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Eat with a Porpoise: Measuring the Effectiveness of Seafood Certification & Rating System Programs to Inform a Vaquita-Friendly Seafood Market

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# **Eat with a Porpoise: Measuring the Effectiveness of Seafood Certification & Rating System Programs to Inform a Vaquita-Friendly Seafood Market**

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June 15<sup>th</sup>, 2017

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# Table of Contents

<b>1. Summary</b> .....	<b>3</b>
<b>2. Background</b> .....	<b>4</b>
2.1 Upper Gulf of California, Mexico and fisheries.....	4
2.2 The vaquita near-extinction crisis.....	5
<b>3. Market-based conservation instrument</b> .....	<b>6</b>
3.1 Eco-labels.....	6
3.2 Existing seafood certification and rating systems programs.....	7
3.2.1 <i>Fair Trade</i> .....	7
3.2.2 <i>Marine Stewardship Council (MSC)</i> .....	8
3.2.3 <i>Best Aquaculture Practices (BAP)</i> .....	9
3.2.4 <i>Seafood Watch</i> .....	10
<b>4. Study design</b> .....	<b>10</b>
4.1 Methodology.....	11
4.1.1 <i>Participatory exercise</i> .....	11
4.1.2 <i>Survey</i> .....	13
<b>5. Results</b> .....	<b>14</b>
5.1 Focus group results.....	14
5.2 Survey respondents' seafood consumption habits.....	14
5.3 Label preferences among survey respondents.....	15
5.4 Survey respondents' willingness to pay for eco-labeled seafood.....	17
5.5 Potential UGC labels.....	18
<b>6. Discussion</b> .....	<b>19</b>
6.1 Consumption habits of sample and global seafood production trends.....	19
6.2 Effectiveness of four eco-label programs discussed in study.....	20
6.2.1 <i>Explanation of San Diego fisher results</i> .....	20
6.2.2 <i>Hidden price premium</i> .....	21
6.3 Recommendations to improve market access.....	21
6.4 Study limitations and opportunities.....	23
6.4.1 <i>Stated preference studies</i> .....	23
6.4.2 <i>Sample group bias</i> .....	23
6.4.3 <i>Future research opportunities</i> .....	23
<b>7. Conclusion</b> .....	<b>23</b>
<b>8. Acknowledgements</b> .....	<b>24</b>
<b>9. References</b> .....	<b>25</b>
<b>10. Appendix</b> .....	<b>30</b>

*“We ate our way into the problem, we can eat our way out.” –Sarah Mesnick*

## **1. SUMMARY**

The Upper Gulf of California (UGC), Mexico, is home to the most critically endangered marine mammal in the world, the vaquita. Due to both accidental entanglement in gillnets set for shrimp and other finfish, and the resurgence of an illegal fishery for totoaba, the species is in imminent danger of extinction. The fate of the vaquita lies in the cessation of illegal fishing, a permanent ban of all gillnets, the speedy development of alternative gear for legal fisheries, and a fisheries incentive program to encourage the adoption of new gear. This study explored the use of an eco-labeling scheme as a means of raising awareness and support for future seafood products caught with gear that does not entangle vaquita and minimizes bycatch of other non-target species. Eco-labels are one (of many) market-based tools that could help to promote sustainable fishing practices, provide economic incentives to producers, and engage consumers in supporting a gillnet-free UGC.

The two main questions I set out to answer include the following: 1. Are consumer-facing seafood labels working; and, 2. If so, can this market-based approach support a gillnet-free UGC? To best answer these questions, I conducted a stated preference study. The purpose of these studies are to ask questions that help show the monetary tradeoff each person would be willing to make regarding the value of goods or services. In this study, since there is no product (i.e. an eco-labeled gillnet-free UGC shrimp), demand was measured by asking consumers how much they were willing to pay for a low bycatch and wild-caught seafood product.

The participatory exercise revolved around a simple board game. There were 13 focus groups that participated in the game. Focus groups were conducted from March 28<sup>th</sup> to April 29<sup>th</sup>, 2017. Each group was made up of with 2-8 participants (n=58) representing a particular NGO, foundation, academic institute, seafood restaurant/retailer, and a selected group of fishermen and consumers. The game was made up of four eco-label categories: geography, production method, nutrition, and existing label/rating programs. The existing label/rating programs discussed in this study are either voluntary environmental performance labels—like the Marine Stewardship Council (MSC), Fair Trade, and Best Aquaculture Practices (BAP)—or a set of recommendations independently produced by a non-certifying body like the Seafood Watch rating system.

There were 5-7 eco-label “chip” options to choose from within each of the board game categories, including a wildcard. Each group was told to discuss and choose one eco-label chip within each of the four categories. Once the group reached a consensus, they were asked to place their eco-label chip on the board game. After each focus group finished the game, they individually completed an 18-question written survey.

The second group—representing the same demographics—did not participate in the game and completed a 16 to 18-question written survey. There were a total of 377 survey responses across both groups. The survey was conducted between March 28<sup>th</sup> to May 6<sup>th</sup>, 2017 either in-person or through Survey Monkey. The survey included questions relating to willingness to pay for an eco-labeled seafood product that was wild-caught with low bycatch, questions about existing label/rating program familiarity and loyalty, and questions about potential UGC labels as feedback for those particular NGOs who designed

the labels (The Environmental Defense Fund, Pronatura, Pesca Abc, San Felipe Pescados y Mariscos (SFPYM).

The exercise revealed that a majority of the focus groups prefer to purchase seafood that is labeled with the following four attributes: U.S. caught or local, low bycatch, contains no additives, and rated by Seafood Watch as a “Green” (best choice) or “Yellow” (good alternative) product. The survey found that 75% of all respondents recognize one or more of the four label/rating programs. Among this group, 73% seek out products labeled by one or more of these programs, with Seafood Watch and Fair Trade being the most recognized and trusted of these labels/ratings. Most eco-label consumers were willing to pay a maximum of 20%-30% more for a wild-caught and low bycatch eco-labeled seafood product over an uncertified one.

The proof-of-concept study was designed for a local, San Diego-based demographic likely to purchase a vaquita-friendly seafood product, and cannot be assumed to represent a broader demographic or other regions in the country. However, the results suggest a demand for an eco-labeled gillnet-free UGC seafood product. This approach could mark a rare instance where conservation goals and the needs of fishing communities are equally met.

