing, who demand to recreate between 10AM and 2PM, who don't like the mineral sun-blocks and choose petrochemical sunscreens instead are imposing their health choices on the rest of us, people who eat from the ocean in Hawai'i. Our society chose to eliminate the effects of second-hand smoke by banning smoking in shared public spaces, in many locations long before the FDA and Surgeon's General said there was data to do so.

The NAS is not a regulatory agency, it will only make recommendations to the EPA. We don't need to wait because a dermatologist on Maui has a storeroom full of products being sold through his office and on-line. Mineral sun-blocks cannot be patented, so they're not as profitable as lab-produced chemical

products. We already have generations of data from credible dermatologists that the most effective sun protection remains clothing or mineral sun-blocks. Luckily, chemistry and biology work the same whether its Brazil, Italy, China or Hawai'i. The beauty of science is that researchers elsewhere can give us information, today.

The US Virgin Islands banned these products in 2019. They didn't wait for more and more reports. Bill 135/Ordinance 5306 corrects loopholes created by the weak state-wide ban of only two compounds. Petrochemical sunscreen ingredients bioaccumulate. We don't know the long-term health impacts and medical costs for people who eat from the ocean and accumulate these compounds in their tissues, even if they never applied petrochemical sunscreens to their own skins. But just like mask-mandates, we know enough to ere on the side of caution. So the question becomes why and who are we waiting for, the people who sell these products, so they don't lose money in the short-term, or the people who get their food from our island shores every day?

Mahalo,

Jeff Bagshaw

Volunteer Coordinator, Information and Education Associate

`Ahihi-Kina`u Natural Area Reserve (DLNR/DOFAW)

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Science of the Total Environment 647 (2019) 1305–1313

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/scitotenv

Concentrations and tissue-specific distributions of organic ultraviolet absorbents in wild fish from a large subtropical lake in China

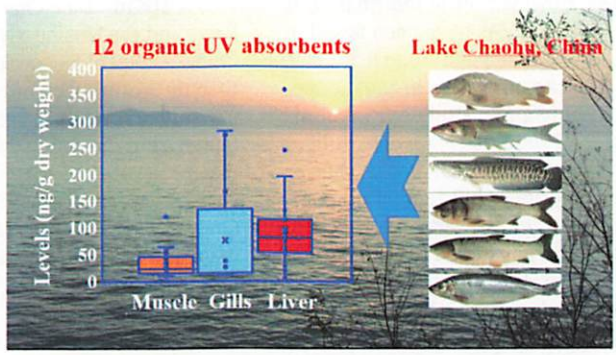
Zhenwu Tang [a,b], Fuyong Zhong [b], Jiali Cheng [c], Zhiqiang Nie [d], Xue Han [b], Yu Han [a], Yufei Yang [d,*]

[a] College of Life and Environmental Sciences, Minzu University of China, Beijing 100081, China
[b] College of Environmental Science and Engineering, North China Electric Power University, Beijing 102206, China
[c] Key Laboratory of Trace Element Nutrition of National Health and Family Planning Commission, National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention, Beijing 100021, China
[d] State Key Laboratory of Environmental Criteria and Risk Assessment, Chinese Research Academy of Environmental Sciences, Beijing 100012, China

HIGHLIGHTS

- Accumulation of 12 UVAs were investigated in freshwater fish from China.
- Tissue-specific UVA distribution was discussed in wild fish.
- Field-based log BAF_{muscle} values were lower than those predicted by modeling.
- High liver accumulation capacity of UVAs was observed in fish.

GRAPHICAL ABSTRACT



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ABSTRACT

Organic ultraviolet absorbents (UVAs) have been detected in various materials and biota, but little is known about the distributions of UVAs in the tissues of biota. In this study, tissue-specific UVA accumulation in six fish species from Lake Chaohu, China, was investigated. The sums of 12 UVA concentrations in muscles, gills, and livers were 7.65–120, 10.1–281, and 26.4–359 ng/g dry weight, respectively. Ethylhexyl methoxycinnamate, 4-methylbenzylidene-camphor, and 2-(2′-hydroxy-3′,5′-di-*tert*-butylphenyl)-5-chlorobenzotriazole were the dominant UVAs. Ethylhexyl salicylate and homosalate have been found in the aquatic species firstly. UVAs were taken up to different degrees by different fish species. The UVA muscle bioconcentration factors were lower than predicted by the Estimation Programs Interface Suite model, suggesting that such models may overestimate UVA accumulation in fish. The tissue distribution patterns indicated that UVAs are easily transferred to the muscles after being absorbed through the gills. The liver was found to preferentially accumulate UVAs and have a high UVA accumulation capacity, implying liver damage may be caused by UVAs. This is the first time the partitioning of UVAs between the liver, muscle, and gills of freshwater fish has been studied. The data acquired will improve our understanding of the pharmacokinetics and toxicities of UVAs in aquatic organisms.

1. Introduction

Organic ultraviolet absorbents (UVAs) are used in personal care products such as sunscreens and cosmetics to protect skin from the

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E-mail addresses: zwtang@ncepu.edu.cn (Z. Tang), niezq@craes.org.cn (Z. Nie), cqyyf@163.com (Y. Yang).

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0048-9697/

harmful effects of sunlight (Fent et al., 2010; Liao and Kannan, 2014; Sharifan and Ma, 2017). UVAs are also added to products such as paints, plastics, and textiles to prevent light-induced aging and degradation (Lu et al., 2016). High UVA concentrations have been found in aquatic environments (Bratkovics et al., 2015; Gago-Ferrero et al., 2015; Huang et al., 2016) because UVAs enter natural water directly when people are involved in aquatic recreation and indirectly via wastewater. Some UVAs are lipophilic, i.e., have high octanol–water partition coefficients (K_{ow}s) (Peng et al., 2017), suggesting that they may accumulate in biota.

It has recently been found that UVAs can bioaccumulate in various aquatic organisms. Benzophenone-3 (BP-3), octocrylene (OC), ethylhexylmethoxycinnamate (EHMC), and octyldimethyl *p*-aminobenzoic acid (OD-PABA) have been detected in marine organisms such as cod, mussels, and shrimp from the coasts of France, Norway, and Portugal (Bachelot et al., 2012; Groz et al., 2014; Langford et al., 2015). UVA components of sunscreen have also been detected in Franciscana dolphin tissues (Gago-Ferrero et al., 2013). EHMC, OC, BP-3, and 4-methylbenzylidene-camphor (4-MBC) have been found in aquatic organisms from lakes and rivers in Germany, Spain, and Switzerland (Balmer et al., 2005; Buser et al., 2006; Fent et al., 2010; Gago-Ferrero et al., 2015; Wick et al., 2016). UVAs have also been found in clams, mullet, and mussels from the Ebro River (Spain) and Tagus Delta (Portugal) (Cunha et al., 2015). 4-MBC has been found frequently and at a high mean concentration of 103 ng/g dry weight (dw) in seafood from the European Union (Cunha et al., 2018). However, little information is available on UVAs in biota outside Europe. UVAs have been found in urban creek from Canada (Lu et al., 2016, 2017) and Guanabara Bay, Brazil (Molins-Delgado et al., 2018). UVA accumulation in aquatic species in Asia has been investigated in only a few studies (Kim et al., 2011; Nakata et al., 2009, 2012; Peng et al., 2015, 2017). To date, studies of only a small number of UVAs in a small number of animal species have been performed, so the data available are insufficient for us to understand the global distributions of UVAs and the negative effects of UVAs on ecosystems. >20 organic UVAs may be added to cosmetics in China, and cosmetics may contain 4%–10% UVAs by weight (NHFPC, 2015). Little information on UVA accumulation in aquatic species in China is available. UVAs have been found in marine organisms from the South China Sea (Peng et al., 2015, 2017; Sang and Leung, 2016). However, to the best of our knowledge, no previous study has been focused on UVA accumulation in freshwater organisms in natural aquatic systems in China or on the potential risks posed by UVAs in natural aquatic ecosystems.

The UVAs show different bioaccumulation potency in aquatic species. Bioconcentration factors (BCFs) of 67–1500 and 700–2300 have been found for EHMC and 4-MBC, respectively (Balmer et al., 2005; Fent et al., 2010; Lu et al., 2016). Bioaccumulation factors of $10^{4.01}$–$10^{6.72}$ have been found for 2-(2H-Benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol (UV-234), and different bioaccumulation factors were found for different conditions and species (Lu et al., 2016). Various factors such as the species, body size, lipid content, and sampling location may affect UVA bioaccumulation (Gago-Ferrero et al., 2015). The trophic level of a species may affect the UVA bioaccumulation factor under field conditions because of UVA biomagnification (Fent et al., 2010; Peng et al., 2017). It has been confirmed in several studies that UVA accumulation is compound- and species-specific (Lu et al., 2016, 2017; Nakata et al., 2009; Vidal-Liñán et al., 2018). Field-based BCFs for UVAs are not available for Chinese aquatic species, especially freshwater fish.

The distributions of UVAs in different tissues in an animal can provide information about UVA metabolism and toxicity (Gago-Ferrero et al., 2012). After accumulating within the body, UVAs may enter the blood, enterohepatic, and/or lymphatic circulation systems and be distributed to various tissues (Lu et al., 2017). Endogenous partitioning and elimination processes will be affected by many factors, such as the metabolic potency of the target tissue, the exposure route, and the physicochemical properties of the target compound (Chen et al., 2017; Tanoue et al., 2015). UVAs may be metabolized, excreted, or remain at high concentrations in tissues. Some fish organs are of particular interest. The gills are important because they are key entry points for xenobiotic compounds, the liver is of interest because of its role in xenobiotic metabolism, and muscles are of interest because humans can be negatively affected by consuming contaminated fish muscle tissues. UVA bioaccumulation has previously been found to be congener specific (Gago-Ferrero et al., 2015; Lu et al., 2017; Molins-Delgado et al., 2018). However, the selective bioaccumulation of UVAs in different organs and the tissue-specific distributions of UVAs remain poorly understood.

In this study, we investigated the distributions of 12 commonly used UVAs in six species of freshwater fish from Lake Chaohu, a large subtropical lake in China. To the best of our knowledge, UVAs in freshwater fish from natural aquatic systems in China have not previously been studied. This is the first time the partitioning of 12 UVAs between the gills, liver, and muscle of wild fish has been quantitatively investigated.

2. Materials and methods

2.1. Study area and sample collection

Lake Chaohu is the fifth largest freshwater lake in China, and has a surface area of ~760 km^2 and a capacity of between 1.72×10^9 and 3.23×10^9 m^3. Lake Chaohu is on the flood plain between the Yangtze River and the Huaihe River in the center of Anhui Province in eastern China. A total of 54 species of fish from 16 families (significantly fewer than the historical record of 90 fish species) were found in Lake Chaohu in a survey conducted between 2002 and 2004 (Guo, 2005). It was estimated from the results of a survey performed between 2007 and 2010 that 14×10^3–14.5×10^3 t of fish biomass is produced in the lake each year (Zhao and Xi, 2015). More than 9.1×10^6 people live in the Lake Chaohu Basin, which is rapidly developing economically and contains many important industrial plants, including chemical, plastic, and textile plants. Lake Chaohu suffers from serious pollution (Wang et al., 2013; Yang et al., 2012). The polybrominated diphenyl ether (PBDE) concentration (mean (sum of eight PBDE) 43 ng/L and mean decabromodiphenyl ether concentration 42 ng/L) and tetrabromobisphenol A concentrations (maximum 4.87 μg/L) in water in Lake Chaohu have been found to be at the high end of concentrations found in aquatic environments around the world and are likely to pose great ecological risks to aquatic organisms in Lake Chaohu (Wang et al., 2013; Yang et al., 2012).

We collected samples of six fish species with large biomass yields from Lake Chaohu and determined the UVA concentrations in the samples. The fish species that were collected were bighead carp (*Aristichthys nobilis*), black carp (*Mylopharyngodon piceus*), common carp (*Cyprinus carpio*), grass carp (*Ctenopharyngodon idellus*), silver carp (*Hypophthalmichthys molitrix*), and snakehead (*Ophiocephalus argus* Cantor). The fish samples were collected from the center of the western half of Lake Chaohu in September 2016. The length and weight of each fish was determined, then the fish was wrapped in aluminum foil and frozen before being transported to the laboratory. In the laboratory, the fish were allowed to thaw naturally, then each fish was carefully skinned with a stainless-steel scalpel. The gills were removed, rinsed three times with Milli-Q water, then dried with filter paper. The gills, livers, and muscle tissues from 2 to 3 individuals were separately pooled to provide composite single-tissue samples for each species, to provide sufficient of each tissue for analysis. The numbers of composite samples produced are shown in Table 1. Each sample was freeze-dried, ground, homogenized, and then stored at −20 °C until further analysis was performed.

2.2. Sample preparation and instrumental analysis

A total of 12 UVAs was analyzed. The selected UVAs are permitted to be used in China by the NHFPC (2015) and have previously been found

Table 1
Frequencies of detection, concentration ranges (means ± standard deviation) of organic ultraviolet absorbents (ng/g dry weight) in muscle of wild fish from Lake Chaohu.

	Black carp $n = 8$	Common carp $n = 5$	Snakehead $n = 8$	Grass carp $n = 6$	Silver carp $n = 8$	Bighead carp $n = 8$	Detection frequency in all species
Body length (cm)	57.0–68.0	24.6–38.2	46.0–49.0	35.2–48.5	34.1–37.4	32.4–35.2	
Body weight (g)	2562–5450	321–1528	1251–1380	804–2400	875–1090	808–970	
Lipid content (%)	18.0	10.8	14.0	7.60	8.40	9.20	
BP	<1.23	<1.23	<1.23	<1.23	<1.23	<1.23	0
EHS	<0.46–2.60 (0.86 ± 0.59)	<0.46	<0.46–2.85 (0.49 ± 0.10)	1.14–8.87 (4.10 ± 4.99)	<0.46–4.00 (1.97 ± 0.01)	<0.46–1.24 (0.46 ± 0.23)	58%
HMS	1.06–11.0 (2.55 ± 0.31)	<0.13–1.04 (0.56 ± 0.74)	0.84–2.68 (1.43 ± 0.65)	0.98–2.97 (1.67 ± 0.94)	1.46–3.70 (2.41 ± 0.57)	1.09–2.04 (1.69 ± 0.25)	95%
BP-3	<0.25–1.63 (0.64 ± 0.67)	<0.25	<0.25–7.12 (2.96 ± 5.03)	0.37–3.19 (1.94 ± 0.15)	<0.25	<0.25–100 (19.6 ± 11.3)	53%
4-MBC	0.54–6.83 (2.13 ± 0.94)	<0.09–1.55 (0.70 ± 0.76)	<0.09–4.96 (2.23 ± 3.51)	3.04–16.2 (9.41 ± 4.45)	1.10–10.8 (4.08 ± 1.53)	0.95–3.77 (2.39 ± 1.20)	91%
OD-PABA	<0.08–0.97 (0.22 ± 0.59)	<0.08–4.12 (1.38 ± 0.08)	<0.08–3.12 (2.01 ± 2.05)	<0.08–0.77 (0.34 ± 0.55)	<0.08–0.13 (<0.08)	<0.08–12.2 (2.18 ± 2.62)	231%
EHMC	<0.14–9.94 (1.60 ± 0.21)	<0.14–38.4 (10.2 ± 27.2)	<0.14–41.2 (18.0 ± 29.2)	<0.14–3.85 (0.75 ± 0.47)	<0.14–4.14 (0.98 ± 0.56)	<0.14–14.8 (2.54 ± 10.4)	53%
UV-320	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0
UV-326	<0.10–3.76 (1.48 ± 5.51)	<0.10–2.39 (1.35 ± 0.56)	0.69–12.1 (5.35 ± 1.32)	1.38–13.8 (6.23 ± 8.54)	<0.10–2.15 (0.93 ± 0.13)	<0.10–14.6 (2.87 ± 9.74)	79%
UV-329	0.67–0.78 (0.73 ± 0.02)	<0.19	6–15.86 (5.38 ± 0.76)	1.37–13.0 (3.57 ± 0.37)	0.78–2.73 (1.49 ± 0.56)	0.75–2.05 (1.22 ± 0.34)	88%
OC	<0.73–2.88 (1.95 ± 2.08)	<0.73–5.27 (2.50 ± 2.05)	0.73–3.84 (1.04 ± 0.83)	4.07–13.7 (8.43 ± 3.19)	<0.73–8.95 (2.54 ± 1.50)	<0.73–2.93 (1.25 ± 1.51)	70%
UV-327	1.93–4.20 (3.07 ± 0.10)	1.43–4.52 (2.82 ± 1.38)	<0.23–10.43 (4.78 ± 0.11)	<0.23–4.01 (1.61 ± 2.30)	1.08–3.03 (2.16 ± 0.31)	2.62–5.14 (3.75 ± 1.45)	91%
Σ_{12} UVAs	7.65–24.8 (15.2 ± 7.15)	8.66–50.7 (19.5 ± 29.7)	13.8–59.3 (43.7 ± 30.7)	24.3–52.0 (38.0 ± 19.6)	11.3–26.6 (16.6 ± 2.01)	7.78–120 (38.0 ± 19.6)	

Concentration of individual chemical less than method detection limit was calculated using 0 when calculating the Σ_{12} UVAs, mean, standard deviation, respectively.

in environmental media in China. The selected UVAs had log K_{ow}s of 3.15–6.91 (Table S1). The selected UVAs can interact with hormone receptors and therefore have hormonal activities. Information on the 12 UVAs is presented in Table S1. The standards and other materials are described in the Supplementary Data. Each gill, liver, or muscle sample was extracted by ultrasonicating it with a 1:1 v/v mixture of acetone and *n*-hexane. The UVA concentrations in the extracts were determined using an Agilent 7890 gas chromatograph coupled to an Agilent 5975 mass spectrometer (Agilent Technologies, Santa Clara, CA, USA). The extraction and analysis methods are described in detail in the Supplementary data.

2.3. Quality assurance/quality control

Each target compound was identified if the ion abundance ratio of a peak at the correct retention time in a sample chromatogram matched the ion abundance ratio of the relevant peak in the standard chromatograms. The UVA concentrations were determined using an internal standard method. The linearity for each UVA over the concentration range 10–400 μg/L was investigated by analyzing replicate standards at seven different concentrations in the concentration range tested. The reproducibility of the method and the relative recoveries of the analytes were determined by analyzing five fish muscle samples that had been spiked with the target compounds at two levels, respectively. The recoveries were 71.2%–108% and the relative standard deviations were <8.25%. The limit of detection (LOD) was defined as the concentration giving a signal-to-noise ratio of 3. The UVA LODs were 0.08–1.23 ng/g dw. The quality assurance/control parameters for each UVA are shown in Table S2 in the Supplementary Data. A procedural blank extract and an extract of a sample spiked with UVA standards were injected after every 8–10 samples to assess contamination during the sample preparation process and to monitor the instrument performance, respectively. All analyses were performed in duplicate. The analyte concentrations were not corrected for the recoveries.

2.4. Data analysis

The BCF (L/kg) for a UVA was calculated using the equation $BCF_{muscle} = C_{muscle}/C_{water}$, where C_{muscle} is the concentration (in ng/kg wet weight) in fish muscle and C_{water} (ng/L) is the mean concentration in water from Lake Chaohu. The UVA concentrations are shown in Fig. S1 in the Supplementary data. The mean concentration of each UVA in lake water was used. Each concentration in fish muscle below the LOD was replaced with 0.5 × LOD when calculating the BCF, although this could have caused bias in the BCF. The log BCF values for the UVAs were predicted using the Estimation Programs Interface Suite (V4.11) (USEPA, 2017).

Preferential accumulation of UVAs in the gills was assessed by dividing the total UVA concentration in the gills by the total UVA concentration in the gills and muscle tissue. A ratio of 0.5 indicated that no preferential accumulation occurred, and a higher or lower ratio indicated preferential accumulation in the gills or muscle, respectively (Voorspoels et al., 2003). Comparable methods were used to assess preferential accumulation in the liver and muscle. Each UVA concentration below the LOD was replaced with 0.5 × LOD in the preferential accumulation calculations.

The data were processed using SPSS 18.0 software (SPSS, Chicago, IL, USA). Groups were compared using a nonparametric test because the data did not consistently follow normal distributions. Correlation hypotheses were tested using two-tailed Pearson's correlation analyses. Differences were considered significant at $p < 0.05$.

3. Results and discussion

3.1. UVAs in muscle

The UVA distributions and concentrations in the wild fish samples are shown in Table 1 and Fig. S2. Benzophenone (BP) was not detected out in any of the fish muscle samples even though BP has previously been found at high concentrations in water and sediment from Lake

Chaohu (Han, 2018). BP has a relatively low log K_{ow} of 3.15, and may be metabolized easily (Jeon et al., 2008). The 2-(2′-hydroxy-3′,5′-di-*tert*-butylphenyl)benzotriazole (UV-320) concentrations in the muscle tissues were <LOD. UV-320 was also not detected in mussel samples from the Chinese coast (Nakata et al., 2012). In previous studies, UV-320 was not detected in many Chinese industrial products such as plastics and textiles (Wang et al., 2015, 2016), suggesting that UV-320 is not widely used in China. The most frequently detected UVAs were homosalate (HMS), 4-MBC, and 2-(2′-hydroxy-3′,5′-di-*tert*-butylphenyl)-5-chlorobenzotriazole (UV-327), and the next most frequently detected UVAs were octrizole (UV-329), bumetrizole (UV-326), and OC, indicating that these UVAs are found widely in wild fish in Lake Chaohu. The most frequently detected UVAs in freshwater and marine organisms in previous studies were BP-3, 4-MBC, EHMC, and benzotriazole UV stabilizers (BZT-UVAs) (Alonso et al., 2015; Bachelot et al., 2012; Balmer et al., 2005; Buser et al., 2006; Langford et al., 2015; Nakata et al., 2009).

The total concentrations of 10 UVAs (Σ_{10}UVAs) in the six fish species samples were 7.65–120 ng/g dw. As shown in Fig. 1, the EHMC, 4-MBC, and OC concentrations were relatively high and contributed, on average, 19.8%, 13.1%, and 11.5%, respectively, of the Σ_{10}UVA concentration. The BP-3, 4-MBC, EHMC, and OC concentrations were comparable to concentrations previously found in freshwater fish from the Llobregat, Ebro, and Jucar rivers in Spain but lower than found in fish from the Guadalquivir River Basin, also in Spain (Gago-Ferrero et al., 2015). Langford et al. (2015) found BP-3, EHMC, and OC at concentrations of 6.5, 36, and 2.1 ng/g wet weight, respectively, in perch from Lake Mjøsa, Norway. The EHMC and OC concentrations in fish from Lake Chaohu were 3–13 times higher than concentrations found in fish from Swiss lakes but lower than concentrations found in fish from Swiss rivers (Balmer et al., 2005; Buser et al., 2006). The BP-3, 4-MBC, EHMC, and OC concentrations in fish from Lake Chaohu were comparable to concentrations found in *Mugil liza* from Guanabara Bay, Brazil, but higher than concentrations found in wild biota from the Pearl River Estuary and from the Hong Kong coast (Molins-Delgado et al., 2018; Peng et al., 2017; Sang and Leung, 2016). OD-PABA has been detected in many organisms from the Brazilian coast but not in wild mussels from the Pearl River Estuary, the French coast, or Guanabara Bay (Bachelot et al., 2012; Molins-Delgado et al., 2018; Peng et al., 2017). The OD-PABA concentrations in many of our samples were < LOD. Little information is available on ethylhexyl salicylate (EHS) and HMS concentrations in wild organisms. We detected EHS and HMS in 58% and 95%, respectively, of the total fish samples but at concentrations in the low nanograms per gram dw.

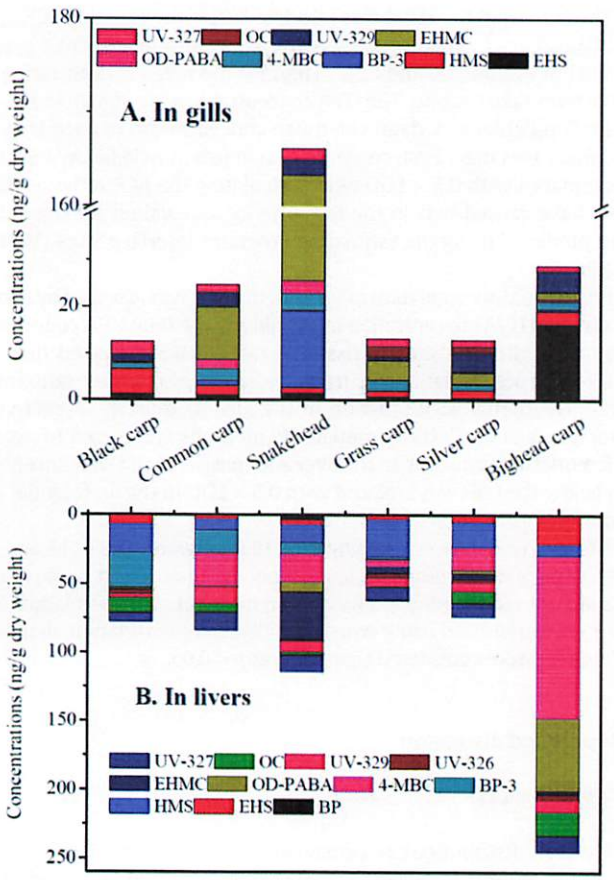

Fig. 1. Total concentrations of UVAs in gills (A) and livers (B) of the investigated fish from Lake Chaohu.

The dominant BZT-UVA was UV-327, which contributed 4.24%–20.1% of the Σ_{10}UVA concentrations in the six fish species. BZT-UVAs have previously been detected in many aquatic species from other parts of the world. The UV-326, UV-327, and UV-329 concentrations were all <LOD in fish from Lake Mjøsa, Norway, and from an urban creek in Canada (Langford et al., 2015; Lu et al., 2016). Consistent with our results, UV-326, UV-327, and UV-329 concentrations of <LOD–71, <LOS–221, and <LOD–97 ng/g lipid weight, respectively, were found in wild fish from Manila Bay (Kim et al., 2011). UV-326 and UV-327 concentrations of <LOD–5.6 and <LOD–9.6 ng/g wet weight, respectively, have been found in various species from the Ariake Sea, Japan, and comparable concentrations have been found in biota from the Pearl River Estuary, and these concentrations were generally lower than the concentrations in the fish samples we analyzed (Nakata et al., 2009; Peng et al., 2017). UVA concentrations may be different in different aquatic organisms because of different UVA use patterns and background BZT-UVA contamination levels being different in different environments but may also be related to compound- and species-specific differences in UVA bioaccumulation (Lu et al., 2016, 2017; Kim et al., 2011; Nakata et al., 2009).

Independent-sample statistical tests (Kruskal–Wallis H tests) indicated that the Σ_{10}UVA concentrations in the six fish species were significantly different ($p < 0.01$), suggesting that the different fish species accumulate UVAs to different degrees. Snakehead and black carp had the highest and lowest Σ_{10}UVA concentrations, respectively. This may be because different species have different habitats and feeding habits. Peng et al. (2017) found significantly higher BP-3 and 2-(2H-benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol concentrations in detritus-feeding fish than in carnivorous and planktivorous fish from the South China Sea. Gago-Ferrero et al. (2015) also found different UVA concentrations in fish species with different dietary and stratum preferences. Fent et al. (2010) found a trend in EHMC biomagnification for selected predator–prey relationships. In another study, UV-329 and octocrylene were found to biomagnify through the marine food web (Peng et al., 2017). The highest EHMC concentration in our samples was in snakehead, which is carnivorous. However, only the BP-3 concentrations in our samples significantly correlated ($p = 0.014$) with the δ^{15}N ‰ values (indicating the trophic level) found in a previous study (Zhong, 2018). It is therefore unclear whether biomagnification contributed to the differences in the UVA concentrations in the muscle samples.

