



SUSTAINABLE PROCUREMENT PLAN

2023

Table of Contents

Introduction	01
Retail Procurement	02
Food Procurement	09
Lessons From In-Depth Interviews	15
Inventory and Procurement Analysis	24
Recommendations	28
Acknowledgements	32
Appendices	33

1. Retail Data

- a. Background Data
- b. Survey Data
- c. Procurement Data

2. Food Data

- a. Background Data
- b. Survey Data
- c. Procurement Data

The Challenge of Achieving Net-Zero Without Sacrificing Revenue


The Aquarium of the Pacific connects people to their ocean and its marine wildlife. We inspire awe and wonder and take tangible actions to ensure a vibrant and beautiful ocean forever.

The Aquarium of the Pacific, which hosts between 1.5 and 2 million visitors every year, is developing an institution-wide sustainability plan with the goal of achieving net-zero greenhouse gas emissions by 2040.

A key ingredient in this plan will be the sustainability of the items sold in its retail stores and food sold in its dining outlets.

In order to support a sustainable procurement policy, our procurement consulting group examined the products being sold, as well as customer preferences for sustainable versus unsustainable products.

Our UCLA team presents primary data on customer preferences from surveys distributed in the main retail store, Pacific Collections, and in the main restaurant, Cafe Scuba. To complement data on customer preferences, our team also interviewed sustainability leads at two peer aquaria and AoP's own leads for retail and food services.



Sustainable Retail Procurement

Investigating the Interplay of Customer Knowledge and Purchasing Preferences

The Aquarium generated \$8,028,638 in revenue from retail in 2022 while selling over 753,960 items. Our main question is, would sales and profit suffer if the Aquarium were to strive to sell only sustainable products? Customer preferences were used to determine how knowledgeable the customer base is with respect to sustainability, as well as the likelihood they would prefer and purchase these items. Part of this inquiry also considered the role of price in customer preferences.



**Fig. 2. The waste hierarchy (Strategy Unit, 2002).
(Published with kind permission of the Cabinet
Office, Strategy Unit, London, UK).**

Figure 1

By prioritizing the procurement of products that contain recycled or compostable material, it reduces the need for products made from new materials and ultimately diminishes their duration in landfills (Figure 1, Appendix 1a.1). Thus, the inclination of customers to purchase sustainable retail items is essential to minimizing waste generation at the Aquarium.

Designing and Conducting a Survey of Customer Preference in Retail Stores

To assess how implementable sustainable products would be within the Aquarium's two retail stores, we created and administered surveys to visitors from February to May 2023.



Pacific Collections

The retail survey is provided in Appendix 1b. We conducted our surveys on February 26th, March 12th, and April 22nd. Surveys were administered weekends and afternoon hours since these were times with peak visitor numbers, and allowed us to maximize our sample size. In total, 101 retail surveys were collected.

Designing and Conducting a Survey of Customer Preference in Retail Stores

We approached customers with our surveys only after we had observed that they had been exploring the retail store for a few minutes.

Team members Kelly, Lingxi, and Abraham, from left to right, placing retail poster



All surveys were completely anonymous, and we encouraged customers to ask us questions if clarification was needed while taking the survey. During our second visit to the Aquarium, we also designed a poster and placed it on the wall of a shelf for plush toys to observe if the poster influenced customers to purchase more sustainable products.



Experimental poster designed by team members

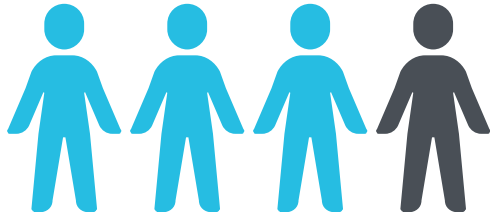
Retail Survey Findings

The summarized data for all retail surveys are provided in Appendix 1b. Survey questions were either multiple choice or Likert scale. For the Likert scale questions, the respondents were asked if they ***agreed or disagreed***, or if specific consumer action was ***likely or unlikely*** (options being: strongly agree, agree, neutral, disagree, strongly disagree or very likely, likely, neutral, unlikely, very unlikely).

We investigated whether knowledge about sustainability or caring about sustainability influenced consumer purchases. The analysis was a chi-square cross-tab analysis. The chi square test based on the data shown below indicated that wanting more variety of sustainable products (Question 4) was significantly linked to also answering that sustainability was important to the respondent (Question 3) (Details in Appendix 1b.1).

Question 3 & 4	Important	Not Important	TOTAL
More Variety	76	3	79
Less Variety	9	13	22
TOTAL	85	16	101 TOTAL

Key Takeaways

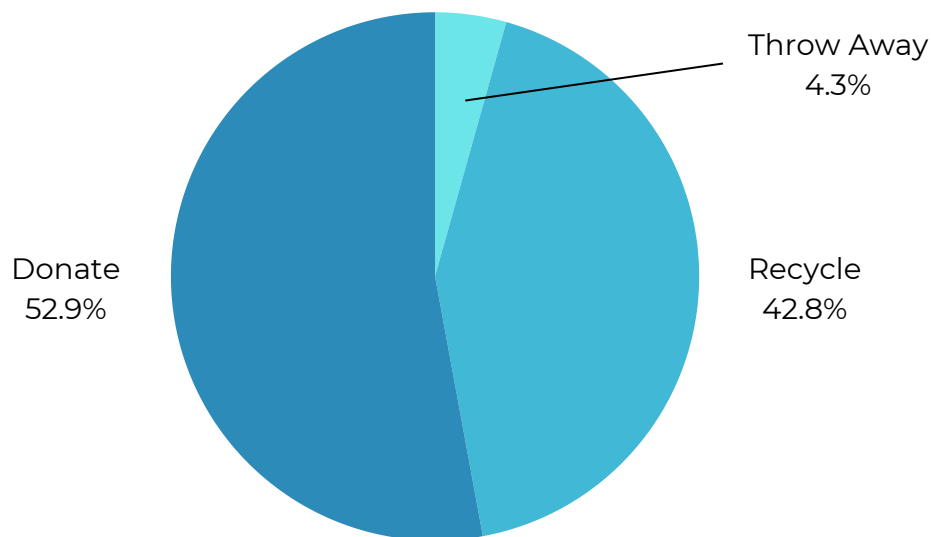


3 out of 4 customers believe that purchasing environmentally friendly products is important to them.



85% of customers want to see a wider variety of eco-friendly products.

Given a menu of disposal choices, the vast majority of customers indicated they would select the more sustainable disposal methods.



More Key Takeaways



of customers would pay a higher price for sustainable products.

Generally, customers display significant knowledge about eco-friendly products, and a majority of customers care about sustainability.

HALF were willing to pay **20% more** for a sustainable choice of product

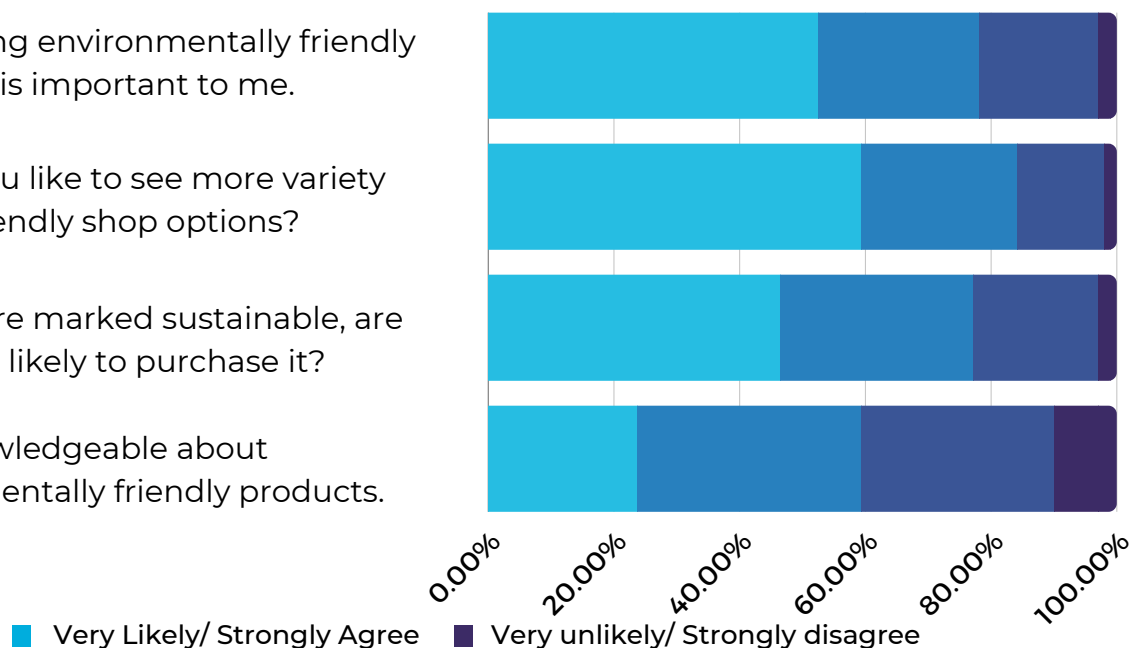
This Implies that the retail store should find replacements that are more expensive, but more sustainable, for products.

Purchasing environmentally friendly products is important to me.

Would you like to see more variety of eco-friendly shop options?

If items are marked sustainable, are you more likely to purchase it?

I am knowledgeable about environmentally friendly products.



Sustainable Food Procurement

Using Surveys to Determine Food Preferences

Our objective is to create a more sustainable food menu at the Aquarium's main restaurant Cafe Scuba. Environmentally-preferred foods may be difficult to market because of indifference toward sustainability, expense, or unfamiliarity with plant-based foods.

The Aquarium's food services need to be both profitable and satisfactory to customers—two goals that do not necessarily align with sustainability. We designed surveys that directly asked guests about their individual food preferences and the factors influencing their choices, as seen in Appendix 2b.1.