## **2. BACKGROUND**

### **2.1 Upper Gulf of California, Mexico and fisheries**

The Gulf of California is considered the one of the world’s top marine biodiversity hotspots (Moreno-Baez et al., 2010). Coastal upwelling events, wind-driven mixing, and strong tidal fluxes make this an important area for spawning, mating, and nursing for many commercially and ecologically important species (Brusca et al., 2017). These highly productive waters are vital to the economic wellbeing of Mexico, supporting large industrial, small-scale, and recreational fishing industries (Moreno-Baez et al., 2010). The focus of this study surrounds the small-scale commercial fisheries of the Upper Gulf of California (UGC), which make up a sizable proportion of the fishing fleet. There are approximately 760 pangas (or small outward-bound motor boats) in the Upper Gulf fishing blue shrimp, curvina golfina, bigeye croaker, Monterrey Spanish mackerel, as well as sharks, rays, crustaceans and bivalves (Moreno-Baez et al., 2010). Fishing communities in the region include Golfo de Santa Clara and Puerto Peñasco in Sonora, and San Felipe in Baja California.

In the Gulf of California, both large and small-scale fisheries generate over 50,000 jobs, which account for half of the nation’s fisheries-related jobs, and just over half the value of all fisheries in the country (Cisneros-Mata, 2010). In Mexico, shrimp is the most valuable fisheries commodity in terms of exports and employment (Gillett, 2008). More vessels are involved in shrimp fishing—particularly in the Pacific, Gulf of Mexico, and Caribbean—and it offers more employment than any other type of fishing (Gillett, 2008). In 2011, the total catch of small-scale fisheries in the Upper Gulf was valued at over \$10 million USD, with approximately 600 boats with shrimp permits (Aburto-Oropeza et al., 2016). In the last half-century, shrimp production in Mexico nearly tripled from 66,000 tons in 1960 to over 183,000 tons in 2007 (Gillett, 2008).

The United States is the largest export market for Mexican seafood and is by far the most important market for high quality UGC shrimp (USAID, 2009). What make these shrimp distinct are their sweet taste, superior quality, and large nearly lobster-like size (USAID, 2009). Unlike most wild shrimp, which are caught with bottom trawls, gillnet-caught shrimp from the UGC are hand-picked from nets so that the product retains the highest quality (S. Mesnick, personal communication, June 5, 2017). All of these factors garner the highest prices for these shrimp, which can be worth up to \$30 a pound in San Diego seafood markets (Poindexter et al., in prep).

The UGC is one of the most important fishing zones in Mexico, contributing to 77% of the country's total fisheries biomass (USAID, 2009, IMCO, 2013). However, the popular, relatively cheap, and easy-to-use gillnets threaten the biodiversity of the region by entangling and drowning non-target species, like turtles, sharks, vaquita, and totoaba (D'Agrosa et al., 2000). Gillnets are made up of a curtain of netting that hangs in the water column, typically composed of monofilament or multifilament nylon (NOAA, 2014).

Gillnet mesh sizes are designed to allow fish to get only their head through the netting (NOAA, 2014). As the fish struggles to free itself, it becomes more and more entangled (NOAA, 2014). Despite regulations in the UGC banning large mesh gillnets (six inches or greater)—used to illegally caught totoaba—lack of compliance and enforcement over the years has weakened this regulation (Rojas-Bracho et al., 2006). Smaller mesh gillnets (<20 cm)—used to capture shrimp and other finfish—also occur in this region (D'Agrosa et al., 2000). Gillnets can also be difficult for non-target species, like cetaceans, to detect by echolocation (NOAA, 2014). Regardless of mesh size, all gillnets contribute to vaquita mortality, which is further discussed in subsequent sections (D'Agrosa et al., 2000).

## 2.2 The vaquita near-extinction crisis

The vaquita (*Phocoena sinus*), a small porpoise endemic to the UGC, is the most critically endangered marine mammal in the world (EIA, 2016). Vaquita are caught and drown in gillnets set for shrimp and other species (WWF, 2016). In most parts of the world, it is unusual to use gillnets to capture shrimp (Seafood Watch, 2017). The tremendous tidal currents are what make this possible in the UGC (Brusca et al., 2017). Gillnets are also used to illegally catch endangered totoaba (*Totoaba macdonaldi*), which is a large fish in the croaker family, similar in size to vaquita. These fish are captured for their prized swim bladders, which are sold to Chinese markets for their alleged medicinal properties (EIA, 2016). Fishermen can receive upwards of \$8,500 per kilogram of swim bladder, which can equate to a large portion of their annual (legal) fishing income (EIA, 2016). While the focus of this paper surrounds the vaquita bycatch issue in the shrimp fishery, it is important to note that vaquita are threatened by all gillnets used for other legal and illegal fisheries.

In 1997, the vaquita population was estimated at 567 individuals, and currently fewer than 30 individuals are thought to remain (CIRVA-8, 2016). Given the critically endangered status of vaquita and the direct threat posed by gillnets, it is widely accepted in the scientific community that the only way to completely eliminate incidental bycatch is to permanently ban gillnets in the UGC (CIRVA-8, 2016). However, fishing restrictions are particularly unpopular in the three UGC fishing communities of Golfo de Santa Clara and Puerto Peñasco in Sonora, and San Felipe in Baja California (USAID, 2009). These

communities rely heavily on gillnetting to support their livelihoods, and would suffer huge economic losses with a permanent ban unless alternative—and economically and ecologically viable—fishing methods were available.

Tradeoffs are inherent in conservation (Morzaria-Luna et al., 2012). In the case of vaquita, actions intended to reduce bycatch come at a cost, typically to local communities who rely on fishery resources (Morzaria-Luna et al., 2012). Win-win solutions motivate many popular conservation programs (Morzaria-Luna et al., 2012). In practice, however, benefits from recovering a species from near-extinction, while also increasing human wellbeing are very difficult to accomplish simultaneously (Morzaria-Luna et al., 2012). In the UGC, weak enforcement and rampant illegal fishing, slow development of alternative gear for legal fisheries, and little investment in career opportunities outside of fishing make this mutual gain for fishermen and conservation even harder to achieve.

