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<https://escholarship.org/uc/item/7r8226f6>

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### Publication Date

2019-06-01

# Understanding Sustainability Behavior: Leveraging Behavioral Decision Research to Drive Sustainable Actions in the Surf Community

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Capstone Report  
Master of Advanced Studies, Marine Biodiversity & Conservation

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June 11, 2019



**Center for Marine  
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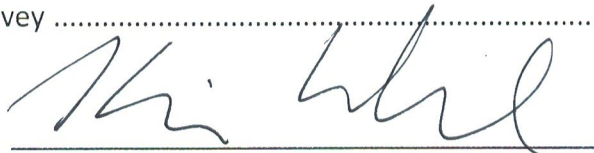
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## **ABSTRACT**

Climate change is an invisible, diffuse, and long-term threat that requires individual behavior change on a global scale in order to help mitigate its effects. However, people have a difficult time matching their behavior to their attitudes despite having good intentions. This attitude-behavior gap is especially large in sustainability issues. Using an online survey, this project partnered with non-profit organization Sustainable Surf and specifically focuses on the surf community. It leverages the fields of decision science and behavioral economics to understand why the contradiction between attitudes and behavior exists and how to address it.

The nature of surfing provides a direct relationship with the ocean, and our data shows that surfers are more likely to engage in climate-friendly behaviors than those who do not surf. However, they still face barriers to action and need help making better decisions for themselves and the environment. Surf industry stakeholders, such as brands, surfboard shapers, media, and competition platforms have the greatest potential to shape these decisions towards achieving personal and community benefits. Surfing as a sport also has the ability to influence those who have never surfed before but have some connection to the culture, either through a desire to learn or an engagement with surf competitions. Surfers and the surf industry can set an example of widespread behavior change, which can potentially lead to policy change. To help surf stakeholders catalyze this transition, we have identified a list of potential strategies based in behavioral decision research at the end of this report.

## INTRODUCTION

*Background* | Climate change is a time-sensitive issue that requires a rapid solution, including behavior change at an individual level. However, it is also an invisible, diffuse, and long-term problem. People do not receive immediate and tangible feedback or results from their actions. Therefore, the attitude-behavior gap, or the disconnect between what individuals say about their attitudes and what they actually do, is large in sustainability issues, often due to mental, financial, or educational barriers.<sup>31</sup> It is difficult for individuals to break through entrenched behaviors despite having sustainable attitudes or intentions. This study utilizes the fields of decision science and behavioral economics as interdisciplinary tools to understand how individuals in the surf and broader community make daily lifestyle choices, learn what barriers they face to living sustainable lifestyles, and identify possible behavioral interventions that may help address this gap and mitigate climate change effects.

Decision science is an interdisciplinary field of study that seeks to understand and improve the judgment and decision-making of individuals, groups, and organizations under risk and uncertainty.<sup>10</sup> It leverages behavioral and analytical approaches to understanding human decision making and is grounded in psychology, economics, business, philosophy, and statistics.<sup>27</sup> One focus of decision science is behavioral economics, a related field that identifies biases in economic decisions that vary from classical economic theory.<sup>23</sup> The differences between these two fields are nuanced, and for the purposes of this project will be used interchangeably. Both fields recognize that people make suboptimal decisions due to impulse, emotion, impatience, or restrictions in human information processing. In the sectors of finance, health care, and even nutrition, insights based in these fields have had profound impact on policy and behavior change. However, these same principles have been largely untapped in most other applications, including marine sciences and conservation.<sup>22</sup>

This study has partnered with Sustainable Surf, a 501(c)(3) non-profit organization with the mission to “be the catalyst that transforms surf culture into a powerful force for protecting the ocean playground.”<sup>28</sup> Their strategy is to change the narrative by taking a systems change

perspective based on Donella Meadow's paper "Leverage Points: Places to Intervene in a System" in order to achieve market transformation.<sup>35, 18</sup> Their campaigns involve both surfing individuals and the surf industry to solve critical environmental issues such as climate change, marine plastic pollution, and ocean acidification.<sup>28</sup> Their ECOBOARD project is the first third party ecolabel for surfboards, focusing on the use of sustainable materials while still maintaining a high performance level.<sup>33</sup> Since its launch in 2012, over 150,000 ECOBOARDS have been made by over 100 brands.<sup>33</sup> As a leader in the sustainability and surfing space and having contributed to several publications,<sup>9</sup> Sustainable Surf openly embraces new approaches to solve the most pressing ocean issues.

This project specifically focuses on Sustainable Surf's Deep Blue Life educational campaign, which inspires individuals (surfers and those connected to surf culture) to adopt a low-carbon, ocean-friendly lifestyle by making better choices daily.<sup>29</sup> In order to change the question from "Why should I?" to "Why shouldn't I?", their Deep Blue Life actions not only reduce an individual's impact on the ocean but also provide them tangible short- and long-term benefits.<sup>30</sup> Sustainable Surf has identified the surf community as current stakeholders who are most ready to make a change due to their already vested interest to protect their ocean playground.<sup>30</sup> Surfing allows for direct and repeated engagement with nature and opens up a pathway to experience coastal and wider systemic transitions, including climate change.<sup>7</sup> The surfing community has also increased its environmental and social activism and engagement over the past three decades.<sup>7</sup> However, their behavior can sometimes contradict their attitudes, and the reasons are not clear.<sup>17</sup> This is an opportunity to create awareness for decision science as an emerging tool to develop a deeper understanding on what motivates surfers and the broader community to make pro-environmental actions.

This study was conducted through an online survey, sampling the global adult community. Building upon Sustainable Surf's strategy, we hypothesized that the surf community engages more in sustainable behaviors because of their personal stake in ocean health. Despite this, they still may not live a climate positive lifestyle due to barriers they face or decisions they

might make simply based on how choices are presented to them. The primary goal of this study is to identify possible behavioral interventions that may be effective at unlocking the barriers to action for surfers and even beyond. In doing so, it may also raise awareness for leveraging decision science and behavioral economics as tools to further marine conservation efforts. Due to the parameters of this project, further research is needed, but this report can serve as a foundation to future work.

35 million people globally consider surfing to be one of their pastimes,<sup>8</sup> and youth marketing research has shown that surfing is the number one sport that teenagers and young adults, ages 14-24, want to learn.<sup>35</sup> This implies surfing's ability to reach beyond and influence those who have never surfed before. Surfing stakeholders like surf competitions, clothing brands, surfboard brands, and surf media can have greater influence on sustainability and conservation if they have better tools to communicate to their followers and customers. The list of qualified recommendations at the end of this report is directed at those stakeholders to help catalyze that transition. If these messages take hold, they can further extend to municipalities and policy makers. Examples of successful advocacy and policy change have been demonstrated by surfers and surf organizations to protect overcrowding surf breaks on the Gold Coast, Australia,<sup>8</sup> and prevent coastal development at Trestles surf break,<sup>17</sup> leading to economic and social benefits.<sup>8</sup>

*Literature Review* | Reddy et al. (2016) discusses how current conservation science focuses on nature and its ecosystem services rather than targeting the science behind human behavior.<sup>22</sup> They formulated seven guiding questions for applying behavioral insights specifically to conservation policy, such as adaptive management and conservation planning.<sup>22</sup> The questions focus on defining the behavior change problem, gathering evidence to inform behavior change approaches (awareness, incentives, nudges), and evaluating the success of the interventions to improve policy.<sup>22</sup>

The Surfrider Foundation conducted a socioeconomic and recreational profile of surfers in the United States to understand the demographics of these coastal users.<sup>34</sup> Surfing is a multi-billion

dollar industry, but not much is known about surfers' backgrounds.<sup>34</sup> They profiled that the average surfer is a 34-year old male who earns \$75,000 per year and spends \$40 per visit to a surf site, contributing to the local economy.<sup>34</sup> This purchasing potential creates a behavior change opportunity for sustainability.