No significant correlations were found between the UVA concentrations in the fish samples and the lipid contents of the fish samples. The fish size (body weight and length) was not related to the UVA concentration. Similar results have been found for other fish species from the Pearl River Estuary and Iberian River Basins (Gago-Ferrero et al., 2015; Peng et al., 2017). The 4-MBC, OC, and EHS concentrations positively correlated with each other ($p < 0.05$), indicating these UVAs had similar accumulation patterns or similar sources (commercial and/or industrial products). No significant relationships were found between the other BZT-UVA concentrations except for the UV-326 and UV-329 concentrations in the fish samples. In contrast, the concentrations of several BZT-UVAs in organisms from the Ariake Sea and Manila Bay significantly

correlated (Kim et al., 2011; Nakata et al., 2009). UVAs may have different excretion rates, uptake rates, and metabolism in different fish species, and these may all contribute to there being different UVA distributions in different fish species. No correlations were found between the UVA concentrations and the log K_{ow} values for the UVAs. These results suggest that UVA bioaccumulation and elimination may be both compound- and species-specific.

3.2. BCFs

Muscle BCFs (BCF_{muscle}) were calculated to allow the abilities of the fish to take up UVAs to be assessed, and the results are shown in Table 2. There were significant interspecies differences ($p < 0.05$) in the log BCF_{muscle} values for the target UVAs except for OD-PABA, EHMC, and UV327. However, no relationships were found between the UVA log BCF_{muscle} values and the body weights and lengths. UV-327 had the highest mean log BCF_{muscle} value, UV-326 the next highest, and 4-MBC the next. UVA BCF_{muscle} values have been determined under field conditions in few studies. 4-MBC was found to have log BCFs of 3.99–4.36 in fish from Swiss lakes (Balmer et al., 2005). UV-327 and UV-320 were found to have log BCFs of ~3.78 and ~4.52, respectively, in finless porpoises from the Ariake Sea (Nakata et al., 2010). Fent et al. (2010) found log BCF_{muscle} values of 2.12–3.18 (mean 2.88) for EHMC in freshwater fish. The different log BCF_{muscle} values we found may have been caused by interspecies differences in UVA uptake, elimination, and metabolism. Temporal variations in UVA concentrations and variations in UVA bioavailability in water also probably contributed to the different log BCF_{muscle} values.

No significant relationships were found between the UVA log BCF_{muscle} values and log K_{ow} values. Significant parabolic relationships were found in some previous studies between log BCF and log K_{ow} values for chemicals with high log K_{ow} values, such as polychlorinated biphenyls (PCBs) (log K_{ow} 4.7–8.5), short-chain chlorinated paraffins (log K_{ow} 5.1–6.6), and BZT-UVAs (log K_{ow} 5.3–12.2) (Zhu et al., 2015; Lu et al., 2016; Sun et al., 2017). This was attributed to the poor bioavailabilities of such hydrophobic chemicals (Buckman et al., 2006; Kelly et al., 2011; Lu et al., 2016). The lack of a relationship between log BCF_{muscle} and log K_{ow} for the UVAs in our study indicated that UVA uptake and elimination in fish are affected by many factors in addition to the log K_{ow} values. These results indicate that selective bioaccumulation of UVAs cannot be predicted from the UVA log K_{ow} values.

We compared the measured log BCF_{muscle} values with log BCF_{muscle} values calculated using the Estimation Programs Interface Suite (V4.11). As shown in Table 2, the measured log BCF_{muscle} values were generally lower than the predicted values except for UV-326. Lower measured BCFs than calculated BCFs have previously been found for OD-PABA, BP-3, and OC (Blüthgen et al., 2012, 2014; Ma et al., 2017). This may be because these chemicals can be metabolized by fish. For example, BP-3 can be transformed into benzophenone-1 by adult zebrafish (Blüthgen et al., 2012). Vidal-Liñán et al. (2018) found very low BP-3 and OD-PABA concentrations in mussels, and they found maximum concentrations 1–2 d after exposure and that the concentrations then decreased. This accumulation pattern indicates that BP-3 and OD-PABA can be biotransformed in mussels. Most UVAs are very lipophilic, so they will be absorbed by the excreta in fish. The apparent bioavailabilities of UVAs may therefore be low, and they may not bioaccumulate in fish as much as theoretically expected (Kaiser et al., 2012).

The characteristics of ambient water (e.g., the pH and dissolved organic matter concentration) may also have contributed to the differences between the measured and predicted BCF_{muscle} values. BZT-UVAs are very weak acids with pK_a values of 7–10, so their uptake and bioconcentration potentials will increase as the pH increases (Tanoue et al., 2015). The dissolved organic matter concentration was found to affect OD-PABA bioconcentration in crucian carp (Ma et al., 2017). Different mean log BCF values were found for different UVAs (Table 2), and this may be related to different UVAs having different uptake and biotransformation rates and/or the UVA concentrations in the water phase and organism phase not being in equilibrium (Tanoue et al., 2015).

3.3. Distributions in gills

The UVA concentrations in the gills of the six fish species were determined (Fig. 1(A)). BP and UV-320 were not detected in the gill samples. The Σ_{10}UVA concentrations in the gill samples were 12.5–166 ng/g dw (mean 43.0 ng/g dw). EHMC, UV-329, and HMS made the largest contributions to the Σ_{10}UVA concentrations. However, BP-3 and EHS were the dominant UVAs in snakehead and bighead carp, respectively. The gills are some of the most exposed organs of a fish to pollutants in the environment, and are in continuous contact with the water. Xenobiotic compounds in the water are taken up through the gills and can accumulate in the gill tissue. UVA concentrations in fish gills have been little studied. The BP-3, OC, 4-MBC, and EHMC concentrations found in the gills of *Mugil liza* in a previous study (Molins-Delgado et al., 2018) were comparable to the concentrations found in our samples.

No relationships were found between the UVA concentrations in the gill samples and the body weights and lengths of the fish or the lipid contents of the gill samples, and no significant relationships were found between the UVA concentrations in the gill samples and the UVA log K_{ow} values. BCF_{muscle} values under field conditions are normally controlled by uptake from both the diet and through the gills (Kobayashi et al., 2013). In a previous study, wild fish in streams were found to take up and eliminate pharmaceutical and personal care products predominantly through the gill membranes. It was proposed that uptake and elimination through the gills contributed more to the BCF_{plasma} values than did dietary exposure (Tanoue et al., 2015). We explored the relationships between the UVA concentrations in the gill samples and the log BCF_{muscle} values. The concentrations of 10 UVAs in the gill samples (on a dw or lipid weight basis) increased as the log BCF_{muscle} values decreased, but none of the correlations were

Table 2
The log values of observed and predicted bioconcentration factors (BCFs, L/kg) of organic ultraviolet absorbents in wild fish from Lake Chaohu.

	Black carp $n = 8$	Common carp $n = 5$	Snakehead $n = 8$	Grass carp $n = 6$	Silver carp $n = 8$	Bighead carp $n = 8$	Mean of observed values	Predicted values
BP	–	–	–	–	–	–	–	1.18
EHS	1.13 ± 0.34	0.98	0.98 ± 0.35	1.77 ± 0.36	1.50 ± 0.33	0.92 ± 0.28	1.21	3.61
HMS	1.25 ± 0.34	0.65 ± 0.47	1.13 ± 0.22	1.21 ± 0.19	1.38 ± 0.15	1.24 ± 0.10	1.14	3.73
BP-3	0.51 ± 0.36	0.17	0.92 ± 0.70	0.96 ± 0.36	0.17 ± 0.00	1.11 ± 1.11	0.64	1.58
4-MBC	2.39 ± 0.37	1.83 ± 0.61	2.27 ± 0.71	3.13 ± 0.26	2.72 ± 0.33	2.56 ± 0.19	2.48	3.57
OD-PABA	1.99 ± 0.44	2.40 ± 0.89	2.95 ± 0.61	2.29 ± 0.38	1.78 ± 0.07	2.35 ± 0.95	2.29	3.47
EHMC	0.87 ± 0.64	1.45 ± 1.10	1.92 ± 1.03	0.66 ± 0.60	0.89 ± 0.55	0.78 ± 0.84	1.09	3.69
UV-320	–	–	–	–	–	–	–	3.58
UV-326	2.52 ± 0.79	3.01 ± 0.55	3.60 ± 0.43	3.69 ± 0.40	2.86 ± 0.43	3.06 ± 0.65	3.12	3.11
UV-329	1.82 ± 0.02	1.23	2.42 ± 0.54	2.32 ± 0.37	2.08 ± 0.21	2.02 ± 0.15	1.98	3.77
OC	1.26 ± 0.65	1.51 ± 0.42	1.21 ± 0.33	2.10 ± 0.19	1.46 ± 0.41	1.24 ± 0.33	1.46	4.21
UV-327	3.25 ± 0.11	3.19 ± 0.21	3.24 ± 0.56	2.71 ± 0.63	3.09 ± 0.14	3.33 ± 0.13	3.13	4.01

statistically significant. This suggested that UVA uptake through the gills affected UVA accumulation in fish muscle.

It is generally more difficult for large molecules than small molecules to cross a membrane, so the accumulation of large molecules in gills will be limited (Kierkegaard et al., 1999). However, we did not find a significant relationship between UVA accumulation in gills and UVA molecular weight. This suggested that the UVA molecular weight is not related to the ability of the UVA to cross membranes. In previous studies of the permeabilities of lipid bilayers to small molecules it was found that the abilities of many drugs to cross membranes are not related to the molecular weights of the drugs (Bemporad et al., 2004; Orsi et al., 2009).

The gill accumulation ratios for seven UVAs (excluding UVAs found in few gill samples) were determined from the UVA concentrations in the gill and muscle samples. The mean gill accumulation ratios for the seven chemicals in the six fish species that were studied were 0.357–0.602. As shown in Fig. 2, slight preferential gill storage of a small number of chemicals was found, implying that UVAs tend to be transferred to fish muscle tissues after being absorbed through the gills. Significant negative correlations ($p < 0.05$) were found between the gill accumulation ratios and field-based and wet-weight-based log BCFs for seven UVAs (Fig. 2), indicating that intake through the gills and subsequent transfer to other tissues are important contributors to UVA accumulation in muscle tissue. The ratios for the different UVAs varied widely, suggesting that different UVAs are taken up at different rates by fish and that UVAs are accumulated to different degrees by different fish tissues.

3.4. Accumulation in liver

UV-320 was not detected out in any of the liver samples, and BP was detected in only snakehead liver. The total UVA concentrations and concentration profiles are shown in Fig. 1(B). The most abundant UVAs were 4-MBC, HMS, and UV-327. UVA concentrations in wild fish liver have been determined in few previous studies. BP-3, EHMC, and OC were found at concentrations of <20–1037, <30–36.9, and <20–11,875 ng/g dw, respectively, in cod livers (Langford et al., 2015). Those concentrations were higher than the concentrations in our samples. UVA concentrations previously found in *Mugil liza* livers (Molins-Delgado et al., 2018) were also higher than the concentrations found in our samples. However, the UV-327 and UV-329 concentrations in our samples were comparable to concentrations found in livers from fish from an urban creek in Canada (Lu et al., 2016).

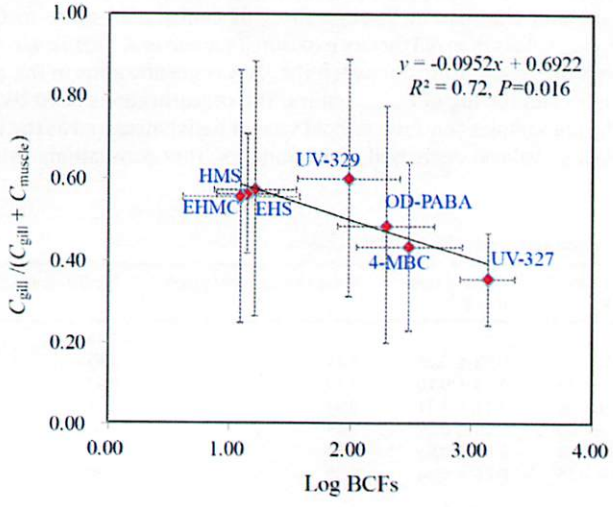

Fig. 2. Relationship of UVA accumulation ratios in fish gills versus logarithm of muscle bioconcentration factors (BCFs) field based wet-weight. The other UVAs were not included in the fitted line due to their lower detection frequencies in gills or muscles of the investigated fish.

The total UVA concentrations in the livers from the six different fish species were significantly different ($p < 0.05$). The highest UVA concentrations were found in bighead carp livers and the next highest in snakehead livers. The differences will have reflected differences in UVA accumulation and elimination in the livers of different species. UVA distributions in different tissues from each of the six fish species were assessed. The total UVA concentrations in the different snakehead tissues were not significantly different ($p = 0.17$). The total UVA concentrations in the different tissues were different for the other species. The UVA concentrations decreased in the order gill > liver > muscle for bighead carp ($p = 0.008$) and liver > muscle > gill for black carp ($p = 0.004$), common carp ($p = 0.013$), grass carp ($p = 0.013$), and silver carp ($p = 0.006$). The differences were probably related to the snakehead, bighead carp, and other fish species being exposed to different UVA concentrations and interspecies variability in UVA elimination and biotransformation. Brominated flame retardants, organochlorine chemicals, short-chain chlorinated paraffins, and BZT-UVAs have been found to preferentially accumulate in the liver relative to muscle in many marine and terrestrial organisms, including fish, in previous studies (Bodiguel et al., 2009; Brázová et al., 2012; Lu et al., 2017; Sun et al., 2017; Wu et al., 2009). This is probably related to the strong affinity of the phase-I biotransformation enzyme cytochrome P450 for such lipophilic compounds (Lu et al., 2017; Sun et al., 2017; Wu et al., 2009). The xenobiotic contaminant OD-PABA has been found to induce cytochrome P-450 activity in *Carassius auratus* (Lu et al., 2017), but other enzymes, such as esterases, can also modify UVAs (Liang et al., 2017). Differences in detoxifying activities in the liver could therefore cause some UVAs (the less easily detoxified UVAs) to accumulate more than other UVAs (the more easily detoxified UVAs) in the liver.

No significant positive correlations were found between the UVA concentrations in the liver samples and the fish body weights and lengths ($p > 0.05$). The UVA concentrations in the liver samples increased as the UVA log K_{ow} values increased, although the correlation was not statistically significant ($r = 0.515$). Lipophilic compounds have been found to accumulate in liver in many previous studies (Lu et al., 2017; Sun et al., 2017; Wu et al., 2009). In our samples the lipid contents of the liver samples (means 16.8%–30.4%) were significantly higher than the lipid contents of the muscle samples (means 7.60%–18.1%). The relatively high lipid content of the liver may favor lipophilic UVAs being deposited in the liver, decreasing the abilities of the UVAs to cross the liver membranes and be released from the liver (Tanoue et al., 2015). UVAs may also be transported to the liver, which is a xenobiotic-metabolizing organ, and be metabolized in the liver before being able to be transported to other tissues. It is important to note that UVA accumulation in the liver will be a complex process. For example, BZT-UVAs may bind to serum albumin through hydrogen bonds or electrostatic interactions, suggesting that there may be special bioaccumulation mechanisms in hepatic tissues in addition to hydrophobicity-driven partitioning (Zhuang et al., 2016). A significant positive linear correlation ($p = 0.014$) was found between the total UVA concentrations in the liver samples and the δ^{15}N ‰ values for the fish (Fig. S3), suggesting that the trophic level of an organism may affect the UVA concentration in the liver.

Preferential accumulation ratios were calculated for eight of the UVAs (Fig. 3). Preferential accumulation ratios were not calculated for BP and UV-320 because they were detected in few liver and muscle samples. The preferential accumulation ratios of the eight UVAs were 0.414–0.896, indicating that the UVAs were preferentially stored in the liver. The different ratios for different UVAs indicated that different UVAs are accumulated to different degrees in the liver. No significant correlation was found between the log K_{ow} values and the preferential accumulation ratios, implying that UVA accumulation in the liver is governed by active hepatic accumulation processes in addition to passive redistribution governed by the lipid contents of the tissues (Voorspoels et al., 2003).

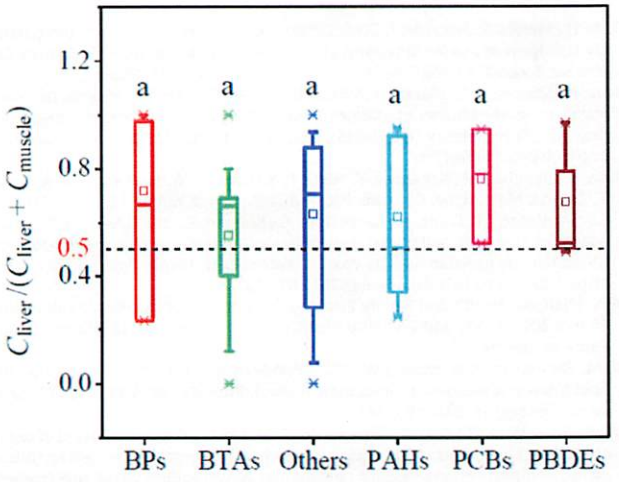

Fig. 3. Liver accumulation ratios of different chemicals observed in wild fish. BPs only refers to BP-3; BTAs including UV-326, UV-27 and UV-329; Others including EHS, HMS, 4-MBC, OD-PABA, EHMC and OC; PAHs including fluorine, pyrene, anthracene, chrysene and phenanthrene, and the data from references (Solé et al., 2001; Xu et al., 2011; Zhao et al., 2014); PCBs including PCB52, 101, 138, 153 and PCB 180, and the data from references (Bodiguel et al., 2009; Brázová et al., 2012; Xian et al., 2008); PBDEs including PBDE99, 100, 153, 154 and PBDE183, and the data from references (Carlsson et al., 2011; Wu et al., 2009; Xian et al., 2008). Boxplots are defined as follows: center line, median; hollow block, mean; boxplot edges, 25th and 75th percentiles; whiskers, 10th and 90th percentiles of distribution.

A better understanding of the accumulation of UVAs in fish livers was gained by comparing the preferential accumulation ratios with preferential accumulation ratios previously found for polycyclic aromatic hydrocarbons (PAHs), PBDEs, and PCBs in other parts of the world (Fig. 3). It was difficult to make comparisons because different aquatic species were used in different studies, so simple comparisons were made where possible using fish species with similar habitats, feeding habits, and trophic levels. The BP-3, BZT-UVA, and other UVA preferential accumulation ratios were not significantly different from the PAH, PCB, and PBDE preferential accumulation ratios ($p > 0.05$), suggesting that the liver may have similar UVA accumulation capacities and PAH, PCB, and PBDE accumulation capacities, although our data were limited. As mentioned in other publications, hepatic sequestration is an important pharmacokinetic property when quantifying the toxic equivalencies of chemicals (Van den Berg et al., 1998).

The liver accumulation ratios significantly and negatively correlated with the log BCF_{muscle} values for EHS ($p = 0.002$), OC ($p = 0.007$), and UV-329 ($p = 0.013$), implying that preferential liver accumulation may mitigate the distributions of these UVAs into muscle tissues. Wan et al. (2006) found that polychlorinated dibenzo-*p*-dioxin and dibenzofuran trophic magnification factors are strongly affected by tissue selectivity for the more-chlorinated isomers. In previous studies, HMS, UV-329 and UV-531 trophic magnification factors of 1.52, 1.61, and 1.70, respectively, have been found, and some UVAs (e.g., 2-(2H-benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol and BP-3) have been found to undergo trophic dilution in aquatic food webs (Peng et al., 2017; Zhong, 2018). It is therefore still unclear how hepatic sequestration of UVAs affects the trophic transfer of UVAs. This will need to be studied in more detail in future studies.

4. Conclusions

Our results confirmed that fish in Lake Chaohu are moderately to highly contaminated with UVAs except for BP and UV-320. We detected EHS and HMS in a wide range of wild fish species. UVA bioaccumulation data are provided in this paper, and UVA concentrations found in fish in Lake Chaohu are compared with UVA concentrations found in other organisms in other areas. Our results indicated that UVAs are selectively taken up by various fish species at different trophic levels. The log BCF_{muscle} values were generally lower than predicted using a model, suggesting the toxicological risks posed by UVAs to wild fish may be overestimated in risk assessments based only on model predictions. Hepatic sequestration of UVAs was found, and the accumulation capacity of the liver for UVAs was found to be similar to the accumulation capacities of the liver previously found for PAHs, PCBs, and PBDEs. The toxic effects that could be caused by UVAs retained in the liver should be of great concern. Our results indicate that determining UVA concentrations in target organs provides information that may improve our understanding of UVA uptake, accumulation, and elimination in wild fish and the risks posed by UVAs to wild fish. Future studies focused on UVA hepatotoxicities and biotransformation will further improve our understanding of the risks posed by UVAs to organisms.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.scitotenv.2018.08.117.

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First Determination of UV Filters in Marine Mammals. Octocrylene Levels in Franciscana Dolphins

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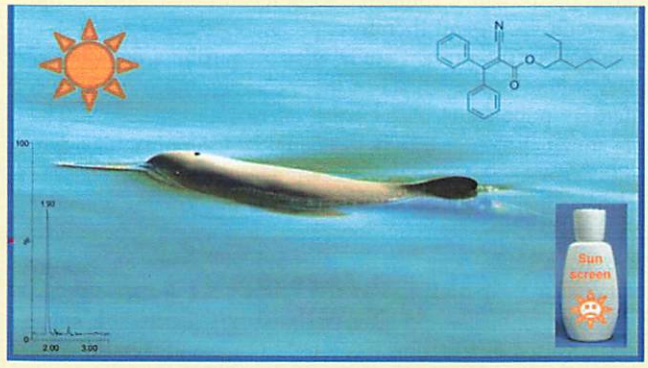
ABSTRACT: Most current bioexposure assessments for UV filters focus on contaminants concentrations in fish from river and lake. To date there is not information available on the occurrence of UV filters in marine mammals. This is the first study to investigate the presence of sunscreen agents in tissue liver of Franciscana dolphin (*Pontoporia blainvillei*), a species under special measures for conservation. Fifty six liver tissue samples were taken from dead individuals accidentally caught or found stranded along the Brazilian coastal area (six states). The extensively used octocrylene (2-ethylhexyl-2-cyano-3,3-diphenyl-2-propenoate, OCT) was frequently found in the samples investigated (21 out of 56) at concentrations in the range 89−782 ng·g^{-1} lipid weight. São Paulo was found to be the most polluted area (70% frequency of detection). Nevertheless, the highest concentration was observed in the dolphins from Rio Grande do Sul (42% frequency of detection within that area). These findings constitute the first data reported on the occurrence of UV filters in marine mammals worldwide.



INTRODUCTION

UV filters (UV F) are emerging environmental contaminants for which there is currently a lack of knowledge about their occurrence, fate, and effects on the ecosystems.[1] UV F constitutes a large and heterogeneous group of chemicals that are ingredients in personal care products to protect skin and hair from the sunlight, and in other industrial goods such as paint, wax, plastic, or textile to prevent photodegradation of polymers and pigments.[2]

These chemicals enter the aquatic environment either indirectly, via wastewater treatment plant effluents (urban and industrial) or directly, through human aquatic recreational activities. Previous studies have demonstrated the occurrence of UV F in water, sewage sludge, sediment, and biota.[3−6] Many UV F are lipophilic compounds, therefore have the potential for bioaccumulation and biomagnification in aquatic ecosystems through the trophic chain.[3] Works on biota were mainly focused on fish,[2,3,7,8] but other organisms have been studied as well, such as fish eating birds and aquatic invertebrates.[3] Several UV filters are known to have toxic effects on both aquatic and terrestrial organisms. Although the studies dealing with ecotoxicity of these compounds is scarce, they have been shown to act as environmental estrogens and antiandrogens, cause reproductive disruption and affect the thyroid axis.[9,10] So far, there is still even more limited information available about

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the fate and effects of these chemicals in marine ecosystems. High levels of multiclass UV F in seawater have been reported, with concentrations up to 799 ngL^{-1} of 4-methylbenzylidene camphor (4MBC).[11,12] Recently, it has been documented that UV F caused harmful effects on coral reefs (coral bleaching) by promoting viral infections.[13] As regards marine biota, the analysis of four benzotriazole UV stabilizers, namely UV-320, UV-326, UV-327, and UV-328, and the UV filter 4MBC in marine organisms from the Ariake Sea (Japan) revealed that the three benzotriazole stabilizers investigated bioaccumulated in all the species analyzed, from benthic invertebrates to several fish species, including the hammerhead shark.[14]

Among UV filters, octocrylene (2-ethylhexyl-2-cyano-3,3-diphenyl-2-propenoate, OCT) is of great concern since it is a highly lipophilic compound (log K_{ow} 6.88), stable, and resistant to sunlight degradation, but there is evidence that it can trigger the production of potentially harmful free radicals (reactive oxygen species) when it releases the absorbed energy. The widespread occurrence of this compound, as well as its high concentrations found in sewage sludge and sediments[4,5] appears to be associated with its extensive use in formulations, especially personal care products, because both protects in UVA and UVB regions, and augments the absorbing capacity of other organic UV filters, such as ethylhexylmethoxycinnamate (EHMC), avobenzone (AVB), and benzophenone-3 (BP3).[15] Since maintaining the absorption capacity is important to prevent erythema and to reduce the subsequent risk of melanoma development, formulations containing OCT had superior performance compared to other formulations that did not contain OCT, and therefore, preferably used.

The goal of the present study was to contribute for a better understanding of the impact of the increasing use of UV filters in densely populated coastal areas on marine organisms. The study aimed at demonstrating the potential for biomagnification of the extensively used sunscreen agent OCT on marine mammals, specifically on dolphin, since they occupy a higher trophic level in the marine food chain, and have relatively low metabolic activity, thus accumulating high levels of organic pollutants in their body.[16] For this study Franciscana dolphin (*Pontoporia blainvillei*) was the selected species. It is a small cetacean with a distribution restricted to the southwest Atlantic Ocean. This is the most impacted cetacean off the eastern coast of South America[17] and is listed as "vulnerable" in the Red Book of the International Union for Conservation of the Nature (IUCN). Franciscana was considered a species that needs particularly measures of conservation[18] and is also included in the Index II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, that Argentina, Uruguay, and Brazil are undersigned. Their coastal distribution makes it particularly vulnerable to human activities such as incidental capture in fisheries and habitat degradation by anthropic contaminants.[19−21] Evidences suggest that the mortality rates are excessive and unsustainable.[22]

EXPERIMENTAL SECTION

Chemicals and Reagents. OCT (>98% purity), and the isotopically labeled compound benzophenone-d_{10} (BP-d_{10} 99% purity), used as internal standard (IS), were obtained from Sigma-Aldrich (Steinheim, Germany). Organic solvents and HPLC grade water (Lichrosolv), as well as H_2SO_4, formic acid (98% purity) and hydromatrix were provided by Merck (Darmstad, Germany). Nitrogen and argon (purchased from Air Liquid, Barcelona, Spain) were of 99.995% purity. The syringe and the pressurized liquid extraction (PLE) cellulose filters used were purchased from Whatman (London, U.K.) and from Dionex Corporation (Sunnyvale, CA), respectively. Isolute Alumina Cartridges used for solid phase extraction (SPE) were obtained from Biotage (Uppsala, Sweden).

The OCT and BP-d_{10} stock standard solutions were prepared in methanol at 200 mg L^{-1}. The solutions were stored in the dark at −20 °C. A diluted 20 mg L^{-1} stock standard solution was prepared weekly. Working solutions were prepared daily by appropriate dilution of the diluted stock standard solution.

Sampling Area and Sample Collection. The Brazilian coastline has around 8500 km of length. The Southeast Brazilian region, historically, had turned into an important industrial center of Brazil. Rio de Janeiro and São Paulo States are the most anthropogenically disturbed areas along the country shoreline. Massive metropolitan complex surrounds the estuaries and bays, which have been receiving discharges of chemical contaminants from domestic, industrial and agricultural wastewaters besides also they are impacted by overfishing, harbor activities, and solid trash.[23,24] Santos estuary, in São Paulo coast, is the most important Brazilian example of environmental degradation from aquatic and atmospheric pollution by industrial origin. The largest harbor in Latin America (the Port of Santos) and the largest industrial complex in Brazil are located in this area. Industrial activities began in the 1950s with the establishment of diverse factories (steel, oil, and agribusiness) and have turned this estuary into the final destination for toxic waste and contaminated effluents since then.[25] See Figure 1 for a map of the study areas.