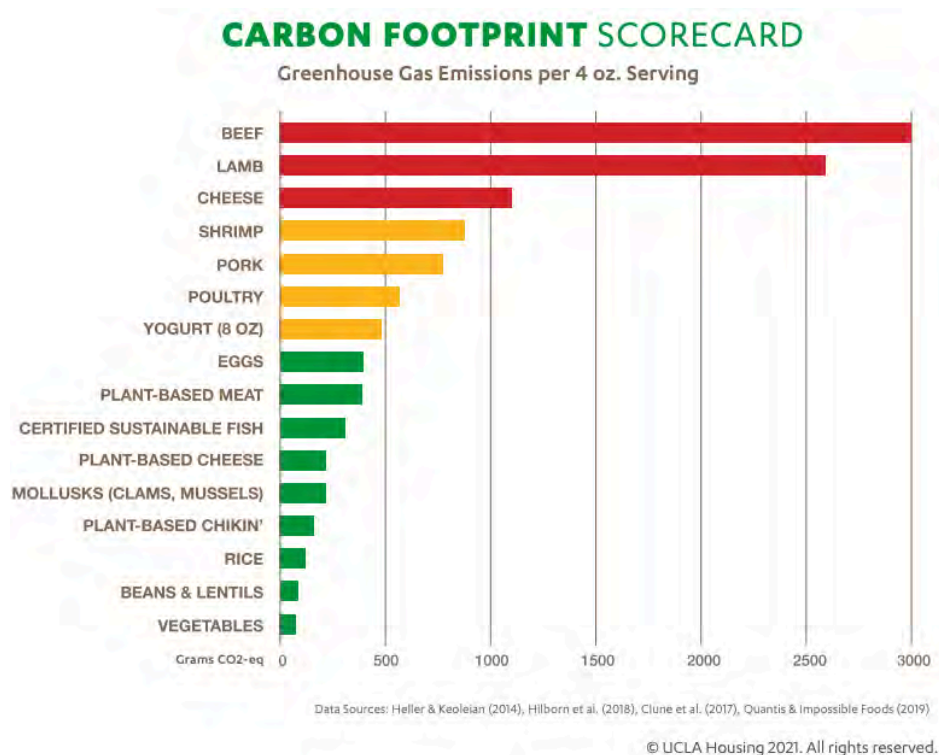


Figure 2

Foods differ by an order of magnitude in terms of greenhouse gas emissions produced per unit of protein or calories (Figure 2, Appendix 2a.2). One way to reduce emissions is to preferentially consume foods with lower emissions than beef and dairy products, such as plant-based meats and sustainably caught fish.

Using Surveys to Determine Food Preferences

To deduce customer preferences towards low-emitting meal options compared to high emitting burgers and similar foods at Cafe Scuba, we created and administered surveys to visitors from February 2023 to May 2023.



Cafe Scuba

The finalized food surveys are provided in Appendix 2b.1. We conducted our surveys on February 26th, March 12th, and April 23rd. We chose weekends and afternoon hours to conduct our surveys because a majority of visitors would be at the restaurant for lunch, allowing us to maximize our sample size. We distributed our surveys once they were seated, instead of when they were most preoccupied (i.e., waiting in line or eating their meal). Surveys were completely anonymous and voluntary. In total, we collected 100 food surveys over the three sampling dates.

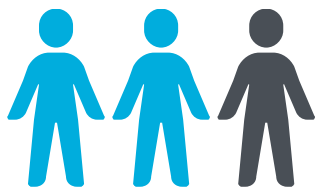
Food Survey Findings

Providing information about sustainability can influence purchasing decisions.

The summarized data and chi-square analysis for all food surveys is provided in Appendix 2b. Here we focus on the most useful and compelling results.



Customers were more likely to choose sustainable foods if given some sort of carbon footprint-related information on the menu.



2 out of 3 customers were inclined to choose sustainable food options if they were provided with information about CO₂ footprint.

More Survey Findings



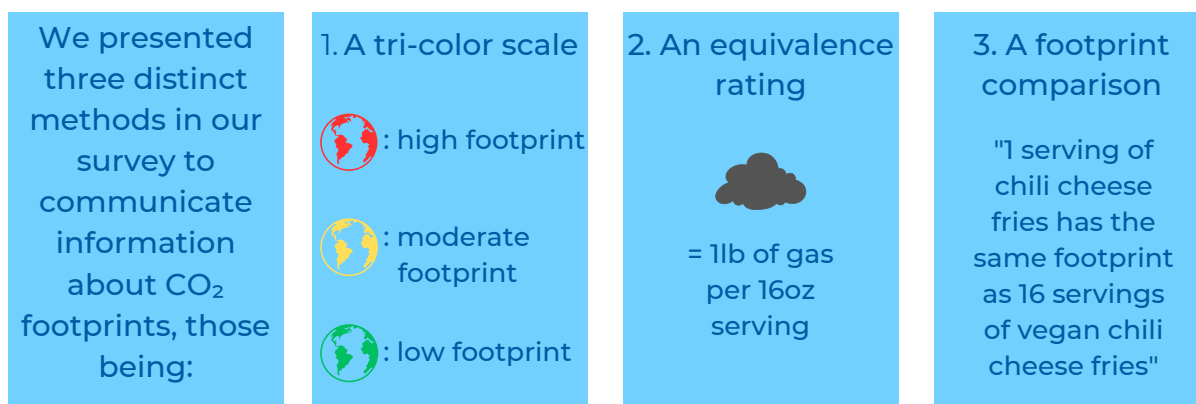
of customers were willing to try Wicked Kitchen items in the future...

...25% would order a Wicked Jalapeno Burger if it were the same price as a Beef Cheeseburger.

One of the most striking results was the extent to which customers do not think about their emissions when ordering food. Specifically, over 82% of those surveyed either disagreed or were ambivalent to the statement "I think about my CO₂ footprint when I order food", yet 66%, on average, were willing to choose a sustainable food option if they were more informed of its footprint.

Respondents react differently to the type of information presented to them.

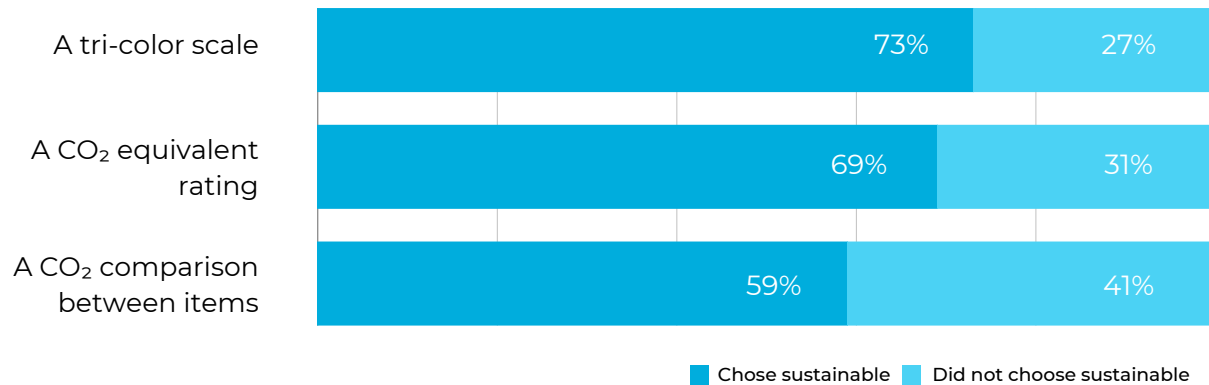
The full extent of the methods and chi-square tests of significance are provided in Appendix 2b. Here we summarize the trends and results.



Note: items were considered sustainable if it avoided the highest-emitting option

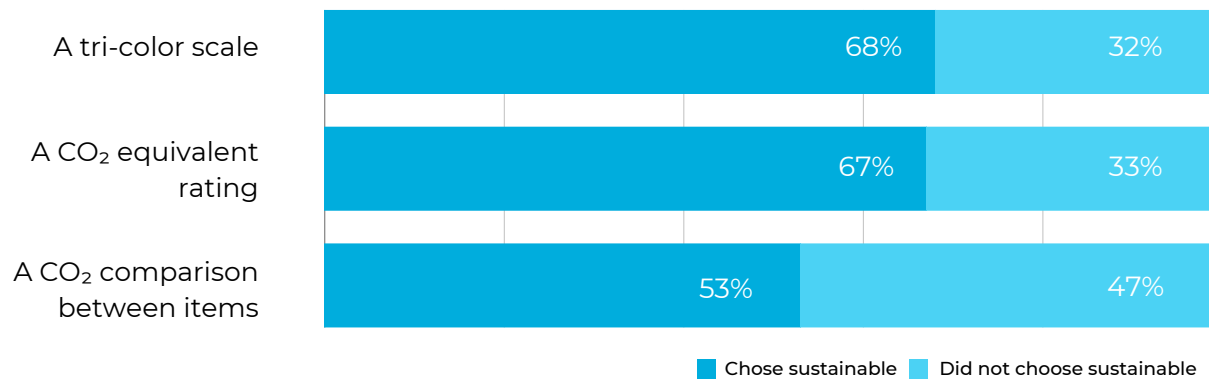
More Survey Findings

The % of customers who would choose sustainably if presented with...



Narrowing in on the 82% of people who didn't think of their footprint yielded similar results.

The % of customers who didn't think of their carbon footprint would choose sustainably if presented with...



Lessons Learned From In-Depth Interviews

LEARNING FROM OTHER AQUARIA

We reached out to two peer aquaria to learn from their experience with advancing sustainability.

We interviewed representatives from we set up remote meetings with representatives from National Aquarium and Monterey Bay Aquarium regarding sustainability and sustainable procurement. For the National Aquarium, we interviewed **Jake Hoeffner**, who is the general manager of SSA group at National Aquarium and has been in this position for 7 years. The SSA group provides food and retail services for the National Aquarium. For Monterey Bay Aquarium, we interviewed **John Abrahamson**, the VP of sales, who joined Monterey Bay Aquarium in 2017.



Above: National Aquarium <https://aqua.org/>
Below: Monterey Bay Aquarium
<https://www.montereybayaquarium.org/visit>

National Aquarium

Retail Sector

One challenge with implementing sustainable strategies within the retail sector for National Aquarium is the constraint that the SSA group manages retail across many different aquaria, with less local tailoring; therefore, it is harder for the aquarium to find a perfect balance between price and sustainability, especially when the Baltimore population is less wealthy compared to other locations. Nonetheless, National Aquarium has found ways to improve its sustainable practices within the retail sector, such as improving packaging, switching to digital, featuring recyclable plushies, and holding local workshops.

Findings

Packaging

In order to reach the no single-use plastic goal, the National Aquarium is asking their partners to get rid of plastic packaging and instead use more sustainable and recyclable materials when packing, similar to what they are doing with the food sector.