Since 1993, the government of Mexico has invested hundreds of millions of dollars in a number of vaquita conservation policies. Unfortunately, most of these policies have been unsuccessful due to the issues mentioned above. Most recently, in April 2015, after increasing pressure from the scientific community, Mexican President Enrique Peña Nieto announced a two-year emergency gillnet ban throughout the vaquita habitat and called for increased enforcement. This ban was expected to open up opportunities to implement alternative “vaquita-friendly” fishing gear, while also sustainably supporting artisanal fishing communities (EIA, 2016). Due to continued illegal gillnetting, the species experienced a 49% decline between 2015 and 2016 (CIRVA-8, 2016). For more in-depth analyses on the development and execution of the various vaquita conservation regulatory policies see Barlow et al., 2010, Rojas-Bracho et al., 2006, and Rojas-Bracho et al., 2013.

### **3. MARKET-BASED CONSERVATION INSTRUMENT**

#### **3.1 Eco-labels**

Information in the supply chain is inherently asymmetrical, as producers will always have more information than consumers (Ward and Phillips, 2008). The goal of labeling consumer goods is to correct this information externality (Ward and Phillips, 2008). A market-based conservation instrument—like an eco-label—could be an effective approach to promoting sustainable fishing practices, providing economic incentives to producers, and engaging consumers in supporting a gillnet-free UGC. However, eco-labels rely on consumer willingness to pay for the true costs of producing sustainable seafood.

According to the International Organization for Standardization, eco-labels are defined as:

“A voluntary, multiple-criteria based, third-party program that rewards a license that authorizes the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle consideration” (Global Eco-Labeling Network, 2017).

Seafood eco-labeling is designed to increase demand for and access to well-managed fisheries, and reduce demand for others—without the use of direct regulation—by relying on consumers to make informed purchasing decisions (Gutiérrez et al., 2012). There are many knowledge gaps when it comes to measuring the effectiveness of eco-labels. Some of

these include: traceability of a price premium, eco-label benefits to fishermen and the environment, and the role these certifications play in incentivizing a change in harmful fishing practices. This study focuses on three unknowns, which include: (1) changes in consumer-purchasing behavior in response to seafood eco-labels; (2) attitudes and preferences of eco-label attributes among consumers; and (3) willingness to pay for an eco-labeled seafood product over an uncertified one.

While environmental labeling has been in global environmental policy-making since 1977 (starting with the Blue Angel Program established by the German government), it has not been without its critics (UNEP, 2005). In 2009, the environmental marketing firm TerraChoice conducted a survey on more than 2,000 products sold in large North American retail stores. The study revealed that more than 98% of environmentally-labeled products were misleadingly labeled ranging from a lack of proof about the product's environmental benefits, or use of vague terms like "natural" or "green," or even falsely claiming to be certified by a particular authority that the product was not (Food and Water Watch, 2010).

In the case of fisheries, over 90% of seafood Americans consume is imported with unknown environmental and health and human safety standards (NOAA, 2017, Food and Water Watch, 2010). According to the U.S. Government Accountability Office (GAO), the U.S. Food and Drug Administration (FDA) only inspects 1% to 2% of imported seafood. In the absence of a U.S. Department of Agriculture (USDA) "organic" equivalent or any other U.S. government label for fresh and wild-caught seafood—assessing quality, nutrition, or otherwise—private companies and organizations have sought to fill that niche (Food and Water Watch, 2010).

Several potential issues exist with a non-government regulated seafood label. Some of these include how the certifying body defines sustainability, whether it is ecological/ecosystem-wide, or species-specific, and the set of (often highly contested) environmental, social and human rights factors that determine whether a fishery can be granted certification or rating. Lengthy review processes and the prohibitive costs of certification pose some additional challenges. Standards, motivations and approaches all vary between existing seafood eco-label programs, some of which are highlighted in this study.

### 3.2 Existing seafood certification and rating system programs

The four seafood certification programs and rating systems discussed in this study are either voluntary environmental performance labels, like the Marine Stewardship Council (MSC), Fair Trade, and Best Aquaculture Practices (BAP), or a set of recommendations independently produced by a non-certifying body, like the Seafood Watch rating system (Wessells et al. 2001, McDonald, 2017) (**See Appendix A**).

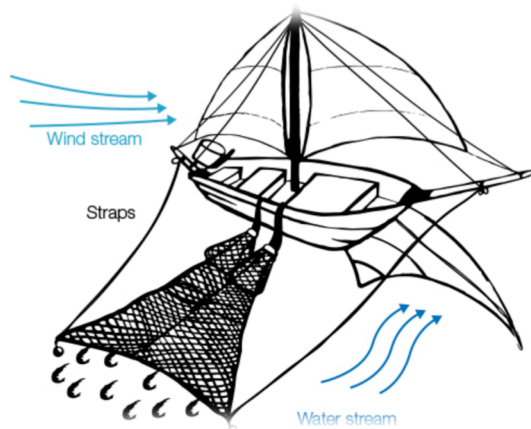
#### 3.2.1. *Fair Trade*

Fair Trade is a third-party certification based on standards of sustainable social, economic, and environmental development (Fair Trade USA, 2017). A large focus of this certification is on the farmer or fisherman, who in a conventional trade system has little power over the price, or profit of his/her product. The standards of Fair Trade are designed to address the



imbalance of power in trading relationships, unstable markets, and the injustices of a conventional trade system (Fair Trade USA, 2017). Fair Trade accomplishes this by ensuring fair prices for the farmer or producer, facilitating long-term trading partnerships, and enabling greater control over the trading process (Fair Trade USA, 2017). Unlike other certification programs, Fair Trade premiums actually make it back to the producer (Fair Trade USA, 2017). Fair Trade standards do not require organic certification as part of its requirements. However, organic production is promoted (Fair Trade USA, 2017).

In 2014, Fair Trade USA started its Capture Fisheries Program in an effort to bring the benefits of Fair Trade to small-scale fishermen and their respective communities (Fair Trade USA, 2017). The goal of this program is to create more resilient livelihoods in coastal communities, improve working and living conditions, increase supply and demand for consciously sourced seafood, and increase environmental stewardship and ecosystem protection (Fair Trade USA, 2017). The Capture Fisheries Program implements a step-wise approach that requires advancement in social, economic, and environmental conditions overtime (Fair Trade USA, 2017).