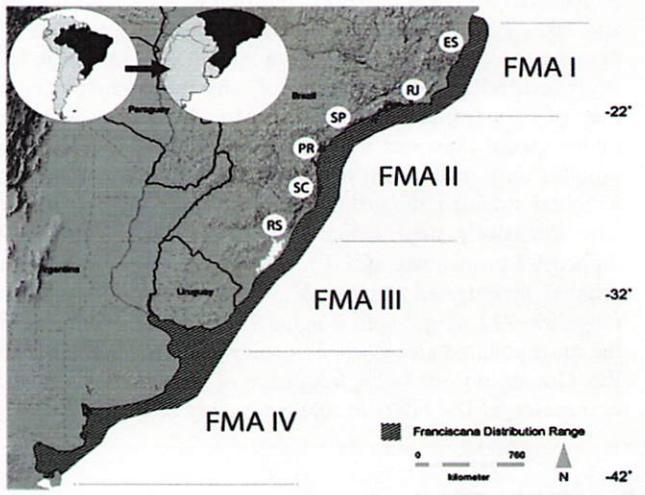

Figure 1. Study area map, Southeaster and Southern coast of Brazil. Brazilian States sampled: ES, Espírito Santo; RJ, Rio de Janeiro; SP, São Paulo PR, Paraná; SC, Santa Catarina; RS, Rio Grande do Sul; FMA, Franciscana Management Areas (I–IV).

Collected samples were taken from individual dolphins found stranded dead at the beaches or incidental caught in fishing nets along the Brazilian coast, Southwestern Atlantic, from 1994 to 2009. Available information on the samples is given in Table 1. Sexual maturity is known to occur at different length depending on the coastal area. The individuals considered in this study included males and females, adult (sexually matured), juvenile (sexually immature >100 cm length) and calves (sexually immature <100 cm length) specimens.

Table 1. Sampling Locations and Dates, Biological Information on the Dolphins Collected along the Brazilian Coast, And Concentrations of OCT in the Liver Samples[a]

location Brazilian State	sample code	sex	length	sexual maturity	physical maturity	sampling date (year)	concentration OCT (ng g^{-1} lw)
Espirito Santo (12) FT: 25%	PON 08	M	70	Im	Ca	2003–2006	nd
	PON 12	M	73	Im	Ca	2003–2006	**129**
	PON 11	M	100	Im	Ju	2003–2006	nd
	PON 02	M	112	Im	Ju	2003–2006	nd
	PON 13	M	113	Im	Ju	2003–2006	nd
	PON 06	M	114	Im	Ju	2003–2006	nd
	PON 14	M	115	Ma	Ad	2003–2006	nd
	PON 09	M	117	Ma	Ad	2003–2006	nd
	PON 07	F	109	Im	Ju	2003–2006	nd
	PON 15	F	115	Im	Ju	2003–2006	nd
	PON 03	F	118	Im	Ju	2003–2006	**89**
	PON 10	F	136	Ma	Ad	2003–2006	**712**
Rio de Janeiro (1) FT: 0% FT: 0%	RJ 46	uk	na	na	na	2003–2006	nd
Sao Paulo (10) FT: 70%	BP 125	M	100	Im	Ju	2006	**100**
	BP 120	M	103	Im	Ju	2005	nd
	BP 133	M	112	Ma	Ad	2006	**380**
	BP 149	M	116	Ma	Ad	2007	**144**
	BP 176	**M**	**122**	**Ma**	**Ad**	2008	**141**
	BP 110	M	124	Ma	Ad	2006	nd
	BP 108	F	94	Im	Ca	2006	**524**
	BP 113	F	110	Im	Ju	2006	**269**
	BP 151	F	138	Ma	Ad	2007	**130**
	BP 140	F	110	Im	Ju	2006	nd
Paraná (3) FT: 33%	PR 50	F	56.5	Im	Ca	2003–2006	**129**
	PR 53	F	98	Im	Ca	2003–2006	nd
	PR 01	F	140	Ma	Ad	2003–2006	nd
Santa Catarina (11) FT: 18%	PB 221	M	83.5	Im	Ca	2003–2006	nd
	PB 23	M	102	Im	Ju	2003–2006	nd
	PB 22	M	107	Im	Ju	2003–2006	nd
	PB 53	**M**	**87.3**	**Im**	**Ca**	2003–2006	**345**
	PB 62	**M**	102	Im	Ju	2003–2006	**401**
	PB 56	**M**	109	Im	Ju	2003–2006	nd
	PB 222	F	129	Ma	Ad	2003–2006	nd
	PB 30	F	133	Ma	Ad	2003–2006	nd
	PB 37	F	133.5	Ma	Ad	2003–2006	nd
	PB 162	uk	127.5	Ma	Ad	2003–2006	nd
	PB 44	uk	145	Ma	Ad	2003–2006	nd
Rio Grande do Sul (19) FT: 42%	CA 143	M	125.5	na	na	1997	nd
	CA 32	M	129.5	Ma	Ad	1994	nd
	CA 142	M	133.7	Ma	Ad	1997	nd
	CA 36	M	137	Ma	Ad	1994	**153**
	CA 156	M	137	Ma	Ad	1998	nd
	CA 172	M	143	Ma	Ad	1999	nd
	CA 152	F	107.5	Im	Ju	1998	**142**
	CA 63	F	135.5	Im	Ju	1994	nd
	CA 124	F	137	Im	Ju	1997	nd
	CA 153	F	na	na	na	1998	nd
	CA 33	M	131	Ma	Ad	1994	**473**
	CA 108	F	157	Ma	Ad	1995	nd
	CA 173	F	161	Ma	Ad	1999	**493**
	CA 179	M	110	Im	Ju	1999	**107**
	CA 193	F	116	Im	Ju	1999	**129**
	CA 194	F	123	Im	Ju	1999	**782**
	CA 234	M	103	Im	Ju	2000	**103**
	CA 237	M	132	Im	Ju	2000	nd

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Table 1. continued

location Brazilian State	sample code	sex	length	sexual maturity	physical maturity	sampling date (year)	concentration OCT (ng g^{-1} lw)
	CA 255	M	106	Im	Ju	2001	nd

"In parentheses, the number of samples analyzed, nd: not detected, uk: unknown, na: not available, FT: percentage of positive samples within the area, Ca: Calves, Im: immature, Ma: mature, Ju: juvenile, Ad: adult. Method limit of detection (MLOD) and method limit of quantification (MLOQ) are 23 and 75 ng g^{-1} lw, respectively. Total frequency: 100 × 21/56 = 38%, Calves: 100 × 4/7 = 57%

Fifty six individual were analyzed, belonging to many States of Brazil: Espírito Santo (n = 12), Rio de Janeiro (n = 1), São Paulo (n = 10), Paraná (n = 3), Santa Catarina (n = 11) and Rio Grande do Sul (n = 19). Liver samples collected were placed in aluminum foil, frozen, and further lyophilized. Freeze-dried liver tissue was ground, homogenized and stored in brown glass sealed containers at −20 °C until analysis.

Analytical Methods. In order to prevent contamination and photodegradation of samples and standard solutions all glassware used was previously washed and heated overnight at 380 °C, and further sequentially rinsed with different organic solvents and HPLC grade water. Separate solvents and only previously unopened packages of solvents, chemicals and other supplies were used. In addition, a set of at least two operational blanks were processed together with each batch of samples. Standard solutions and samples were always covered with aluminum foil and stored in the dark. Furthermore, gloves were worn during the sample preparation process.

Sample Preparation. Ssamples were extracted by PLE using an automatic extractor ASE 200 (Dionex Corporation, Sunnyvale, CA, USA). One gram dry weight of freeze-dried dolphin liver tissue was mixed in the extraction cells with hydromatrix. The PLE optimized parameters were as follows: preheating of 5 min, heating of 5 min, two extraction cycles of 10 min using dichloromethane/hexane as extraction solvent (1/1, v/v), temperature of 100 °C, pressure of 10 000 kPa, flush volume of 80% of cell and 90 s of nitrogen purge. The PLE extract obtained was concentrated to 3 mL and then subjected to a purification step via acid attack with concentrated H_2SO_4 (95−97% purity) (4 × 2 mL). The extract was purified by SPE with alumina cartridges (5 g/20 mL), using 40 mL of hexane:dichloromethane (1/2). Finally, the extract was evaporated to dryness. The residue was further reconstituted with 0.1 mL of acetonitrile and the IS was added before LC-MS analysis.

Lipid Content Determination. The lipid content determination was performed by gravimetric analysis. After the extraction, the extracts were concentrated to incipient dryness, each vial was weighed and the difference between the initial weighing and weighing after the addition and evaporation rate was used to calculate the percentage of lipids.

Percentage lipid content was determined for each individual. Mean values were calculated for those specimens sampled in the same geographical area, which were in the range 4% - 7%.

UPLC-ESI(+)-MS/MS Analysis. Target analysis of OCT was performed by ultrahigh performance liquid chromatography (UPLC)-tandem mass spectrometry (MS/MS) using an Acquity UPLC chromatograph attached to a triple quadrupole detector (TQD) mass spectrometer (Waters). A Hibar Purospher STAR HR R-18 ec. (50 mm × 2.0 mm, 2 μm) column (Merck) was used. The solvent flow rate was set to 0.4 mL min^{-1} and the column temperature was kept at 50 °C. The sample volume injected was 10 μL. The chromatographic separation was performed by using as mobile phase HPLC grade water (A) and acetonitrile (B), both with 0.3% formic acid. The adopted elution gradient started with 5% of eluent B, increasing to 95% in 1.20 min, kept constant for 2.30 min, and rising to 100% in the following 0.5 min. During the next 2.5 min the elution gradient was kept constant, and then back to initial conditions in 3 min.

MS/MS was operated in selected reaction monitoring (SRM) and positive electrospray ionization mode (ESI+). The optimized parameters were as follows: desolvation gas (nitrogen), 750 L h^{-1}; collision gas (argon), 0.19 mL min^{-1}, nebulization gas (nitrogen), 90 L h^{-1}; ion spray voltage 3.35 kV; source temperature, 130 °C and desolvation temperature, 450 °C. Two characteristic transitions of the protonated molecular ion $[M+H]^+$ (precursor ion) were recorded.

For the positive confirmation of OCT in liver tissue samples, strict criteria had to be met in order to avoid false positives. Following the European Commission Decision 2002/657/EC,[26] that although it was initially conceived for food residue analysis, it has been accepted by the scientific community for environmental analysis, a minimum of three identification points (IPs) is required for this purpose. In our case, these 3 IPs corresponded to the precursor ion (m/z 362 amu) and to the two transitions recorded from the precursor ion ($[M+H]^+$) to the product ions $[M+H-C_8H_{16}]^+$ and $[M+H-C_8H_{16}-H_2O]^+$ at m/z 250 and 232 amu, respectively. Besides, the chromatographic retention time of the analyte in the sample should not vary more than 2.5% in comparison to the calibration standards', and the relative abundance of the two SRM transitions monitored must also be compared to the standards' corresponding values, and range about ±20%. Figure 2 represents the chromatograms for OC corresponding to a standard solution at 40 ng mL^{-1}, and to a dolphin liver sample from an adult male from São Paulo. In this case, retention times were exactly the same and the difference in SRM ratios was solely 6%, and thus, confirming the identification

The described methodology probed to be precise and sensitive for the quantification of OCT in dolphin liver samples affording method limits of detection (LOD) and quantification (LOQ) of 23 and 75 ng g^{-1} lipid weight (lw), respectively, and a relative standard deviation of 9%.

RESULTS AND DISCUSSION

OCT Concentration in Liver Tissue. The analysis of the samples revealed that OCT was present in 21 out of the 56 samples analyzed (38% frequency of detection) with concentrations in the range 89−782 ng g^{-1} lw (see Table 1). These concentrations are notoriously higher than that reported by Balmer et al.[7] for OCT in lake fish (25 ng g^{-1} lw). This outcome was expected, as with other organic pollutants that bioaccumulate and biomagnify along the food chain, given the higher trophic level occupied by dolphins.

From the six sampling areas selected, Rio de Janeiro was one of the areas where we expected to find residues of the sunscreen because of its beach area with very active aquatic activities. However, in the only sample taken OCT was not detected. Despite that, we cannot rule out its presence in the area since

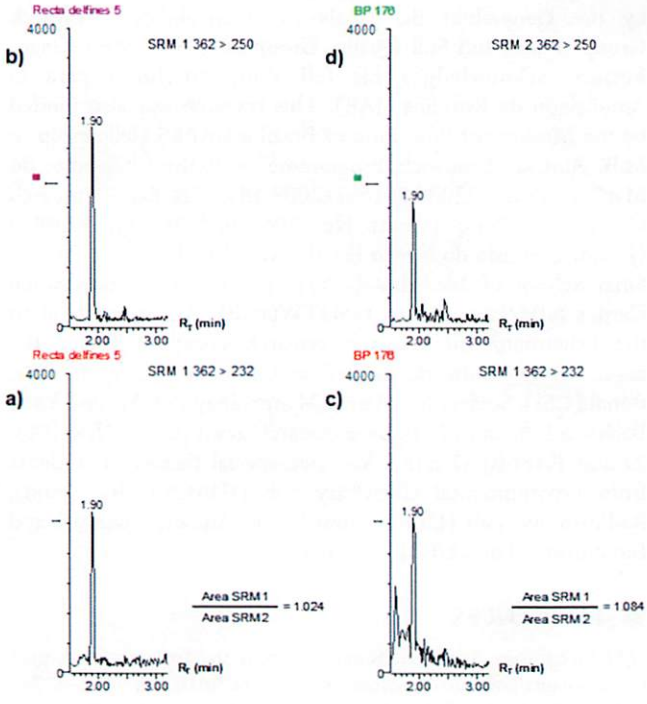

Figure 2. Reconstructed SRM reference chromatogram for OCT corresponding to a standard solution at 40 ng mL^{-1} (a and b), and a chromatogram corresponding to a dolphin liver sample from an adult male (sample code BP 176) from Sao Paulo (c and d).

we were only able to analyze one sample. In contrast, the most contaminated zone was São Paulo, where OCT was most frequently detected (70%), followed by Rio Grande do Sul, where the UV filter was observed in 8 out of the 19 dolphins sampled, and at the highest concentration, 782 ng g^{-1} lw. Nevertheless, the geographical distribution of positive samples, as depicted in Figure 3, indicated that the highest mean

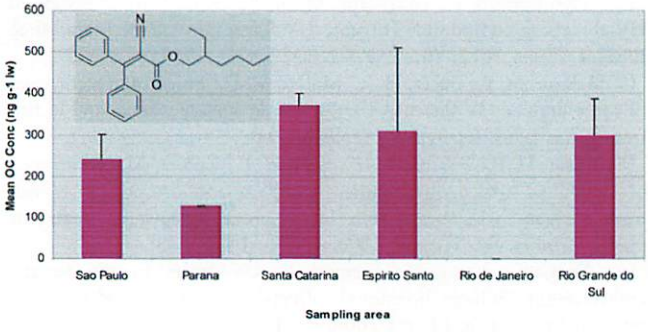

Figure 3. Distribution of OCT mean concentrations in dolphin's liver (ng g^{-1} Lw) and standard error, along the Brazilian coast sampling areas.

concentration (373 ng g^{-1} lw) was determined in the samples from Santa Catarina State. This sampling area is a partially enclosed estuarine receiving industrial and urban wastewater discharge, which could act as a sink for anthropogenic pollutants. In a recent study with polybrominated diphenyl ethers (PBDEs) in the same samples from this work, it was observed also the higher levels in the dolphins from this disturbed bay, in Santa Catarina.[20] Similar mean concentrations were reported for OCT and for the group of PBDEs. The comparison of the concentrations observed in the rest of areas evidenced a different source for OCT and PBDEs anthropogenic emissions. The geographical distribution of mean concentrations (ng g^{-1} lw) for OCT was: 373 (SC) > 310 (ES) > 298 (RS) > 241 (SP) >129 (PR), whereas for the group of congeners of PBDEs it was: 432 (SC) > 329 (SP) > 156 (PR) > 144 (ES) >37 (RJ) > 34 (RS).

From 1994 to 2009 there has been a steady growing use of UV filters as society has become aware of the dangerous effects of sunlight. These currently popular chemicals have shown to have a protective role against photoaging, photocarcinogenesis and photoimmunosuppression promoted by UV sun radiation.[27−29] Thus, potential temporal changes in the bioaccumulation behavior of OCT were also assessed taking into account the increasing use of sunscreen products. However, a direct correlation could not be identified.

Relationships Between OCT Concentration and Biological Characteristics. The inclusion of individuals with varying biological characteristics in this study provided an opportunity to examine contaminant liver tissue concentrations in relation to lipid content, sex, and physical and sexual maturity.

The trend of increased concentration in biota samples with increasing lipid content may be observed for a number of organic pollutants.[30] In an attempt to assess the behavior of the lipophilic UV filter, the correlation between liver lipid content and OCT concentration was evaluated, however, no correlation could be established based on these parameters (linear least-squares regression coefficient of 0.371). The reason for this differential behavior remains unclear.

Many studies have reported gender-specific differences in the concentrations of persistent organic pollutants in marine mammals, showing the well-known high variation in the burden of lipophilic pollutants of females due to reproductive stage.[20,31] Therefore, the potential correlation between sex and OCT concentration was also assessed. Different statistical tests were carried out, Pearson, Kendall, and Spearman. All they showed no statistical differences among OCT concentrations and gender. Significance values were: Pearson, 0.225; Kendall, 0.397; Spearman, 0.411.

Nevertheless, potential maternal transfer cannot be ruled out. In order to assess the mother-to-calf transfer of OCT, a sample of placenta from one pregnant female dolphin was collected and analyzed, revealing that OCT was present in both the placenta and the liver tissue at concentrations below LOQ (61 ng g^{-1} Lw semiquantitative analysis) and 130 ng g^{-1} lw, respectively (liver sample reference BP151 in Table 1) being indicative of gestational transfer. This hypothesis, however, cannot be fully confirmed without data on a higher sample size of pregnant female dolphins. However, it must be taken into account the great difficulty in obtaining this kind of samples. On the other hand, contamination data on breast milk could also support the maternal transfer, specifically lactation transfer, of the bioaccumulated OCT. This fact recently has already been characterized in humans. Reported levels of OCT in women breast milk were in the range 4.70−135 ng g^{-1} lw, with 67% frequency of detection.[32] This transfer was consistent with the OCT accumulation data obtained in the present study, where OCT was found in four out of the seven analyzed calves (57% frequency of detection) higher than the frequency estimated considering the complete set of individuals (38%), and at increasing concentrations (129−524 ng g^{-1} lw) as their length was greater. Nevertheless, it has to be highlighted that,

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obviously, the exposure pathways of human and dolphins are clearly different.

Biomagnification. Several studies have probed that biomagnification can occur for lipophilic organic contaminants. In addition to high concentration levels, the process that produce biomagnification also results in age (or length)-specific patterns for adult male marine mammal. A different pattern has been reported for adult female mammals despite being exposed to contamination similarly to males. During gestation and lactation contaminant body burden deceased by transfer to calves.[20,33]

In order to probe the potential biomagnification of OCT, a full trophic analysis of this compound must be accomplished. However, as lower trophic level organisms on these areas were not available, we tried to provide preliminary evidence by comparing our results with published data on the terrestrial food chain. To date solely one study reported data on UV filter biomagnifications. Fent et al.[3] recently investigated the accumulation in the terrestrial food chain of EHMC, an UV filter, having a similar lipophilicity (log K_{ow} 6.1) to that of OCT. The differences in EHMC concentrations in cormorant, fish and macroinvertebrates suggested a trend for biomagnification. Cormorants are migratory fish eating birds, representing a high terrestrial trophic level. Average concentrations of EHMC in five of these birds was 341 ng g^{-1} lw, with values in the range 16−701 ng g^{-1} lw, whereas decreased average concentrations were observed in lower trophic levels. This concentration range was comparable to that obtained for OCT in the present study (89−782 ng g^{-1} lw). It must be pointed out that cormorants are migratory birds with high metabolic capacity and whose exposure routes in the terrestrial environment are different from that of the dolphins of the present study, which are coastal and nonmigratory. Therefore, we cannot perform an accurate comparison between these two species.

In summary, these findings demonstrate for the first time that the extensively used sunscreen agent OCT accumulates in liver of dolphins at high concentration levels (up to 782 ng g^{-1} lw) similar to those of anthropogenic organic persistent pollutants. This study also provides evidence that maternal transfer may occurs trough placenta and likely also through breast milk.

The results presented herein suggest that OCT biomagnifies through the marine food web. In order to probe the biomagnification of this UV filter a full trophic level analysis of OCT will be further performed. The present study establishes the baseline levels for OCT in dolphins from Brazilian coastal waters. Efforts should be directed toward the analysis of other marine organisms to assess the impact of OCT as well as other extensively used UV filters and their transformation products on marine ecosystems.

AUTHOR INFORMATION

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Notes

The authors declare no competing financial interest.

ACKNOWLEDGMENTS

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County Clerk

From: Marty Baker <mbaker@hccmail.org>
Sent: Wednesday, December 15, 2021 5:19 PM
To: County Clerk
Subject: Written Testimony for Ms. Rainey Matthews

To whom it may concern,

I am writing on behalf of Ms. Rainey Matthews, who has informed me of her nomination to be a Commissioner on the Maui County Commission on Persons with Disabilities. Ms. Rainey was a staple in our community and with our church. She is an incredibly humble, personable, and knowledgeable advocate for persons with disability. She lovingly helped to educate, inform, and challenge those around her in ways that made us all desire to know better and do better. If you were to grant her the honor of this position, all those associated with her would only be grateful for the opportunity. She is a wonderful human being, and she makes the world around her better as well.

Please do not hesitate to reach out with any questions.

Marty Baker
Student/Family Minister
Heritage Church of Christ
C: (214) 232-6526

County Clerk

From: Ann Zadeh <annzadeh@gmail.com>
Sent: Wednesday, December 15, 2021 7:30 PM
To: County Clerk
Subject: Agenda Item #CR 21-137 Maui County Commission on Persons with Disabilities- Rainey Dock Matthews

Dear Maui County Council,

Knowing Rainey Dock Matthews personally and having worked with her both in her role as a member of the Mayor's Committee on Persons with Disabilities and a member of the Tarrant Transit Alliance in Fort Worth Texas, where I served in elected office as the City Council Representative for District 9 from 2014 until 2021, I can assure you that she will be an incredible member of the Maui County Commission on Persons with Disabilities. Her passion and dedication are unparalleled and her lived personal experience has only heightened her dedication to the work to improve the lives of those living with disabilities. Her experience in Fort Worth serving on the Mayors Committee on Persons with Disabilities provides her with experience that is aligned with the Mission and Vision of the Maui County Commission on Persons with Disabilities. You could not find a more perfect candidate for this work and you are lucky to have her. We truly miss her here in Fort Worth, Texas.

Sincerely,
Ann

Ann Zadeh, AICP
Executive Director, Community Design Fort Worth
https://www.designfortworth.org/

annzadeh@gmail.com
817 454 2112 (cell)
Ann Zadeh Personal Facebook

Ann Zadeh Public Facebook

Ann Zadeh Twitter

Ann Zadeh Instagram

County Clerk

From: Rachel Albright - TTA <rachel@tarranttransitalliance.org>
Sent: Thursday, December 16, 2021 5:02 AM
To: County Clerk
Subject: Letter of Support for Rainey Dock Matthews

Honorable Michael J. Molina, Committee Chair
Government Relations, Ethics, and Transparency
200 South High Street
Wailuku, Hawaii 96793

Dear Chair Molina:

I am writing today to give my overwhelming support on behalf of Rainey Matthews, serving as a commissioner on the Maui County Commission on Persons with Disabilities.

I met Rainey when the Tarrant Transit Alliance - a coalition focused on improving transit access in Tarrant County, Texas - began. Since then, she has been my mentor and greatest spokesperson for people with disabilities. She would give her time to speak in educational outreach programs about the relationship between transit and the differently-able and her time spent on our Board of Directors shaped our organization's focus and policies. I can not emphasize enough what an incredible asset she would be to the Maui community in serving this role.

Please do not hesitate to contact me with you would like additional information about Rainey. My information is in my signature below.

Sincerely,

Rachel Albright
President
The Tarrant Transit Alliance
She • Her • Hers

8179950374
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PO Box 470474, Fort Worth, TX 76147

Ke Ao Hāli'i
Save Hāna Coast

Council of the County of Maui
Agenda- Dec. 17, 2021

RE: J.1. County Communications NO. 21-560

Aloha Council Members: December 15, 2021

In 2018 members of the Hāna community came together to form Ke Ao Hāli'i (KAH, "protective blanket of clouds", save Hana coast) with a goal of establishing conservation status for the open space lands from Mokae to Maka'alae. The Hāna community and their supporters are now poised to have established conservancy for over 150 acres of contiguous, coastal lands.

Phase 1, Ke Ao Hāli'i's land conservation efforts started with the purchase of 27 acres at Mokae, overlooking Hāmoa Beach in 2020 with support from the State of Hawaii Legacy Land Conservation Program and Maui County's Open Space Fund. The Mokae parcel is now permanently designated as protected open space under a conservation easement co-held by Hawai'i Island Land Trust (HILT) and Maui County, and managed by KAH.

Phase 2, On November 30, 2021 Ke Ao Hāli'i completed purchase of an additional 30 acres from Hana Ranch Partners, with contributions from the State of Hawaii Legacy Land Conservation Program ($1.6 million), and Maui County's Open Space Fund ($1.5 million). Similar to the Mokae property, this land is now permanently protected by a conservation easement co-held by HILT and Maui County.

Phase 3, Ke Ao Hāli'i's next goal is acquisition of the 40 additional coastal acres at Mokae II, located between the Mokae lands acquired in 2020 and the recently acquired Maka'alae lands. The State of Hawaii Legacy Land Conservation Program and Maui County's Open Space Fund have awarded KAH the funds to complete this purchase, however, the State budget shortfalls limited the amount the actual funds available to complete this project by an amount of $669,300. Ke Ao Hāli'i is working to raise these remaining funds to complete the purchase in early 2022 and is asking for help from Mayor Victorino and the Maui County Council.

Phase 4, Upon completion of the third phase, Hana Ranch Partners has committed to donating 54 acres previously protected with conservation easements at Maka'alae (lands fronting Pōhakuloa and Opau Bays).

This final acquisition will establish over 150 contiguous acres of undeveloped open lands makai of Hana Highway from Haneo'o Road to Waiohonu Stream. These treasured lands will be the collective responsibility of Hana residents. The land is to be

Ke Ao Hāli'i
Save Hāna Coast

managed by Ke Ao Hāli'i with help of the Hāna community and supporting partners through the implementation of a land management plan intended to preserving the conservation values of the land.

I have included with this letter our Masterplan parcel acquisition spread sheet and a map; Mokae & Maka'alae Acquisition, indicating parcel groups and funding sources.

We ask that you please support to amend Appendix A, Part II of the FY 2022 budget as outlined.