Digital Transition

The National Aquarium also provides an online shop partnering with MuzeMerch, which uses recyclable materials only for packaging and became busy during COVID. The aquarium makes an effort to perform a digital transition for both retail and food sectors by putting QR codes in shops and restaurants on their website, menu, etc..

Local Workshops

The National Aquarium invites local artists, that make jewelry from trash found in the ocean, to hold educated workshops for the local community about ocean conservation and sell sustainable products.

National Aquarium

Food Sector

Findings

Plastic

Replaced grab-and-go containers with compostable alternatives.

Switched from plastic plates and utensils to reusable dishware that is returned to the kitchen after use to be washed and used again.

Promoted the sales of 'hand fruits', such as oranges and bananas, which naturally have their own shell and do not require plastic to be packaged and stay fresh.

Partnered with companies that will use crates to ship their items to the facility instead of single-use plastic packaging when shipping things to the aquarium.

Composting

Partnered with a composting farm. By doing so, they are able to see the majority of the life cycle of the product and can observe that even after being "thrown away", the waste is being utilized to enhance the environment.

Dairy and Beef

Reduced some beef and dairy products by making changes like reducing the size of their signature 'smash burger' that helps them use less meat in each burger.

Switched over one of their most popular dessert items, their cheesecake, to a dairy-free cheesecake made from almond milk.

Ensured that there are ample vegan and vegetarian options on the menu.

Monterey Bay Aquarium

Retail Sector

Product Quality & Public imaging

Monterey Bay Aquarium eliminated all cheap-looking souvenirs with the aquarium logo on them and started making new products with higher-quality materials.



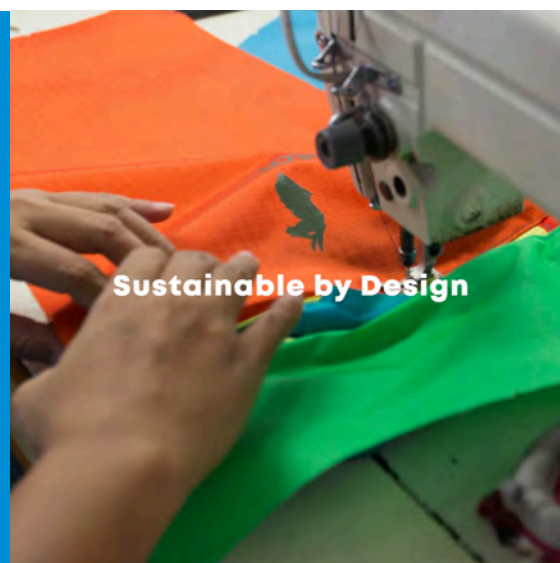
<https://www.montereybayaquarium.org/visit/dining-and-shopping>

Apparel Quality improvement

The aquarium preferred to sell t-shirts made of organic materials over t-shirts made of 100% recycled materials. 100% recycled t-shirts create micro-particles that could be harmful to the environment when washed.

The new clothing partner that Monterey Bay Aquarium will be working with is Cotopaxi, which makes high-quality clothing and is dedicated to the conservation of the environment.

“We don't want to be represented on some cheap-looking plastic. That's not us, that's not who we want to be”.



Sustainable by Design

<https://www.cotopaxi.com/pages/sustainable-by-design>

Monterey Bay Aquarium

Retail Sector

Posters and Signs?

Our retail team conducted a small experiment in Pacific Collections using the experimental poster to communicate to the customers that they are buying more sustainable products. To our surprise, the poster did not significantly increase the sales. However, there is insubstantial evidence to support this, as the experiment only lasted an hour.

Story-telling is the key

Although Monterey Bay Aquarium has some signs in the store printing “Shop with confidence”, they are not the main reason why customers would want to buy sustainable products. The key to selling these products is story-telling. A good example of this is the "Two Trees Pencil" story that is told at the cashier.

“Stories in aquarium retail is why we are different from other random stores”



"After you're done using this pencil, plant it in a container to grow your own tree. Each pencil purchased also pays for a mangrove tree to be planted as part of the Million Mangrove Project through Natural Capital Partners. Healthy mangrove forests provide habitat for fish and can store up to four times more carbon than rainforests - making them an important tool when it comes to fighting climate change. Funds from the sale of this pencil also help support the Aquarium's global conservation efforts."

<https://shop.montereybayaquarium.org/products/two-trees-pencil>

Monterey Bay Aquarium

Food Sector

"If you hit every single mark, you will have nothing to sell. You have to pick your battles."

In terms of the food sector, the Monterey Bay Aquarium has shown us that making a drastic change that better aligns with the company's sustainability morals can prove to be effective and profitable at the same time. Here we have listed some of the most effective sustainable changes they have made under John's direction.

Plastic

The Monterey Bay Aquarium has made the choice to ***get rid of all plastic in their front-of-the-house operations***. This includes excluding chip bags, water bottles, to-go packaged foods, etc.

They made the major decision of ***cutting ties with Coca Cola and Pepsi***. This also allows aquarium goers to learn from the aquarium's decision and hopefully influence them to think about their environmental footprint more often.

Waste

They have also made the bold decision to ***get rid of all trash bins from the front of the house operations***. This would help decrease waste contamination that happens due to lack of waste sorting knowledge across the general public.

Monterey Bay Aquarium has instead hired a busser team who customers can bring their trash to and the team will sort the waste properly. This enhances proper recycling and composting from the source facility.

A Talk with Jeff Spofford

We spoke with Jeff, the head of retail, to learn more about actions the Aquarium has already taken regarding sustainability in the retail stores.

The retail staff currently ask individual vendors about the source of their products (e.g., bamboo) to assess if they are made sustainably. Although it is possible for the Aquarium to sell more sustainable products, it is a long process. Factories produce the items, so they must consider profitability, which is outside of the vendor's control on whether their products are sustainable. Fortunately, the majority of vendors are competing to become more eco-friendly. Partnering with sustainable vendors requires a balance between profits and customer interests.



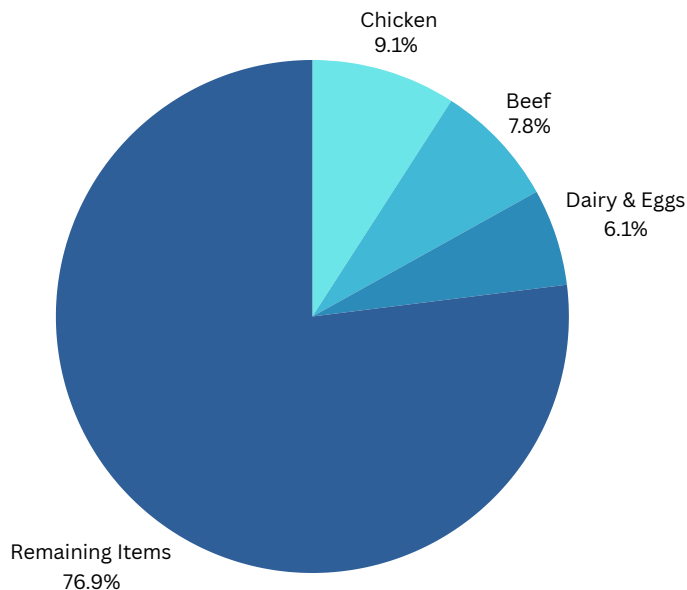
Pacific Collections

Pacific Collections accounts for **80% of the total sales**. The Aquarium determines the prices, not the vendors. Its two retail stores have seen a substantial increase in sales since 2020.

After the products are delivered, the packaging is recycled at a warehouse or the retail store. It is rarely thrown away. All bags and receipts given to customers during transactions are 100% recyclable.

A Talk with Chef Ken

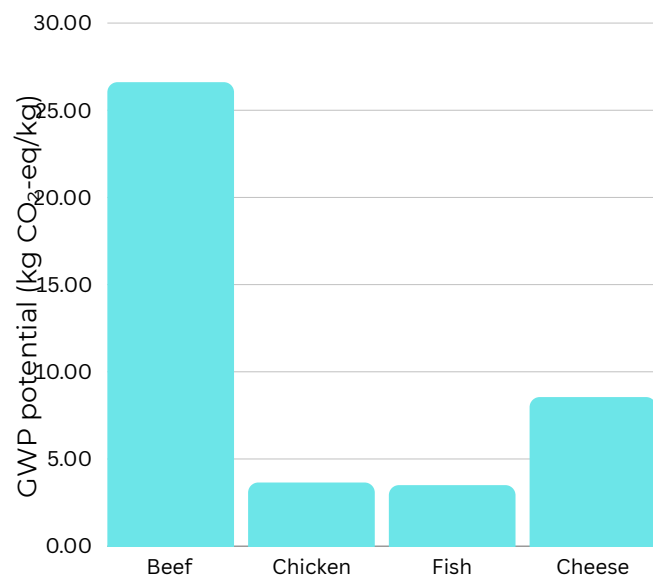
"There is a hard line to balance between being an educational center and an entertainment center."