Sustainable Surf, in collaboration with Dr. Gregory Borne from Plymouth Marjion University, conducted a "Deep Blue Survey" in 2018 to explore surfers' ability to engage with sustainability as well as lead on these issues.<sup>6</sup> They found that being in nature was the most significant motivation for surfing, and all respondents considered themselves to be environmentally aware.<sup>5</sup> Respondents felt that they acted in an environmentally friendly way, but did identify infrastructure, money, and information as their main barriers.<sup>5</sup> The survey results also revealed that evoking concern about the environment through risk association was a prominent factor in activating behavior.<sup>5</sup> Surfers felt a connection to their global community, but when asked about responsibility for environmental problems, presented a contradiction between self-responsibility and a transfer of responsibility diffused amongst "everyone."<sup>5</sup>

*Discussion of Decision Science and Behavioral Economics* | Decision science and behavioral economics are related experimental fields. Decision science uses quantitative techniques to inform individual decision-making under risk and uncertainty, and behavioral economics applies psychology to explain economic decision-making. Both are based on the premise that people's decisions and judgment vary from those implied by standard economic theory. Rather than assuming that humans are rational information processors – calculating, logical, unemotional, patient – these fields acknowledge that human decisions are not always optimal, and the decision-making process is not always straightforward. Restrictions in information processing, biases, and irrationality prevent benefit-maximizing choices. Rather than focusing on traditional information- and incentive-based solutions, behavioral economics works on the understanding that *how* choices are presented matters.

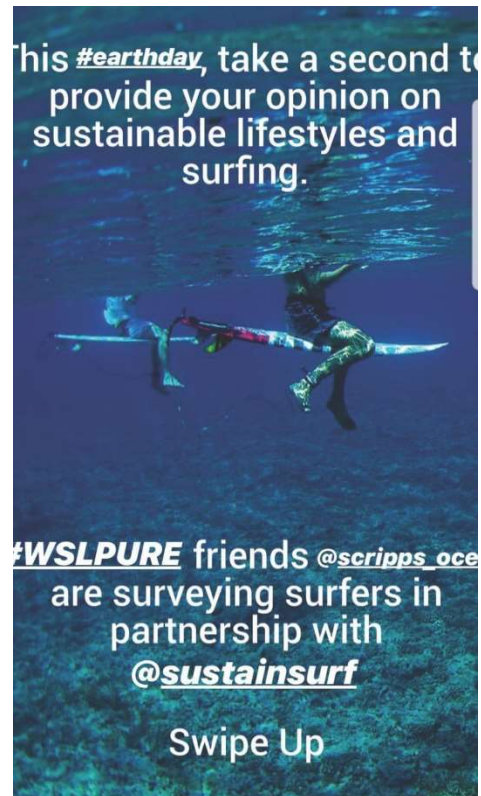


Simply put, people do not always know what is best for them and even when they do, they cannot always act on that understanding. Traditional direct choice solutions, like taxes or bans, are not creative interventions and create discomfort with their “heavy-handed paternalism.” The alternative solution is “libertarian paternalism,” a policy implementation that improves the welfare of those behaving suboptimally without limiting the freedom of choice of those behaving optimally.

## METHODOLOGY

*Survey and Procedures* | A quantitative online survey was created for primary data collection. The survey was modeled after Sustainable Surf’s 2018 Deep Blue Survey<sup>6</sup> but utilizes a different approach. By expanding the sample frame to include people who do not surf and leveraging a different conceptual framework for analysis, it complements and fills in the gaps of the initial Deep Blue Survey. Questions asked about respondents’ relationship to surfing, engagement level with ten different sustainable lifestyle behaviors, barriers to engagement, climate change belief, mitigation responsibility, and general demographics. The survey was administered through Qualtrics. Informed consent was obtained before participation and no personal identifiable information such as name, email, or IP address was collected. A copy of the survey is included in Appendix D.

The survey was fielded for two and a half weeks, from April 10 – 28, 2019, and was distributed two ways. Sustainable Surf reached out to partners who were able to post recruitment material to their followers, either



Instagram Story by World Surf League



World Surf League @wsl · 2h  
This #EarthDay, take a second to provide your opinion on sustainable lifestyles and surfing. #WSLPURE friends @Scripps\_Ocean are surveying surfers in partnership with @sustainurf. Take the survey here: [wsl.tv/scripps](http://wsl.tv/scripps)



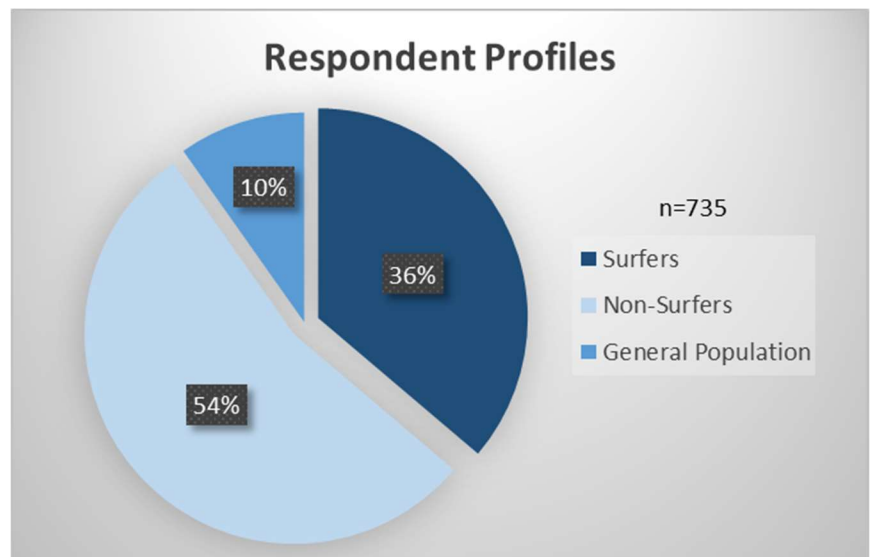
Kirstin Scholtz  
Twitter post by World Surf League

on social media (Facebook, Instagram, and Twitter) or in an online article on their website. Partners who participated included: World Surf League, The Inertia, Sustainable Surf, Lonely Whale, SurfDome, and Alison's Adventures. Examples of recruitment material are shown on the previous page. The second distribution method was through the Atkinson Behavioral Research Laboratory at UCSD Rady School of Management. The survey was fielded there for one week, from April 15 – 19, 2019.

*Population and Sample Frame* | The study's target population was the global adult community, and the sample frame was specifically those who followed online surf or sustainability media. The survey targeted the surf community as well as the general population, or non-surf community, in order to compare the differences between the two samples, if any.

*Analysis* | After data collection was completed, data analysis included recoding and calculating measures of central tendency using pivot tables in Microsoft Excel. A total of 816 responses was collected, with 50 partial responses, 11 non-consent, and 20 under age 18 respondents, totaling to a 10% drop-out rate and a total of 735 usable responses.

Respondents were separated into three groups based on specific criteria: surfers, non-surfers, and general population. Surfers were defined as individuals who surf, not including those respondents who have "only surfed a few times in their life." Non-surfers were defined as people who do not surf but are interested in



surfing (i.e. they watch surfing online, follow professional surfers on social media, etc.), and did include those who have "only surfed a few times in their life." Finally, general population was

defined as individuals who do not surf and are not interested in surfing. The final breakdown came out to be 266 surfers, 397 non-surfers, and 72 general population.