Mahalo Nui Loa,

Robin Rayner,
Member
Ke Ao Hali'i Board of Directors

Ke Ao Hali'i - Save Hana Coast - Land Acquisitions

November 15, 2021

Funding Cycle	Land Parcels	TMK Numbers	Acres	Land Use	Asking Price	Appraised Value	Purchase Price	Maui County Open Space FD	State of HI LLCP	Other Donors	estimate time to completion
FY2019	Mokae Parcel I	(2) 1-4-010:004	27	AG	$3,000,000	$2,800,000 {$103,704}	$2,800,000	$726,879 * match-26%	$2,118,000 FY19	$0	Completed 3/20/2020
	Mokae/ Hamoa	(2) 1-4-007:001	1.316	AG	$0	$205,360	$0	$0	$0	$205,360	Completed 2020
FY2021	Maka'alae Parcel group	(2) 1-4-012:002 (2)1-4-010:030, 032 & 034	30.34	AG	$4,950,000	$3,081,700 {$109,750}	$3,081,700	$1,500,000 match-50%	$1,581,700 FY20 & 21	$71,000	Completed 11/30/2021
FY2021	Mokae II Parcel group	(2) 1-4-010:008 , 009 010 & 012	32.71	AG	$6,426,750	$3,763,300 {$115,051}	$3,763,300	$1,900,000 match-50%	$1,194,000 ** FY21	$740,000***	Pending 12/30/2021
FY2021	Kāki'o Parcel	(2) 1-4-010:014	7.02	AG	na	$338,500	$200,000	$200,000 match-59%	$0	$138,500	Pending 3/30/2022
	Maka'alae Conservation Lands	(2)1-4-010:033, 029, 028, 027 & 017 (2)1-4-012:001, 021 & 022	53.59	AG/C	$0	estimated $1,735,726 {$32,389}	$0	$0	$0	$1,735,726	at project Completion
TOTALS	Hana Maui		151.976		$0	$11,924,586	$9,845,000	$4,326,879	$4,893,700	$2,150,586	

NOTE: { } *indicate cost per acres*

** includes an additions $44,879 for closing costs*

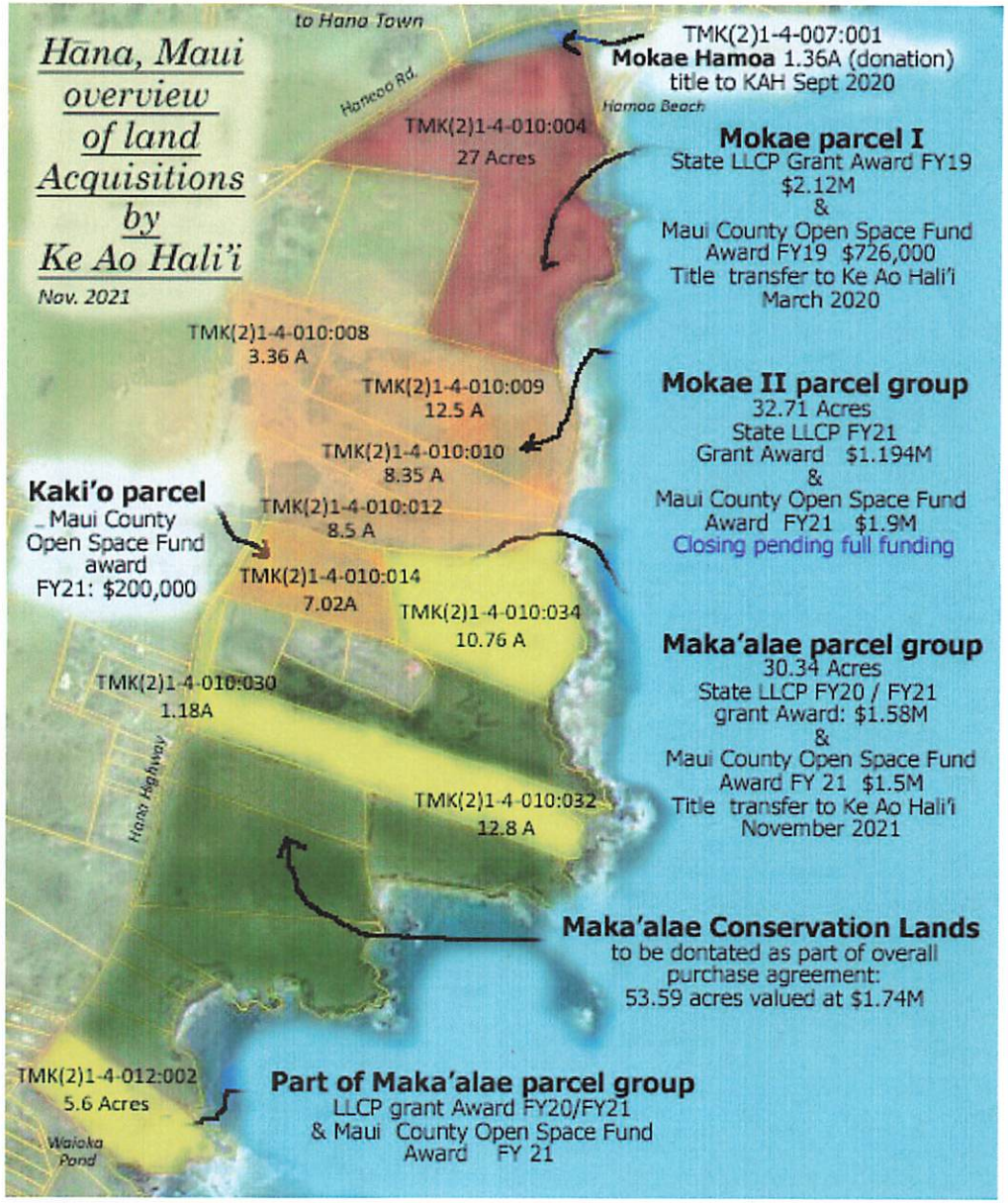
Mokae II Parcel group:

*** Full funding for this project; $1,863,300, was awarded by BLNR- LLCP, however State budget for LLCP FY21 fell short of the necessary funding by $669,300. Thus, $1,194,000 is all the funding availble for this project in LLCP FY 21 budget. Application for LLCP FY22 grant cycle has been submitted and will be reviewed late 2022*

**** includes $669,300 shortfall from LLCP Grant award FY21 + 71,000 due diligence*

KAH's fund raising efforts to meet the $669,300 shortfall to purchase the Mokae II Parcel group:

- $100,000 grant solicited by HILT and awarded to KAH for the purpose of completing the Mokae II purchase
- $18,679 from Legacy Land separate funding source to complete Mokae II
- $14,000 from KAH private funding effort, and still ongoing


Hāna, Maui overview of land Acquisitions by Ke Ao Hali'i
Nov. 2021
to Hana Town
Hamoa Rd.
Hamoa Beach
TMK(2)1-4-007:001
Mokae Hamoa 1.36A (donation)
title to KAH Sept 2020
TMK(2)1-4-010:004
27 Acres
Mokae parcel I
State LLCP Grant Award FY19
$2.12M
&
Maui County Open Space Fund
Award FY19 $726,000
Title transfer to Ke Ao Hali'i
March 2020
TMK(2)1-4-010:008
3.36 A
TMK(2)1-4-010:009
12.5 A
TMK(2)1-4-010:010
8.35 A
Mokae II parcel group
32.71 Acres
State LLCP FY21
Grant Award $1.194M
&
Maui County Open Space Fund
Award FY21 $1.9M
Closing pending full funding
Kaki'o parcel
Maui County
Open Space Fund
award
FY21: $200,000
TMK(2)1-4-010:012
8.5 A
TMK(2)1-4-010:014
7.02A
TMK(2)1-4-010:034
10.76 A
TMK(2)1-4-010:030
1.18A
Maka'alae parcel group
30.34 Acres
State LLCP FY20 / FY21
grant Award: $1.58M
&
Maui County Open Space Fund
Award FY 21 $1.5M
Title transfer to Ke Ao Hali'i
November 2021
Hana Highway
TMK(2)1-4-010:032
12.8 A
Maka'alae Conservation Lands
to be dontated as part of overall
purchase agreement:
53.59 acres valued at $1.74M
TMK(2)1-4-012:002
5.6 Acres
Waioka
Pond
Part of Maka'alae parcel group
LLCP grant Award FY20/FY21
& Maui County Open Space Fund
Award FY 21

Testimony of
Pacific Resource Partnership

City Council
Council of the County of Maui
Councilmember Alice L. Lee, Chair
Councilmember Keani Rawlins-Fernandez, Vice Chair

County Communication No. 21-556—Mayor, notifying of his veto of Bill 111 (2021), Draft 1

Friday, December 17, 2021
9:00 A.M.
City Council Chamber

Aloha Chair Lee, Vice Chair Rawlins-Fernandez, and Members of the Council.

Pacific Resource Partnership (PRP) is a non-profit market recovery trust fund which represents approximately 7,000 men and women union carpenters and 240 large and small contractors. With our expertise in research, compliance, marketing, and project advocacy, we are committed to building a stronger, more sustainable Hawaii in a way that promotes a vibrant economy, creates jobs, and enhances the quality of life for all residents of Hawaii.

PRP writes in strong opposition of Bill 11, Draft 1, and respectfully requests this Council uphold the Mayor's veto of this bill.

The proposed bill will further complicate and prolong the process of getting Maui's residents into affordable housing and likely increase the overall cost of housing units.

Affordable housing projects using government subsidies, including but not limited to Low Income Housing Tax Credits (LIHTC), are highly regulated by County, State, and Federal agencies. Agencies have specific requirements regarding tenant selection, financial qualifications, fair housing and accessibility. Adding an additional layer of regulation to the selection process and taking away the developer, its partners, or its management company's ability to establish a wait list is unnecessary and equates to more risk for the developer, tax credit investors, debt financiers, and private equity investors. This risk alone may deter developers from building affordable housing in Maui.

Moreover, the proposed amendments will put a heavy burden on the Department of Housing and Human Concerns (DHHC) to ensure that all County, State, and Federal regulations are followed in a timely manner. This will likely require DHHC to hire and retain more staff with experience in developing affordable housing, and require DHHC to invest in additional resources to deliver these new responsibilities. Furthermore, DHHC or its designee will likely be held liable for any errors occurring during the qualification process.

PRP
PACIFIC RESOURCE PARTNERSHIP

THE POWER OF PARTNERSHIP
WWW.PRP-HAWAII.COM
PHONE → 808.528.5557 1100 ALAKEA STREET / 4TH FLOOR HONOLULU / HI 96813 TWITTER: @PRPHAWAII WWW.FACEBOOK.COM/PACIFICRESOURCEPARTNERSHIP

(Continued From Page 1)
We are also concerned that changing the sales period from 90 days to 120 days will create additional carrying costs for projects thereby making housing more expensive.

We have witnessed and continue to see how Maui's overregulation of affordable housing projects have kept this county in its current housing crisis. We need to find new ways to incentivize developers to build more affordable housing before the problem gets worse. Given the above, we respectfully recommend that this Council uphold the Mayor's veto of this bill and consider policies that encourage the construction of more affordable housing.

Thank you for this opportunity to submit written testimony.

County Clerk

From: MICHAEL McGUIRE <mikemcguire87@msn.com>
Sent: Thursday, December 16, 2021 8:49 AM
To: County Clerk
Subject: Sunscreen Ordinance 5306

We strongly support Sunscreen Ordinance 5306. There are multiple stressors threatening the marine ecosystem, but this non-mineral sunscreen threat is something we can address immediately. FDA has placed these products in Non-GRASE until the sunscreen industry can prove their products are safe and effective. Non-Mineral sunscreen products have questionable effects on the health of humans and marine life.

The Precautionary Principle states that the burden of proof for potentially harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.

Let me know if you have any questions.

Mahalo

Michael and Deborah McGuire

County Clerk

From: Wendy Galasso <galwen53@gmail.com>
Sent: Thursday, December 16, 2021 9:17 AM
To: County Clerk
Subject: Sunscreen Ordinance Support

Aloha Maui County Council members,

I am in total support of Sunscreen Ordinance 5306 and the placement of unsafe products on the FDA Non-GRASE list.

I am a "Reef Teach" volunteer on Hawaii Island through the Kohala Center and feel that binding ordinances banning unsafe sunscreen products should be enacted to help our marine and other ecosystems become healthy again and maintain such health into the future.

I am so glad that Maui is leading the way on this issue and hope that your actions will show the rest of the state and country that we are all united in the protection of our ecosystems and the health of our residents and visitors.

Mahalo,

Wendy Galasso

County Clerk

From: Ron Lucey <Ron.Lucey@gov.texas.gov>
Sent: Thursday, December 16, 2021 10:32 AM
To: County Clerk
Cc: 'Rainey Dock Matthews'
Subject: Agenda Item # - CR 21-137Support for Appointment of Ms. Rainey Dock Matthews to serve as the mayoral nominee for the Maui Commission on Persons with Disabilities

Chair Molina and Committee Members:

My name is Ron Lucey. I serve as the Executive Director of the Texas Governor's Committee on People with Disabilities (GCPD) in Austin Texas. Last month I wrote in support of the appointment of Ms. Rainey Dock Matthews to serve as the mayoral nominee for the Maui Commission on Persons with Disabilities. I understand a final confirmation vote is scheduled for December 17th. I highly recommend Ms. Mathews confirmation for your committee's vacancy. Ms. Matthews formerly served as the Chair of the Fort Worth Mayors Committee on Persons with Disabilities. In her role as chair the GCPD had an excellent working relationship with her and we found the Fort Worth Mayor's Committee on People with Disabilities to be among the most active and successful committees across our state. The success of the committee was due in large part to Ms. Rainy Matthew's outstanding leadership of this committee. Her passionate support of people with disabilities is balanced by her pragmatic and respectful approach to public service. Her lived experience as a woman with a disability and professional knowledge of public accommodations, including accessible transportation, voting, pedestrian infrastructure, and accessible recreation programs and facilities will serve your community well as you work towards the full inclusion of individuals with disabilities in the economic and social life of Maui. Please contact me if I can answer any additional questions about this outstanding nominee.

Respectfully,

Ron Lucey
Executive Director
Texas Governor's Committee on People with Disabilities
P.O. Box 12428
Austin TX 78711
(512) 463-5742
(737) 701-6976 Cell
ron.lucey@gov.texas.gov
http://gov.texas.gov/disabilities/
Sign up for our Gov Delivery Bulletins on Disability Issues:
https://public.govdelivery.com/accounts/TXGOV/subscriber/new

County Clerk

From: VINCENT J CARR <fishnirish@bellsouth.net>
Sent: Thursday, December 16, 2021 10:36 AM
To: County Clerk
Subject: Ordinance 5306

You don't often get email from fishnirish@bellsouth.net. Learn why this is important

Aloha Maui County Council Members,,
I strongly support Sunscreen Ordinance 5306. Of course there are many stressors that threaten the marine ecosystem. This measure is but one step that is needed to avoid future damage. The non-mineral sunscreen threat can easily be addressed right now by this ordinance.
I am a volunteer on a beach where we interact with visitors daily that are interested in lessening their impact on the marine environment while they enjoy the beauty of our Hawaiian waters and marine life. Whenever we discuss sunscreen I hear a common refrain: "Oh yes, we have "reef-friendly" sunscreen. I waited until we got to Hawaii to purchase sunscreen because I knew that they would only be selling the proper products". Unfortunately, that is not the current reality. Ordinance 5306 will help these people accomplish their goal of minimizing their impact on the marine environment. Please enact and enforce Ordinance 5306.
Mahalo,
Vince Carr

County Clerk

From: Ellen B. McKinley
Sent: Thursday, December 16, 2021 1:15 PM
To: County Clerk
Cc: Kelly King; Axel I. Beers
Subject: CC 21-557
Attachments: Reef-Safe Sunscreen Report.pdf; Bill 135 Comments December 16 2021.pdf

Ellen McKinley, Executive Assistant
Office of Councilmember Kelly T. King
South Maui Residency
Office: 808.270.7108
200 South High Street, 8th Floor, Wailuku HI 96793
http://mauicounty.us/

Now is the time to provide input to update the South Maui Community Plan! https://southmaui.wearemaui.org/get-involved/

we are SOUTH MAUI

In support of New Sunscreen Law: Bill 135 (2021)/Ordinance 5306

As noted by Mayor Victorino in his comments to the Council of the County of Maui (paragraph below), removing toxic sunscreens from the environment (aquatic and terrestrial) is merely the "first step" in the process to address the global threats to coral reefs. Increases in the amounts and/or even maintaining the existing levels of ocean temperatures, carbon dioxide, plastics, stormwater runoff and in general "chemical pollution" from sunscreens and other toxic chemicals will only continue to have disastrous effects to Hawaii's and the World's marine ecosystems.

> *"Finally, while I applaud the Council's efforts in attempting to reduce threats to our marine ecosystems, coral reefs face graver dangers through increasing ocean temperatures and levels of carbon dioxide in seawater, and increasing levels of trash and micro-plastics from improper disposal and stormwater runoff. Without addressing these types of global threats to coral reefs, our marine ecosystems will still continue to face an uphill battle."*

So, with that said I applaud you and the Mayor for recognizing that coral reefs are endangered and for taking the "first step" to remove toxic substances like organic sunscreens from Hawaii's waters protecting coral and all that live within the reef. Additionally, I want to encourage you to continue to remove/remediate other toxic chemicals/environmental conditions that exist in order to bring back Hawaii's natural resources and return these precious assets back to the people.

National Academy of Sciences "Expert Panel" Sunscreen Review:

Industry has been telling the American people - for at least the last 100 years - that there is no impact of toxic chemicals to humans and/or the environment despite the thousands of scientific papers published demonstrating that this is untrue. Industry has always claimed that the chemical(s) in question only benefit us, making our lives better! Based on the state of our environment and the trail of dead bodies (human and non-human alike), it is obvious that "industries benefits" of a better life are unseen.

Case in point would be the lobbyist group Public Access to SunScreens (PASS) Coalition. This group boosts of successfully lobbying the Congress of the United States to fund the Environmental Protection Agency (EPA) to fund the National Academy of Sciences (NAS) – who has been known to take "Millions in Gifts From Drugmakers" (sunscreens are classified as drugs) (https://khn.org/news/article/national-academies-big-pharma-support-drug-waste-report/) to put together a panel of "biased" experts (see attached letter sent to NAS as well as several US government representatives) to come to a conclusion that the Food & Drug Administration (FDA) and the National Oceanic and Atmospheric Administration (NOAA) has

already made relating to the human and environmental toxicity of organic sunscreen chemicals (see official views below). Therefore, it is unclear what benefit the NAS panel's version of science has on anything when it is announced in September 2022.

FYI … FDA is responsible for Human Health & Safety and NOAA is responsible for U.S. National Marine Sanctuaries; the EPA and/or NAS have no jurisdiction directly related to sunscreen regulations for humans or environmental impact to coral reefs. Therefore, whatever conclusion this bogus panel concludes has little to no legal impact on what has already been determined by the responsible agencies – the NAS is simply a pawn used by industry lobbyists – like the PASS Coalition and others - to prolong the removal of toxic sunscreen chemicals from our bodies and the environment - to maintain billions in profits from sunscreen and anti-aging product sales.

FDA's Official View - https://www.fda.gov/media/124655/download: *On February 21, 2019, FDA issued a proposed rule describing the conditions under which FDA proposes that OTC sunscreen monograph products are generally recognized as safe and effective (GRASE) and not misbranded.*

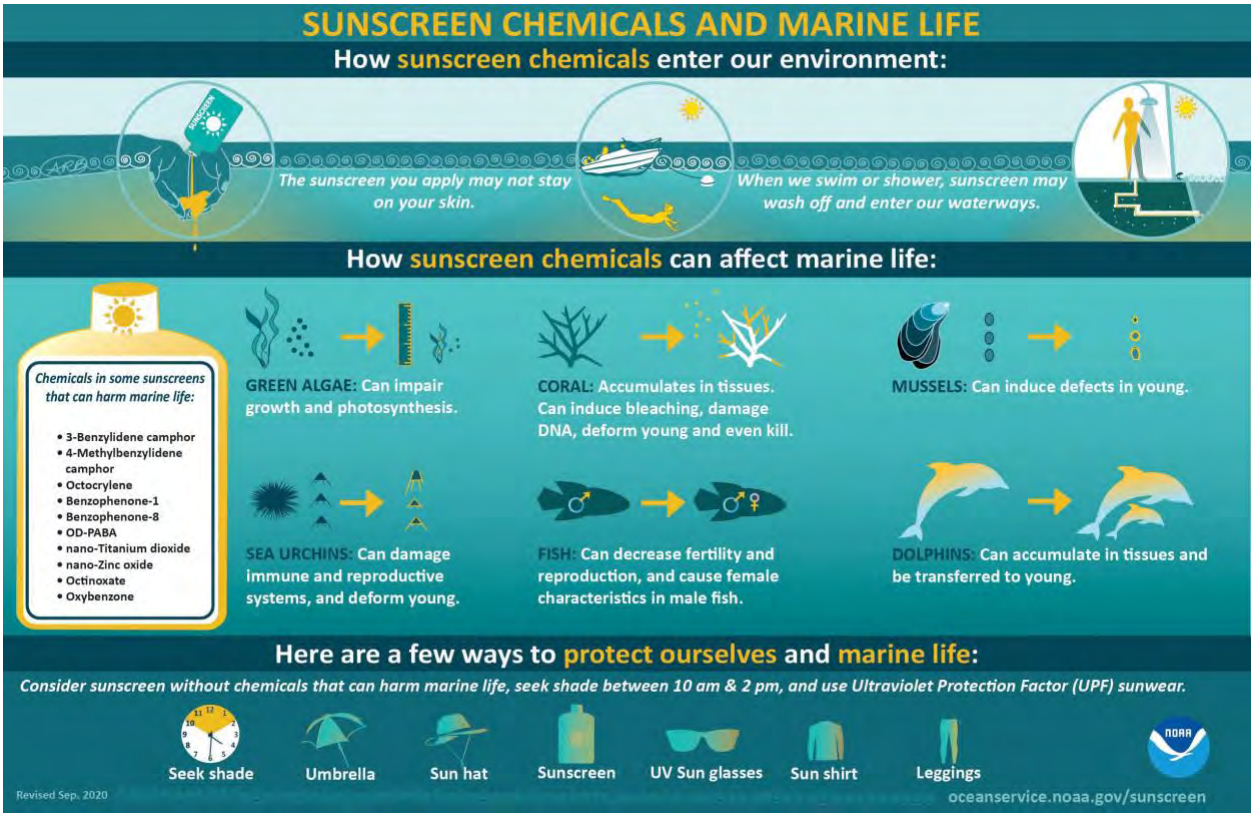
This action is an important example of FDA's ongoing efforts to ensure that sunscreens are safe and effective for regular, life-long use. The agency anticipates these changes will improve the quality, safety, and efficacy of sunscreens Americans use every day. FDA will continue to work with industry and public health stakeholders to make sure that consumers have access to safe and effective sunscreens.

1. Proposed GRASE Status of Active Ingredients Listed in the Stayed 1999 Final Monograph
FDA has proposed the following categories for the 16 sunscreen monograph ingredients.

GRASE* for use in sunscreens	***Not GRASE** for use in sunscreens***	****Insufficient data for use in sunscreens***
Zinc oxide and titanium dioxide	***Aminobenzoic acid (PABA) and trolamine salicylate***	***Cinoxate, dioxybenzone, ensulizole, homosalate, meradimate, octinoxate, octisalate, octocrylene, padimate O, sulisobenzone, oxybenzone, avobenzone***

**GRASE= Generally Recognized as Safe and Effective **These ingredients are not currently marketed. ***For those ingredients in the "insufficient data" category, FDA proposes that it needs additional data to determine that sunscreens with these ingredients would be GRASE.*

NOAA's Official View - https://oceanservice.noaa.gov/news/sunscreen-corals.html: *Common chemicals used in thousands of products to protect against harmful effects of ultraviolet light threaten corals and other marine life.*



The above comments are based on my experience with product development, regulatory compliance as well as pre-clinical and clinical safety testing with some environmental testing of OTC sunscreen actives and formulations dating back to 1976.

Mahalo,
Joe DiNardo – Toxicologist
December 16, 2021

Reef-Friendly or Reef-Safe?

An Assessment of the Availability and Use of Reef-Safe Sunscreen on the Island of Maui, Hawai‘i

December 2021

KiheiCharter.org
Innovative 21st Century Public Education

MARINE INSTITUTE
MAUI OCEAN CENTER

Contents

BACKGROUND

In 2018, Governor of Hawai‘i, David Ige, signed Senate Bill 2571 into law, making Hawai‘i the first state to ban the sale and distribution of sunscreens containing oxybenzone octinoxate (Speight, 2020).

The Food and Drug Administration considers the only active ingredients in sunscreen to be safe and effective are zinc oxide and titanium dioxide, two of the main ingredients in mineral-based sunscreen. Laboratory trials found that zinc oxide and titanium dioxide do not cause coral bleaching or toxicity (Adler, et al., 2020). However, environmental scientists and health experts are concerned about chemicals like avobenzone, octocrylene, homosalate, and octisalate that are often used to substitute oxybenzone and octinoxate. Danovaro et al. (2008) found that sunscreens containing these ingredients cause the rapid and complete bleaching of hard corals, even at extremely low concentrations.

Research demonstrates that octocrylene can disrupt human hormones and have toxic impacts on the brain and reproductive health of a variety of aquatic organisms. Downs et al., (2021) show that octocrylene bioaccumulates in fish species and degrades into benzophenone, a powerful carcinogen, reproductive disruptor, and herbicide.

Avobenzone is also an endocrine disruptor and can reduce coral resilience against the high ocean temperatures that are threatening corals worldwide due to global warming (Downs, 2021).

The Maui County Council unanimously passed Bill 135 on November 19, 2021, to prohibit the sale, distribution, or use of non-mineral sunscreens. Bill 135 recognizes that a number of non-mineral sunscreens have recently been demonstrated to pose a threat to the health of coastal ecosystems, coral reefs, and other marine species.

All members involved in this study submitted written testimony in support of Bill 135. Once signed into law, Bill 135 will take effect on October 1, 2022.

One limitation to legislation is enforcement since visitors to Maui often bring non-mineral-based sunscreens from other states or countries. Therefore, education and outreach will be vital to reducing the use of non-mineral-based sunscreens.

All sunscreen products surveyed met Hawai‘i's legislative standards; however, just 82, out of the 210 sunscreen products surveyed, are **reef safe**.

FREQUENTLY USED TERMS

Table 1. Sunscreen categories and descriptions, November 2021.

Sunscreen	Description
Reef-Safe	Contains only mineral UV-blocking ingredients
Reef-Friendly	Does not contain oxybenzone or octinoxate ***(does contain other chemical-based ingredients)***
Reef-Conscious	Does not contain oxybenzone or octinoxate ***(does contain other chemical-based ingredients)***
*Toxic	Contains oxybenzone or octinoxate ***(identified as *Toxic)***

Figure 1. Coral fragments, MOC Marine Institute coral lab, Maui, Hawai‘i. November 2021. Photo: MOC Marine Institute

PURPOSE

This report is the result of an independent investigation to serve the community of Maui, Hawai‘i, to protect coral reefs and marine ecosystems, and inspire the next generation of environmental stewards. We intend for this report to remain free and accessible.

The purpose of the project was to:

1. Gain insight into the public’s current understanding and awareness of the non-regulated terms, **reef-safe** and reef-friendly
2. Increase public awareness of the critical distinction between the terms **reef-safe** and reef-friendly
3. Investigate the accessibility of **reef-safe** sunscreen products available to consumers in Maui, Hawai‘i
4. To engage 7th-grade students in hands-on research related to an environmental issue impacting local coastal ecosystems.