**FIGURE 1:** Illustration of the suripera net—an alternative to trawl fishing—currently used in the southern Gulf of California where strong winds propel small vessels equipped with a sail (Del Pacifico, 2016).

In Sinaloa, Mexico, eight small-scale cooperatives of artisanal shrimp producers—participating in a long-term fishery improvement project (FIP)—recently received the first Fair Trade certification in the world for wild shrimp (Kearns, 2016). What sets their practices apart from other UGC shrimp fishermen is the type of fishing gear they use. The *suripera* is used by small vessels, which are equipped with a sail (Del Pacifico, 2016) (**Figure 1**). Unlike bottom trawling, the *suripera* has less environmental impact, as it relies on wind power to drag a light monofilament screen along the seafloor

(Del Pacifico, 2016). This monofilament screen moves horizontally capturing shrimp that have landed on the net into a special bag where they remain alive until they are they are sorted by the fisher (Del Pacifico, 2016). By capturing the shrimp alive, the fishers are able to return immature shrimp—along with other non-target species—back to the ocean, resulting is very little to no bycatch (Del Pacifico, 2016).

### 3.2.2 Marine Stewardship Council (MSC)

In 1997, World Wildlife Fund (WWF) and Unilever—who at the time was one of the world's largest seafood buyers—created the Marine Stewardship Council (MSC) (Food and Water Watch, 2011). In 1999, MSC became independent, certifying only large and commercially important wild fisheries that met its three core principles: (1) maintaining sustainable fish stocks, (2) minimizing environmental impact, (3) and effective management (MSC, 2017). It views its certification as a way to maintain long-term working relationships with its partner fisheries (Food and Water Watch, 2011).

Previous to the MSC certification, there was no internationally recognized eco-label that could be used to evaluate the demand for sustainable fish products (UNEP, 2005). In June 2004, there were ten MSC-certified fisheries, and as of May 2016, there were 280, and 90 under assessment (MSC, 2017). A major criticism of the MSC certification is its high cost and weak standards certifying what some believe are controversial fisheries, like the Ross Sea Antarctic toothfish fishery (Christian et al., 2013, Smith, 2011). Additionally, the high cost of certification (US\$20,000-\$100,000 for a recommendation, and \$75,000 for annual audits) make it impractical for small fisheries or low value stocks to afford partnership with MSC (Sainsbury, 2010).

MSC has certified a number of wild shrimp fisheries in Canada, the U.S., Chile, and Suriname (MSC, 2017). While there are currently no MSC-certified shrimp fisheries in Mexico, World Wildlife Fund is pursuing the first steps of certification with Pescados y Mariscos—a group monitoring and promoting vaquita-friendly fishing in San Felipe (E. Sanjuro via S. Mesnick, personal communication, June 14, 2017).

### *3.2.3. Best Aquaculture Practices (BAP)*

In 2003, under the Global Aquaculture Alliance (GAA), the Best Aquaculture Practice (BAP) certification was launched and at the time only covered shrimp aquaculture practices. The GAA has worked to develop, improve, and expand the BAP certification. The BAP label is focused only on farmed seafood products and aims to be, “...an international certification system that verifies environmentally and socially responsible processes” under which farmed seafood is produced (Global Aquaculture Alliance, 2017). This label now covers farmed shrimp, salmon, mussels, and other finfish and crustacean species (Global Aquaculture Alliance, 2017).

The original intent of the BAP certification was to address the rapid growth of aquaculture practices that have made it possible to produce increasing amounts of fish while keeping prices low to ensure consumers around the world have access to affordable protein (World Bank, 2013). BAP-certified farms and producers must have traceability documentation throughout the production chain to inform retail, foodservice, and wholesale purchasers of their responsible, environmentally, and socially conscious practices and products (Global Aquaculture Alliance, 2017). The BAP certification also accounts for animal welfare and human health.

There are four different tiers of BAP certification. The top-tier, four-star production groups incorporate all levels of the aquaculture production chain: BAP-certified seafood processors with the associated farm, feed mill, and hatchery (Global Aquaculture Alliance, 2017). The other certification levels involve some combination of one or more of these production groups. Once accepted, there is a third-party audit, and the facility must be willing to provide full traceability records for at least three months (Global Aquaculture Alliance, 2017). After the audit is considered successful, the facility pays a program-based fee, which is generated based on total annual seafood production (Global Aquaculture Alliance, 2017). There are different sets of standards and guidelines based on the type of facility applying for the BAP certification.

### *3.2.4. Seafood Watch*

The Monterey Bay Aquarium Seafood Watch program is an “information organization” empowering businesses, organizations, and consumers to adopt its seafood recommendations and rating criteria—“Green” (best choice), “Yellow” (good alternative), and “Red” (avoid) (McDonald, 2017). Seafood Watch is not a certifying body. Its recommendations are based on government reports, journal articles, white papers, and expert information on fisheries and farms (McDonald, 2017). The recommendations are updated twice a year and the Wild-Capture, Salmonid, and Aquaculture standards are updated every four years (McDonald, 2017). The last revision of the standards was published in 2015 (McDonald, 2017).

Each December, Seafood Watch prioritizes new fisheries for assessment (McDonald, 2017). The decision-making body for its seafood standards is made up of 14 members and seven stakeholder groups (McDonald, 2017). There are two public comment periods, with the most recent one generating 400 comments (McDonald, 2017). The standards are pilot-tested and further revised.

To date, Seafood Watch has produced 1,200 seafood ratings (McDonald, 2017). The program aims to effect change on the water or at the farm, and create more direct relationships with industry partners, some of these include Whole Foods, Safeway, Target, Hy-vee, Mars, FoodBuy, Disney, and many more (McDonald, 2017). While all of their partners pledge to purchase only “Green” and “Yellow” rated seafood, Whole Foods is the only industry partner that displays the Seafood Watch rating as an on-product label for wild-caught seafood products.

In 2013, the Monterey Bay Aquarium Seafood Watch Program produced a final report on Mexico Pacific and Gulf of Mexico shrimp species. All Mexican wild-caught shrimp received an “Avoid” designation due to poor management and non-compliance with regulations (Fisher, 2013). These low sustainability ratings are typical among consumer seafood buying guides due to the high bycatch ratios and impact of industrial trawlers on the seabed (USAID, 2009).