Overall, 421 responses came from the Rady Behavioral Lab conducted on UCSD campus, so aggregate data was also skewed toward college-age students in the age bracket 18-24. The data was subject to undercoverage because the remainder of the sample frame only covered individuals who follow online surf or sustainability media outlets, which also possibly skews towards already sustainably minded respondents. The nature of a survey also exposes itself to self-selection, where individuals choose to participate in an online survey, biasing towards those who already have a stake in surfing or sustainability.<sup>6</sup> The environmental aspect of the survey questions may have pressured respondents to answer positively.<sup>6</sup> Therefore, the results of this survey may not be completely representative of the target population. In addition, due to the uneven distribution across the three groups, we were unable to conduct a two-sample t-test as planned, and thus could not determine statistical significance between groups.

## RESULTS

The survey asked respondents about their engagement level with the following ten behaviors.

The results of the first behavior, buying organic food, are discussed in detail below.

- Buy organic food if available, even if it costs more
- Support local businesses, farmers, or fishermen
- Bike as primary transportation
- Drive a hybrid or electric vehicle
- Use public transit as primary transportation
- Recycle
- Use reusable shopping bags
- Compost
- Buy energy-efficient appliances and products
- Use reusable water bottles or coffee mugs

When it comes to purchasing organic food, 80% of surfers do so at least sometimes or more, while only 63% of non-surfers and 53% of general population do (*see Appendix A*). Surfers skew to the right in frequency. The top barrier overall is expense, and out of all ten behaviors, purchasing organic food has the highest proportion of individuals who do not believe this action

makes a difference environmentally (buying energy-efficient appliances was second). There may be a disconnect between organic produce being an environmental decision as the meaning of “organic” has become watered down.<sup>19</sup> The primary selling point for organic products is health rather than the environment or ethics.<sup>19</sup> Confusion about the benefits between organic versus conventional products, a lack of trust in the term, and the additional expense have caused the term “organic” to become lost in translation.<sup>19</sup>

In general, surfers are more likely to engage in these ten sustainable lifestyle behaviors than non-surfers and the general population. Although they still cite barriers to action, surfers are more likely to push past these barriers and engage more often with climate-friendly behaviors that non-surfers and the general population do not, such as supporting local businesses and markets, biking as primary transportation, composting, and using energy-efficient appliances and products. For example, supporting the local economy and reducing one’s carbon footprint by buying from local businesses, farmers, or fishermen yields 89% of surfers who do so at least sometimes or more, compared to 65% of non-surfers and 61% of the general population (see *Appendix B*). Transportation-related behaviors like biking, using public transit, and driving a hybrid or electric vehicle have low overall engagement due to lack of ownership. However, these results may be skewed towards college students, and 61% of respondents are from California where most activities require a car. Actions like recycling, using reusable shopping bags, and using reusable water bottles and coffee mugs have over 90% engagement across all groups. A summary table of the ten behaviors and the top barriers can be found in Appendix C.

Behaviors are more likely to have higher overall engagement when they are smaller acts – recycling, using reusable water bottles or coffee mugs, and using reusable shopping bags. This may be related to perceived norms, or an individual’s perception or opinion about what others believe one should do in a specific situation.<sup>20</sup> Cialdini et al. (2006) subjected visitors of Arizona’s Petrified Forest National Park to different types of messages that admonished the theft of the petrified wood.<sup>12</sup> They found that communicating approved or disapproved behavior, known as injunctive information, was most likely to reduce theft.<sup>12</sup> This type of

normative feedback has been effective in prompting pro-environmental behaviors, like reducing home energy usage by comparing one home's energy consumption to the regional average.<sup>2</sup> This same phenomenon may occur with these three behaviors (recycling, reusable water bottles, reusable shopping bags) when people believe they should be a part of the norm. On the contrary, the behaviors that require more time, effort, or larger upfront financial commitment – biking, using public transit, composting, buying organic food, driving a hybrid or electric vehicle, using energy-efficient products – have lower overall engagement.

Respondents were later asked about the top three benefits that would help them engage more in the previous behaviors. The top three benefits were: 1) My choices are more available in my area, 2) My choices have lower costs or prices, and 3) My choices protect the environment. Since sustainable or environmentally friendly products have traditionally been seen as inferior,<sup>1</sup> surfers in particular also care about whether products or services work the same or better as their conventional counterparts. Individuals in the general population group additionally look for their environmental choices to have a tangible benefit, to be required to make more environmental choices, and to have more information about their options.

The first and second preferred benefits (availability and cost) align with respondents' previously stated barriers. However, we should expect to see higher overall engagement with the ten listed behaviors since respondents stated that they would want their choices to protect the environment. This points to inconsistency in their attitudes and behaviors. Nevertheless, increased availability may not lead to a parallel increase in engagement due to the status quo bias, or the tendency for inaction. Status quo bias occurs when people prefer for things to stay the same, either by behaving the same or staying with a previous decision,<sup>24</sup> even if the cost of action is small and the decision is important.<sup>4</sup> Just because something becomes more available, does not mean someone is more likely to engage with or use it.

Without mentioning the words "climate change," respondents were then asked about the effects of climate change, including changing global temperatures, sea level rise, more extreme

weather events, and ocean warming. We avoided using the term “climate change” in order to maintain a neutral perspective and avoid creating bias as climate change is not quite universally accepted and can be a point of contention. Overall, 96% of respondents were considered climate change believers. When asked about the timescale of these effects, 68% overall believe that the threats will influence their present life. Surfers are more likely to believe the immediacy of climate change at 82%. 84% of respondents overall believe that these effects are mostly to completely anthropogenic (human-caused), and over half (52%) believe that the effects can be slowed.

82% of overall individuals believe or strongly believe that an individual’s choices and behavior can make a difference on the environment; however, they could have been thinking of behaviors other than the ones listed in the survey. In addition, although overall 97% of respondents or people close to them have also experienced at least one extreme weather event in the last five years, when non-surfers and general population were asked to rank who they hold responsible for mitigating climate change effects, individuals come last. Surfers were the only group that did rank individuals as number one. The rankings for non-surfers and general population were:

- 1) Federal government
- 2) Corporations and companies
- 3) Local government
- 4) Local communities
- 5) Individuals, including myself
- 6) No one – things are out of our hands

Surfers, on the other hand, ranked:

- 1) Individuals, including myself
- 2) Corporations and companies
- 3) Local government
- 4) Local communities
- 5) Federal government
- 6) No one – things are out of our hands

The difference in the “individuals, including myself” ranking between surfers compared to non-surfers and general population reinforces the previous data that surfers are more likely to engage in climate-friendly behaviors. While we did not ask surfers about their reasons for

engagement or ranking, there are a few possible explanations for this. The nature of surfing is individualistic, so surfers may be more likely to see themselves as having more responsibility or their individual actions as making a bigger difference. On the other hand, the low ranking of individuals by the non-surfer and general population groups could be due to optimism bias, or the tendency to overestimate the probability of positive events and underestimate the probability of negative events happening to themselves in the future.<sup>25</sup> Because they do not have a direct relationship with the ocean, these two groups may not link their actions with global climate change effects that will affect them.

## DISCUSSION AND RECOMMENDATIONS

Behavioral economics is based on psychological experimentation to develop theories about human decision making. Because this study used a survey rather than an experiment, any connections to decision science and behavioral economics concepts are correlational and not causation. Although we are speculating and could not test for each concept (which are individual projects in themselves), our aim is to create awareness of these fields as possible tools and prompt further research in the conservation and sustainability space.