STUDENT LEARNING OBJECTIVES

Using quantitative and qualitative methods, students learn how to conduct in-the-field research focused on the impacts of human behavior on Hawai‘i’s fragile coastal ecosystems. This project centers on the question*, how does engaging youth in place-based science focused on a local ecological issue shape their attitudes, behaviors, and beliefs about these topics?*

Figure 2. 7th-grade students from Kihei Charter School learn how to measure and monitor water quality at MOC Marine Institute, November 2021. Maui, Hawai‘i.
Photo: MOC Marine Institute

PROJECT TEAM

Kīhei Charter School
Jadda Miller, 7th-grade Science Teacher

MOC Marine Institute
Thomas Cutt, Executive Director
Chanel Browne, Sea Turtle Program Coordinator

Stanford University
Dr. BJ Fogg
Behavior Design Lab

Kīhei Charter School
Student Participants:
Aiden Acerador, Chase Amouyal, Jia Ray Li Angel, Luz Arnal, Slade Auffhammer, Derek 'Kaikea' Barona, Evan Bearden, Conner Beaver, Noa Clayton, Lee Cowles, Andre Cerezo, Makani Cogliandro, Brodrick Craig, Jayden Craig, Nicole Critchlow, Jordyn Diego, Sedona Dressler, Annalise Eller, August Eyerman, Noa Fleming, Arayanna Foster, Hana Freet, Miri Glickman, William Greenleaf, Maxwell Gregory, Madilyn Hays, Eli Hazlet, Ava Herren, Brayden Hill, Mason Hu, Cross Huey, Jacob James, Liliu Kaahumanu, Tanya Kari, Parker Kahoohanohano, Austin Kriegh, Andrew Kohl, Isabella Kusch, Ava Larson, Ethan Luckau, Myer Madaus, Ciro Martin, Yona Martin, Fayez Menasra, Noa Moscovich, Lillian Murta, Nainoa Obrochta, Austin Olson, Kingston Palebianco, Hope Patterson, Justin Pe Benito, Sophia Peterson, Mikaela Petrilli, Vienna Phillips, Mason Pinheiro, Gershon Portillo, Mia Rafael, Brandon Ramirez, Adam Ramos, Brandon Ramos, Peytin Robinson, Kevin Rodriguez Velador, Jessica Rosado, Isabella Shiffler, Waiaulia Smith, Miranda Somers, Kaitlyn Tiwari, Wyatt Van der Lee, Desmond Wallace, Maia West, Hannah Wick, Bodhi Williams

MOC Marine Institute
Student Participant:
Harley-Ann Smith

Special Recognition

Jessica Rosado is one of the 7th-grade students that attends Kīhei Charter School who participated in this research project. We give special recognition to Jessica as she went beyond the expectations of a student participant on numerous occasions. Jessica consistently achieves excellence in her work and her support throughout this project was invaluable.

Has this project inspired you to learn more and do more to protect coral reefs?

"Yes, it has. I want to make a difference and help our planet. I care so much about animals and saving the planet, so I'm really glad that I got to learn about how the sunscreen that we use can impact future generations. I want to continue making this place better." – Lili'u Kaahumanu, 7th grade

Photo: Kihei Charter School

METHODS

Beachgoer Interviews
The project team surveyed one-hundred beachgoers to learn about sunscreen use and the factors that influence purchasing decisions. We asked the following questions:
1) What type of sunscreen are you using today?
2) Where did you purchase your sunscreen?
3) What factors influenced your purchasing decision?
(See full list of interview questions in appendix B).

Each student interviewer was paired with one adult researcher. Students asked beachgoers the survey questions and completed the digital data collection form. Having the students complete the form made the interview process less demanding for beachgoers and possibly increased the participation rate.

Retail Store Surveys
Students surveyed 17 stores and 210 different sunscreen products across the island of Maui from September to October 2021. The students collected in-store data on available sunscreen products. They noted if products met Hawai‘i's legislative designation and if the products were **reef-safe** (mineral-based). The team selected the surveyed stores due to their high visitation rate, accessibility, and proximity to the ocean. The project team analyzed each store based on the number and percent of sunscreen products sold that 1) Met Hawai‘i legislation guidelines and 2) Are considered **reef-safe** (mineral-based).

Figure 3. Students from Kihei Charter School interview beachgoers about sunscreen use, November, 2021. Maui, Hawai‘i. Photo: MOC Marine Institute

How did you feel when you found out that the Maui County Council passed Bill 135?

"I felt very rewarded and very happy. It is one of those feelings when you're proud to be part of something." – Jessica Rosado, 7th grade

Photo: MOC Marine Institute

100
beachgoers interviewed

20%
using reef-safe sunscreen

96% of interviewees were visitors to the island of Maui

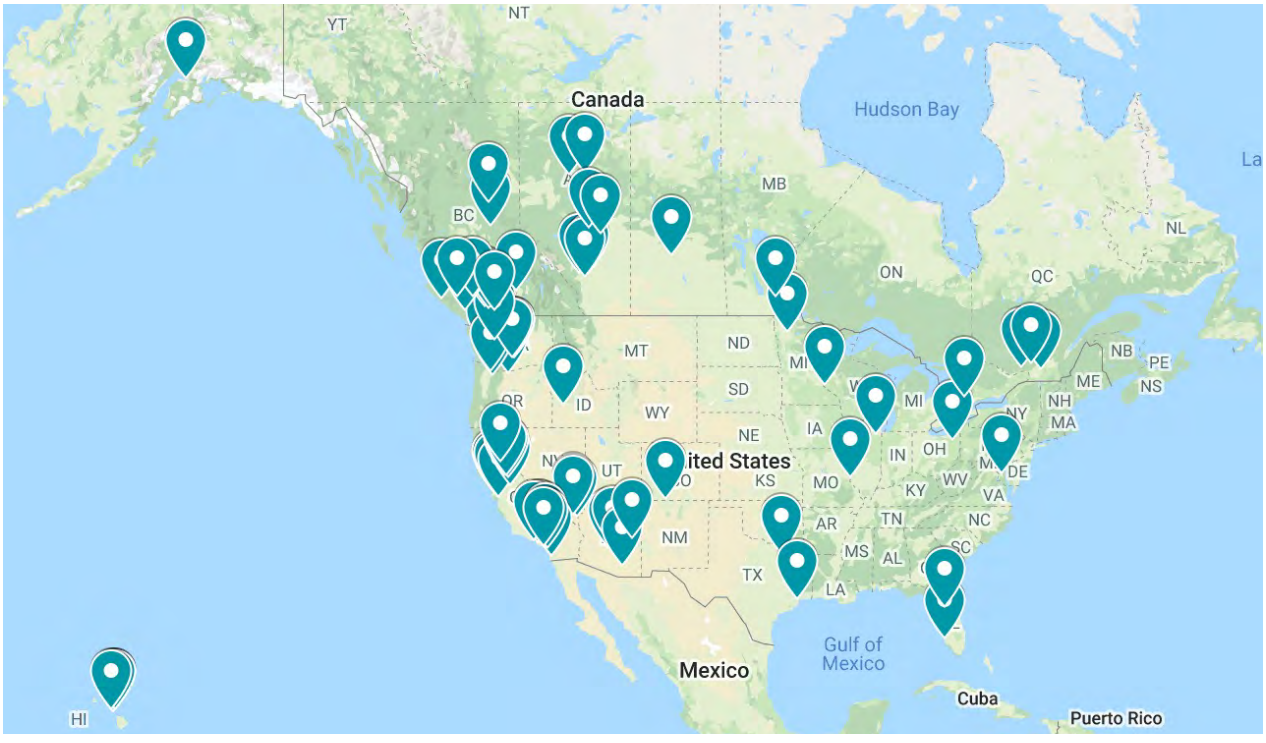


Figure 4. Map displaying home zip codes and postal codes of beach goers interviewed, November 2021.

45% did not purchase their sunscreen on Maui

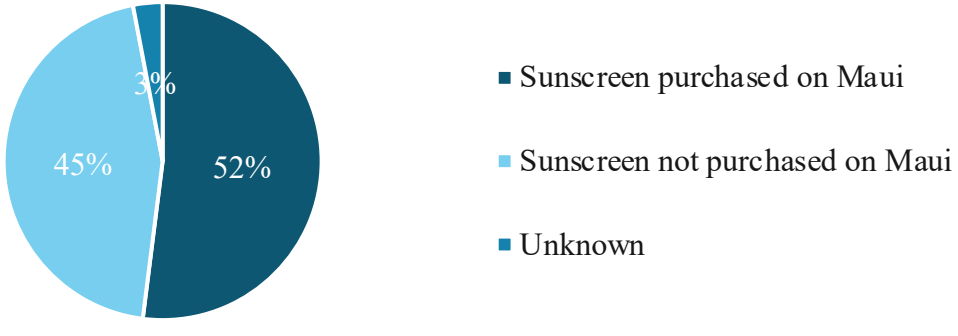


Figure 5. 45% of beachgoers interviewed did not purchase their sunscreen products on Maui, November 2021.

35% of the beachgoers interviewed purchased their sunscreen because they believed it was **reef-safe**

Table 2. Sunscreen categories and descriptions, November 2021.

Sunscreen	Description
Reef-Safe	Contains only mineral UV-blocking ingredients
Reef-Friendly	Does not contain oxybenzone or octinoxate ***(does contain other chemical-based ingredients)***
Reef-Conscious	Does not contain oxybenzone or octinoxate ***(does contain other chemical-based ingredients)***
*Toxic	Contains oxybenzone or octinoxate ***(identified as *Toxic)***

***Toxic:** Does not meet Hawai'i's 2021 Legislation (contains oxybenzone or octinoxate).

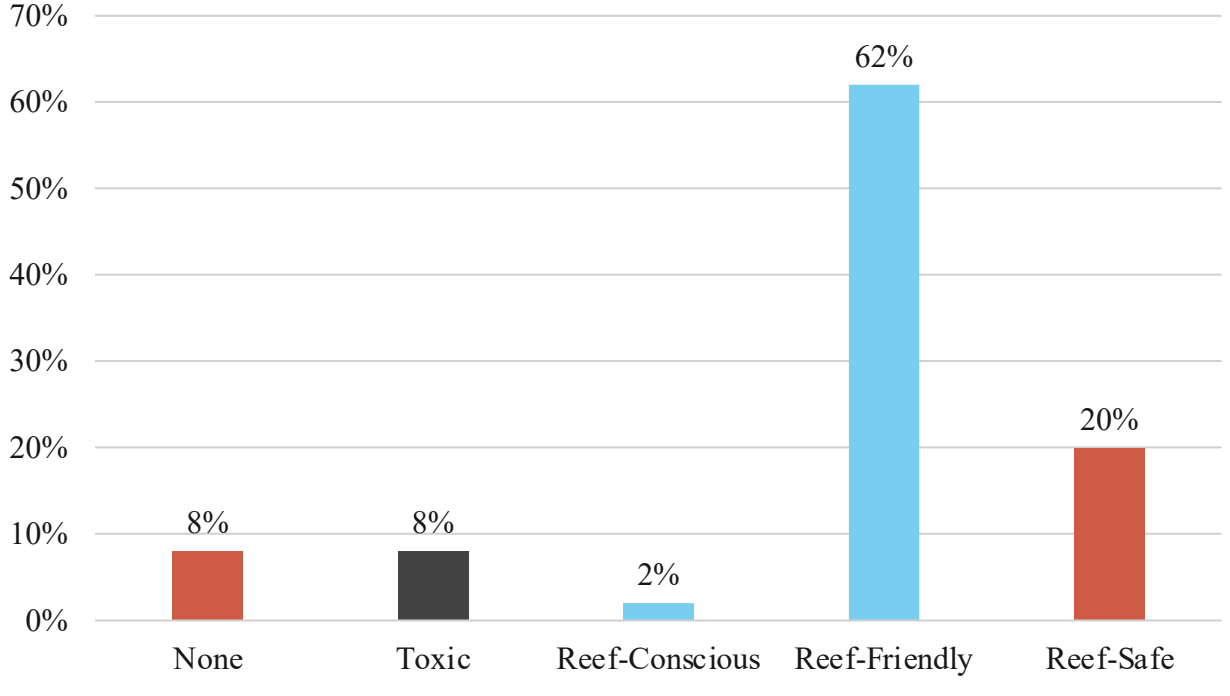


Figure 6. Percent usage of sunscreen products by interviewees, Maui, Hawai'i. November 2021.

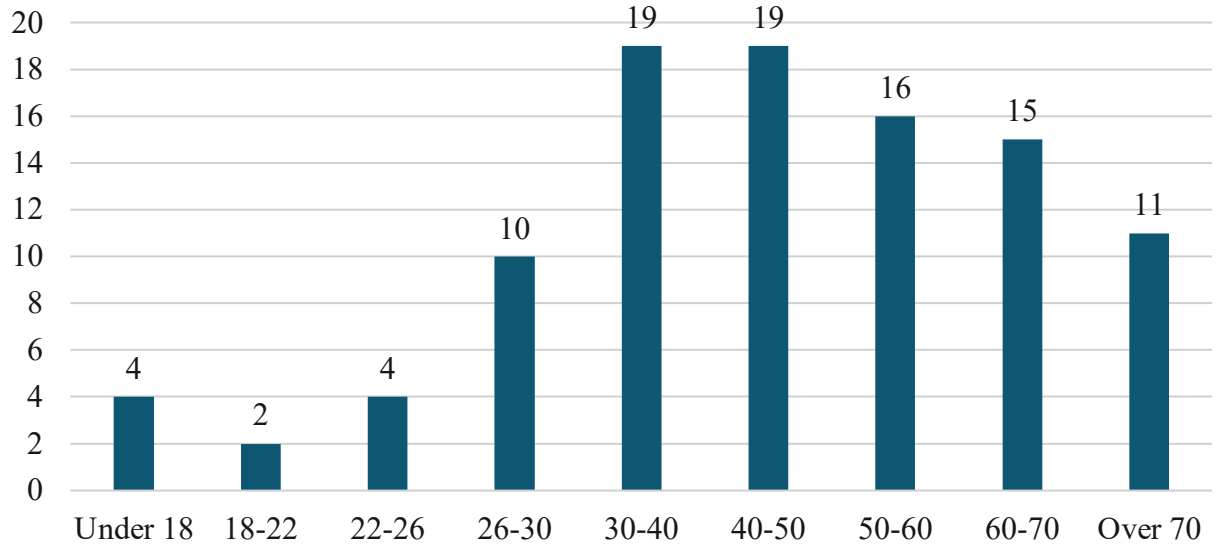


Figure 7. Age range of beachgoers interviewed, November 2021. Maui, Hawai‘i.

Table 3. Age range of beachgoers interviewed and type of sunscreen, November 2021. Maui, Hawai‘i.

Age Range	Reef-Safe	Reef-Friendly	Reef-Conscious	*Toxic	None
Under18	1	2			1
18-22		2			
22-26		2		1	1
26-30	1	9			
30-40	5	10	2		2
40-50	4	14		1	
50-60	4	9		2	1
60-70	2	8		2	3
Over 70	3	6		2	

How did you feel when you found out that the Maui County Council passed Bill 135?

"I felt proud that we did something that could help preserve the coral reefs around Maui and hopefully lead other islands and cities to do the same."
– Hana Freet, 7th grade

Photo: MOC Marine Institute

SUPERMARKETS / GROCERY STORES

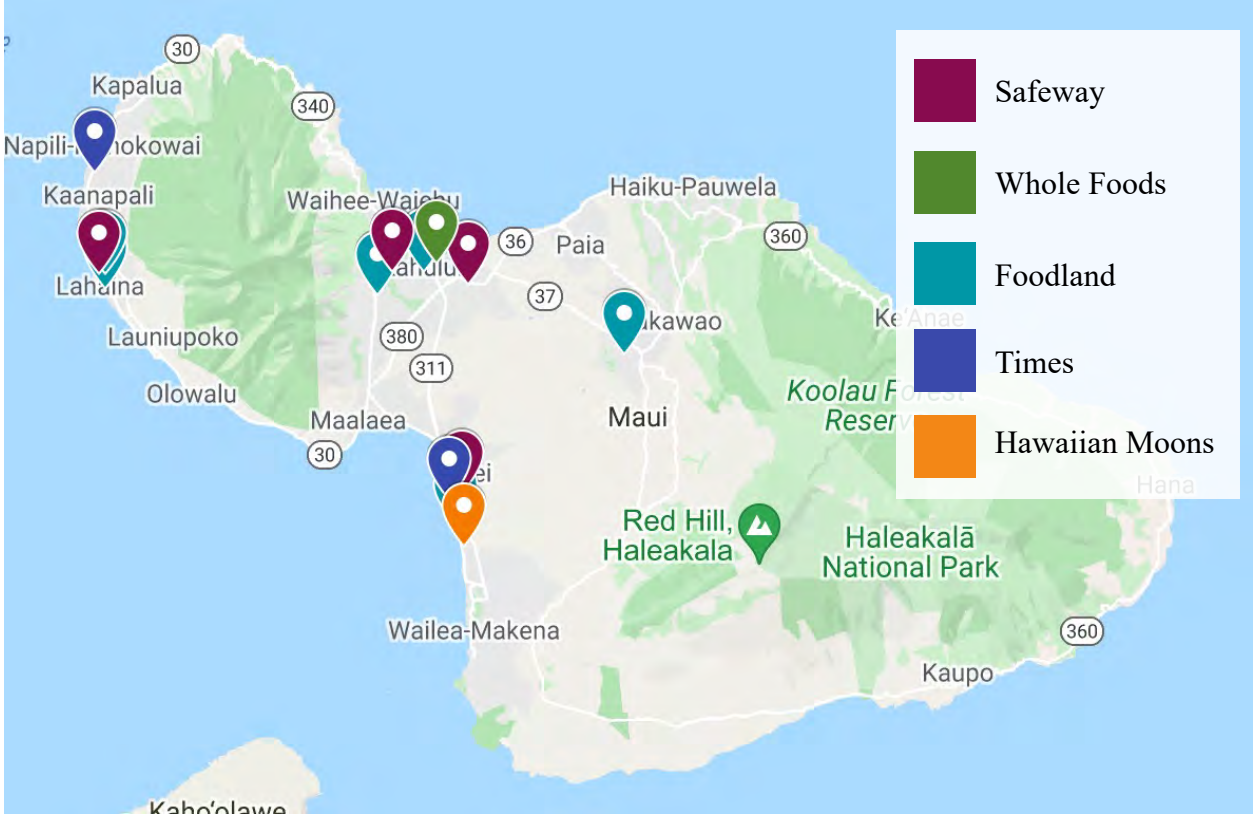


Figure 8. Map of supermarkets/grocery stores surveyed, November 2021. Maui, Hawai‘i.

SAFEWAY

There are 4 Safeway locations on the island of Maui, Hawai‘i. At the time of this survey, Safeway sold 45 different sunscreen products. 100% of the sunscreen products sold at Safeway meet 2021 Hawai‘i Legislation. 15.5% (n=7) of the sunscreen products sold at Safeway are **reef-safe**.

Safeway, Maui Locations:

58 Maui Lani Parkway Suite 5000
Wailuku, Hawai‘i 96793

1090 Ho‘okele Street
Kahului, Hawai‘i 96732

1221 Honopi‘ilani Highway
Lahaina, Hawai‘i 96761

277 Pi‘ikea Avenue
Kihei, Hawai‘i 96753

SAFEWAY

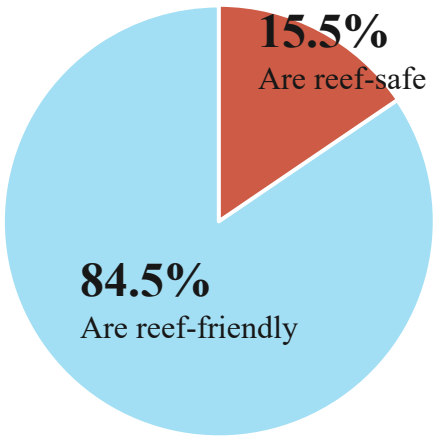


Figure 9. Safeway locations on Maui sell 45 different sunscreen products. 15.5% (n=7) of the sunscreen products sold at Safeway Maui locations are **reef-safe**.

Figure 10. Sunscreen option available for sale at Safeway stores, November, 2021. Maui, Hawai‘i. Photo: Kihei Charter School

WHOLE FOODS MARKET

There is one Whole Foods Market location on the island of Maui, Hawai‘i. At the time of this survey, Whole Foods Market sold 31 different sunscreen products. 100% of the sunscreen products sold at Whole Foods Market meet 2021 Hawai‘i Legislation. 83.9% (n=26) of the sunscreen products sold at Whole Foods Market are **reef-safe**.

Whole Foods Market, Maui Locations:

70 E Maui Kaahumanu Ave
Kahului, Hawai‘i 96732

83.9% of the sunscreen products sold at Whole Foods Market are **reef-safe**

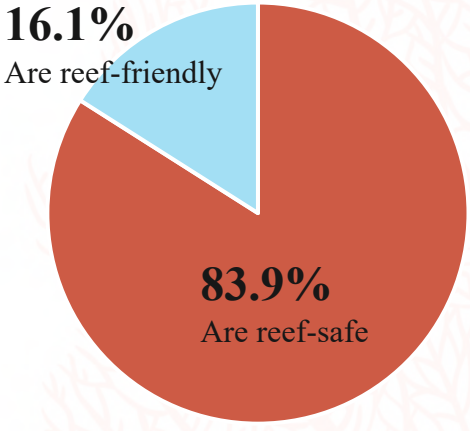


Figure 11. Whole Foods Market locations on Maui sell 31 different sunscreen products. 83.9% (n=26) of the sunscreen products sold at Whole Foods Market are **reef-safe**.

HAWAIIAN MOONS

There is one Hawaiian Moons location on the island of Maui, Hawai‘i. At the time of this survey, Hawaiian Moons sold 19 different sunscreen products. 100% of the sunscreen products sold at Hawaiian Moons meet 2021 Hawai‘i Legislation. 78.9% (n=15) of the sunscreen products sold at Hawaiian Moons are **reef-safe**.

Hawaiian Moons, Maui Locations:

2411 S. Kihei Rd.
Kihei, Hawai‘i 96753

78.9% of the sunscreen products sold at Hawaiian Moons are **reef-safe**

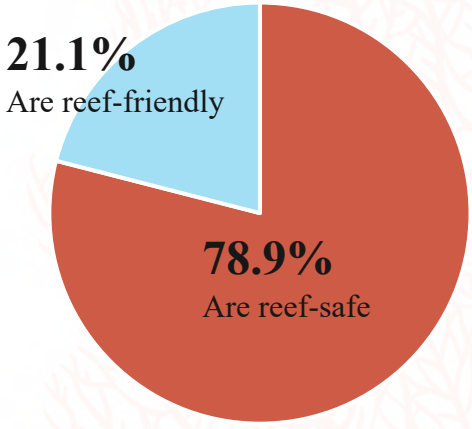


Figure 12. Hawaiian Moons on Maui sells 19 different sunscreen products. More than 78.9% (n=15) of the sunscreen products sold at Hawaiian Moons are **reef-safe**.

TIMES SUPERMARKET

There are 2 Times Supermarket locations on the island of Maui, Hawai'i. At the time of this survey, Times Supermarket sold 43 different sunscreen products. 100% of the sunscreen products sold at Times Supermarket meet 2021 Hawai'i Legislation. 27.9% (n=12) of the sunscreen products sold at Times Supermarket are **reef-safe**.

Times Supermarket, Maui Locations:

1310 S. Kihei Rd.
Kihei, Hawai'i 96753

3350 Lower Honoapiilani Rd.
Lahaina, Hawai'i 96761

27.9% of the sunscreen products sold at Times Market are **reef-safe**

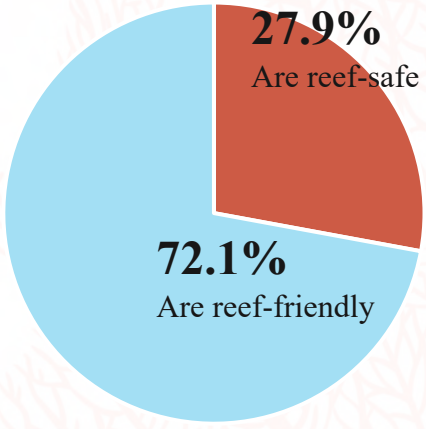


Figure 13. Times Market on Maui sells 43 different sunscreen products. 27.9% (n=12) of the sunscreen products sold at Times Supermarket are **reef-safe**.

FOODLAND

There are 6 Foodland locations on the island of Maui, Hawai‘i. At the time of this survey, Foodland sold 58 different sunscreen products. 100% of the sunscreen products sold at Foodland meet 2021 Hawai‘i Legislation. 22.4% (n=13) of the sunscreen products sold at Foodland are **reef-safe**.

Foodland Maui Locations:

1881 S Kihei Rd
Kihei, Hawai‘i 96753

370 Kehalani Village Dr
Wailuku, Hawai‘i 96793

90 Kane St
Kahului, Hawai‘i 96732

878 Front St #6B
Lahaina, Hawai‘i 96761

345 Keawe St Suite 304
Lahaina, Hawai‘i 96761

55 Pukalani St
Pukalani, Hawai‘i 96768

22.4% of the sunscreen products sold at Foodland are **reef-safe**

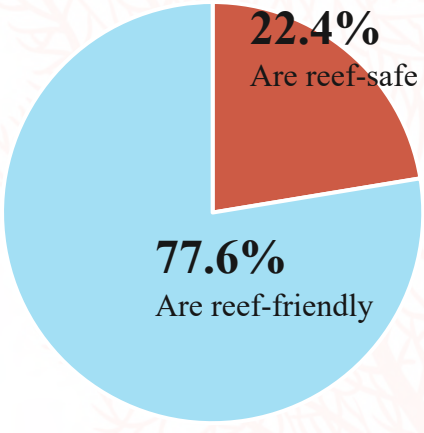


Figure 14. Foodland on Maui sells 58 different sunscreen products. 22.4% (n=13) of the sunscreen products sold at Foodland are **reef-safe**.

CONVENIENCE STORES

Figure 15. Map of convenience stores surveyed, November 2021. Maui, Hawai'i.

ABC STORE

There are 10 ABC Store locations on the island of Maui, Hawai'i. At the time of this survey, ABC Stores sold 48 different sunscreen products. 100% of the sunscreen products sold at ABC Stores meet 2021 Hawai'i Legislation. 27.08% (n=13) of the sunscreen products sold at ABC Store are **reef-safe**.

ABC Store Maui Locations:

247 Pi'ikea Ave #104
Kihei, Hawai'i 96753

2349 S Kihei Rd
Kihei, Hawai'i 96753

61 S Kihei Rd #2
Kihei, Hawai'i 96753

1221 HI-30 STE A-100
Lahaina, Hawai'i 96761

900 Front St
Lahaina, Hawai'i 96761

2435 Kaanapali Pkwy
Lahaina, Hawai'i 96761

3511 Lower Honopi'ilani Rd
Lahaina, Hawai'i 96761

724 Front St
Lahaina, Hawai'i 96761

666 Front St.
Lahaina, Hawai'i 96761

3750 Wailea Alanui Dr A-53
Kihei, Hawai'i 96753

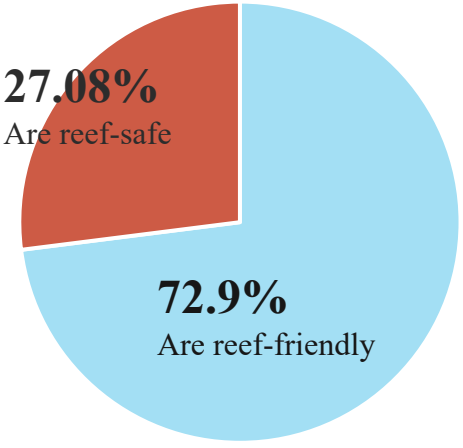


Figure 16. ABC Store locations on Maui sell 48 different sunscreen products. 27.08% (n=13) of the sunscreen products sold at ABC Store Maui locations are **reef-safe**.

27.08% of the sunscreen products sold at ABC Store are **reef-safe**

Figure 17. Sunscreen options available for sale at ABC Stores, November, 2021. Maui, Hawai'i. Photo: MOC Marine Institute

ZACK'S DELI

There is one Zack's Deli on the island of Maui, Hawai'i. At the time of this survey, Zack's Deli sold 20 different sunscreen products. 100% of the sunscreen products sold at Zack's Deli meet 2021 Hawai'i Legislation. 10% (n=2) of the sunscreen products sold at Zack's Deli are reef-safe.

Zack's Deli Locations:

2960 S Kihei Rd B.
Kihei, Hawai'i 96753

10% of the sunscreen products sold at Zack's Deli are **reef-safe**

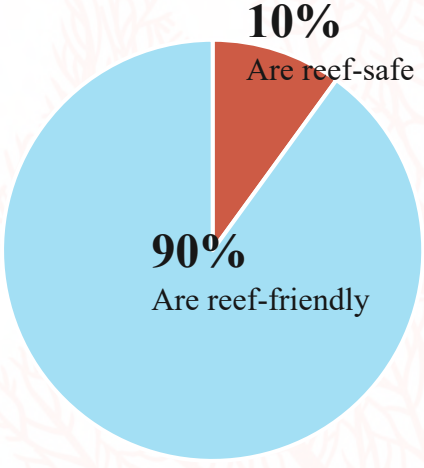


Figure 18. Zack's Deli on Maui sell 20 different sunscreen products. 10% of the sunscreen products sold at Zack's Deli are **reef-safe**.