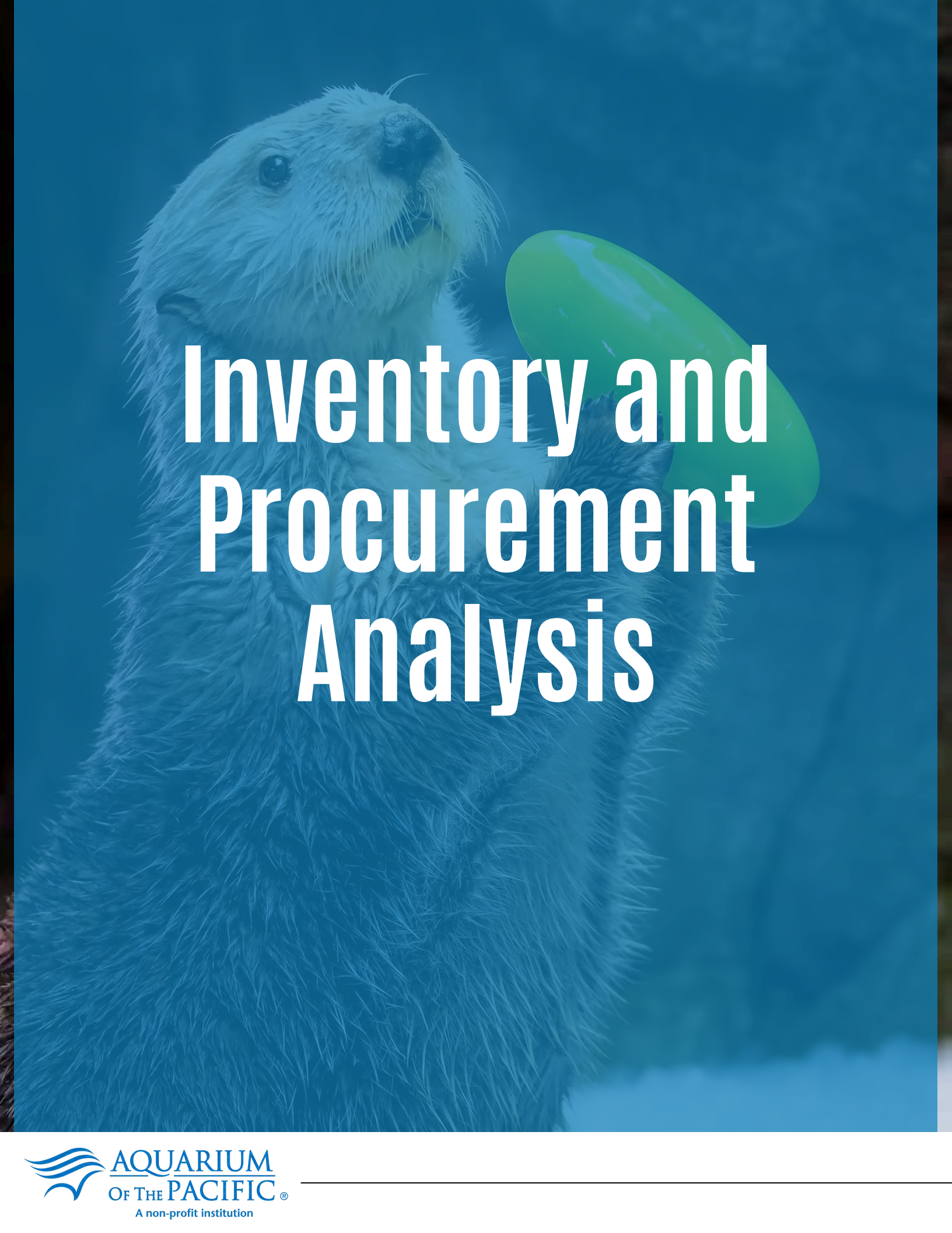
Percent of total food budget dedicated to chicken, beef, dairy and eggs

The Aquarium's food services needs to be both profitable and satisfactory to customers – two goals that do not necessarily align with sustainability. In 2019, the aquarium spent 23% of its food budget on beef, dairy, and chicken products. These products tend to have high to moderate footprints.

According to Chef Ken, Cafe Scuba's top-selling items are the cheeseburger, chicken strips, and beef hotdog-- all relatively high-emitting products. He is working to wean the public off these foods by creating a "green" menu that offers plant-based Wicked Kitchen items. His goal is to have 35% of the total menu plant-based. He plans on incorporating mini-lessons onto the screens outside of Cafe Scuba to inform and educate visitors about sustainable dining options and their impact on choosing environmentally-preferred options.



Global warming potential of popular menu item ingredients



Inventory and Procurement Analysis

Retail

An analysis of the inventory for the retail stores was conducted to omit low performance items, which may reduce total waste production

After meeting with Tina Sarty, the Controller of finances at the Aquarium, she provided an inventory reserve analysis for 2019 that contained a list of items separated into different sections based on their associated turnovers (no sales, inventory turns <0.5 , inventory turns >0.5) (Appendix 1c.1). In order to effectively select items that are underperforming and reduce the number of orders placed for these items, we identified items that resulted in no sales and categorized them by their item type (Table 1).

Category (Item Type)	Quantity on Hand by the End of the Year (12/31/2019)	Sum of the Cost Per Item within Each Category's Quantity
Gift*	17	\$1,593.83
Jewelry	19	\$319
Books	24	\$227.40
Accessories*	17	\$608
Clothing	24	\$618
TOTAL	101	\$3,366.23

Table 1

Retail

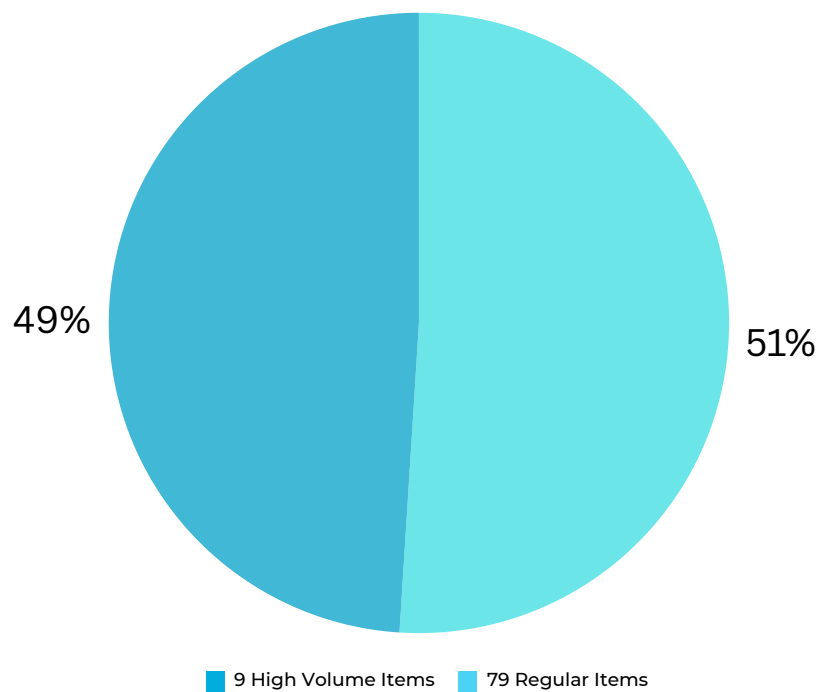
The three primary reasons given for this unsold inventory were high sale price for a small quantity of items (expected to have slower sales), high sale price for items in the new retail space (expected to have slower sales), and quantity ordered near the end of the year, so sales calculations could not be made for these items at the time. For the latter reason, we excluded the \$479 and 239 items from the 'accessories' category, and the \$325.65 and 35 items from the 'gift' category, which are marked with an asterisk.

The category with the largest average costs due to the quantity on hand by the end of 2019 is 'gift', which has items that are often larger and more expensive (such as glass art, coffee mugs, and woven baskets). Reductions in the purchases of these items can decrease the amount in stock and deter the production aspect of an item's life cycle. Focusing on the categories with the lowest average costs, such as 'jewelry', to procure environmentally-preferred products could be an area of interest. It also allows space for new items to be added to inventory in a sustainable manner, as it inherently "replaces" the omitted items. Tina had mentioned that the Aquarium purchases new items to add to its inventory, and as such, this approach can be utilized for sustainable procurement for the Aquarium's two retail stores.

Food

We utilized 2019 SAVOR procurement data to determine which food items are purchased the most by the Aquarium for sale in its food outlets (Appendix 2c.1).

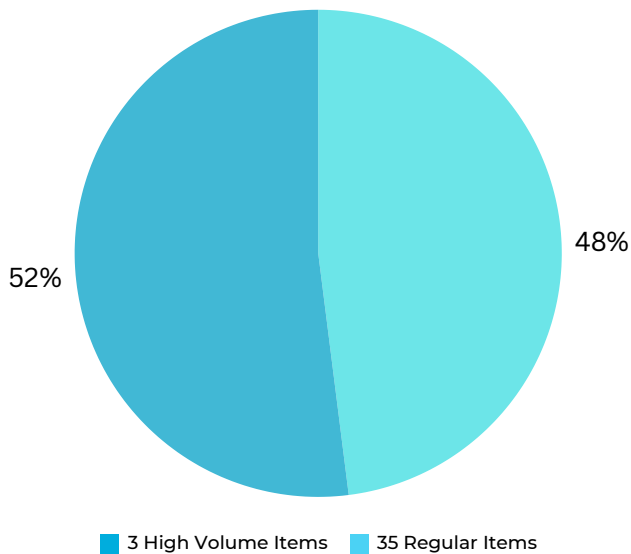
Our summarized findings show that the Aquarium's food budget for beef, chicken, dairy and egg products were dominated by just a couple of specific food items (high volume Items).



Out of 88 unique items, just 9 of those (milk containers, creamers, American and Cotija Cheese) accounted for 49% of the \$72,331 spent on dairy and egg products.

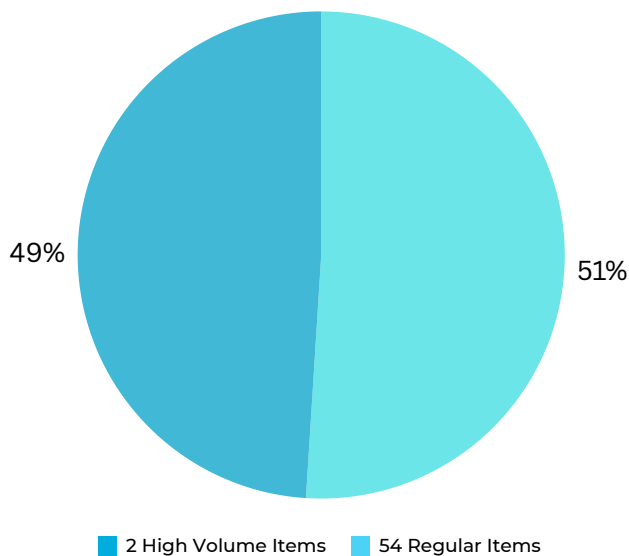
Combined, these 9 items have a 220,000 lb CO2 equivalent footprint.

Food



Out of 38 unique items, 3 (beef filets, short ribs, and patties) accounted for 52% of the \$92,234 spent on beef products.

Combined, these 3 items have a 180,000 lb CO₂ equivalent footprint.



Out of 56 unique items, 2 (chicken breast and tenders) accounted for 51% of the \$107,664 spent on poultry.

Combined, these 2 items have a 74,000 lb CO₂ equivalent footprint.

- The combined footprint of these high volume items is equivalent to nearly 24,000 gallons of gasoline consumed*
- Finding ways to communicate menu items that contain high-volume, high-footprint ingredients can be an effective way to encourage customers to try greener alternatives

*Emissions calculator: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>



Recommendations

General Recommendations

Survey data suggest a strong market for sustainable products. Selling sustainable retail items and food selections requires an educated public.