In general, caring about the environment is still regarded as a moral issue – that is, an individual’s moral identity (moral values and motivation) is related to their tendency towards engaging in environmental actions.<sup>16</sup> In the greater landscape of issues, addressing climate change is a low priority.<sup>21</sup> Pew Research Center asked the public to prioritize policy issues, and they rated “dealing with climate change” as

### Public’s policy priorities: 2011-2019

*% who say \_\_\_\_ should be a top priority for the president and Congress*

	8 years ago Jan 2011	4 years ago Jan 2015	1 year ago Jan 2018	Now Jan 2019	8-year chg '11-'19	1-year chg '18-'19
Strengthening nation’s economy	87	75	71	70	-17	-1
Reducing health care costs	61	64	68	69	+8	+1
Improving education	66	67	72	68	+2	-4
Defending against terrorism	73	76	73	67	-6	-6
Securing Social Security	66	66	67	67	+1	0
Securing Medicare	61	61	66	67	+6	+1
Problems of poor and needy	52	55	58	60	+8	+2
Protecting environment	40	51	62	56	+16	-6
Dealing with immigration	46	52	47	51	+5	+4
Improving job situation	84	67	62	50	-34	-12
Reducing crime	44	57	56	50	+6	-6
Dealing with drug addiction	--	--	49	49	--	0
Reducing budget deficit	64	64	48	48	-16	0
Addressing race relations	--	49	52	46	--	-6
Strengthening the military	43	52	46	45	+2	-1
Improving transportation	33	42	49	45	+12	-4
Dealing with climate change	26	34	46	44	+18	-2
Dealing with global trade	34	30	38	39	+5	+1

Notes: In 2013 and earlier, the item “dealing with the issue of immigration” asked about “illegal immigration.” In 2015 and earlier, the item “Dealing with global climate change”

*The public rated “dealing with climate change” as a very low priority, according to a Pew Research Center study.*

nearly last at 44%.<sup>21</sup> Although it has increased 18% from 8 years ago and “protecting [the] environment” is 8<sup>th</sup> on the list, the economy, health care, education, and social welfare issues are more top of mind.<sup>21</sup> People have more immediate and tangible problems to deal with every day and have limited mental resources to address a slower moving threat like climate change. Therefore, trying to change people’s attitudes may not be the most meaningful solution.

The survey results reinforce the underlying attitude-behavior gap assumption in sustainability – when attitudes do not correlate to actions, influenced by individual, social, and situational factors.<sup>31</sup> While respondents’ pro-environment attitude is present, it is not matched by their behaviors in consistency and frequency, even for surfers. Surfers are uniquely at the mercy of the waves, develop strong attachments to their favorite surf breaks, and put considerable time into surfing and learning the waves.<sup>17</sup> Their connection with the ocean has even been described as religious or spiritual, and studies have found that many surfers self-identify as environmentalists.<sup>17</sup> However, subsequent studies and anecdotal evidence have found contradictions in surfers’ attitudes and behaviors – surfers often support dredging, buy unsustainably produced surfboards, and typically have a higher carbon footprint than the average person due to the amount they travel.<sup>17</sup>

To address this gap, we determine that targeting behavior is more important than targeting attitudes. As shown in the survey data, good attitudes and intentions do not necessarily translate into behavior. A powerful tool to combat this gap is self-signaling, which arises when individuals influence their own self-beliefs through their actions.<sup>14</sup> While many think that our choices are influenced by our personality, attitudes, and character, the reverse is also true – the choices we make shape who we are.<sup>11</sup> Our actions are susceptible to situational context, social influence, and infrastructure, but our actions also affect how we see ourselves.<sup>11</sup> For example, every time we recycle, we infer or “signal” to ourselves that we care about the environment.<sup>11</sup> Behavioral economist Dan Ariely writes in his book, *The Honest Truth About Dishonesty*, that “we observe ourselves in the same way we observe and judge the actions of other people –



inferring who we are and what we like from our actions.”<sup>3</sup> Strengthening behavior not only reinforces attitudes but skips the issue of the attitude-behavior gap.

Surfers are already interested in sustainability due to their tangible relationship with the ocean and vested interest to protect it. In addition, the influence of surfing as a sport and a culture reaches even those who do not surf.<sup>35</sup> Surf stakeholders, including brands, shapers, and competition platforms, have the capacity to change the narrative. There has been a significant push towards sustainability in surf tourism and the industry in the last 15 years, such as sustainability-dedicated positions within top brands like Quiksilver and Vans and growing sustainable clothing brands like Outerknown developed by Kelly Slater.<sup>17</sup> The surf industry can be a leader in sustainability; however, it still has not tapped into its full potential. Improving communications about climate-friendly actions to surfing and non-surfing customers alike will help them make simple and better choices for the environment. Even if doing so does not directly translate into direct purchases for a specific company, using their platform to reinforce sustainable behaviors will benefit their brand and future sustainable product lines.

Surfing can be a predictive factor of behavior, but surfers still need help making better choices daily. The following qualified recommendations list several behavioral interventions, or “nudges,” that may help catalyze behavior changes and minimize the attitude-behavior gap. Nudges are small changes to a choice environment that gently direct individuals toward a desired action while still allowing freedom of choice.<sup>32</sup> Using nudges in this specific application also connects two types of benefits – personal tangible benefits and intangible community benefits when a shared value (i.e. the ocean) is protected.

#### Combatting the Convenience Barrier

- **Baby Steps or Simplifying the Ask:** When trying to reach a seemingly complex or difficult goal, like climate change or even composting, replace it with an easier and simpler one in order to reach the original objective. Creating a small, easy, and concrete “ask” helps people take the first step, which signals to themselves that they are

someone who cares about the environment. This first action becomes an “on-ramp” to more sustainable behavior.

- Examples: The global movement Meatless Mondays encourages people to skip meat on Mondays (a small, easy, and concrete task) to improve their health and the environment.
- The UK Behavioral Insights Team found that the hassle of clearing out the attic prevented people from taking up financial incentives to reduce energy consumption by insulating their homes. Offering to arrange an attic clearing service for homeowners increased insulation installation 2.8 times, even though the cost was passed to the homeowner.<sup>13</sup>

Potential Applications: Surf brands can encourage customers to take simple first steps, even if they are unrelated to the brand’s product or service offerings. For example, companies can promote reusable products (e.g. shopping or produce bags, water bottles, kitchen items, laundry goods) to help customers avoid single-use plastics. This helps shoppers feel like they are contributing to the solution and serves as an on-ramp to larger sustainable commitments.

### Combatting Inconsistent Behavior

- **Preempting Inconsistencies:** People are not perfect and will make mistakes. Recognizing this and helping them to anticipate or correct for these mistakes will allow them to create consistent habits.
  - Examples: People tend to leave their bank cards in the ATM machine after withdrawing money – after the main task is finished, people tend to forget the previous steps (i.e. post-completion error). ATM machines now force users to remove their card before being to take their cash.<sup>26</sup>

Potential Applications: Forgetting reusable products in the car or home is a common barrier and creates behavioral inconsistencies. Before entering a retail store, surf brands can create signage to remind customers to take their reusable shopping bags or water

bottles with them. This allows people to correct themselves if they have forgotten their bag or bottle in the car and reinforces consistent sustainable behavior.