WHALERS GENERAL

There are 4 Whalers General locations on the island of Maui, Hawai'i. At the time of this survey, Whalers General sold 35 different sunscreen products. 100% of the sunscreen products sold at Whalers General meet 2021 Hawai'i Legislation. 11.4% (n=4) of the sunscreen products sold at Whalers General are reef-safe.

Whalers General Locations:

3750 Wailea Alanui Dr
Kihei, Hawai'i 96753

2580 Kekaa Dr space no m-1
Lahaina, Hawai'i 96761

2463 S Kihei Rd
Kihei, Hawai'i 96753

816 Front St #A
Lahaina, Hawai'i 96761

11.4% of the sunscreen products sold at Whalers General are **reef-safe**

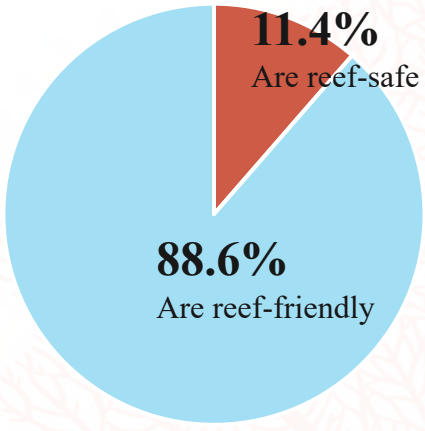


Figure 19. Whalers General locations on Maui sell 35 different sunscreen products. 11.4% (n=4) of the sunscreen products sold at Whalers General Maui locations are **reef-safe**.

PHARMACIES

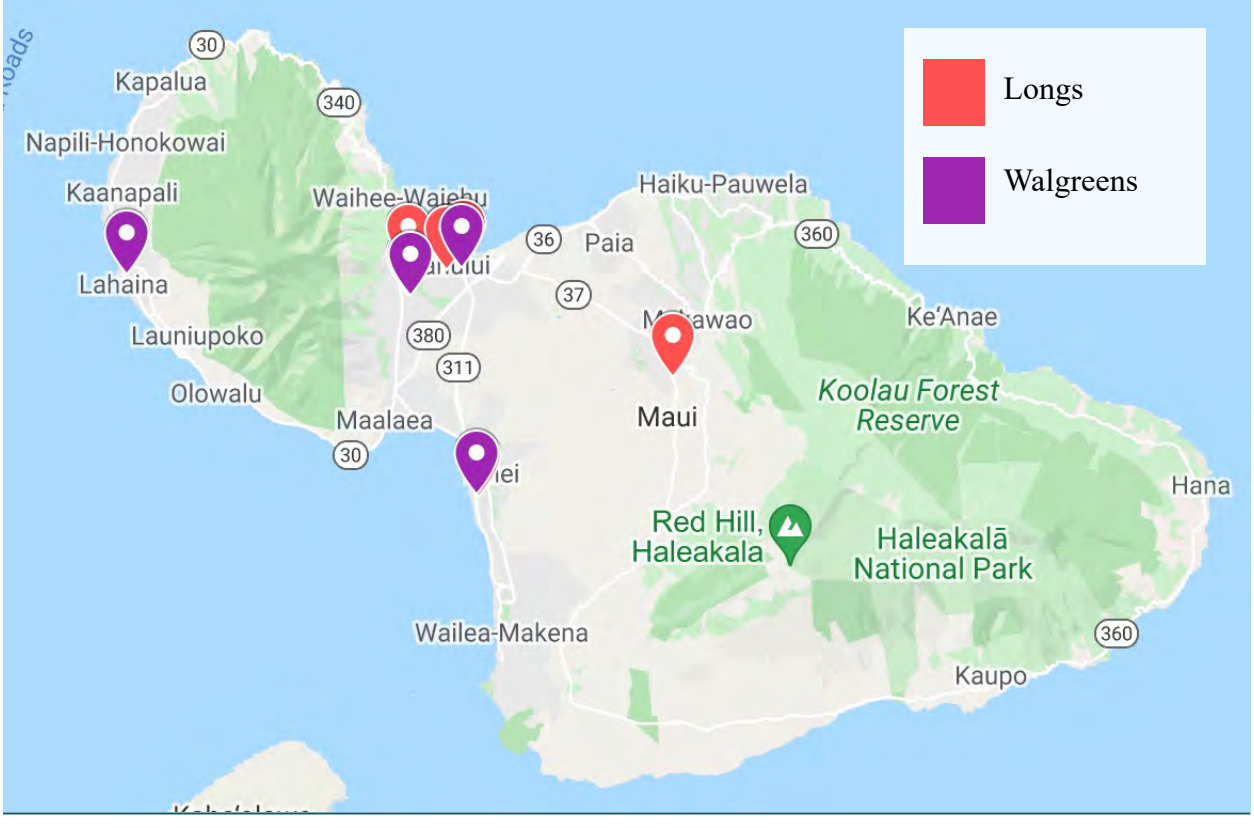


Figure 20. Map of pharmacies surveyed, November 2021. Maui, Hawai'i.

LONGS DRUGS

There are 8 Longs Drugs locations on the island of Maui, Hawai'i. At the time of this survey, Longs Drugs sold 82 different sunscreen products. 100% of the sunscreen products sold at Longs Drugs meet 2021 Hawai'i Legislation. 30.4% of the sunscreen products sold at Longs Drugs are **reef-safe**.

Longs Drugs Maui Locations:

1215 S Kihei Rd
Kihei, Hawai'i 96753

135 Kehalani Village Dr
Wailuku, Hawai'i 96793

275 W Kaahumanu Ave
Kahului, Hawai'i 96732

55 Kiopaa St
Makawao, Hawai'i 96768

1221 HI-30
Lahaina, Hawai'i 96761

1900 Main St
Wailuku, Hawai'i 96793

41 E Lipoa St
Kihei, Hawai'i 96753

70 E Kaahumanu Ave
Kahului, Hawai'i 96732

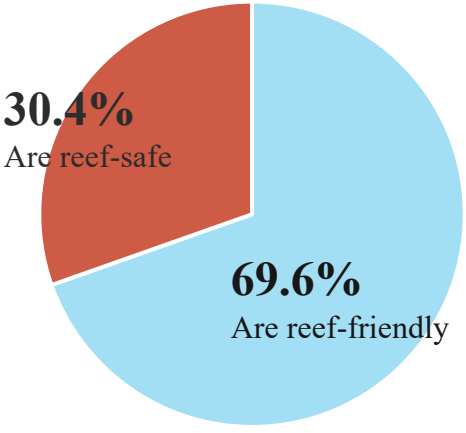


Figure 21. Longs Drugs locations on Maui sell 82 different sunscreen products. 30.4% percent (n=25) of the sunscreen products sold at Longs Drugs Maui locations are **reef-safe**.

30.4% of the sunscreen products sold at Longs Drugs are **reef-safe**

Figure 22. Sunscreen options available for sale at Longs Drugs stores, November, 2021. Maui, Hawai‘i. Photo: Kihei Charter School

WALGREENS

There are 4 Walgreens locations on the island of Maui, Hawai‘i. At the time of this survey, Walgreens sold 41 different sunscreen products. 100% of the sunscreen products sold at Walgreens meet 2021 Hawai‘i Legislation. 29.3% (n=12) of the sunscreen products sold at Walgreens are **reef-safe.**

Walgreens Maui Locations:

10 E Kamehameha Ave
Kahului, Hawai‘i 96732

342 Keawe St
Lahaina, Hawai‘i 96761

700 Waiale Rd
Wailuku, Hawai‘i 96793

2180 Main St Ste 102
Wailuku, Hawai‘i 96793

29.3% of the sunscreen products sold at Walgreens are **reef-safe**

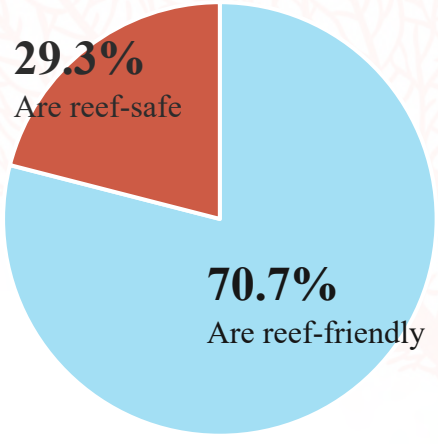


Figure 23. Walgreens locations on Maui sell 41 different sunscreen products. 29.3% (n=12) of the sunscreen products sold at Walgreens Maui locations are **reef-safe**. November 2021.

RECREATIONAL SPORTS STORES

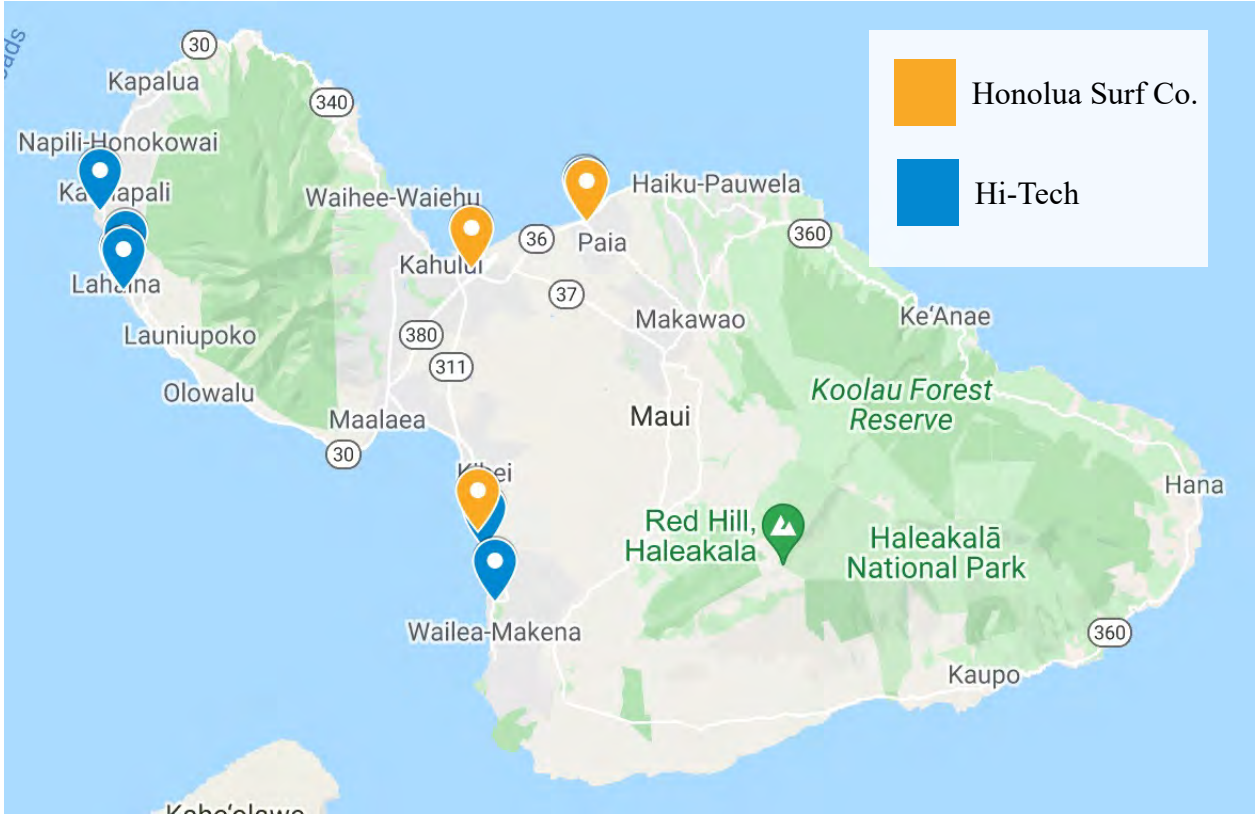


Figure 24. Map of recreational stores surveyed, November 2021. Maui, Hawai'i.

HONOLUA SURF CO.

There are 7 Honolua Surf co. locations on the island of Maui, Hawai'i. At the time of this survey, Honolua Surf co. sold 18 different sunscreen products. 100% of the sunscreen products sold at Honolua Surf co. meet 2021 Hawai'i Legislation. 38.8% (n=7) of the sunscreen products sold at Honolua Surf co. are **reef-safe**.

Honolua Surf co. Maui Locations:

2411 S Kihei Rd
Kihei, Hawai'i 96753

3750 Wailea Alanui Dr B47
Wailea, Hawa'ii 96753

2435 Kaanapali Pkwy E1
Lahaina, Hawai'i 96761

115 Hana Hwy
Paia, Hawai'i 96779

42 Ulupono St # 107
Lahaina, Hawai'i 96761

754 Front St
Lahaina, Hawai'i 96761

845 Front St
Lahaina, Hawai'i 96761

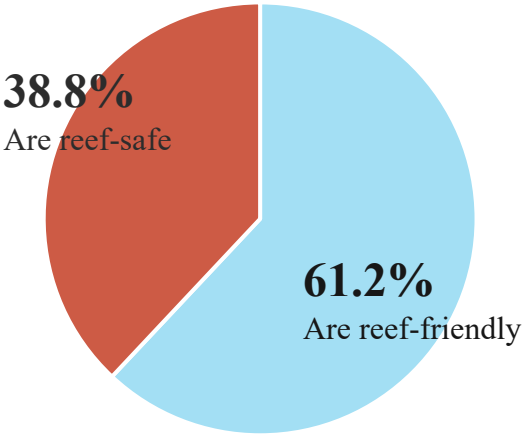


Figure 25. Honolua Surf co. locations on Maui sells 18 different sunscreen products. 38.8% (n=7) of the sunscreen products sold at Honolua Surf co. Maui locations are **reef-safe**.

38.8% of the sunscreen products sold at Honolua Surf co. are **reef-safe**

Figure 26. Sunscreen options available for sale at Honolua Surf co. stores, November, 2021. Maui, Hawai‘i. Photo: Kihei Charter School.

HI-TECH

There are 3 Hi-Tech locations on the island of Maui, Hawai‘i. At the time of this survey, Hi-Tech sold 11 different sunscreen products. 100% of the sunscreen products sold at Hi-Tech meet 2021 Hawai‘i Legislation. 81.8% percent (n=9) of the sunscreen products sold at Hi-Tech are **reef-safe**.

Hi-Tech Maui Locations:

2021 S Kihei Rd
Kihei, Hawai‘i 96753

58 Baldwin Ave
Paia, Hawai‘i 96779

425 Koloa St Shop
Kahului, Hawai‘i 96732

81.8% of the sunscreen products sold at Hi-Tech are **reef-safe**

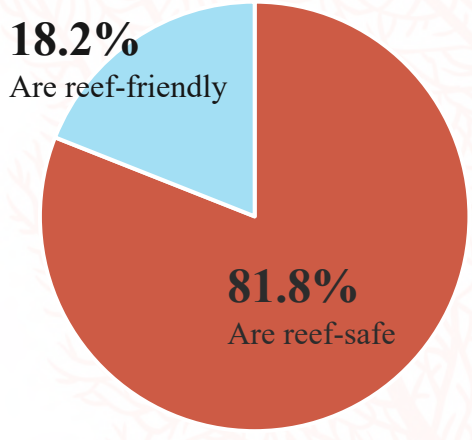


Figure 27. Hi-Tech locations on Maui sells 11 different sunscreen products. 81.8% (n=9) of the sunscreen products sold at Hi-Tech Maui locations are **reef-safe.**

MAUI DIVE SHOP

There are 2 Maui Dive Shop locations on the island of Maui, Hawai‘i. At the time of this survey, Maui Dive Shop sold 9 different sunscreen products. 100% of the sunscreen products sold at Maui Dive Shop meet 2021 Hawai‘i Legislation. 77.7% (n=7) of the sunscreen products sold at Maui Dive Shop are **reef-safe**.

Maui Dive Shop Maui Locations:

1455 S Kihei Rd
Kihei, Hawai‘i 96753

101 Maalaea Rd SLIP 74
Wailuku, Hawai‘i 96793

77.7% of the sunscreen products sold at Maui Dive Shop are **reef-safe**

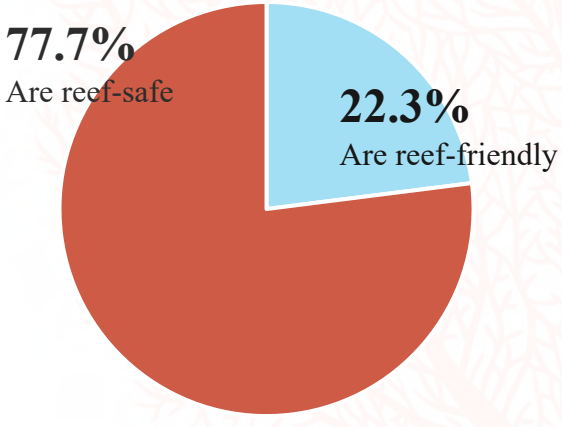


Figure 28. Maui Dive Shop locations on sell 9 different sunscreen products. 77.7% (n=7) of the sunscreen products sold at Maui Dive Shop locations are **reef-safe**.

AUNTIE SNORKEL

There is one Auntie Snorkel location on the island of Maui, Hawai'i. At the time of this survey, Auntie Snorkel sold 3 different sunscreen products. 100% of the sunscreen products sold at Auntie Snorkel meet Hawai'i Legislation. All products, or 100% (n=3) of the sunscreen sold at Auntie Snorkel are **reef-safe**.

Auntie Snorkel Maui Locations:

The Rainbow Mall, 2439 S Kihei Rd #101a
Kihei, Hawai'i 96753

100% of the sunscreen products sold at Auntie Snorkel are **reef-safe**

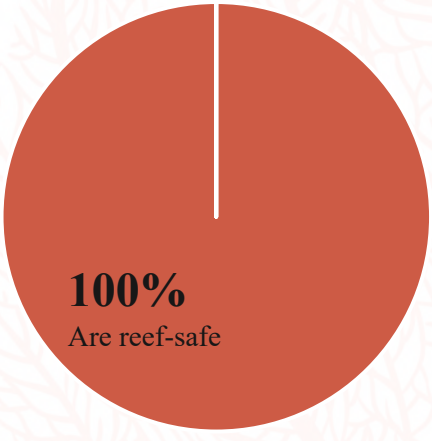


Figure 29. Auntie Snorkel locations on Maui sells 3 different sunscreen products. All products, or 100% (n=3) of the sunscreen sold at Auntie Snorkel are **reef-safe**.

BOSS FROG'S

There are 7 Boss Frog's locations on the island of Maui, Hawai'i. At the time of this survey, Boss Frog's sold 1 sunscreen product. 100% of the sunscreen products sold at Boss Frog's meet 2021 Hawai'i Legislation. All products, or 100% (n=1) of the sunscreen sold at Boss Frog's are **reef-safe**.

Boss Frog's Maui Locations:

2395 S Kihei Rd
Kihei, Hawai'i 96753

2463 S Kihei Rd A-15
Kihei, Hawai'i 96753

1770 S Kihei Rd, Kihei
Hawai'i 96753

1215 S Kihei Rd, Kihei
Hawai'i 96753

300 Ma'alaea Rd (Building 2, Shop #2N
Wailuku, Hawai'i 96793

150 Lahainaluna Rd
Lahaina, Hawai'i 96761

156 Lahainaluna Rd
Lahaina, Hawai'i 96761

100% of the sunscreen products sold at Boss Frog's are **reef-safe**

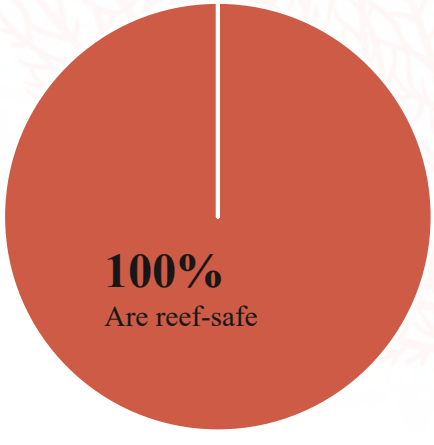


Figure 30. Boss Frog's locations on Maui sell 1 sunscreen product. All products, or 100% (n=1) of the sunscreen sold at Boss Frog's are **reef-safe**.

BIG BOX STORES

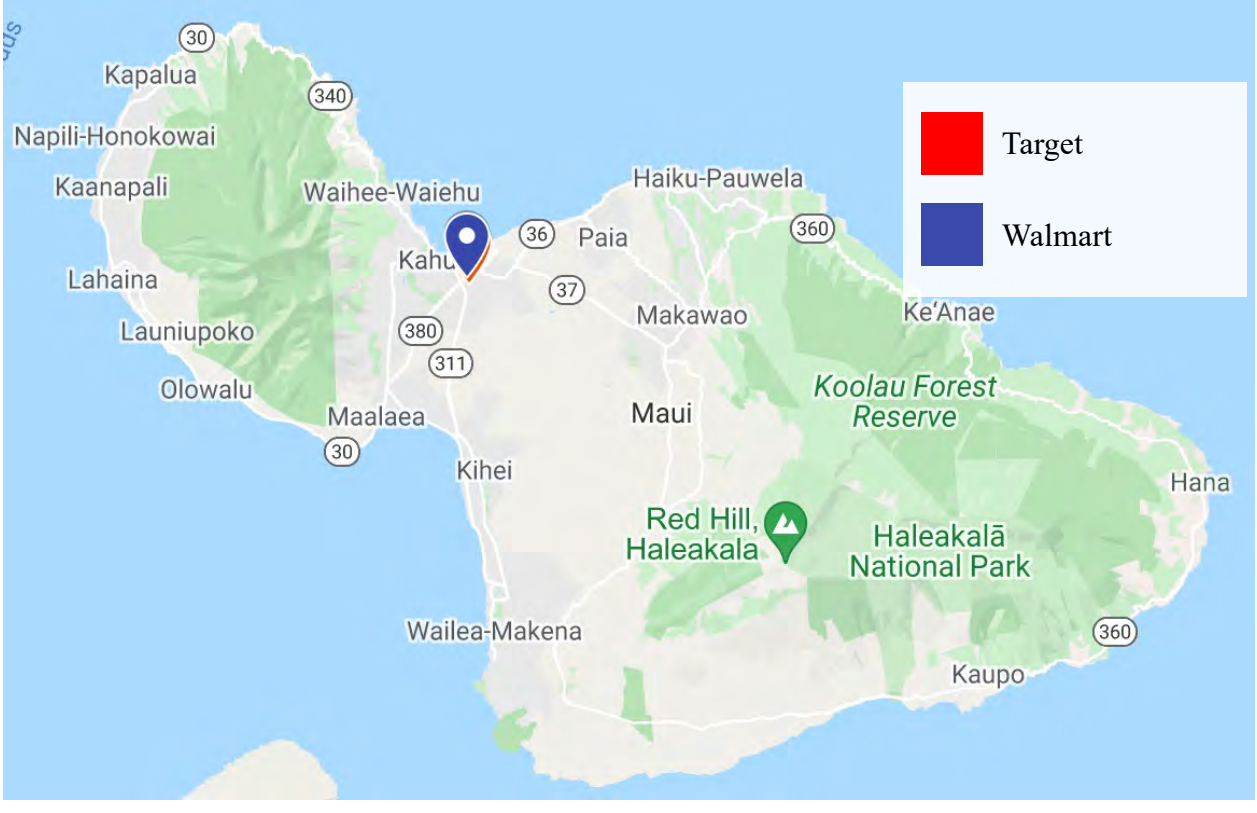


Figure 31. Map of big box store surveyed, November 2021. Maui, Hawai'i.

WALMART

There is one Walmart on the island of Maui, Hawai'i. At the time of this survey, Walmart sold 69 sunscreen products. 100% of the sunscreen products sold at Walmart meet 2021 Hawai'i Legislation. 17.3% (n=12) of the sunscreen products sold at Walmart are **reef-safe**.

Walmart Maui Location:

101 Pakaula St
Kahului, Hawai'i 96732

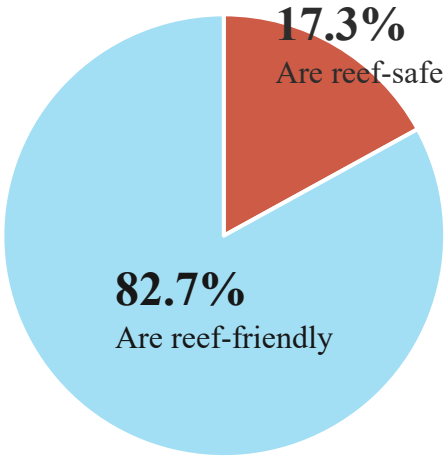


Figure 32. Walmart on Maui sells 69 sunscreen products. 17.3% (n=12) of the sunscreen products sold at Walmart Maui locations are **reef-safe**. November 2021.

17.3% of the sunscreen products sold at Walmart are **reef-safe**

Figure 33. Sunscreen options available for sale at Walmart, November, 2021. Maui, Hawai‘i. Photo: MOC Marine Institute.

TARGET

There is one Target on the island of Maui, Hawai‘i. At the time of this survey, Target sold 68 sunscreen products. 100% of the sunscreen products sold at Target meet Hawai‘i Legislation. 36.7% (n=25) of the sunscreen products sold at Target are **reef-safe**.

Target Maui Locations:

100 Ho‘okele St
Kahului, Hawai‘i 96732

36.7% of the sunscreen products sold at Target are **reef-safe**

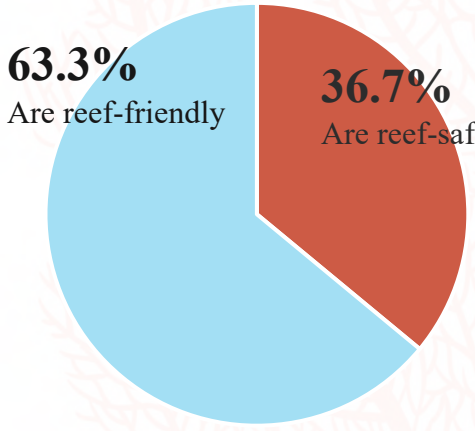


Figure 34. Target on Maui sells 68 sunscreen products. 36.7% (n=25) of the sunscreen products sold at Target Maui locations are **reef-safe**.

STUDENT LEARNING OUTCOMES

Through collaborative and community-based approaches to scientific research, we identified that when big ideas and complex concepts are presented in ways students can relate to through their lived experiences, they tend to grasp the material more profoundly.

Seventy-one percent of students involved in this project completed a voluntary post-survey. Below are some of their responses:

- 55% of students were not aware of the impacts that non-reef-safe sunscreen has on coral reef ecosystems before this project.
- 80% responded they plan to either use **reef-safe** sunscreen, tell people about the harmful effects of chemical-based sunscreen, or both.
- 33% of students stated that writing testimony in support of Bill 135 was the most rewarding aspect of this project.
- 16% said protecting the coral reefs was the most rewarding aspect of this project.
- 16% said research and data collection was the most rewarding aspect of this project.
- 18% said the entire project was rewarding.
- 17% said that the most rewarding aspect of this project was learning about coral reefs

Engaging students in research that serves to protect local ecosystems have the capacity for increasing students' overall efficacy towards environmental action. Youth that experience an increase in efficacy have the potential to become change agents in their communities. These hands-on learning experiences could also increase the effectiveness of science education as a whole.

STUDENT QUOTES

QUESTION: Has this project inspired you to learn more and do more to protect coral reefs?

"Yes, it has. I want to make a difference and help our planet. I care so much about animals and saving the planet, so I'm really glad that I got to learn about how the sunscreen that we use can impact future generations. I want to continue making this place better."
- Lili'u Kaahumanu, 7th-grade

"Yes since I know the huge effect sunscreen has on the coral reefs I want to educate people on this subject." - Madilyn Hays, 7th-grade

"Yes, I will now help inform other people, I will learn more about this issue, and I will do my best to wear sun shirts and other things so I don't have to wear sunscreen in the ocean, and if I do it will be reef safe." - Hannah Wick, 7th-grade

"Yes it has, before I had a little knowledge about non-reef safe sunscreen, but now I have learned a lot about this topic. This project has inspired me to show people how bad non-reef safe sunscreen is and it has also inspired me to safe the reefs." - Sophia Peterson, 7th-grade

QUESTION: How did you feel when you found out that the Maui County Council passed Bill 135?