## **4. STUDY DESIGN**

In collaboration with the National Oceanic and Atmospheric Administration (NOAA) Fisheries Southwest Fisheries’ Science Center and the Gulf of California Marine Program at Scripps Institution of Oceanography, UC San Diego, we measured consumer preferences towards eco-labeled seafood through a participatory exercise and stated preference survey. The exercise and survey were presented to various NGOs, foundations, government agencies, sustainable seafood retailers/restaurants, academic institutions, and a select group of fishermen and consumers. The results of this study were compared to a September 2015 to August 2016 San Diego seafood market revealed preference study by NOAA economist, Oriana Poindexter.

The survey was designed using stated preference methods. The purpose of these studies are to ask questions that help show the monetary tradeoff each person would be willing to make regarding the value of goods or services (Carson, 2012). In this study, since there is

no product (i.e. an eco-labeled gillnet-free UGC shrimp), demand was measured by asking consumers how much they were willing to pay for a low bycatch and wild-caught seafood product. While stated preferences studies rely on primary data collected with surveys, revealed preference approaches use secondary data or some combination of primary and secondary data (Champ et al., 2003). Secondary data can be collected from an existing source, such as property tax records, or in the case of this study, observed seafood market data.

A number of questions were explored to help determine whether an eco-labeling scheme has the potential to be an effective conservation instrument in the UGC to mitigate bycatch of vaquita and other non-target species (**Figure 2**).

**Figure 2: Research Questions**

1. Are respondents familiar with and loyal to existing seafood certifications and rating system programs?
2. What attributes do various stakeholder groups value most when purchasing an eco-labeled seafood product?
3. Are respondents willing to pay more for a wild-caught and low bycatch eco-labeled seafood product?
  - 3a. How does their willingness to pay compare to a 2015-16 revealed preference study of eco-labeled seafood market data across San Diego County?
4. Which attributes and seafood label/rating program(s) would be most appropriate for an UGC shrimp product?
  - 4a. Among the existing UGC labels, which do respondents prefer most and why?

## 5.1 Methodology

### 5.1.1 Participatory exercise

Focus groups were conducted from March 28<sup>th</sup> to April 29<sup>th</sup>, 2017. The academic focus group included masters' students from the Scripps Institution of Oceanography, University of California, San Diego, which were the first group to beta test the exercise and survey. The breakdown of stakeholder focus groups is listed in **Table 1**. The focus group and survey respondents represent a stratified sample that roughly reflects the proportion of each size group in reality.

Aside from the consumer and academic focus groups, the remaining groups were selected based on their work in the UGC, involvement in vaquita conservation efforts, dedication to reducing fisheries bycatch, and promoting sustainable fisheries locally or internationally. A narrated script was read to each focus group to ensure that all participants received the same level of information. Participants were told that the exercise would be audio recorded to collect any information that was not captured in the written survey. Focus groups were either conducted in-person, or in-person with some participants engaged over a virtual communication platform.

<b>Table 1:</b> Focus group and survey demographics. <b>Total (n=377)</b> *Survey only; <b>Bold</b> =focus group & survey				
<b>Consumer (n=170)</b>	<b>Academic (n=108)</b>	<b>NGO/Foundation/Gov't (n=61)</b>	<b>Retailer/Restaurant (n=31)</b>	<b>Fisher (n=7)</b>
Tuna Harbor Docksider Market*	<b>MAS MBC cohort</b>	<b>Seafood Watch</b>	<b>Mitch's Seafood</b>	<b>Tuna Harbor Docksider Market</b>
Aquarium of the Pacific*	Scripps Institution of Oceanography*	<b>Environmental Defense Fund</b>	<b>Land and Water Co.</b>	San Diego Swordfish fishermen*
Catalina Offshore Products*	University of New Mexico*	<b>FishWise</b>	El Pescador	
Survey Monkey consumers*		<b>O'Neill Sea Odyssey</b>	Catalina Offshore*	
<b>Focus group with random seafood consumers</b>		<b>San Diego Zoo Institute for Conservation Research</b>	Whole Foods*	
		<b>Birch Aquarium</b>	Saiko Sushi*	
		<b>Gordon and Betty Moore Foundation</b>	Blue Water Seafood Market and Grill*	
		Surfrider*	Pacific Beach Fish Shop*	
		Wildcoast*	The Fishery*	
		San Diego Coastkeeper*	Trulucks*	
		Aquarium of the Pacific*	Survey Monkey chefs*	
		National Marine Sanctuaries Monterey Bay*		
		NOAA Fisheries Southwest Fisheries Science Center Monterey*		

The exercise revolved around a board game with four eco-label categories: geography, production method, nutrition, and existing eco-label programs (**Table 2**). There were 5-7 eco-label “chips” to choose from within each category, including a wildcard. Respondents were asked to put on their respective NGO “hat,” chef “hat,” academic “hat,” etc. and imagine they were going shopping for their usual seafood product. Each group was asked to collectively pick one eco-label chip (within each of the four eco-label categories) that influences their purchasing decisions most by placing that particular chip on the board game. At the end of the four rounds, a picture of the board game was taken to record the group results (**Appendix B**).

Eco-label Categories	Eco-label Chip Options
Geography	Upper Gulf of CA caught, Mexico caught, U.S. caught, local*, low carbon footprint, wildcard
Production method	Low bycatch, wild, farmed, small-scale fishery*, picture of a fisherman, picture of a fisherwoman, and a wildcard
Nutrition	Non-GMO, no preservatives, high in omega 3, fresh*, low mercury, and a wildcard
Existing label/rating programs	Seafood Watch, Fair Trade, Marine Stewardship Council, Best Aquaculture Practices, and a wildcard.

**TABLE 2:** Participatory exercise categories. The nutrition and existing label/rating program “chip” options were based on findings from Poindexter et al., in prep. The geography and production method chip options were selected in partnership with committee members. \*See **Appendix B** for definitions.