01 The Aquarium can motivate customers to make more sustainable purchases by using informative signage.

02 The Aquarium can better market its core values by employing story-telling tactics.

03 Increase the availability of sustainable items, and customers will be willing to purchase them.

Recommendations

Retail

Annual inventory analysis

- Focus on categories with a higher portion of unsold items and higher costs. Omit those that are consistently underperforming.

Have staff members chat with customers to tell sustainability stories

- Offer storytelling station.
- Storytelling at register.

Look for more sustainable product replacements

- Customers are willing to pay 10% more for sustainable products.

Implement more obvious signage near sustainable products

- Place sustainable labels or stickers near the products' shelves for the signage to be more obvious.



Example label and in-store demonstration



Recommendations

Food

Add Carbon Footprint Metrics to Menu

- Customers are receptive to carbon-footprint data. The simpler, the better.



high footprint



moderate footprint



low footprint

Educate Visitors on their impact

- Encourage customers to choose greener foods by communicating that their choices have an impact.

Offer Wicked Kitchen Samples

- Customers might be more willing to purchase if they know what the item tastes like. Many are already willing to try these items in the future.

Tell the Story of Institutional Behavior

- Institutional action is needed to supplement individual behavior.

Acknowledgements

We would like to give a special thank you to the Monterey Bay Aquarium, the National Aquarium, Chef Ken Stewart, Jeff Spofford, Tina Sarty, and Fahria Qader for aiding us in the process of gathering information to use in the development of our sustainable procurement policy recommendations!

**We thank you for your
continued support in
our efforts to contribute
to the sustainability of
the Aquarium of the
Pacific in Long Beach.**

Authors

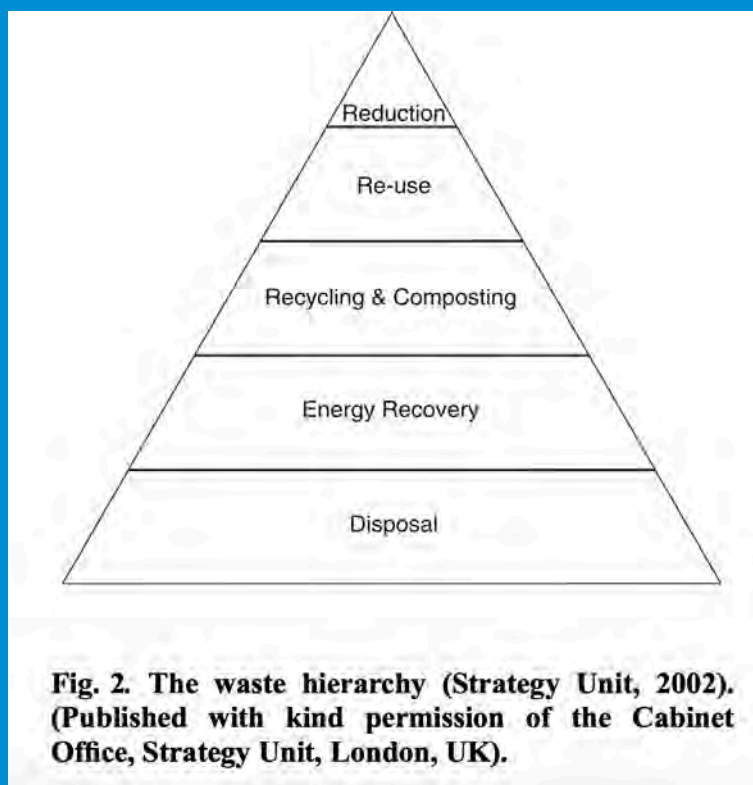
Student Team: Faheema Ahmed, Simon Dionson, Abraham Hernandez, Lingxi Liu, Kelly Ou, Pelpita K Pahan D Perera, Magaly Santos, Jessa Smith, and Bailey Vargas

Advisor: Dr. Peter Kareiva

Appendix 1a

1a.1: Waste Management and Reduction

Figure 1 from "Incorporating sustainable practices for zoos and aquariums: a Triple Bottom Line approach" by S. Townsend, 2009, International Zoo Yearbook, 43(1), p. 55 (<https://doi.org/10.1111/j.1748-1090.2008.00065.x>). Copyright 2009 by The Zoological Society of London.



Appendix 1b

1b.1: Finalized Retail Survey



Retail Services Study

Hello there!

Thank you for choosing to participate in this survey. For your discretion, here are some important points to note:

- Your response is anonymous
- Responses will be used to assess current retail practices
- Your response matters!

Q1. Below is a list of sustainable items. Which of the following would you be interested in if sold at the aquarium?

- ☐ Sustainable clothing ☐ Sustainable stuffed animals ☐ Reusable/recyclable Products ☐ None of the above



Q2. After browsing, did the retail shop offer a variety of sustainable or eco-friendly gifts and merchandise?

- ☐ Yes ☐ No ☐ I'm not sure

Q3. Purchasing environmentally friendly products is important to me.

Strongly Agree ☐ ☐ ☐ ☐ ☐ Strongly Disagree

Q4. Would you like to see more variety of sustainable or eco-friendly toy options/gift shop options/souvenirs?

Very likely ☐ ☐ ☐ ☐ ☐ Very unlikely

Q5. What is the highest price increase you would pay in order to support a sustainable purchase (i.e., a reusable bag)?

☐ 0% ☐ 10% ☐ 20% ☐ 30%

Q6. If items were marked as sustainably made or earth friendly, would you be more likely to purchase it?

Very likely ☐ ☐ ☐ ☐ ☐ Very unlikely

Q7. When disposing of your purchases, are you likely to recycle, donate, or throw away the items that you purchased here? (select all that's applicable)

Throw Away ☐ Recycle ☐ Donate ☐



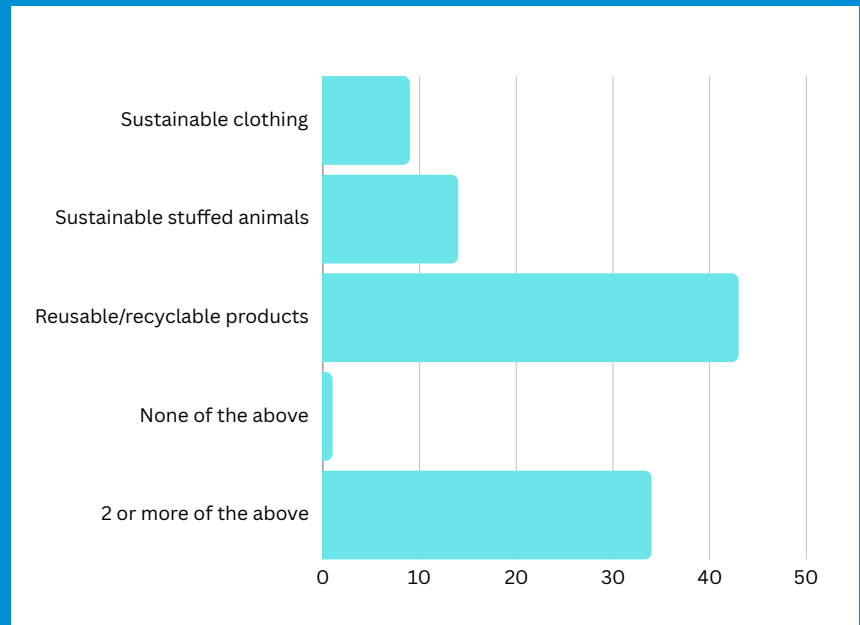
Q8. I know what makes a product environmentally friendly.

Strongly Agree ☐ ☐ ☐ ☐ ☐ Strongly Disagree

Thank you for taking this survey! Your feedback is very important. If there is anything you'd like us to know, please write below.

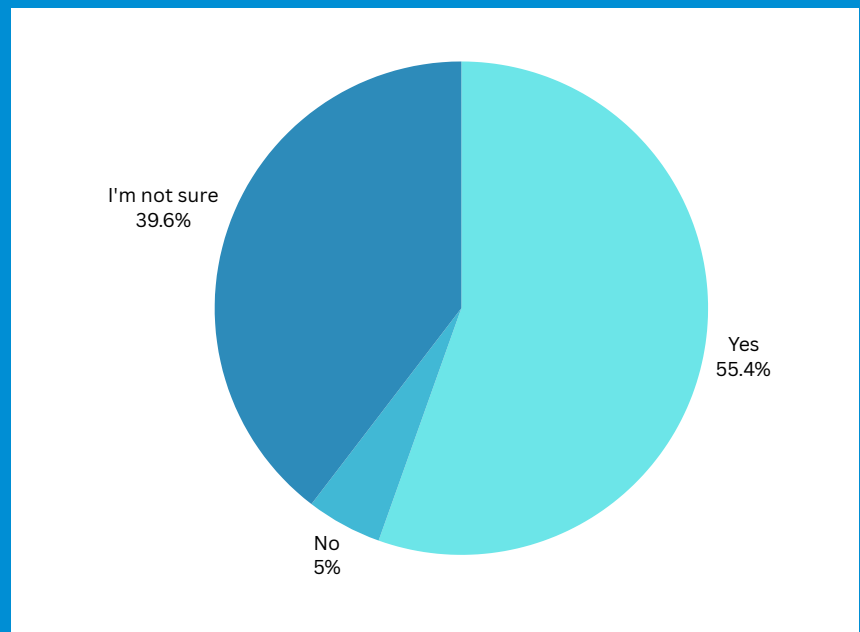
1b.2 Question 1 responses

Q1		Responses
Sustainable clothing	1	9
Sustainable stuffed animals	2	14
Reusable/recyclable products	3	43
None of the above	4	1
2 or more of the above	5	34