"I was happy because it helps the environment and hopefully soon the whole world will ban non-safe sunscreen ingredients." - Mason Hu, 7th-grade

"I really liked it and it put it into perspective that we can change things."
- Annalise Eller, 7th-grade

"I felt proud and like I was a part of history." - Waiaulia Smith, 7th-grade

"I felt very rewarded and very happy. It is one of those feelings when you're proud to be part of something." - Jessica Rosado, 7th-grade

"I felt proud that we did something that could help preserve the coral reefs around Maui and hopefully lead other islands and cities to do the same." - Hana Freet, 7th Grade

DISCUSSION

Data collected during the in-store surveys was based on inventory at the time of survey. An area for further investigation could be collecting data on all products available at the store, in-stock, or not. We have also recognized that surveying stores at hotels and resorts could prove insightful to understanding the availability and accessibility of **reef-safe** sunscreen products and any education and information available to visitors regarding the safety of different sunscreen products.

The use of non-regulated labels, Reef Friendly, **Reef Safe**, and Reef Conscious can be a point of confusion for consumers. Through our research, we identified many sunscreens containing chemical ingredients labeled reef-friendly and reef-conscious. **Reef-safe** was most commonly used to describe mineral-based sunscreen products. An area for further investigation could be the community's understanding of these terms.

There is little information about beachgoer's use of sunscreens on Maui, the prevalence of petrochemicals in sunscreens used by beachgoers, or public awareness of the effects of petrochemicals. An area of opportunity for further investigation is the development of effective education and outreach strategies to increase the general public's awareness of the impacts of non-reef-safe sunscreen.

Figure 35. Photo of 7th-grade students from Kihei Charter School on field trip to MOC Marine Institute, Maui, Hawai'i. November 2021. Photo: MOC Marine Institute.

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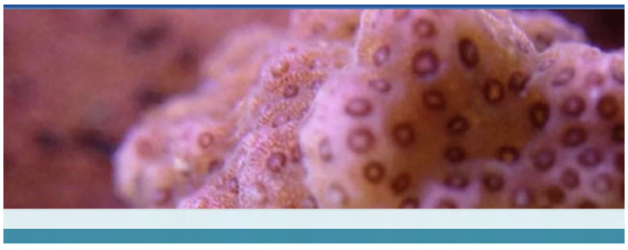
APPENDICES

APPENDIX A: DATA COLLECTION FORM

Store	Location	Sunscreen Name and Brand	Reef-Safe (Y/N)	Meets HI Legislation (Y/N)

APPENDIX B: IN-PERSON SUNSCREEN SURVEY



Sunscreen Survey

jmiller@kiheicharter.org (not shared) Switch account

What is your home zip code? *

Your answer

What age range best represents you? *

- Under 18
- 18 - 22
- 22 - 26
- 26 - 30
- 30 - 40
- 40 - 50
- 50 -60
- 60 - 70
- 70 +

What type of sunscreen are you using today? *

- Reef-safe
- Reef-friendly
- Reef-conscious
- None of the above
- Not wearing sunscreen

Did you purchase your sunscreen on Maui? *

- Yes
- No
- Unknown

If you bought your sunscreen on Maui, where was it purchased? *

- Safeway
- Whole Foods Market
- Times Market
- Foodland
- Costco
- ABC Store
- Ross
- Surf shop
- Snorkel/Dive Shop
- Hotel/Resort Store
- Other small convenience store
- N/A

Why did you purchase this brand of sunscreen? *

- Price
- Good for the reef
- It was the only option
- This is the one that I always purchase
- Other

May we have your email address to share our project report once it is finished?

Your answer

Submit Clear form

APPENDIX C: IN-STORE SUNSCREEN DATA

Table 4. Sunscreen products available for sale at Safeway stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 100 - 6 Oz	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion SPF 50 - 6 OZ	No	Yes
Coppertone Sport Spray SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray Spf 100	No	Yes
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	**Yes**	**Yes**
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	No	Yes
Coppertone Waterbaby Spf 50	No	Yes
Coppertone Kids Spray Spf 50	No	Yes
Coppertone Sport Spray Spf 70	No	Yes
Coppertone Dc Face Ltn Spf 50	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free SPF 30	No	Yes
Neutrogena Pure & Free Sunscreen Baby Spf 50	**Yes**	**Yes**
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 45	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 55	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 30	No	Yes
Neutrogena Sheer Zinc Sunscreen Protection Dry Touch Broad Spectrum SPF 50	**Yes**	**Yes**

Table 4. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection SPF 70	No	Yes
Neutrogena Ultra Sheer Sunscreen Face & Body Stick SPF 70	No	Yes
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Signature Care Sport Sunscreen Lotion Water Resistant Non Greasy SPF 50	No	Yes
Signature Care Sport Sunscreen Lotion Water Resistant Non Greasy SPF 30	No	Yes
Signature Care Sunscreen Lotion Ultra Dry Touch Water Resistant Light SPF 70	No	Yes
Signature Care Sunscreen Lotion Ultra Dry Touch Water Resistant Light SPF 50	No	Yes
Aveeno Active Naturals Sunscreen Lotion Protect + Hydrate Broad Spectrum SPF 70	No	Yes
Aveeno Baby Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Alba Botanica SPF 70 Clear Sunscreen Spray	No	Yes
Alba Botanica Sunscreen Tropical Fruit Kids Clear Spray Broad Spectrum SPF 50	No	Yes
Alba Botanica Sunscreen Clear Spray Nourishing Coconut Broad Spectrum SPF 50	No	Yes
ALL Good Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**

Table 5. Sunscreen products available for sale at Whole Foods Market stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Alba Botanica SPF 50 Clear Sensitive Sunscreen Spray	No	Yes
Alba Botanica Sunscreen Tropical Fruit Kids Clear Spray Broad Spectrum SPF 50	No	Yes
Alba Botanica Sunscreen Clear Spray Nourishing Coconut Broad Spectrum SPF 50	No	Yes
Alba Botanica Sensitive Mineral Sunscreen SPF 33	**Yes**	**Yes**
ALL Good Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Spray Sunscreen SPF 30	**Yes**	**Yes**
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Mineral SPF 30	**Yes**	**Yes**
Sun Bum Mineral Spray SPF 30	**Yes**	**Yes**
Goddess Garden Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
Babo Botanical Sheer Mineral Sunscreen Spray	**Yes**	**Yes**
Babo Botanical Clear Zinc Sport Stick Sunscreen SPF 30	**Yes**	**Yes**
Pacifica Mineral Broad Spectrum Sunscreen SPF 30	**Yes**	**Yes**
Pacifica Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
The Seaweed Bath SPF 40 Sport Sunscreen	No	Yes
The Seaweed Bath SPF 30 Sport Sunscreen	No	Yes
Mineral Sport Spray SPF 30 365 Whole Foods Market	**Yes**	**Yes**
Mineral Sunscreen Lotion SPF 30 365 Whole Foods Market	**Yes**	**Yes**
Hydrating Facial Sunscreen Lotion SPF 30 365 Whole Foods Market	**Yes**	**Yes**
Thinkbaby Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**
Thinksport Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**

Table 5. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Think Broad Spectrum Sunscreen SPF 30	Yes	Yes
Badger Clear Zinc Broad Spectrum Sunscreen SPF 40	Yes	Yes
MyChelle Solar Defense Broad Spectrum Sunscreen SPF 50	Yes	Yes
MyChelle Solar Defense Broad Spectrum Sunscreen SPF 30	Yes	Yes
MyChelle Solar Defense Broad Spectrum Sunscreen SPF 28	Yes	Yes
Cocokind Broad Spectrum Sunscreen SPF 32	Yes	Yes
Raw Love All Natural Mineral Sunscreen	Yes	Yes
Kokua Sun Care Zinc Sunscreen SPF 50	Yes	Yes

Table 6. Sunscreen products available for sale at Hawaiian Moons stores in Maui, Hawai'i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Alba Botanica Soothing Sunscreen Lavender Broad Spectrum SPF 45	No	Yes
Alba Botanica Hawaiian Sunscreen green tea Broad Spectrum SPF 45	No	Yes
Alba Botanica Sensitive Mineral Sunscreen SPF 33	**Yes**	**Yes**
Goddess Garden Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
Babo Botanical Sheer Mineral Sunscreen Spay	**Yes**	**Yes**
Babo Botanical Clear Zinc Sport Stick Sunscreen SPF 30	**Yes**	**Yes**
Thinkbaby Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**
Thinksport Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**
Think Broad Spectrum Sunscreen SPF 30	**Yes**	**Yes**
Badger Clear Zinc Broad Spectrum Sunscreen SPF 40	**Yes**	**Yes**
MyChelle Solar Defense Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**
Raw Love All Natural Mineral Sunscreen	**Yes**	**Yes**
Kiss My Face Broad Spectrum SPF 30	**Yes**	**Yes**
Kiss My Face Kids Spray SPF 30	**Yes**	**Yes**
Kiss My Face Broad Spectrum Kids SPF 30	**Yes**	**Yes**
Kiss My Face Broad Spectrum Baby SPF 50	**Yes**	**Yes**
Maui Surfer Honey Natural Sunscreen SPF 30	**Yes**	**Yes**
Derma-E Sun Defense SPF 30	**Yes**	**Yes**
Derma-E Sun Defense Kids Spray SPF 50	No	Yes

Table 7. Sunscreen products available for sale at Times Supermarket stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	**Yes**	**Yes**
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray SPF 50	No	Yes
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	No	Yes
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	**Yes**	**Yes**
Coppertone Waterbaby SPF 50	No	Yes
Coppertone Kids Spray SPF 50	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 55	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 30	No	Yes

Table 7. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Alba Botanica Soothing Sunscreen Lavender Broad Spectrum SPF 45	No	Yes
ALL Good Kids Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Spray Sunscreen SPF 30	**Yes**	**Yes**
Land Shark SPF 50, 6.5 oz.	No	Yes
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Mineral SPF 30	**Yes**	**Yes**
Sun Bum SPF 30 Broad Spectrum	No	Yes
Sun Bum SPF 50 Broad Spectrum	No	Yes
Cetaphil Sheer Mineral Sunscreen Broad Spectrum SPF 30	**Yes**	**Yes**
Cetaphil Sheer Mineral Sunscreen Broad Spectrum SPF 50	**Yes**	**Yes**

Table 8. Sunscreen products available for sale at Foodland stores in Maui, Hawai'i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 100 - 6 Oz	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes

Table 8. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	**Yes**	**Yes**
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	No	Yes
Coppertone Kids Spray Spf50	No	Yes
Neutrogena Sheer Zinc Sunscreen Protection Dry Touch Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection Spf 30	No	Yes
Neutrogena Sensitive Skin Mineral Sunscreen Lotion Spf 60+	**Yes**	**Yes**
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 30	No	Yes
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Spray SPF 30	No	Yes

Table 8. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Red Gecko All Natural Sunscreen SPF 30	**Yes**	**Yes**
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Mineral SPF 30	**Yes**	**Yes**
Sun Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum SPF 15 Broad Spectrum	No	Yes
Sun Bum SPF 30 Broad Spectrum	No	Yes
Sun Bum SPF 50 Broad Spectrum	No	Yes
Sun Bum SPF 70 Broad Spectrum	No	Yes
Sun Bum SPF 15 Sunscreen Spray	No	Yes
Sun Bum SPF 30 Sunscreen Spray	No	Yes
Sun Bum SPF 50 Sunscreen Spray	No	Yes
Sun Bum SPF 70 Sunscreen Spray	No	Yes
Maui Vera Mineral Sunscreen SPF 30	**Yes**	**Yes**
Coola Classic Body Sunscreen SPF 30	No	Yes
Coola Classic Sunscreen Spray SPF 50	No	Yes

Table 9. Sunscreen products available for sale at ABC Stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 100 - 6 Oz	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	No	Yes
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free Spf 30	No	Yes
Neutrogena Pure & Free Sunscreen Baby Spf 50	**Yes**	**Yes**
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 55	No	Yes

Table 9. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 30	No	Yes
Neutrogena Sheer Zinc Sunscreen Protection Dry Touch Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Sheer Zinc Kids Broad Spectrum SPF 50	No	Yes
Neutrogena Ultra Sheer Sunscreen Face & Body Stick Spf 70	No	Yes
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 50	No	Yes
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 30	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Spray SPF 30	No	Yes
Aveeno Protect + Hydrate Broad Spectrum SPF 30	No	Yes
Aveeno Protect + Hydrate Broad Spectrum SPF 60	No	Yes
Aveeno Baby Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Aveeno Active Positively Mineral Sensitive Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Aveeno Ultra-Calming Daily Moisturizer Mineral Sunscreen SPF 30	**Yes**	**Yes**

Table 9. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Red Gecko All Natural Sunscreen SPF 30	Yes	Yes
Raw Elements Face and Body SPF 30	Yes	Yes
Raw Elements Face Stick SPF 30	Yes	Yes
Maui Vera Mineral Sunscreen SPF 30	Yes	Yes

Table 10. Sunscreen products available for sale at Zack's Deli stores in Maui, Hawai'i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 50	No	Yes
Red Gecko All Natural Sunscreen SPF 30	**Yes**	**Yes**

Table 11. Sunscreen products available for sale at Whalers General stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 45	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 55	No	Yes
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 30	No	Yes
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes

Table 11. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Spray SPF 30	No	Yes
Maui Vera Mineral Sunscreen SPF 30	**Yes**	**Yes**

Table 12. Sunscreen products available for sale at Longs Drugs stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 100 - 6 Oz	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Foam SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray Spf 100	No	Yes
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	**Yes**	**Yes**
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	No	Yes
Coppertone Waterbaby Spf 50	No	Yes
Coppertone Kids Spray Spf50	No	Yes

Table 12. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Signature Care Sport Sunscreen Lotion Water Resistant Non Greasy SPF 50	No	Yes
Signature Care Sport Sunscreen Lotion Water Resistant Non Greasy SPF 30	No	Yes
Signature Care Sunscreen Lotion Ultra Dry Touch Water Resistant Light SPF 70	No	Yes
Signature Care Sunscreen Lotion Ultra Dry Touch Water Resistant Light SPF 50	No	Yes
Aveeno Active Naturals Sunscreen Lotion Protect + Hydrate Broad Spectrum SPF 70	No	Yes
Aveeno Protect + Hydrate Broad Spectrum SPF 30	No	Yes
Aveeno Baby Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Aveeno Active Positively Mineral Sensitive Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Aveeno Ultra-Calming Daily Moisturizer Mineral Sunscreen SPF 30	No	Yes
ALL Good Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Spray Sunscreen SPF 30	**Yes**	**Yes**
Aloe Up Kids Sport Spray Sunscreen SPF 50	No	Yes
Aloe Up Spray Sunscreen SPF 30	No	Yes
Aloe Up Sport Performance Spray Sunscreen SPF 30	No	Yes
Raw Elements Face and Body SPF 30	**Yes**	**Yes**
Raw Elements Face Stick SPF 30	**Yes**	**Yes**
Land Shark SPF 30, 6.5 oz.	No	Yes
Land Shark SPF 50, 6.5 oz.	No	Yes
Hawaiian Blend Sensitive Skin SPF 50	No	Yes
Hawaiian Blend Essentials SPF 30	No	Yes
Hawaiian Blend Extreme Sport SPF 30	No	Yes
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**

Table 12. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Coppertone Sport Spray Spf 70	No	Yes
Copperton Dc Face Ltn Spf 50	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free Spf 30	No	Yes
Neutrogena Pure & Free Sunscreen Baby Spf 50	**Yes**	**Yes**
Neutrogena Ultra Sheer Dry Touch Sunblock Lotion SPF 55	No	Yes
Neutrogena Sheer Zinc Sunscreen Protection Dry Touch Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection Spf 70	No	Yes
Neutrogena Ultra Sheer Sunscreen Face & Body Stick Spf 70	No	Yes
Neutrogena Invisible Daily Defense Sunscreen Lotion Spf 60	No	Yes
Neutrogena Sensitive Skin Mineral Sunscreen Lotion Spf 60+	**Yes**	**Yes**
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 50	No	Yes
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 30	No	Yes
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Spray SPF 30	No	Yes

Table 12. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Mineral SPF 30	**Yes**	**Yes**
Sun Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum SPF 30 Broad Spectrum	No	Yes
Sun Bum SPF 50 Broad Spectrum	No	Yes
Sun Bum SPF 70 Broad Spectrum	No	Yes
Coola Classic Body Sunscreen SPF 30	No	Yes
Coola Classic Sunscreen Spray SPF 50	No	Yes
CVS Health Zinc Sheer Lotion SPF 30	**Yes**	**Yes**
CVS Health Baby Broad Spectrum Lotion SPF 50	**Yes**	**Yes**
Babyganics Mineral Sunscreen SPF 50	**Yes**	**Yes**
Babyganics Mineral Sunscreen Spray SPF 50	No	Yes
Babyganics Mineral Sunscreen Stick SPF 50	**Yes**	**Yes**

Table 13. Sunscreen products available for sale at Walgreens stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	**Yes**	**Yes**
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Foam SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 30	No	Yes
Coppertone Glow Sunscreen SPF 30	No	Yes
Coppertone Glow Sunscreen SPF 50	No	Yes

Table 13. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Bare Republic Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
Bare Republic Mineral Sunscreen Spray SPF 50	**Yes**	**Yes**
Bare Republic Mineral Face Sunscreen SPF 70	**Yes**	**Yes**
Bare Republic Mineral 'Clearscreen' Spray SPF 50	No	Yes
Bare Republic Mineral Baby Sunscreen Lotion SPF 50	**Yes**	**Yes**
Bare Republic Mineral Sunscreen Sheer Zinc Oxide SPF 30	**Yes**	**Yes**
La Roche-Posay Face & Body SPF 60	No	Yes
Cera VeHydrating Sunscreen Broad Spectrum SPF 30	**Yes**	**Yes**
Blue Lizard Australian Sunscreen Sensitive Face Mineral-Based Sunscreen SPF 30	No	Yes
Blue Lizard Australian Sunscreen Kids Mineral-Based Sunscreen SPF 30	No	Yes
Blue Lizard Australian Sunscreen Sport Mineral-Based Sunscreen SPF 30	No	Yes
Blue Lizard Australian Sunscreen Active Mineral-Based Sunscreen SPF 30	No	Yes
Blue Lizard Australian Sunscreen Sensitive Mineral-Based Sunscreen SPF 30	**Yes**	**Yes**
Walgreens Hydrating Broad-Spectrum Sunscreen SPF 30	No	Yes
Walgreens Sensitive Skin Broad-Spectrum Sunscreen SPF 50	No	Yes
Walgreens Sport Broad-Spectrum Sunscreen SPF 30	No	Yes
Walgreens Sport Broad-Spectrum Sunscreen SPF 50	No	Yes
Walgreens Sport Spray Sunscreen SPF 30	No	Yes
Australian Gold Botanical Mineral Sunscreen SPF 50	**Yes**	**Yes**

Table 14. Sunscreen products available for sale at Honolua Surf co. stores in Maui, Hawai'i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Mineral SPF 30	**Yes**	**Yes**
Sun Bum Face Broad Spectrum SPF 50	No	Yes
Sun Bum Face Mist SPF 45	No	Yes
Sun Bum Face Broad Spectrum SPF 70	No	Yes
Sun Bum Mineral Spray SPF 30	**Yes**	**Yes**
Sun Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum SPF 15 Broad Spectrum	No	Yes
Sun Bum SPF 30 Broad Spectrum	No	Yes
Sun Bum SPF 50 Broad Spectrum	No	Yes
Sun Bum SPF 70 Broad Spectrum	No	Yes
Sun Bum SPF 15 Sunscreen Spray	No	Yes
Sun Bum SPF 30 Sunscreen Spray	No	Yes
Sun Bum SPF 50 Sunscreen Spray	No	Yes
Sun Bum SPF 70 Sunscreen Spray	No	Yes
Vertra Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**

Table 15. Sunscreen products available for sale at Hi-Tech stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Baby Bum Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Broad Spectrum SPF 50	No	Yes
Sun Bum Mineral Spray SPF 30	**Yes**	**Yes**
Sun Bum SPF 15 Broad Spectrum	No	Yes
Maui Vera Mineral Sunscreen SPF 30	**Yes**	**Yes**
Raw Love All Natural Mineral Sunscreen	No	Yes
Salt and Stone Broad Spectrum Sunscreen	**Yes**	**Yes**
One Love Body and Soul Sunscreen	**Yes**	**Yes**
TropicSport SPF 30 Mineral Sunscreen	**Yes**	**Yes**
Mama Kuleana	**Yes**	**Yes**

Table 16. Sunscreen products available for sale at Maui Dive Shop stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Faces Weightless SPF 30	No	Yes
Red Gecko All Natural Sunscreen SPF 30	**Yes**	**Yes**
Raw Elements Face and Body SPF 30	**Yes**	**Yes**
Raw Elements Face Stick SPF 30	**Yes**	**Yes**
Raw Elements Baby + Kids Broad Spectrum	**Yes**	**Yes**
Raw Elements Baby + Kids Stick	**Yes**	**Yes**
Raw Love All Natural Mineral Sunscreen	**Yes**	**Yes**
Yea Bah Natural Sunscreen SPF 30	**Yes**	**Yes**

Table 17. Sunscreen products available for sale at Auntie Snorkel stores in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Maui Vera Mineral Sunscreen SPF 30	Yes	Yes
Hawaiian Sol Sunscreen SPF 30	Yes	Yes
Maui Surf and Soul	Yes	Yes

Table 18. Sunscreen products available for sale at Boss Frog's stores in Maui, Hawai'i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Hawaiian Sol Sunscreen SPF 30	Yes	Yes

Table 19. Sunscreen products available for sale at Walmart in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 15	No	Yes
Banana Boat Hair & Scalp Defense Sunscreen Spray Broad Spectrum SPF 30 - 6 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 15	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Light As Air Lotion Spf 50 - 6 OZ	No	Yes
Banana Boat Light As Air Spray Spf 50	No	Yes
Banana Boat Simply Protect Sensitive SPF 50	No	Yes
Banana Boat Simply Protect Baby SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Foam SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Simply Protect Mineral Enriched Sensitive SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Spray SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 30	No	Yes
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	**Yes**	**Yes**

Table 19. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	No	Yes
Coppertone Waterbaby Spf50	No	Yes
Coppertone Kids Spray Spf50	No	Yes
Coppertone Glow Sunscreen SPF 30	No	Yes
Coppertone Glow Sunscreen SPF 50	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free Spf 30	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free Spf 50	No	Yes
Neutrogena Sheer Zinc Kids Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection Spf 70	No	Yes
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection Spf 50	No	Yes
Neutrogena Invisible Daily Defense Sunscreen Lotion Spf 60	No	Yes
Neutrogena Sheer Hydro Boost Sunscreen Lotion Spf 50	No	Yes
Neutrogena Sport Face Sunscreen Lotion Spf 70	No	Yes
Neutrogena Pure & Free Baby Sunscreen Stick Spf 50	**Yes**	**Yes**
Hawaiian Tropic Dark Tanning Sunscreen Lotion Broad Spectrum SPF 4	No	Yes
Hawaiian Tropic Sheer Touch Sunscreen Lotion Ultra Radiance Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Spray Clear Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen 50 SPF	No	Yes
Hawaiian Tropic Silk Hydration Sunscreen Lotion Weightless SPF 30	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes
Hawaiian Tropic Matte Effect Spf 30 Lotion	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 50	No	Yes

Table 19. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Hawaiian Tropic Island Sport Sunscreen Spray SPF 30	No	Yes
Hawaiian Tropic Island Sport Sunscreen Spray SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Lotion Broad Spectrum SPF 50	No	Yes
Hawaiian Tropic AntiOxidant+ Sunscreen Spray SPF 30	No	Yes
Aveeno Protect + Hydrate Broad Spectrum SPF 30	No	Yes
Aveeno Protect + Hydrate Broad Spectrum SPF 60	No	Yes
Aveeno Baby Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Aveeno Kids Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Aveeno Kids Natural Protection Sunscreen Stick SPF 50	**Yes**	**Yes**
ALL Good Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Spray Sunscreen SPF 30	**Yes**	**Yes**
Land Shark SPF 50, 6.5 oz.	No	Yes
Hawaiian Blend Sensitive Skin SPF 50	No	Yes
Hawaiian Blend Essentials SPF 30	No	Yes
Australian Gold Botanical Mineral Sunscreen SPF 50	**Yes**	**Yes**
Australian Gold Botanical Plant-Based Sunscreen SPF 50	No	Yes
Australian Gold Botanical Plant-Based Sunscreen SPF 30	No	Yes
Australian Gold Botanical Sunscreen Spray SPF 50	No	Yes
Australian Gold Botanical Instant Bronzer Spray SPF 8	No	Yes
Australian Gold Botanical Instant Bronzer Spray SPF 15	No	Yes
Australian Gold Botanical Instant Bronzer Spray SPF 30	No	Yes

Table 20. Sunscreen products available for sale at Target in Maui, Hawai‘i, October 2021

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 50 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Sunscreen Lotion Broad Spectrum SPF 30 - 8 Oz	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 30	No	Yes
Banana Boat Ultra Sport Performance Clear Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Banana Boat Kids Mineral Sunscreen Lotion Broad Spectrum SPF 50 - 6 Oz	**Yes**	**Yes**
Banana Boat Kids Sport Tear & Sting Free Sunscreen Lotion Spray Broad Spectrum SPF 50 - 6 Oz	No	Yes
Banana Boat Kids Mineral Foam SPF 50	**Yes**	**Yes**
Banana Boat Kids Mineral Enriched SPF 50	No	Yes
Banana Boat Sport Mineral Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Banana Boat Sport Mineral Sunscreen Spray Broad Spectrum SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 50	No	Yes
Coppertone Sport Sunscreen High Performance Lotion Broad Spectrum SPF 30	No	Yes
Coppertone Sunscreen Lotion Water Babies Pure & Simple SPF 50	**Yes**	**Yes**
Coppertone Water Babies Sunscreen Lotion Spray Broad Spectrum SPF 50	No	Yes
Neutrogena Clear Face Liquid-Lotion Sunscreen Break-Out Free Spf 30	No	Yes
Neutrogena Sheer Zinc Sunscreen Protection Dry Touch Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Sheer Zinc Kids Broad Spectrum SPF 50	**Yes**	**Yes**
Neutrogena Beach Defense Sunscreen Lotion Water + Sun Protection Spf 70	No	Yes
Neutrogena Ultra Sheer Sunscreen Face & Body Stick Spf 70	No	Yes
Neutrogena Invisible Daily Defense Sunscreen Lotion Spf 60	No	Yes
Hawaiian Tropic Sheer Touch Lotion Sunscreen Ultra Radiance Broad Spectrum SPF 15	No	Yes

Table 20. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Hawaiian Tropic Island Sport Sunscreen Lotion Broad Spectrum SPF 30	No	Yes
Aveeno Baby Natural Protection Sunscreen Lotion Broad Spectrum SPF 50	**Yes**	**Yes**
Alba Botanica Sunscreen Tropical Fruit Kids Clear Spray Broad Spectrum SPF 50	No	Yes
Alba Botanica Hawaiian Sunscreen green tea Broad Spectrum SPF 45	No	Yes
ALL Good Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Mineral Sport Sunscreen SPF 30	**Yes**	**Yes**
ALL Good Kids Spray Sunscreen SPF 30	**Yes**	**Yes**
Raw Elements Face and Body SPF 30	**Yes**	**Yes**
Raw Elements Face Stick SPF 30	**Yes**	**Yes**
Land Shark SPF 30, 6.5 oz.	No	Yes
Land Shark SPF 20, 6.5 oz.	No	Yes
Hawaiian Blend Sensitive Skin SPF 50	No	Yes
Hawaiian Blend Essentials SPF 30	No	Yes
Hawaiian Blend Extreme Sport SPF 30	No	Yes
Hawaiian Blend Extreme Sport SPF 30	No	Yes
Hawaiian Blend Extreme Sport Spray SPF 30	No	Yes
Hawaiian Blend Extreme Essentials Spray SPF 30	No	Yes
Hawaiian Blend Extreme Sensitive Spray SPF 50	No	Yes
Hawaiian Blend Broad Spectrum Lip Protection SPF 45	No	Yes
Sun Bum Mineral SPF 30	**Yes**	**Yes**
Sun Bum Baby Bum Stick Mineral SPF 50	**Yes**	**Yes**
Sun Bum Face Broad Spectrum SPF 50	No	Yes
Sun Bum Face Mist SPF 45	No	Yes
Sun Bum Face Broad Spectrum SPF 70	No	Yes
Sun Bum SPF 30 Broad Spectrum	No	Yes
Sun Bum SPF 50 Broad Spectrum	No	Yes

Table 20. Continued

Sunscreen Brand	Reef-Safe	Meets HI Legislation
Sun Bum SPF 50 Sunscreen Spray	No	Yes
Sun Bum SPF 70 Sunscreen Spray	No	Yes
Bare Republic Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
Bare Republic Mineral Sunscreen Spray SPF 50	**Yes**	**Yes**
Blue Lizard Australian Sunscreen Kids Mineral-Based Sunscreen SPF 30	No	Yes
Blue Lizard Australian Sunscreen Active Mineral-Based Sunscreen SPF 30	**Yes**	**Yes**
Blue Lizard Australian Sunscreen Sensitive Mineral-Based Sunscreen SPF 30	**Yes**	**Yes**
Babyganics Mineral Sunscreen SPF 50	**Yes**	**Yes**
Babyganics Mineral Sunscreen Spray SPF 50	No	Yes
Babyganics Mineral Sunscreen Stick SPF 50	**Yes**	**Yes**
Pacifica Mineral Sunscreen Broad Spectrum Sunscreen SPF 50	**Yes**	**Yes**
Target Brand Mineral Sunscreen Spray SPF 30	**Yes**	**Yes**
Target Brand Mineral Sunscreen Spray SPF 50	**Yes**	**Yes**
Target Brand Mineral Sunscreen Lotion SPF 30	**Yes**	**Yes**
Target Brand Mineral Sunscreen Lotion SPF 50	**Yes**	**Yes**
Target Brand Sunscreen Sport Spray SPF 15	No	Yes
Target Brand Sunscreen Sport Spray SPF 30	No	Yes
Target Brand Sunscreen Sport Spray SPF 50	No	Yes
Target Brand Sunscreen Sport Broad Spectrum SPF 50	No	Yes
Target Brand Sunscreen Kids Spray SPF 50	No	Yes
Target Brand Sunscreen Kids Mineral Broad Spectrum SPF 50	**Yes**	**Yes**

APPENDIX D: EXAMPLES OF MARKETING AND BRANDING

Figure 36. (Left) Hawaiian Tropic broad spectrum sunscreen marketed as reef-friendly. Walmart, Maui, Hawai‘i. (Right) Banana Boat Sport spray sunscreen marketed as reef-friendly. Foodland, Maui, Hawai‘i.