*5.1.2 Survey*

The survey was conducted between March 28<sup>th</sup> to May 6<sup>th</sup>, 2017 either in-person or through Survey Monkey. The survey included questions relating to willingness to pay for an eco-labeled seafood product that was wild-caught with low bycatch, questions about existing label/rating program familiarity and loyalty, and questions about potential UGC labels as feedback for those particular NGOs who designed the labels (The Environmental Defense Fund, Pronatura, Pesca Abc, San Felipe Pescados y Mariscos (SFPYM) (**Appendix C**)). These NGOs are currently working with fishermen in the region to develop new ways of fishing without gillnets. My goal was to test the reception of these labels. Survey respondents were selected based on the same criteria as the focus groups. Questions were designed in collaboration with capstone advisory members. The survey-only groups are shown in **Table 1**.

A Survey Monkey link was sent to the Scripps Institution of Oceanography community, friends and family (who posted the link on their various social media platforms), restaurants, NGOs and government agencies. On March 25<sup>th</sup> and April 29<sup>th</sup>, surveys were handed out in-person to customers at the Tuna Harbor Docks Market, Catalina Offshore Products, and at the Aquarium of the Pacific’s Urban Ocean Festival.

An 18-question survey was completed after each focus group, which was also distributed to various respondents independent of the exercise. A 16-question version was provided to only survey monkey respondents (**Appendix D.3**). Partway through sampling, the survey was slightly modified based on feedback from the first few survey groups, which included the MAS MBC cohort, the first visit to Tuna Harbor Docks Market, San Diego Zoo Institute for Conservation Research, University of New Mexico, the consumer focus group, Surfrider, and the Birch Aquarium. Tableau and Microsoft Excel were used to visualize the data and develop exploratory statistics.

In a 2015-16 revealed preference study, Poindexter et. al. made six bimonthly trips to 72 San Diego County seafood markets recording label and product information (species name, price, production method, condition at sale, country of harvest, and eco-labels) for all non-

frozen seafood products and all frozen shrimp products—a total of 18,397 products (Poindexter et al., in prep). This data was used to compare in-store price premiums on MSC, BAP, and Seafood Watch labeled/rated seafood products and willingness to pay results among eco-label consumers from the stated preference study.

## 6. RESULTS

### 6.1 Focus group results

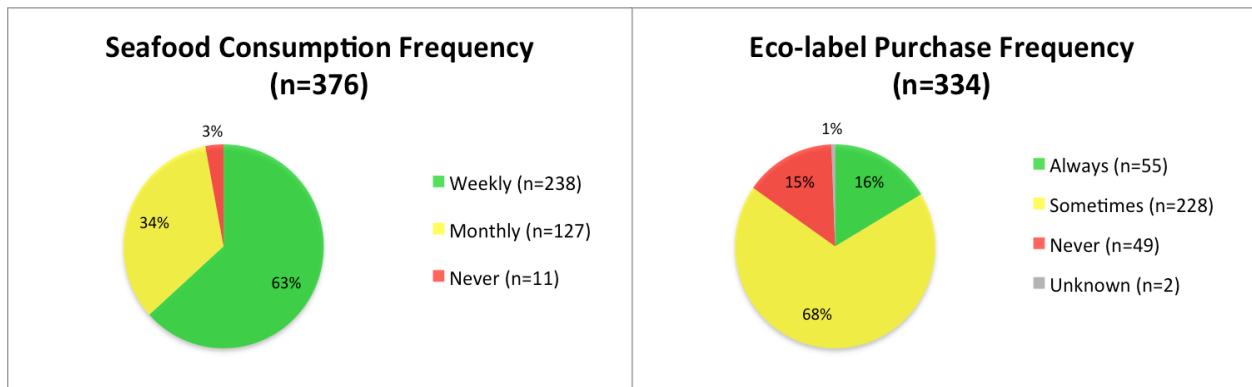
There were 13 focus groups with 2-8 participants each (n=58). The exercise revealed that a majority of the focus groups prefer to purchase seafood that is labeled with the following four attributes: U.S. caught or local, low bycatch, contains no additives, and rated by Seafood Watch as a “Green” (best choice) or “Yellow” (good alternative) (**Table 3**).

Eco-label Categories	Eco-labeled Chip Options
Geography	Local (5); US-caught (5); UGC (2); Mexico caught (1)
Nutrition	Wildcard (5): <i>no additives/low toxins/100% organic/low contaminants/broad spectrum profile</i> ; Fresh (3); High in Omega 3 (2); Low mercury (2); No preservatives (1)
Production method	Low bycatch (6); Wildcard (3): <i>Responsibly produced/environmentally friendly/1-by-1 caught</i> ; Small-scale fishery (2); Wild (2)
Existing label/rating programs	Seafood Watch (5); Fair Trade (2); BAP (2); Wildcard (2): <i>Don't support 3<sup>rd</sup> party labels/ASC</i> ; MSC (1)