### Right Information at the Right Time

- **Information Provision and Providing Feedback:** People do not have all the information or perfect information. However, simply providing information does not directly translate into behavior change. The same information can have different effects on behavior and welfare and completely depends on how that information is delivered. Providing relevant and meaningful information or feedback at the time of a decision help people respond better. A well-designed feedback system tells people when they are doing well or when they could be making a better decision.
  - Examples: The alarm in response to an undone seatbelt in the car is immediate, relevant, and delivered at the right time.
  - Showering is a daily, energy- and water-intensive behavior. Goette et al. (2016) provided study participants real-time feedback on their resource consumption by installing a device that measured the flow of water. It provided simple and intuitive information that included temperature, real-time usage, previous water consumption, and imagery of a polar bear on progressively melting ice. They found that beginning almost immediately, there was a large and significant reduction in water usage per shower.<sup>15</sup>
  - The one for one model developed by TOMS shoes, where one needed item is donated for every item purchased, is a successful business model. It has since been adopted by other brands including Warby Parker and 4ocean due to its success. This strategy provides tangible personal benefits and community benefits integrated within the product and does not require extra effort on the part of the consumer. The nature of the model inherently provides immediate positive feedback, as the consumer knows that their purchase directly helps someone in need. This feedback fits into people's value systems and make them feel good about their purchase.

Potential Applications: Surf businesses should use their platform as an opportunity to increase transparency by explaining their specific sustainability impact, framing through personal and community benefits and telling better stories about their process. This may help to boost credibility, increase accountability, and avoid greenwashing. It can also help to directly link consumers' actions and purchases to environmental and social benefits. This is especially important since the link between a behavior and its effects can be sometimes get lost in translation (e.g. purchasing organic food and energy-efficient appliances). This is further reinforced by survey respondents who identified protecting the environment as a top benefit to help them engage more with climate-friendly actions.

In addition, when shopping online on the product page or upon checkout, surf brands can highlight a more sustainable alternative to a less sustainable one, if available, in a shopper's cart. For instance, if a shopper has a pair of boardshorts in their cart, retailers can provide appropriate feedback that suggests an alternative pair that is made from recycled materials, highlighting the differences in features, quality, and price. When explaining any environmental benefits, surf companies should also care to avoid jargon for comprehension. This can mean transforming numerical information into units that translate into actual usage (i.e. translating camera "megapixels" into "largest print size") or avoiding statistics that do not necessarily hold any meaning.

## **CONCLUSION AND NEXT STEPS**

Research into what motivates and prevents individuals to mitigate issues like climate change can have a significant impact on both science communication and policy change. Businesses and policy makers need examples of solutions that provide tangible benefits to their consumers and constituents, and this is an area of significant need for conservation. Science communication plays a pivotal role in driving action for time-sensitive issues, and new approaches are always needed. This is especially the case when the majority of communication

is about an abstract slow-moving threat like climate change compared to the timescale on which most individuals make decisions, contributing to a large attitude-behavior gap.

Sustainable Surf recognizes that the surf community has the potential to be a leader on individual actions to solve climate change and other marine conservation issues. They also recognize the potential that the field of decision science can have in understanding how people make daily lifestyle choices and significantly improve communications in the surf industry. Our survey data shows that surfers are already interested in sustainable solutions. However, through our qualified recommendations, the surf industry can help achieve a greater sustainable market transformation by nudging their customers to change their behavior in a way that helps the environment and improves their life. This can subsequently influence even those who do not surf but feel a connection to surf culture.

However, more research applying decision science and behavioral economics is needed in the sustainability space. Each of the concepts and behavioral interventions discussed in this report will require its own individual research in order to prove direct causation to the data. Nevertheless, the implications of applying interdisciplinary methods to conservation and climate change has the potential to influence future science communication, environmental messaging, and policy, ultimately creating a more ocean- and climate-friendly world.

## **ACKNOWLEDGMENTS**

This project would not have been possible without the support of my committee members, advisors, program faculty, cohort, family, and friends.

My Capstone committee chair, Kevin Whilden, was a dedicated collaborator whose encouragement and contribution of creative ideas were always welcomed and appreciated. Dr. Ayelet Gneezy was another critical member of my Capstone committee with her feedback and expertise in behavioral sciences and marketing. The final valuable member of my Capstone committee, Dr. Gregory Borne, always brought a positive attitude to stressful moments and contributed helpful insights and resources in sustainability. A final thank you goes to the partners who distributed my survey and took an interest in the research: The Inertia, World Surf League, Lonely Whale, Surfdomo, Alison's Adventures, Sustainable Surf, and UCSD's Rady Atkinson Behavioral Research Lab.