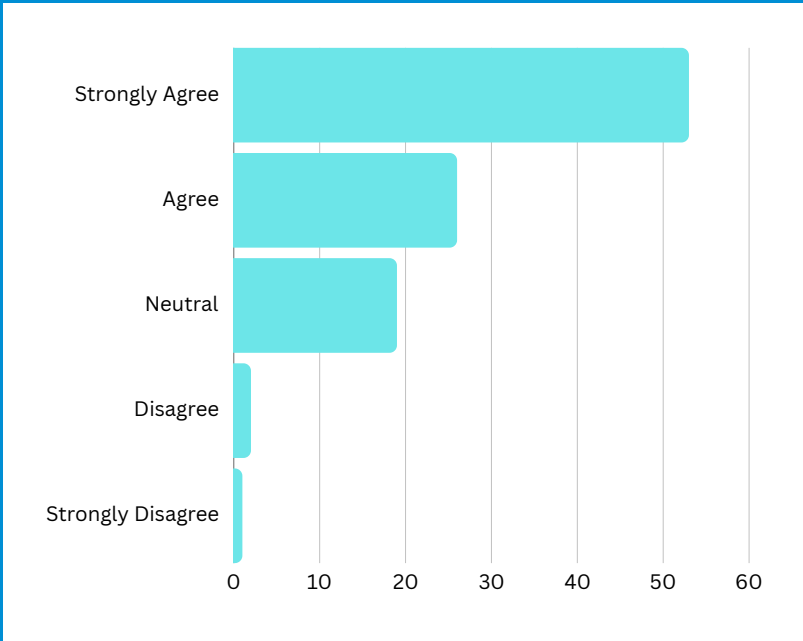
1b.3 Question 2 responses

Q2		Responses
Yes	1	56
No	2	5
I'm not sure	3	40



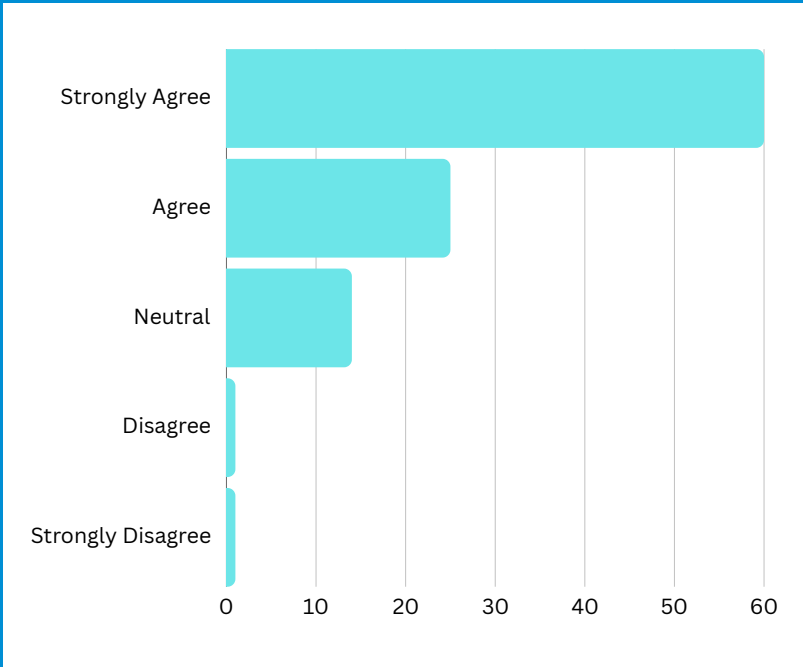
1b.4 Question 3 responses

Q3		Responses
Strongly Agree	1	53
Agree	2	26
Neutral	3	19
Disagree	4	2
Strongly Disagree	5	1



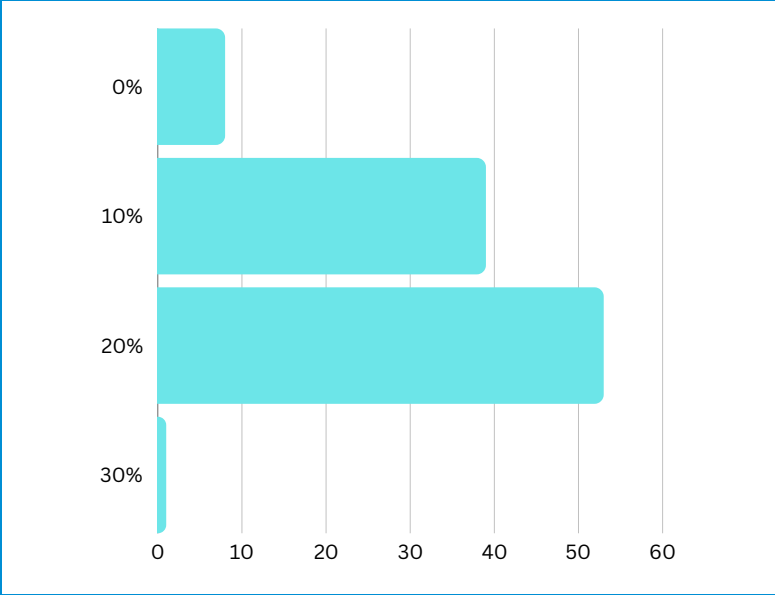
1b.5 Question 4 responses

Q3		Responses
Strongly Agree	1	60
Agree	2	25
Neutral	3	14
Disagree	4	1
Strongly Disagree	5	1



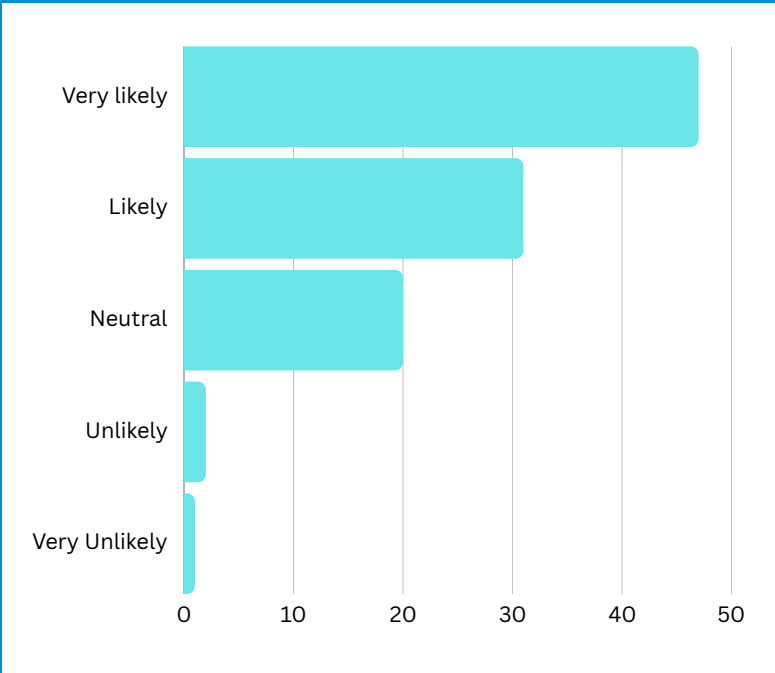
1b.6 Question 5 responses

Q5		Responses
0%	1	8
10%	2	39
20%	3	53
30%	4	1



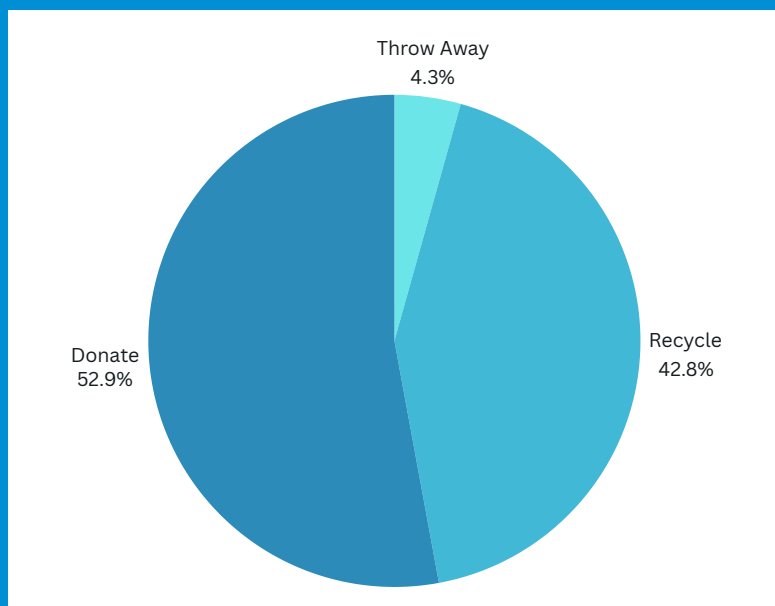
1b.5 Question 6 responses

Q6		Responses
Very likely	1	47
Likely	2	31
Neutral	3	20
Unlikely	4	2
Very Unlikely	5	1



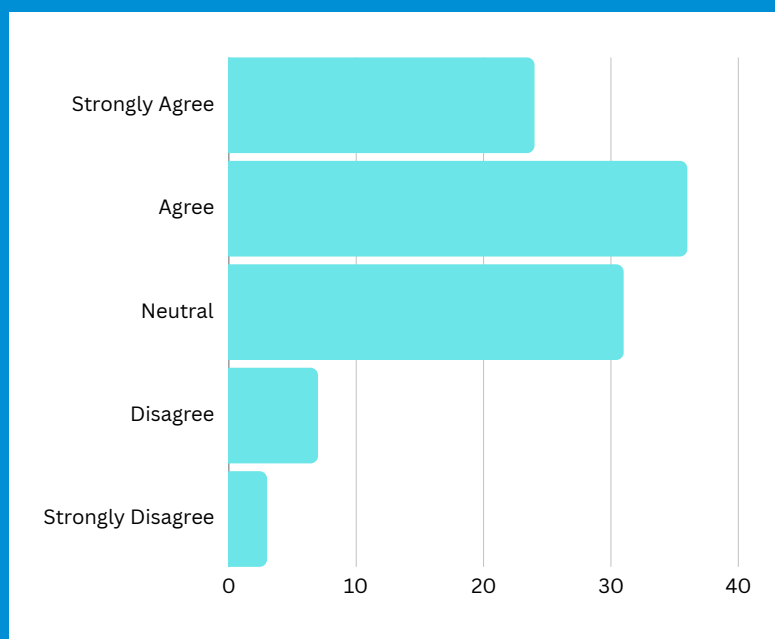
1b.6 Question 7 responses

Q7	
Throw Away	6
Recycle	59
Donate	73



1b.7 Question 8 responses

Q8	Q8 Classes	Q8 Frequency
Strongly Agree	1	24
Agree	2	36
Neutral	3	31
Disagree	4	7
Strongly Disagree	5	3



1b.8 Chi-square test: Q3 & Q5

Hypothesis: Customers who think purchasing eco-friendly products are important would be willing to pay a price increase for them

	Important to me	Not important to me	TOTAL
Price increase	76	17	93
No price increase	3	5	8
TOTAL	79	22	101 TOTAL

- Important (Q3): response was 1 or 2
- Not important (Q3): response was 3, 4 or 5
- Price increase (Q5): response was 2,3, or 4
- No price increase(Q5): response was 1
- Chi-square statistic: 8.4545
- p-value: 0.003641
- significance level: 0.05

Chi-square analysis shows significance: the importance of purchasing eco-friendly products to customers positively influence their willingness to pay for a price increase for these products

1b.9 Chi-square test: Q4 & Q6

Hypothesis: Customers who want to see more variety of products are more likely to purchase products marked eco-friendly.