**Table 3:** Aggregated focus group results. Thirteen total focus groups, with 2-8 participants each (n=58).

### 6.2 Survey respondents' seafood consumption habits

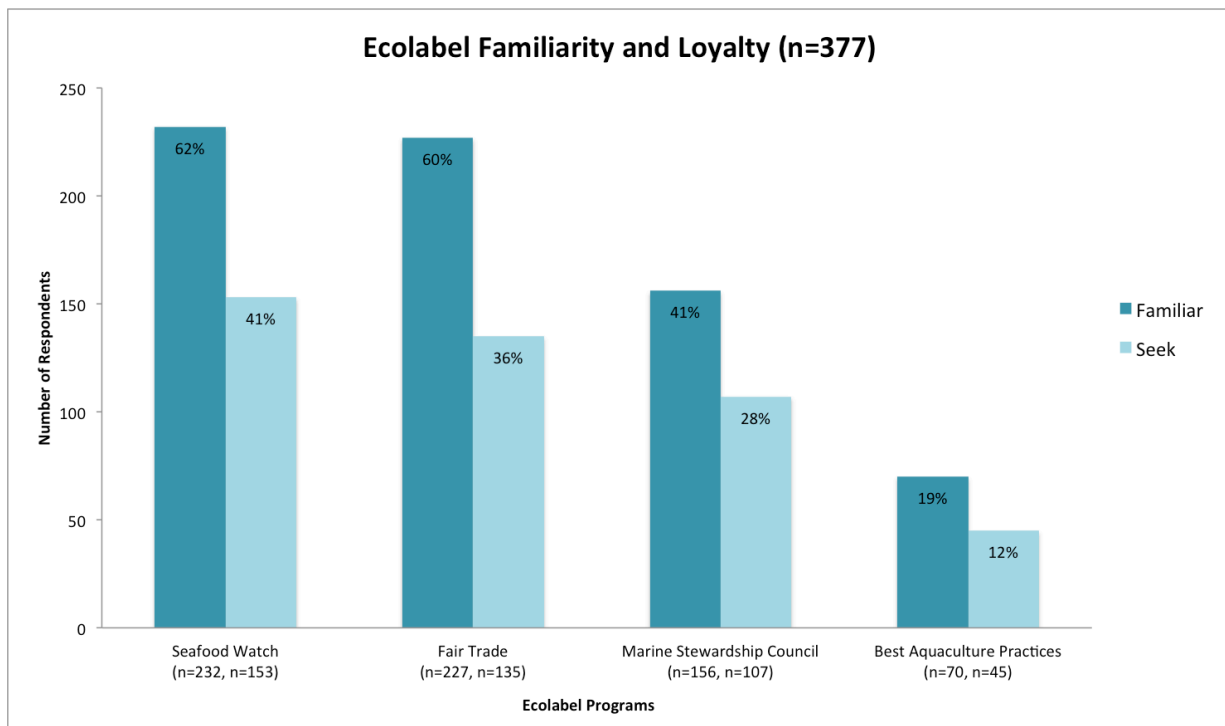
There was a total of 377 survey responses. The survey finds most respondents consume seafood weekly (63%) and tend to purchase eco-labeled seafood products “sometimes” (**Figure 3**). Respondents primarily purchase wild-caught seafood (73%) (**Appendix D.1**) and prefer salmon (47%) to other types of seafood (**Appendix D.2**). Respondents who eat seafood weekly are more than twice as likely to purchase eco-labeled seafood as compared to respondents who consume seafood less frequently (**Appendix D.3**). Respondents primarily purchase their seafood at restaurants (53%) and grocery stores (47%) (**Appendix D.4**).



**FIGURE 3:** Aggregated seafood consumption habits and eco-label purchase frequency pie charts. Sample sizes vary based on survey modifications partway-through sampling and N/A responses.

### 6.3 Label preferences among survey respondents

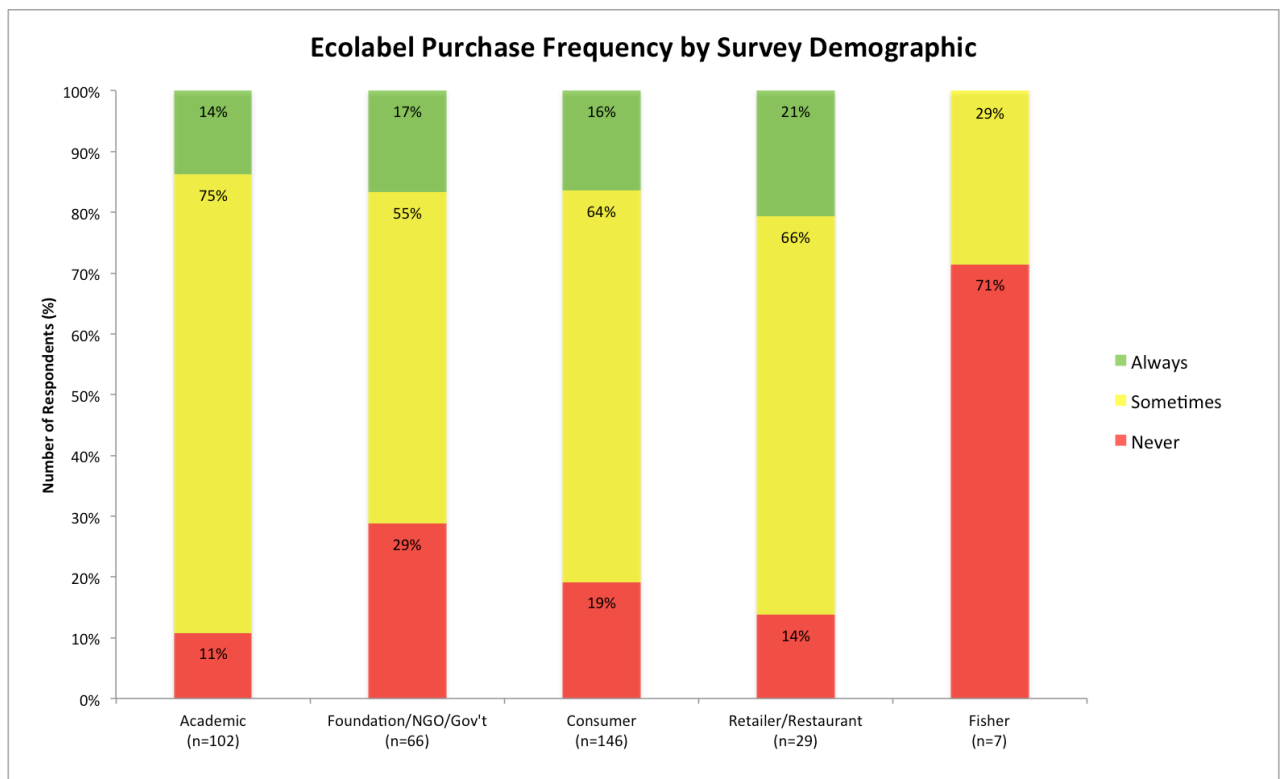
Seventy-five percent of all respondents recognize one or more of the four existing labels in this study. Among those, 73% purchase products labeled by one or more of these organizations. Across the four labeling programs, respondents are the most familiar with and loyal to Seafood Watch and Fair Trade (**Figure 4**).