Figure 37. (Left) Hawaiian Tropic broad spray sunscreen marketed as reef-friendly. Times, Maui, Hawai‘i. (Right) Target brand broad spectrum sunscreen marketed as reef-conscious. Target, Maui, Hawai‘i.

APPENDIX E: REEF-SAFE / MINERAL-BASED SUNSCREEN PRODUCTS AND PRICING

Figure 38. (Left) Baby Bum Mineral Sunscreen (~$14.99). (Center) Red Gecko Broad Spectrum Sunscreen (~$16.99). (Right) All Good Kid's Sunscreen Spray (~$16.99).

APPENDIX E: CONTINUED

Figure 39. (Left) Babyganics Mineral Sunscreen (~$12.99). (Center) Maui Vera Broad Spectrum Sunscreen (~$14.99). (Right) Raw Elements Broad Spectrum Sunscreen (~$18.99).

APPENDIX F: REEF-FRIENDLY SUNSCREEN PRODUCTS AND PRICING

Figure 40. (Left) Banana Boat Simply Protect Spray Sunscreen (~$10). (Center) Alba Sensitive Spray Sunscreen (~$11.49). (Right) Neutrogena Ultra Sheer Sunscreen (~$13.99).

APPENDIX F: CONTINUED

Figure 41. (Left) Banana Boat Simply Sport Spray Sunscreen (~$12.29). (Center) Hawaiian Tropic Broad Sheer Touch Spectrum Sunscreen (~$12.49). (Right) Hawaiian Tropic Island Sport Sunscreen (~$12.99).

County Clerk

From: Lisa Bishop <lisa.fohb@gmail.com>
Sent: Thursday, December 16, 2021 2:32 PM
To: County Clerk
Cc: Kelly King; Ellen B. McKinley; Axel I. Beers
Subject: Testimony for 17 December 2021 Maui County Council Meeting
Attachments: Maui Council Bill 21-135 12.16.21.pdf; NAS-EPA.pdf; NAS Kahele 3.15.21 short.pdf

Aloha,

Please include the attached testimony and two additional attached letters in tomorrow's discussion of Agenda Item CC 21-557.

Mahalo,

Lisa Bishop
President
Friends of Hanauma Bay
(808) 748-1819

——

Dedicated to the conservation of coastal and marine environments, emphasizing stewardship of the natural resources of Hanauma Bay

Council of the County of Maui
Regular Meeting of December 17, 2021 9:00 a.m.
Meeting Site: Online Only
via BlueJeans link https://maui.bluejeans.com/295235670

December 16, 2021

Re: CC 21-557 MAYOR comments relating to Bill 135 (2021) entitled "A BILL FOR AN ORDINANCE ESTABLISHING CHAPTER 20.42, MAUI COUNTY CODE, TO PROHIBIT THE SALE, USE, OR DISTRIBUTION OF NON-MINERAL SUNSCREENS".

Aloha Maui County Council,

Mahalo for the opportunity to testify on agenda item CC 21-557.

The Mayor's comments on Bill 135 (2021) signal that his "administration is prepared to reevaluate the ordinance and if applicable, propose changes to the Council following the findings of the National Academies of Sciences, Engineering and Medicine in the Spring of 2022," prior to the effective date of the law.

He states that "coral reefs face **graver dangers** through increasing ocean temperatures and levels of carbon dioxide in seawater, and increasing levels of trash and micro-plastics from improper disposal and stormwater runoff. Without addressing these types of global threats to coral reefs, our marine ecosystems will still continue to face an uphill battle."

We agree that coral reefs face multiple threats that Councilmember King and others are also working to address, but it is difficult to understand the Mayor's logic that because "coral reefs face graver dangers…" there is no reason to enact this "first step" to remove toxic substances like organic sunscreens from Hawaii's waters to protect coral and all that live within the reef.

That's like telling a cancer patient that there is no point in setting a broken arm because (s)he is undegoing long-term chemotherapy… Complications from an untreated bone fracture will adversely affect a patient's ability to fight the cancer. You fix the broken arm because the whole person deserves and benefits from a holistic approach to health management. Similarly, our fragile marine ecosystems will not survive to thrive under climate change or vast marine debris accumulations unless we eliminate toxic substances like non-mineral sunscreens from the water. It all begins with the water. **If the water is toxic, marine environments cannot survive**. And unlike stopping climate change, eliminating toxic substances like non-mineral sunscreens from the water is an immediateoy achievable goal with no cost to the State of Hawai'i. All it takes is the dedicated leadership that passed Bill 135 (2021).

The FDA is responsible for Human Health and Safety, and NOAA is responsible for U.S. National Marine Sanctuaries. **The NAS has absolutely no jurisdiction over sunscreen regulations for people or environmental impacts to coral reefs**.

The FDA has determined only zinc oxide and titanium dioxide are Generally Recognized as Safe and Effective (GRASE) for use in sunscreens. All other non-mineral organic active ingredients in sunscreens are Not GRASE. https://www.fda.gov/drugs/understanding-over-counter-medicines/questions-and-answers-fda-posts-deemed-final-order-and-proposed-order-over-counter-sunscreen

Q. What is FDA proposing for sunscreen active ingredients in the proposed order?

A. To establish a final order for sunscreens, FDA is reviewing the active ingredients in these products to determine whether sunscreens with such ingredients are generally recognized as safe and effective (GRASE) for OTC sunscreen use. This proposed order applies only to sunscreen active ingredients listed in the 1999 stayed (not in effect) final monograph. FDA is proposing the following categories of sunscreen ingredients:

GRASE* for use in sunscreens	Not GRASE for use in sunscreens because of safety concerns	Not GRASE for use in sunscreens because additional data needed
Zinc oxide and titanium dioxide	Aminobenzoic acid (PABA) and trolamine salicylate	Cinoxate, dioxybenzone, ensulizole, homosalate, meradimate, octinoxate, octisalate, octocrylene, padimate O, sulisobenzone, oxybenzone, avobenzone

*GRASE= Generally Recognized as Safe and Effective, when also in conformity with all other applicable requirements.

Q: Why are titanium dioxide and zinc oxide the only proposed GRASE ingredients?

A. FDA's review of publicly available evidence has found sufficient safety data on both zinc oxide and titanium dioxide to support a proposal that sunscreen products containing these ingredients (at concentrations of up to 25%) are GRASE.

Top

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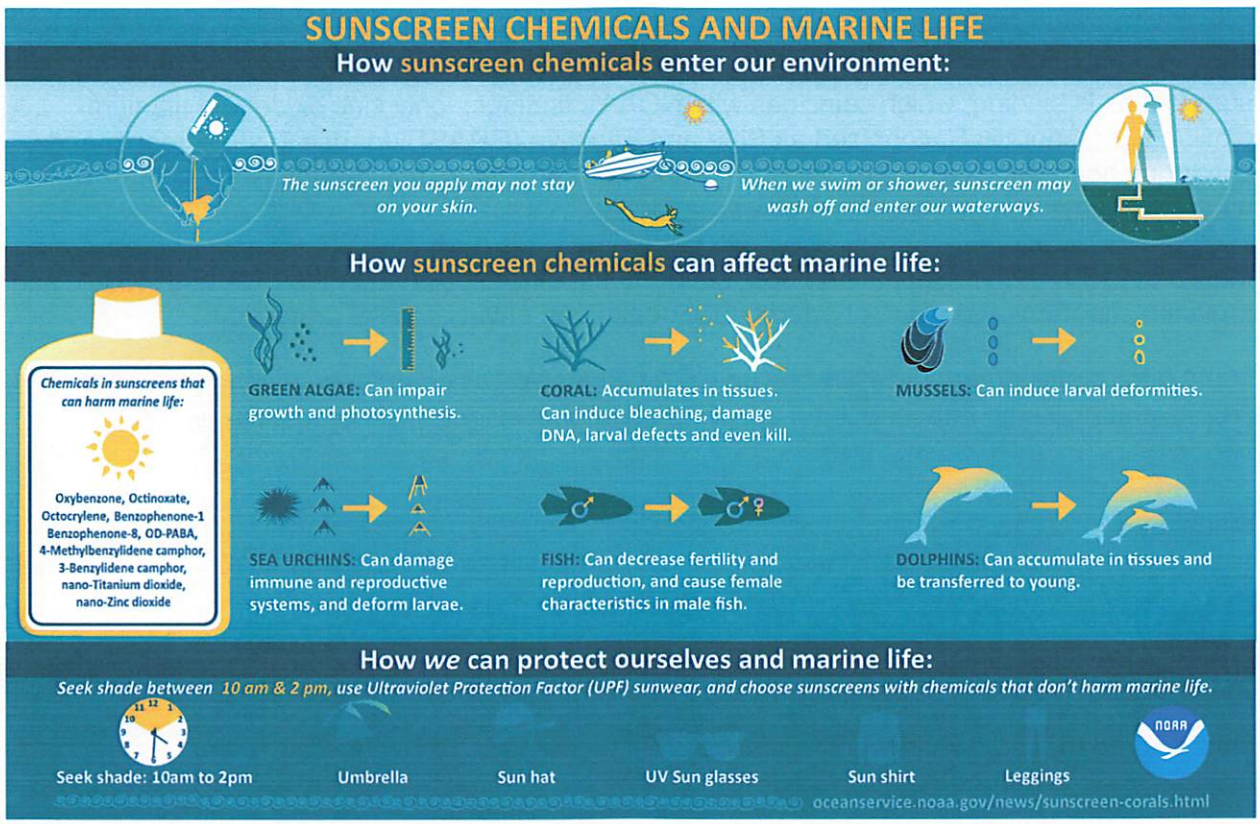
NOAA has determined that common chemicals used in thousands of products to protect against harmful effects of ultraviolet light threaten corals and other marine life:

https://oceanservice.noaa.gov/news/sunscreen-corals.html



The on-going NAS ad hoc committee reviewing the state of science on use of sunscreen ingredients currently marketed in the US is reviewing the same studies that underpin the official positions the FDA and NOAA have already taken on the issue: **only zinc oxide and titanium dioxide are GRASE**.

However, Industry lobbied for this NAS review, and has used waiting for the NAS review as a means of stopping any further sunscreen legislation in Hawai'i and elsewhere.

https://www.happi.com//issues/2021-04-04/view_sunscreen-filter/the-politics-of-sunscreens-are-heating-up/

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An astounding 75% of the panelists selected for this committee have deep and public financial ties with Industry. Concern over this clear conflict of interest was outlined in letters to members of Hawaii's US Congressional Delegation and the EPA by Hawaii organizations representing thousands of residents. We urge the Maui Council to enter these attached letters into the public record for the 17 December 2021 Council meeting.

In summary, the NAS has no jurisdiction on sunscreens, so any comments NAS makes on the state of the science on sunscreens is purely advisory. Only the FDA's determination on sunscreens is binding, which coincides with NOAA's findings: only zinc oxide and titanium dioxide are Generally Recognized as Safe and Effective (GRASE) for use in sunscreens, and common chemicals used in thousands of products to protect against harmful effects of ultraviolet light threaten corals and other marine life.

Maui's Bill 135 (2021), Ordinance 5306, supports the official position of the FDA and NOAA, and provides important and much needed public health and environmental protection.

Mahalo for considering our testimony on CC 21-557 MAYOR comments relating to Bill 135 (2021), and hope the attached letters provide additional insight into our testimony.

Sincerely,

Lisa Bishop
President
(808) 748-1819

PO BOX 25761, Honolulu, Hawaii 96825-0761 * website: www.friendsofhanaumabay.org * email: info@friendsofhanaumabay.org
Friends of Hanauma Bay is a Section 501(c)(3) not-for-profit charitable organization
Federal Tax Identification Number 99-0285649

On Behalf of the Hawai'i Coral Reef Stakeholders Hui

Michael S. Regan **29 March 2021**

Administrator
Environmental Protection Agency
Mail Code 1101A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Aloha Administrator Regan,

The Hawaii Coral Reef Stakeholders Hui includes over 50 organizations, businesses, individuals and eminent scientists from around the world including Canada, France, Israel, Iran, and China. Collectively, the Hui speaks for more than one thousand citizens from Hawai'i and across the country.

We are deeply concerned about the bias of the participants selected by the National Academy of Sciences (NAS) for the recently convened study on the *Environmental Impact of Currently Marketed Sunscreens and Potential Human Impacts of Changes in Sunscreen Usage* sponsored by the Environmental Protection Agency (EPA).

https://www.nationalacademies.org/our-work/environmental-impact-of-currently-marketed-sunscreens-and-potential-human-impacts-of-changes-in-sunscreen-usage

In this study, the EPA has tasked the NAS to review the environmental harms of chemical sunscreens and balance them against the products 'benefits. This process will take the place of a risk assessment which EPA lacks authority to conduct because the products are regulated by the Food and Drug Administration (FDA).

Although the study is supposed to be conducted by unbiased experts, nine out of twelve of the participants selected by the NAS have a financial conflict of interest and are propagandists for the Personal Care Products Council and associated corporations (collectively, the Petrochemical Sunscreen Industry). The Petrochemical Sunscreen Industry directly funds their research, pays them consulting fees, and funds their employers.

Founded in 1863 as a result of an Act of Congress, the NAS is charged with providing independent, objective advice to the nation on matters related to science and technology. NAS's selection of these panelists with clear conflicts of interest puts in doubt the integrity and the outcome of this important consensus report to Congress. Stacking the deck with paid Petrochemical Sunscreen Industry scientists and propagandists also significantly undermines public confidence in the integrity of the scientific process used by the NAS, and the judgment of the EPA.

The following publicly available information shows that nine of the twelve panelists NAS selected for the study have clear ties to the Petrochemical Sunscreen Industry which compromises the legitimacy and integrity of the study:

1. Charles Menzie (Chair) - currently works for Exponent, Inc., a leader in litigation defense and regulatory science. It is a go-to destination for major industries with liability problems which accepts money from the Petrochemical Sunscreen Industry, including members of the American Chemistry Council.

https://www.exponent.com/professionals/m/menzie-charles-a

https://business-ethics.com/2016/12/13/1724-big-companies-in-legal-scrapes-turn-to-science-for-hire-giant-exponent/

2. Scott Belanger - recently retired from the "Global Product Stewardship Global Capability Organization (Environmental Stewardship and Sustainability) of the Procter & Gamble Company". He has long argued that the volume-use of surfactants has no environmental impact.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4130171/pdf/best44_1893.pdf

3. Karen Glanz – appears to have already determined the impact of sunscreens on coral before the NAS panel discussions even started. She co-authored an Op-Ed for the Honolulu Star Advertiser with Kevin Cassel (also appointed to the Study) titled "Sunscreens save lives, have limited impact on coral reefs" (https://www.staradvertiser.com/2018/03/29/editorial/island-voices/sunscreens-save-lives-have-limited-impact-on-coral-reefs/#story-section) whereby she and Cassel lobby against Hawaii's 2018 ban on sale of sunscreens containing the petrochemicals oxybenzone and octinoxate. Additionally, "Sunscreens Save Lives" is a J&J tag line that was used for promoting inappropriate information on High SPF sunscreens to Florida citizens via the Sun Safe Florida web site. The site "sunsafeflorida.com" is no longer on-line, and nothing has been posted on their Twitter page (https://twitter.com/SunSafeFlorida) since October 2019.

4. Kevin Cassel - is not an expert on sunscreens but has received funding from the Petrochemical Sunscreen Industry. He co-authored an Op-Ed for the Honolulu's Star Advertiser with Karen Glanz titled "Sunscreens save lives, have limited impact on coral reefs" (https://www.staradvertiser.com/2018/03/29/editorial/island-voices/sunscreens-save-lives-have-limited-impact-on-coral-reefs/#story-section) that claims sunscreens prevent skin cancer and have limited impacts on coral reefs.

5. Carys Mitchelmore – has recently written two papers: one sponsored by, and one co-authored by, the Personal Care Products Council that tries to argue that coral is not negatively impacted by petrochemical sunscreens. Her recent endeavor outlines what she perceives as the problems with the existing nine coral papers currently in the scientific literature. Again, it appears that she determined the outcome of the NAS panel before it convened.

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9. Kanade Shinkai – a respected dermatologist from the University of San Francisco, California who has co-authored two papers in JAMA Dermatology (she is the editor) addressing the FDA Matta et al publications demonstrating the significant absorption levels of sunscreen into the blood via whole body application. The review of the data is well done. However, her bottom line to dermatologists is that the presence of these materials in the blood at levels significantly above the concern for systemic toxicity is still considered safe, regardless of the significant body of scientific data published in the literature, as noted by the FDA.

It bears repeating: nine of the twelve panelists - 75% - have a financial conflict of interest and are propagandists for the Personal Care Products Council and the Petrochemical Sunscreen Industry.

NAS has stipulated that members of the study cannot be compensated by the Petrochemical Sunscreen Industry during the study. However, the panelists have accepted compensation from the Petrochemical Sunscreen Industry to promote Industry narratives before their selection to the panel, thereby delaying legislative decisions about petrochemical UV filters in sunscreens, and manufacturing doubt about the hundreds of peer-reviewed studies documenting the threats of these UV filters to public and environmental health.

A recent study published March 8, 2021 https://pubs.acs.org/doi/pdf/10.1021/acs.chemrestox.0c00461 confirms that the petrochemical octocrylene in sunscreens degrades into benzophenone, a known mutagen, carcinogen, and endocrine disruptor. Its presence in food products or food packaging is already banned in the United States. **Under California's Proposition 65, there is no safe harbor for benzophenone in any personal care products, including sunscreens, anti-aging creams, and moisturizers.**

Congress failed to act on the dangers of tobacco, glyphosate, neonicotinoids, and PFAS (poly and perfluoroalkyl substances) - the "forever chemicals" that contaminate our drinking water and almost everything we touch, wear, and use. If the NAS study continues with so many participants with ties to the Petrochemical Sunscreen Industry, this most recent study, and hundreds of other important studies over the last 20 years, may be ignored because they do not support the Petrochemical Sunscreen Industry narratives. If Congress informs policy with the results of such a compromised study, it will once again allow endangerment of societal and environmental health for generations. Our country's public health, as well as our nation's fragile marine ecosystems, are depending on impartial professionalism from this panel.

There are too many alarming similarities between this panel and the International Wildlife Conservation Council (IWCC), a committee that was similarly stacked with biased members, that drew public outrage, and ultimately a lawsuit. Like the IWCC, this NAS sunscreen panel embodies the "fox in the henhouse" scenario, endangering the very public and environmental health it is supposed to be protecting.

https://blog.humanesociety.org/2019/10/illegal-government-advisory-panel-touts-benefits-of-trophy-hunting.html?credit=blog_post_021020_id11194

https://blog.humanesociety.org/2020/02/breaking-news-lawsuit-prompts-shutdown-of-trophy-hunters-panel-in-trump-administration.html

We therefore respectfully request that the current study be paused, and the panel dissolved. We ask that the EPA require the NAS to select a new panel of participants with no financial ties to the Petrochemical Sunscreen Industry, and who do not otherwise serve as propagandists for the Personal Care Products Council and associated corporations.

Furthermore, we have requested Congressional oversight over this consensus study to ensure its legitimacy and unbiased rigor. Our country's public health and marine ecosystems deserve an impartial study from our premier scientific body, and the NAS and EPA should want to ensure the integrity of its scientific process.

We have shared these concerns and recommendations with US Senators and Representatives across the country, and our concerns have gained Congressional attention.

Mahalo nui loa for your assistance with this very important issue!

On behalf of the Hawai'i Coral Reef Stakeholders Hui,

Lisa Bishop
President
Friends of Hanauma Bay
(808) 748-1819

Haereticus Environmental Laboratory

Environmental Caucus of The Democratic Party of Hawai'i

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The Honorable Kaiali`i Kahele
1205 Longworth HOB
Washington, DC 20515

99 Aupuni St
Suite 118
Hilo, HI 96720

15 March 2021

Aloha Congressman Kahele,

Founded in 1990, Friends of Hanauma Bay is a 501(c)(3) non-profit dedicated to the conservation of coastal and marine environments, emphasizing stewardship of the natural resources of Hanauma Bay.

We are deeply concerned about the bias of the participants selected by the National Academy of Sciences (NAS) for the recently convened study on the *Environmental Impact of Currently Marketed Sunscreens and Potential Human Impacts of Changes in Sunscreen Usage.*

https://www.nationalacademies.org/our-work/environmental-impact-of-currently-marketed-sunscreens-and-potential-human-impacts-of-changes-in-sunscreen-usage

Although the study is supposed to be conducted by unbiased experts, nine out of twelve of the participants selected by the NAS have a financial conflict of interest and are propagandists for the Personal Care Products Council and associated corporations (collectively, the Petrochemical Sunscreen Industry). The Petrochemical Sunscreen Industry directly funds their research, pays them consulting fees, and funds their employers.

Founded in 1863 as a result of an Act of Congress, the NAS is charged with providing independent, objective advice to the nation on matters related to science and technology.

NAS's selection of these panelists with clear conflicts of interest puts in doubt the integrity and the outcome of this important consensus report to Congress. Stacking the deck with paid Petrochemical Sunscreen Industry scientists and propagandists also significantly undermines public confidence in the integrity of the scientific process used by the NAS.

The following publicly available information shows that nine of the twelve panelists NAS selected for the study have clear ties to the Petrochemical Sunscreen Industry which compromises the legitimacy and integrity of the study:

1. Charles Menzie (Chair) - currently works for Exponent, Inc., a leader in litigation defense and regulatory science. It is a go-to destination for major industries with liability problems which accepts money from the Petrochemical Sunscreen Industry, including members of the American Chemistry Council.

https://www.exponent.com/professionals/m/menzie-charles-a

https://business-ethics.com/2016/12/13/1724-big-companies-in-legal-scrapes-turn-to-science-for-hire-giant-exponent/

2. Scott Belanger - recently retired from the "Global Product Stewardship Global Capability Organization (Environmental Stewardship and Sustainability) of the Procter & Gamble Company". He has long argued that the volume-use of surfactants has no environmental impact.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4130171/pdf/best44_1893.pdf

3. Karen Glanz – appears to have already determined the impact of sunscreens on coral before the NAS panel discussions even started. She co-authored an Op-Ed for the Honolulu Star Advertiser with Kevin Cassel (also appointed to the Study) titled "Sunscreens save lives, have limited impact on coral reefs" (https://www.staradvertiser.com/2018/03/29/editorial/island-voices/sunscreens-save-lives-have-limited-impact-on-coral-reefs/#story-section) whereby she and Cassel lobby against Hawaii's 2018 ban on sale of sunscreens containing the petrochemicals oxybenzone and

octinoxate. Additionally, "Sunscreens Save Lives" is a J&J tag line that was used for promoting inappropriate information on High SPF sunscreens to Florida citizens via the Sun Safe Florida web site. The site "sunsafeflorida.com" is no longer on-line, and nothing has been posted on their Twitter page (https://twitter.com/SunSafeFlorida) since October 2019.

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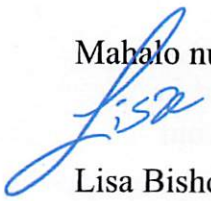
PO BOX 25761, Honolulu, Hawaii 96825-0761 * website: www.friendsofhanaumabay.org * email: info@friendsofhanaumabay.org
Friends of Hanauma Bay is a Section 501(c)(3) not-for-profit charitable organization
Federal Tax Identification Number 99-0285649

Mahalo nui for your assistance in this matter!



Lisa Bishop
President
Friends of Hanauma Bay
(808) 748-1819

County Clerk

From: Stan Franco <stanfranco9114@gmail.com>
Sent: Thursday, December 16, 2021 3:06 PM
To: County Clerk
Subject: Maui County Council Meeting

I will not be able to give oral testimony at your meeting tomorrow so these are my thoughts on Mayor Victorino's veto of Bill No. 111:

1. On the transfer of the eligibility list from developers to the County, I say that this makes the list accountable to the public. Where private developers are interested in profitability, the County must represent the interest of the public. Therefore, it is logical the County should maintain the eligibility list in the public's interest.

2. Concerning the change from 90 days to 120 days for housing built for a particular income group, I see this as a way to assure that homes go to those with the most need. If the County will be subsidizing these homes, we should make every effort to assure that the housing needs of folks in each income group are met. Therefore, we have to prepare our people to be ready to take title to the homes that they need and at incomes they earn. Also, on upcoming housing projects, I suggest that how to sign up for them should be the responsibility of the County of Maui or its designee.

3. In my involvement with the public meetings held by Hawaiian Community Assets in the development of the CAHP, I heard over and over again that our people wanted homes to be built for local residents. I believe that the new durational residency preference is a way to accomplish what the public asked for from the CAHP. The current language was discussed over and over again before the current language was agreed upon. Why do we need to discuss this again?

In general, Mayor Victorino claimed that the current bill may put the County of Maui in a legally challenged position. If we are going to worry about potential legal action, we would not take any action. We should be smart when we are creating legislation, but it should not freeze us from acting. Our community is calling us to act and indeed we must act.

Therefore, I ask the Maui County Council to override Mayor Victorino's veto.

Thank you so much for your foresight in moving our community to action in our housing crisis.

Stan Franco
214-3575