	More variety	Less variety	TOTAL
Likely to Purchase	72	6	78
Not likely to purchase	13	10	23
TOTAL	85	16	101 TOTAL

- More variety (Q4): response was 1 or 2
- Less variety (Q4): response was 3, 4 or 5
- Likely to purchase marked (Q6): response was 1 or 2
- Not likely to purchase marked (Q6): response was 3,4, or 5
- Chi-square statistic: 17.062
- p-value: 0.000036
- significance level: 0.05

Chi-square analysis shows significance: Customers who want to see more variety of products are more likely to purchase products marked eco-friendly

1b.10 Chi-square test: Q3 & Q4

Hypothesis: Customers who think purchasing eco-friendly products are important to them also want to see more variety of these products

	Important to me	Not important to me	TOTAL
More variety	76	9	85
Less variety	3	13	16
TOTAL	79	22	101 TOTAL

- Important (Q3): response was 1 or 2
- Not important (Q3): response was 3, 4 or 5
- More variety (Q4): response was 1 or 2
- Less variety (Q4): response was 3, 4 or 5
- Chi-square statistic: 39.462
- p-value: 0.00001
- significance level: 0.05

Chi-square analysis shows significance: Customers who thinks purchasing eco-friendly products are important to them also wants to see more variety of these products

1b.11 Chi-square Test: Q4 & Q5

Hypothesis: Customers who wants to see more variety of products are more likely to pay for a price-increase for these products

	More variety	Less variety	TOTAL
Price increase	75	18	93
No price increase	4	4	8
TOTAL	79	22	101 TOTAL

- More variety (Q4): response was 1 or 2
- Less variety (Q4): response was 3, 4 or 5
- Price increase (Q5): response was 2,3, or 4
- No price increase(Q5): response was 1
- Chi-square statistic: 4.0604
- p-value: 0.0439
- significance level: 0.05

Chi-square analysis shows significance: Customers who wants to see more variety of products are more likely to pay for a price-increase for these products

1b.12 Chi-square Test: Q3 & Q7

Hypothesis: Customers who think purchasing eco-friendly products are important are more likely to sustainably get rid of used products

	Important to me	Not important to me	TOTAL
Recycle /donate	74	21	95
Throw away	5	1	6
TOTAL	79	22	101 TOTAL

- Important (Q3): response was 1 or 2
- Not important (Q3): response was 3, 4 or 5
- Recycle/donate: Q7
- Throw away: Q7

- Chi-square statistic: 0.098
- P-value: 0.754272
- significance level: 0.05

Chi-square analysis shows insignificance: Whether customers think purchasing eco-friendly products is important to them doesn't affect their way of dealing with used products

Appendix 1c

1c.1: 2019 Inventory Reserve Turnover Analysis
Turns, sales, and quantity by the end of 2019 (December 31st) in 'specific review' tab: [2019 Inventory Reserve Turnover](#)

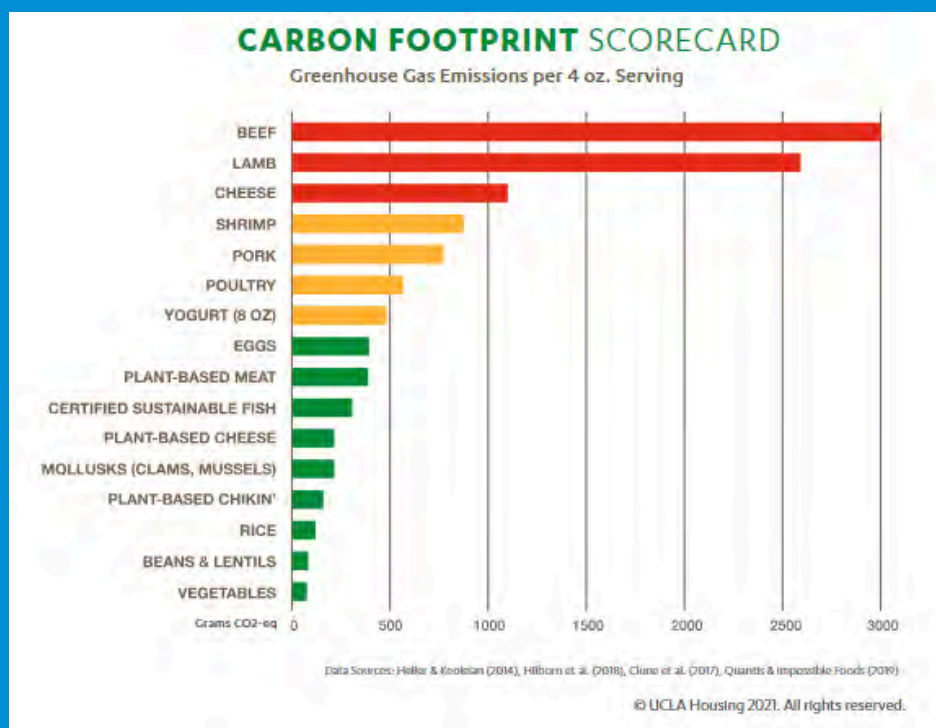
Appendix 2a

2a.1: Calculating Food Emissions

"Systematic review of greenhouse gas emissions for different fresh food categories", Cluen et. al (2017).
See Table 5 or Sheet 1 of [Virtual Food Appendix](#)

2a.2: UCLA Dining Emissions Graphic

Figure 2 from "Fighting Climate Change With Food: A Toolkit to Encourage Climate-Friendlier Eating", UCLA Housing (2021). See Page 5 'Graphic Carbon Footprint Scorecard'



Appendix 2b

2b.1: Released Survey



A non-profit institution

Food Services Study

Hello there!

Thank you for choosing to participate in this survey. For your discretion, here are some important points to note:

- Your response is anonymous
- Responses will be used to assess current food options
- Your response matters!

The aquarium is working towards building a more sustainable menu. Based on the information below, which items would you be most likely to choose?

Q1: All foods have carbon footprints. Eating food with lower carbon footprints is an important way to combat climate change. If these foods were labeled with the following,



: high footprint



: moderate footprint



: low footprint

Which one would you order? (CIRCLE 1)



Veggie Burger



Beef Cheeseburger



Chicken Burger

None of the above

Q2: Certain foods release more harmful gases (carbon dioxide, methane, etc.), by weight, into the atmosphere than others when produced. If these foods were rated by how much they release,



= 1lb of gas per 16oz serving

Which one would you order? (CIRCLE 1)



Chicken Strips



Fish and Chips



Vegan Strips



None of the above

Q3: The aquarium proudly serves vegan Wicked Kitchen items that rival the cost of many of their non-vegan counterparts at a fraction of the carbon footprint.

For this example, a regular cheeseburger meal costs \$16 and a Wicked Jalapeno Burger is the same price. Fill in the blank.

If a cheeseburger meal were to cost _____, I would order the Wicked Jalapeno Burger meal (\$16) instead.

- ☐ \$16 (0% more)
- ☐ \$16.80 (5% more)
- ☐ \$17.60 (10% more)
- ☐ \$18.40 (15% more)
- ☐ \$19.20 (20% more)
- ☐ None. I would order the cheeseburger meal regardless of price.

Q4: Dairy products emit more carbon dioxide into the atmosphere than certain meat products. Did you know that 1 serving of chili cheese fries has the same carbon footprint as about 16.75 servings of vegan chili cheese fries?

Knowing this, which would you choose? (SHADE IN 1)



Chili Cheese Fries



Vegan Chili Cheese Fries

- 1) Chili Cheese Fries ☐
- 2) Vegan Chili Cheese Fries ☐

Q5: After learning about how different menu items have different carbon footprints, how much do you agree or disagree with the following statements:

a. I think about my carbon footprint when I order food.



strongly disagree



disagree



neutral



agree



strongly agree

b. I am willing to try Wicked Kitchen menu items in the future.



strongly disagree



disagree



neutral



agree



strongly agree

c. Small differences in carbon footprints and price don't matter to me as much as familiarity.



strongly disagree



disagree



neutral



agree



strongly agree

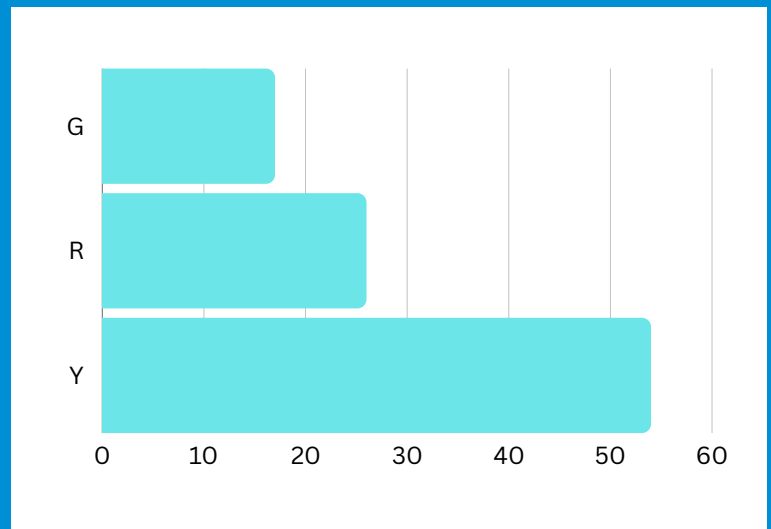
Thank you for filling out the survey. Your feedback is greatly appreciated!