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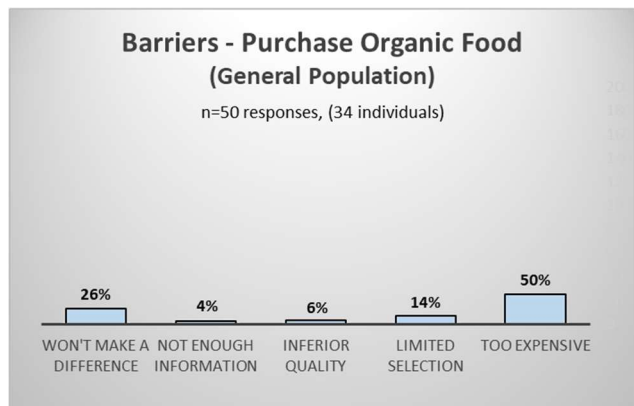
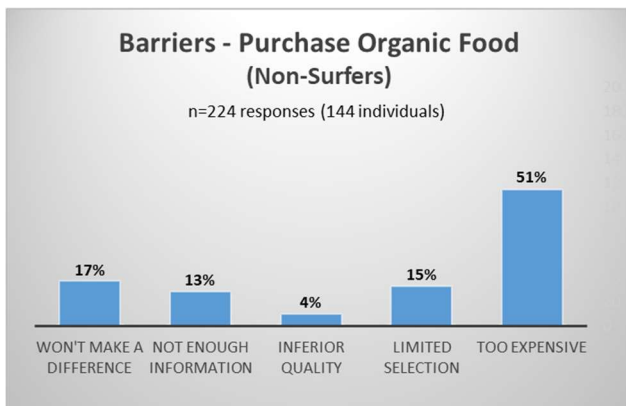
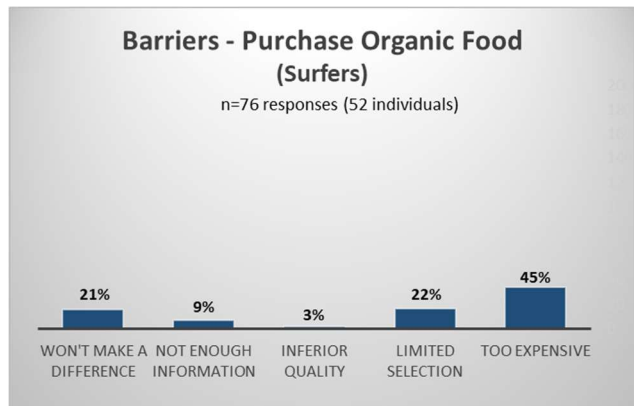
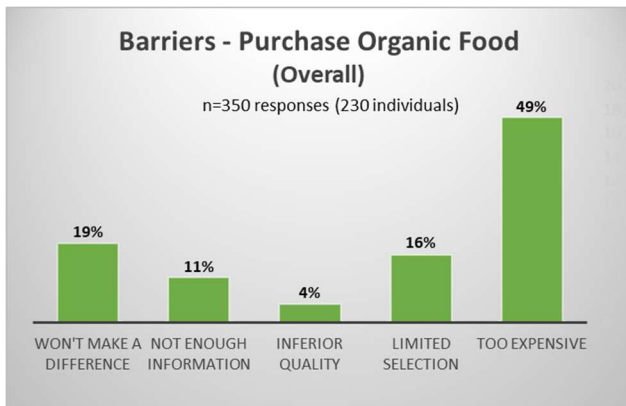
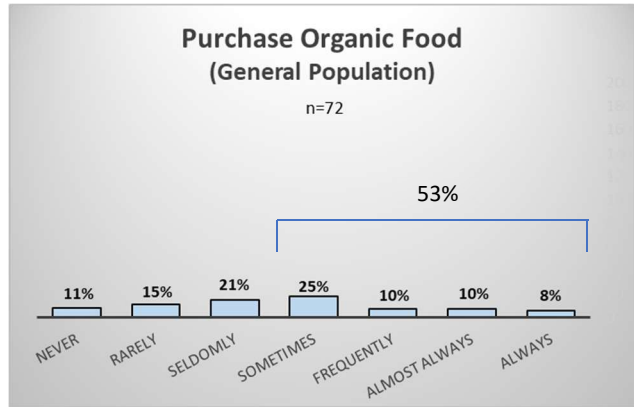
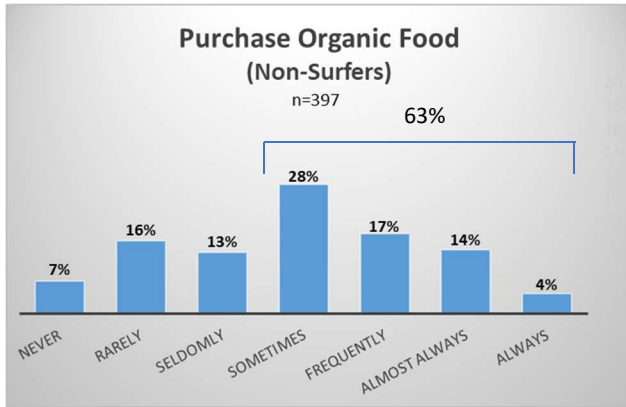
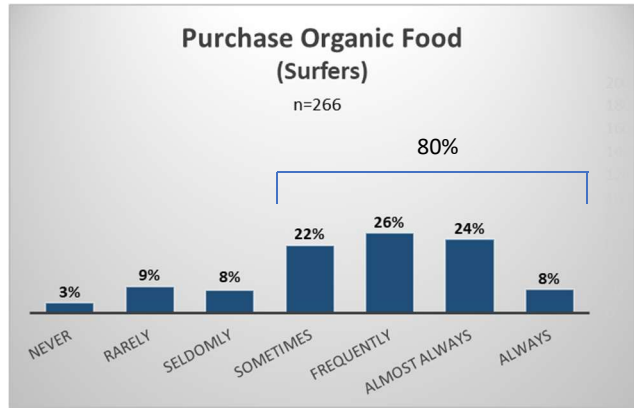
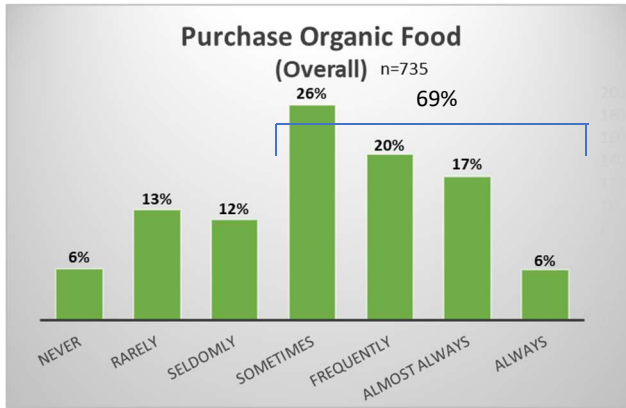
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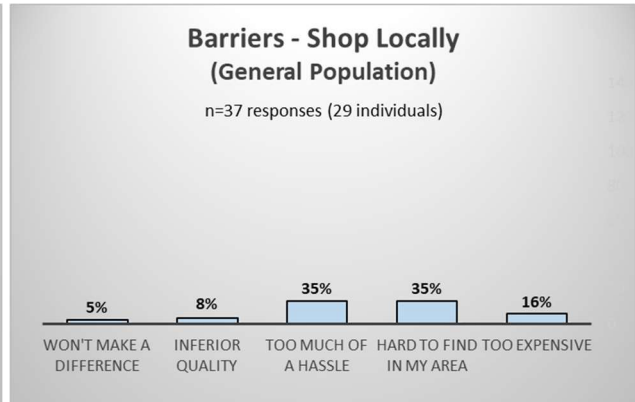
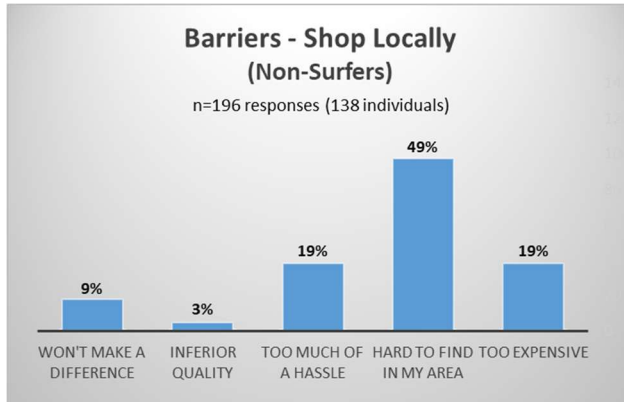
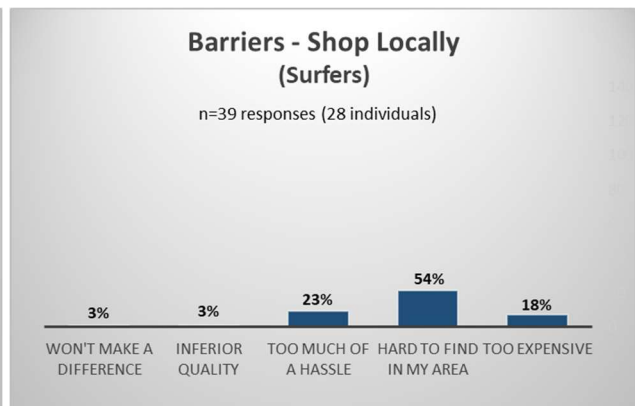
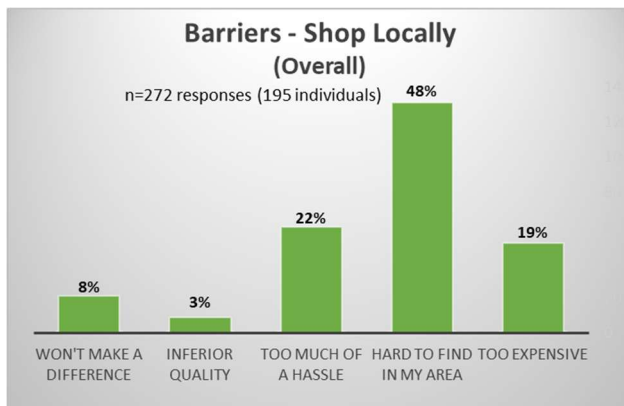
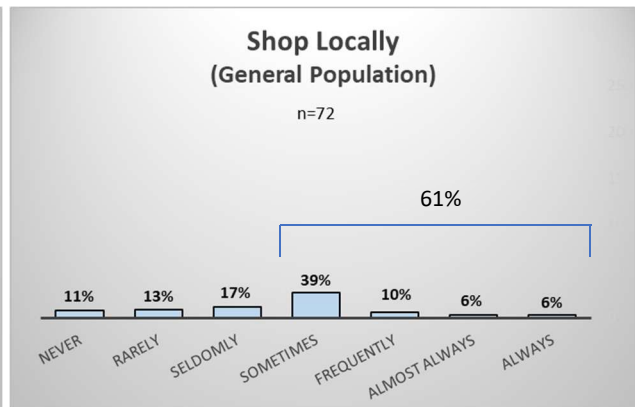
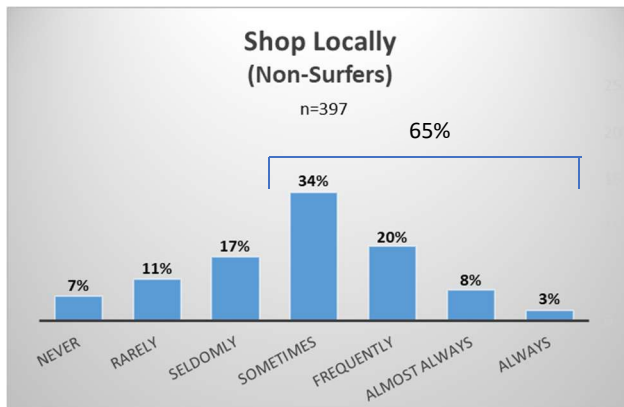
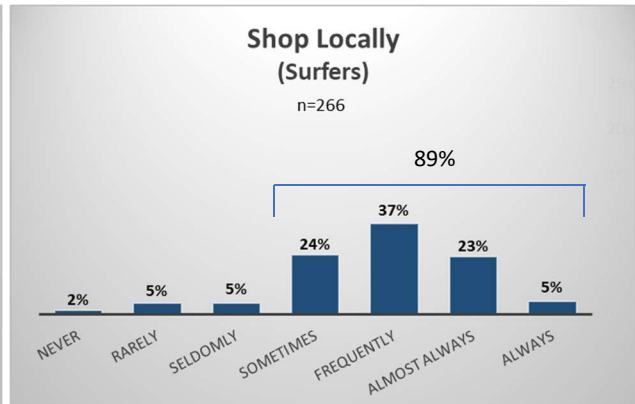


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**APPENDIX A – Buy organic food if available, even if it costs more (Frequency and Barriers)**



## APPENDIX B – Support local businesses, farmers, or fishermen (Frequency and Barriers)



**APPENDIX C – Engagement with Behaviors & Top Barriers**

<b>Purchase Organic Food</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	6%	13%	12%	26%	20%	17%	6%
Surfers (n=266)	3%	9%	8%	22%	26%	24%	8%
Non-Surfers (n=397)	7%	16%	13%	28%	17%	14%	4%
Gen Pop (n=72)	11%	15%	21%	25%	10%	10%	8%

Top Barrier Overall: Too expensive (49%), n=350

<b>Shop Locally</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	5%	9%	13%	31%	25%	13%	4%
Surfers (n=266)	2%	5%	5%	24%	37%	23%	5%
Non-Surfers (n=397)	7%	11%	17%	34%	20%	8%	3%
Gen Pop (n=72)	11%	13%	17%	39%	10%	6%	6%

Top Barrier Overall: Hard to find in my area (48%), n=272

<b>Bike as primary transportation</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	41%	24%	10%	12%	7%	4%	1%
Surfers (n=266)	27%	23%	13%	17%	11%	8%	2%
Non-Surfers (n=397)	48%	24%	9%	9%	5%	3%	1%
Gen Pop (n=72)	58%	22%	7%	10%	1%	0%	1%

Top Barrier Overall: I don't own a bike (41%), n=812

<b>Drive Hybrid or Electric Vehicle</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	65%	10%	5%	7%	4%	5%	4%
Surfers (n=266)	64%	10%	6%	5%	4%	6%	5%
Non-Surfers (n=397)	66%	11%	5%	8%	4%	4%	3%
Gen Pop (n=72)	63%	7%	6%	11%	7%	4%	3%

Top Barrier Overall: I don't own a hybrid or electric vehicle (65%), n=821

<b>Use Public Transit as Primary Transportation</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	16%	19%	10%	18%	16%	15%	6%
Surfers (n=266)	23%	26%	10%	18%	10%	10%	3%
Non-Surfers (n=397)	12%	17%	9%	17%	20%	18%	6%
Gen Pop (n=72)	13%	8%	10%	21%	18%	18%	13%

Top Barrier Overall: I live too far and need to drive (27%), n=574

<b>Recycle</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	1%	1%	2%	11%	23%	37%	26%
Surfers (n=266)	0%	0%	1%	4%	16%	39%	39%
Non-Surfers (n=397)	1%	1%	2%	14%	28%	36%	19%
Gen Pop (n=72)	1%	0%	3%	26%	19%	31%	19%

Top Barrier Overall: Hard to find recycling centers or bins in my area (37%), n=30

<b>Use Reusable Shopping Bags</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	2%	3%	4%	10%	17%	36%	27%
Surfers (n=266)	2%	2%	4%	5%	14%	34%	41%
Non-Surfers (n=397)	3%	4%	5%	13%	19%	39%	18%
Gen Pop (n=72)	4%	6%	4%	18%	17%	31%	21%

Top Barrier Overall: I forget them in my car or home (62%), n=92

<b>Compost</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	26%	15%	12%	22%	10%	9%	6%
Surfers (n=266)	25%	13%	10%	14%	11%	15%	12%
Non-Surfers (n=397)	26%	16%	13%	26%	10%	6%	3%
Gen Pop (n=72)	29%	13%	17%	25%	11%	3%	3%

Top Barrier Overall: Difficulty accessing a compost area (47%), n=531

<b>Use Energy-Efficient Appliances &amp; Products</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	5%	7%	10%	31%	22%	19%	6%
Surfers (n=266)	3%	3%	4%	24%	27%	29%	10%
Non-Surfers (n=397)	6%	8%	15%	34%	20%	14%	4%
Gen Pop (n=72)	11%	13%	8%	39%	18%	7%	4%

Top Barrier Overall: Not enough or confusing information (34%), n=213

<b>Use Reusable Water Bottles or Coffee Mugs</b>	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Overall (n=735)	1%	4%	3%	12%	20%	36%	23%
Surfers (n=266)	0%	2%	3%	5%	16%	41%	33%
Non-Surfers (n=397)	1%	6%	3%	14%	22%	35%	19%
Gen Pop (n=72)	7%	1%	1%	31%	25%	22%	13%

Top Barrier Overall: I forget them in my car or home (51%), n=75

## **APPENDIX D – Survey**

### **Q1** *Do Surfers Live a More Sustainable Lifestyle?*

Surfers spend a lot of time in the ocean, and may have a vested interest in keeping oceans clean and healthy. Even if you don't surf, the sport of surfing could represent a lifestyle that is connected to nature.

Whether you surf or not, we want to know what you believe about the human relationship to a healthy ocean.

Do you think spending time in the ocean makes it easier for surfers to take actions that reduce their impact on the ocean? Or does it not make any difference?

This survey will answer those questions, and will take 10 minutes of your time. The data collected will be used in research by Cynthia Hsia (chsia@ucsd.edu) at Scripps Institution of Oceanography, and will help understand if there are fundamental barriers to taking action that everyone shares.