2b.2: Raw Survey Data

See Sheet 2 of [Virtual Food Appendix](#)

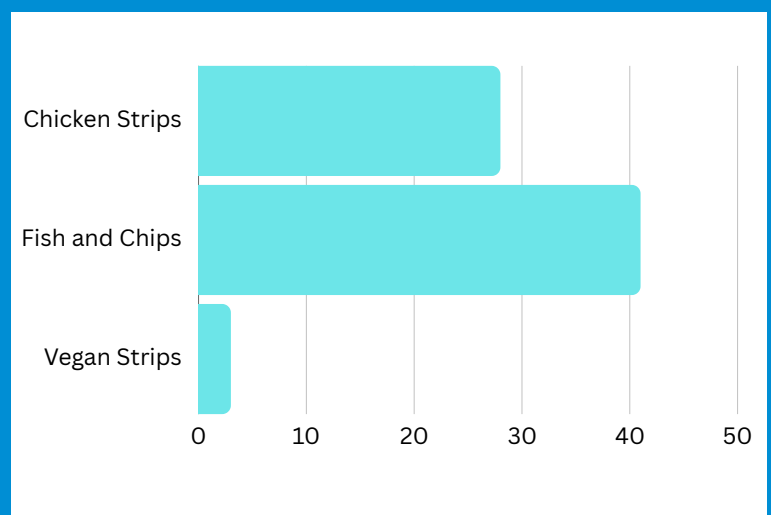
2b.3: Question 1 Responses

	Which one would you order?	# Responses
Green	G	17
Red	R	26
Yellow	Y	54
None of the above	NA	3
	NA/NR not in total	Total answers: 97



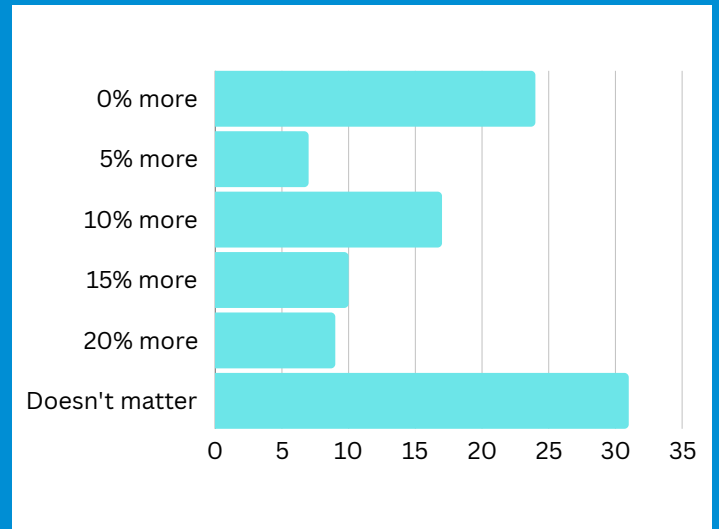
2b.4: Question 2 Responses

Chicken Strips	1	28
Fish and Chips	2	41
Vegan Strips	3	20
None of the above	NA	9
No response	NR	2
	NA/NR not in total	Total answers: 89



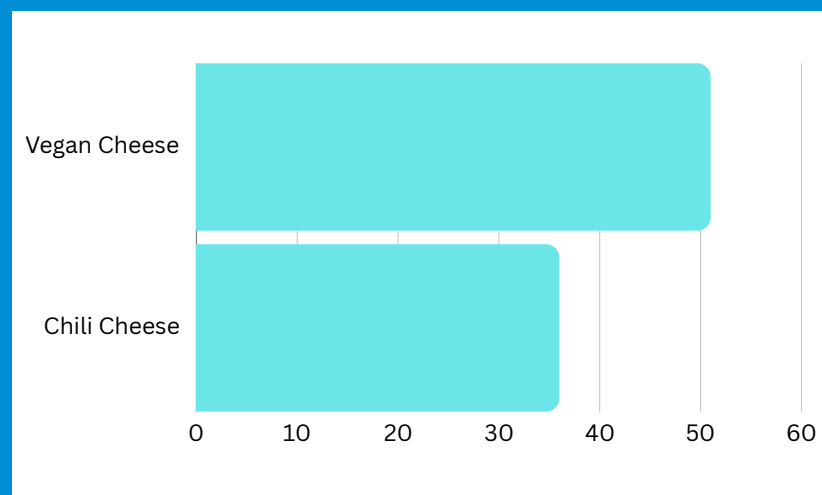
2b.5: Question 3 Responses

0% more	1	24
5% more	2	7
10% more	3	17
15% more	4	10
20% more	5	9
Doesn't matter	6	31
No response	NR	2



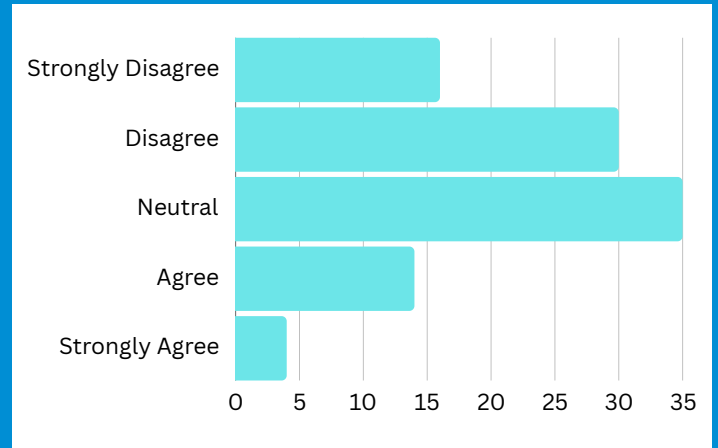
2b.6: Question 4 Responses

Chili Cheese	1	36
Vegan Cheese	2	51
None of the above	NA	11
No response	NR	2



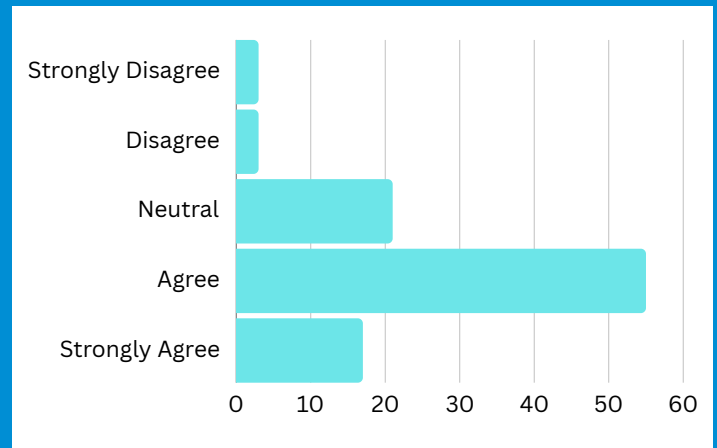
2b.7: Question 5a Responses

Strongly Disagree	1: Strongly Disagree	16
Disagree	2: Disagree	30
Neutral	3: Neutral	35
Agree	4: Agree	14
Strongly Agree	5: Strongly Agree	4
No response	NR	1



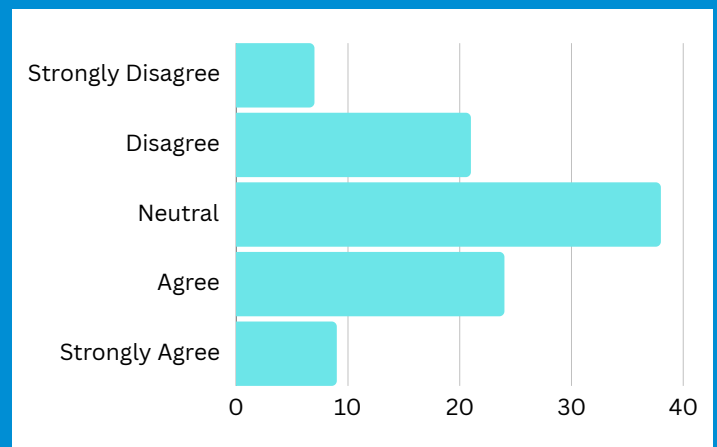
2b.8: Question 5b Responses

Strongly Disagree	1: Strongly Disagree	3
Disagree	2: Disagree	3
Neutral	3: Neutral	21
Agree	4: Agree	55
Strongly Agree	5: Strongly Agree	17
No response	NR	1



2b.9: Question 5c Responses

Strongly Disagree	1: Strongly Disagree	7
Disagree	2: Disagree	21
Neutral	3: Neutral	38
Agree	4: Agree	24
Strongly Agree	5: Strongly Agree	9
No response	NR	1



2b.10: Question 1 Chi-square Analysis

Testing to see if customers who didn't think of their carbon footprint chose sustainably due to the method of communication presented in question 1

TABLE	Lower emis	Higher emis.	
Thinks of CO2	16	1	17
NThinks of CO2	54	25	79
	70	26	96

- Thinks of CO2: if Q5a was 4 or greater
- NThinks of CO2: IF Q5a was 3 or less
- Low emis: if Q1 was G or Y
- High emis: if Q1 was R

- Chi square statistic: 4.7019
- p-value: 0.030129
- significance level: 0.05

Chi-square analysis shows significance: distribution can be explained by customers being influenced to choose sustainably by this communication method

2b.11: Question 2 Chi-square Analysis

Testing to see if customers who didn't think of their carbon footprint chose sustainably due to the method of communication presented in question 2

TABLE	Lower emis	Higher emis.	
Thinks of CO2	13	4	17
NThinks of CO2	48	24	72
	61	28	89

- Thinks of CO2: if Q5a was 4 or greater
- NThinks of CO2: if Q5a was 3 or less
- Low emission: if Q2 was 2 or greater
- High emission: if Q2 was 1

- Chi square statistic: 0.613
- p-value: 0.433648
- significance level: 0.05

Chi-square analysis does not show significance: distribution can be explained by random chance

2b.12: Question 4 Chi-square Analysis

Testing to see if customers who didn't think of their carbon footprint chose sustainably due to the method of communication presented in question 4

TABLE	Lower emis	Higher emis.	
Thinks of CO2	14	3	17
NThinks of CO2	37	33	70
	51	36	87

- Thinks of CO2: if Q5a was 4 or greater
- NThinks of CO2: if Q5a was 3 or less
- Vegan: if Q4 was 2
- No Vegan: if Q4 was 1

- Chi square statistic: 4.9058
- p-value: 0.026766
- significance level: 0.05

Chi-square analysis shows significance: distribution can be explained by customers being influenced to choose sustainably by this communication method

Appendix 2c

2c.1: SAVOR Procurement Data

2019 received stock items: [SAVOR spreadsheet data](#)

2c.2: High Volume Items calculated using SAVOR Procurement Data

[High Volume Items spreadsheet data](#)