Please answer as honestly as possible. There are no right or wrong answers, no matter what you believe. No personal identifiable information will be collected and your anonymous responses will be kept confidential. There are no risks associated with this study. Participation is completely voluntary and you may withdraw at any time without penalty.

By clicking "Agree" below, you are indicating that you are at least 18 years old, have read this form, and agree to participate in this research study.

- Agree
- Disagree

### **Q2** Do you surf?

- Yes
- No

### **Q3** In general, how often do you surf?

- Daily if possible
- Weekly
- Monthly
- Few times per year
- Only surfed a few times in my life

**Q4** Which of the following also describes you? Choose all that apply.

- I watch surfing online
- My friends or family are also surfers
- I follow professional surfers on social media
- I read surf magazines or websites
- I talk to my friends about surfing
- Other: \_\_\_\_\_
- None of the above

**Q5** You indicated that you do not surf. Which of the following describes you? Choose all that apply.

- I want to learn how to surf
- I watch surfing online
- My friends or family are surfers
- I follow professional surfers on social media
- I think surfing is cool
- I read surf magazines or websites
- I talk to my friends about surfing
- Other: \_\_\_\_\_
- None of the above



**Q6** Of the following options, please indicate the extent that you engage in these behaviors.

	Never	Rarely	Seldomly	Sometimes	Frequently	Almost Always	Always, no exceptions
Buy organic food if available, even if it costs more	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support local businesses, farmers, or fishermen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike as primary transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drive a hybrid or electric vehicle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use public transit as primary transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use reusable shopping bags	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buy energy-efficient appliances and products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use reusable water bottles or coffee mugs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q7** You indicated that you never, rarely, or seldomly **buy organic food if available, even if it costs more**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too expensive
- Limited selection
- Inferior quality
- Not enough or confusing information
- I don't believe this behavior makes a difference

**Q8** You indicated that you never, rarely, or seldomly **support local businesses, farmers, or fishermen**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too expensive
- Hard to find in my area
- Too much of a hassle
- Inferior quality
- I don't believe this behavior makes a difference

**Q9** You indicated that you never, rarely, or seldomly **bike as primary transportation**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too much of a hassle
- I live far away and I need to drive
- Lack of bike lanes
- I don't own a bike
- I don't believe this behavior makes a difference

**Q10** You indicated that you never, rarely, or seldomly **drive a hybrid or electric vehicle**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too expensive
- Not enough electric range
- Inferior quality
- Not enough charging stations
- I don't own a hybrid or electric vehicle
- I don't believe this behavior makes a difference

**Q11** You indicated that you never, rarely, or seldomly **use public transit as primary transportation**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Lack of accessible bus routes
- Too much of a hassle
- Reliability, such as on-time buses
- I live far away and I need to drive
- I don't believe this behavior makes a difference

**Q12** You indicated that you never, rarely, or seldomly **recycle**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too much of a hassle
- Not enough or confusing information, such as what to recycle
- Hard to find recycling centers or bins in my area
- I don't believe this behavior makes a difference

**Q13** You indicated that you never, rarely, or seldomly **use reusable shopping bags**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too much of a hassle
- I forget them in my car or home
- Not required in my county or state
- I don't believe this behavior makes a difference

**Q14** You indicated that you never, rarely, or seldomly **compost**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Difficulty accessing a compost area
- Too much of a hassle
- Not enough or confusing information
- I don't believe this behavior makes a difference

**Q15** You indicated that you never, rarely, or seldomly **buy energy-efficient appliances and products**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too expensive
- The rebates are too small or I don't know about them
- Not enough or confusing information
- I don't believe this behavior makes a difference

**Q16** You indicated that you never, rarely, or seldomly **use reusable water bottles or coffee mugs**. Please indicate which of the following barriers prevent you from engaging in this behavior. Choose all that apply.

- Too expensive
- Too much of a hassle
- I forget them in my car or home
- I don't believe this behavior makes a difference

**Q17** What would help you engage more in the behaviors on the previous page? Choose the top 3 reasons below.

Top 3 Benefits

- My choices have lower costs or prices.
- My choices have proven benefits for others.
- My choices are more available in my area.
- If everyone behaves this way.
- I have more information.
- My choices work the same or better.
- If my choices protect the environment.
- I get a tangible benefit in return.
- I am required to make these choices.

**Q18** The following topics are frequently discussed in the media. Please answer the following questions according to your beliefs. There is no judgment and there are no right or wrong answers.

Which of the following do you believe is happening?

	Yes	No
Changing global temperatures	<input type="radio"/>	<input type="radio"/>
Sea level rise	<input type="radio"/>	<input type="radio"/>
More extreme weather events	<input type="radio"/>	<input type="radio"/>
Ocean warming	<input type="radio"/>	<input type="radio"/>

**Q19** Do you believe these changes...

	Influence my life	Influence my children's life	Influence my grandchildren's life	Influence beyond my grandchildren's life	N/A
Changing global temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More extreme weather events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ocean warming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q20** How much do you believe these changes are human-driven?

	Completely	Majority	Some	A little	Not at all	N/A
Changing global temperatures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea level rise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More extreme weather events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean warming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q21** I believe these changes...

	Can be slowed	Can be stopped	Can be reversed	Are inevitable	N/A
Changing global temperatures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea level rise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More extreme weather events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean warming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q22** Do you believe an individual's choices and behavior can make a difference on the environment?

- Strongly Disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly Agree

**Q23** Who do you believe is responsible for mitigating these changes? Please rank the following groups, with 1 being the most responsible, and 6 being the least responsible.

- \_\_\_\_\_ Local government
- \_\_\_\_\_ Federal government
- \_\_\_\_\_ Corporations/companies
- \_\_\_\_\_ Individuals (including myself)
- \_\_\_\_\_ Local Communities
- \_\_\_\_\_ No one - things are out of our hands

**Q24** Have you or anyone close to you experienced the following in the last 5 years? Choose all that apply.

- Hurricanes, typhoons, or cyclones
- Wildfire
- Droughts
- Heat waves
- Flooding
- Heavy precipitation (rain or snow)
- None of the above

**Q25** A carbon footprint is the total greenhouse gases produced directly and indirectly from human activities. In the past, have you calculated your carbon footprint?

- Yes
- No

**Q26** A carbon offset is a way to compensate for one's emissions by purchasing a reduction made somewhere else. In the past, have you purchased carbon offsets?

- Yes
- No

**Q27** What level of authority do you have over your household decisions?

- Final decision authority, individually or as a group
- Significant decision authority, individually or as a group
- Minimal decision authority
- No decision authority

**Q28** Which of the following best describes you?

- Innovator - 1st to adopt an innovation
- Early Adopter - 2nd to adopt an innovation
- Early Majority - Adopt an innovation after an average amount of time
- Late Majority - Adopt an innovation after the average person
- Last to adopt an innovation

**Q29** What is your gender?

- Male
- Female
- Prefer not to say

**Q30** What is your age?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+
- Prefer not to say

**Q31** In which country do you currently reside?  
(Drop down)

**Q32** In which state do you currently reside?  
(Drop down)

**Q33** What is the highest level of education you have completed?

- Less than high school degree
- High school degree or equivalent (GED)
- Some college
- Associate degree
- Bachelor degree
- Graduate degree
- Prefer not to say

**Q34** What is your total household income?

- Less than \$25,000
- \$25,000-\$34,999
- \$35,000-\$49,999
- \$50,000-\$74,999
- \$75,000-\$99,999
- \$100,000-\$149,999
- \$150,000 or more
- Prefer not to say

**Q35** Through which organization or website did you hear about this survey?

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