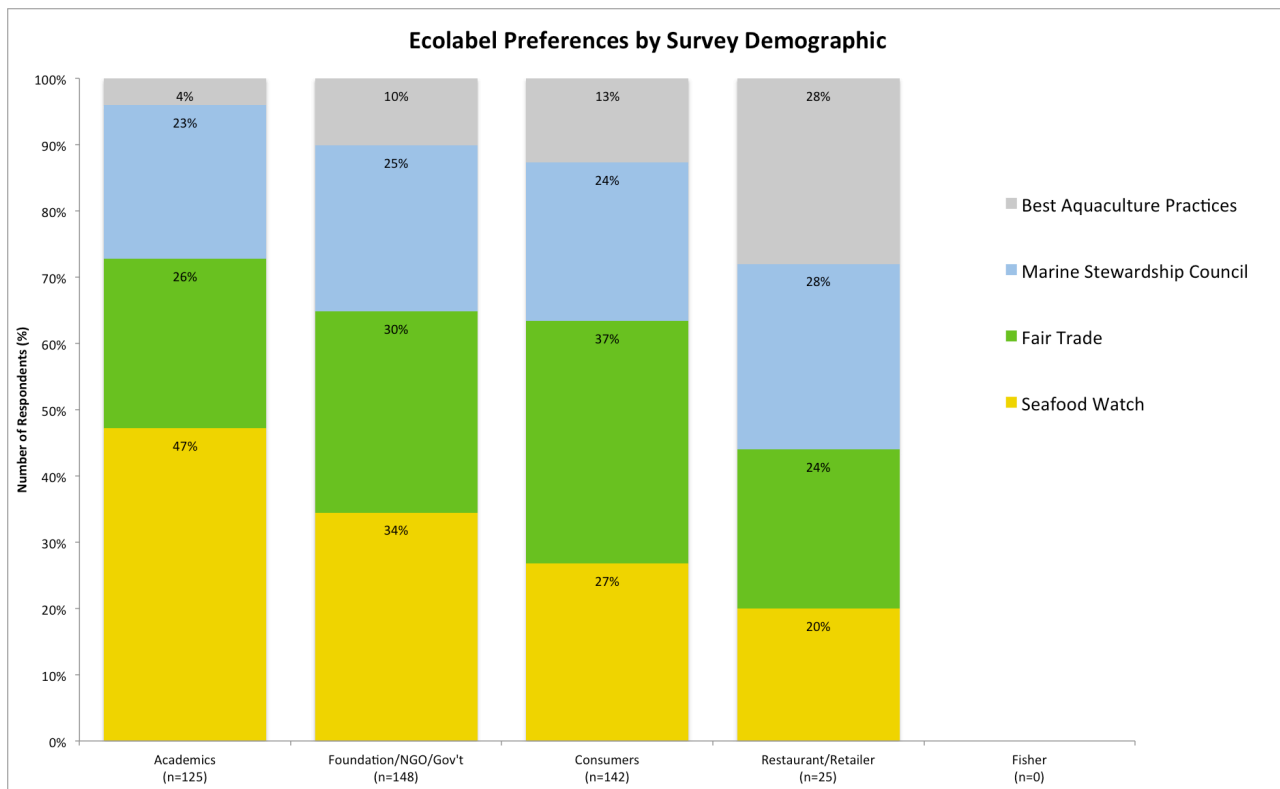
**FIGURE 4:** Consumer familiarity with four seafood certification and rating system programs. By familiarity, subsample of respondents who have seen the label only, “seek”, 2017.

Across the sample groups, fishermen are least likely to purchase eco-labeled seafood (71%) (**Figure 5**), and do not seek existing seafood certification or rating system programs (**Figure 6**).





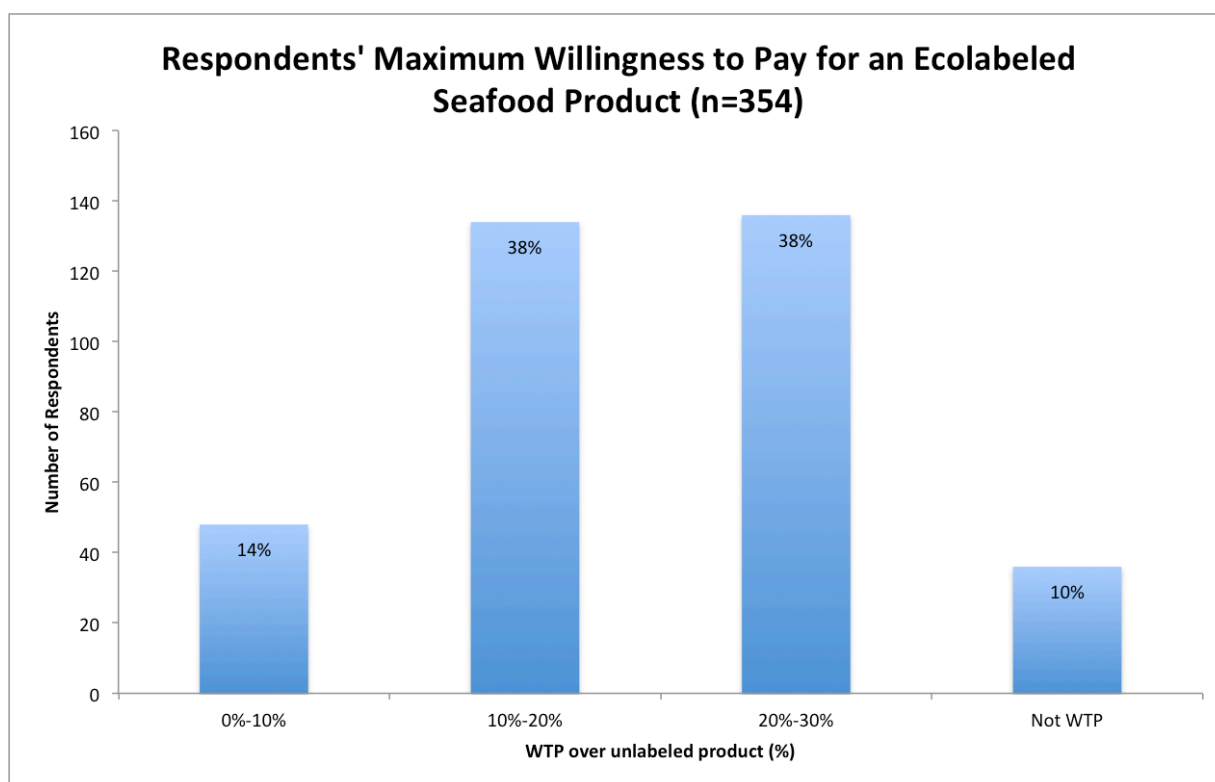
**FIGURE 5:** Eco-label purchase frequency across survey demographics.



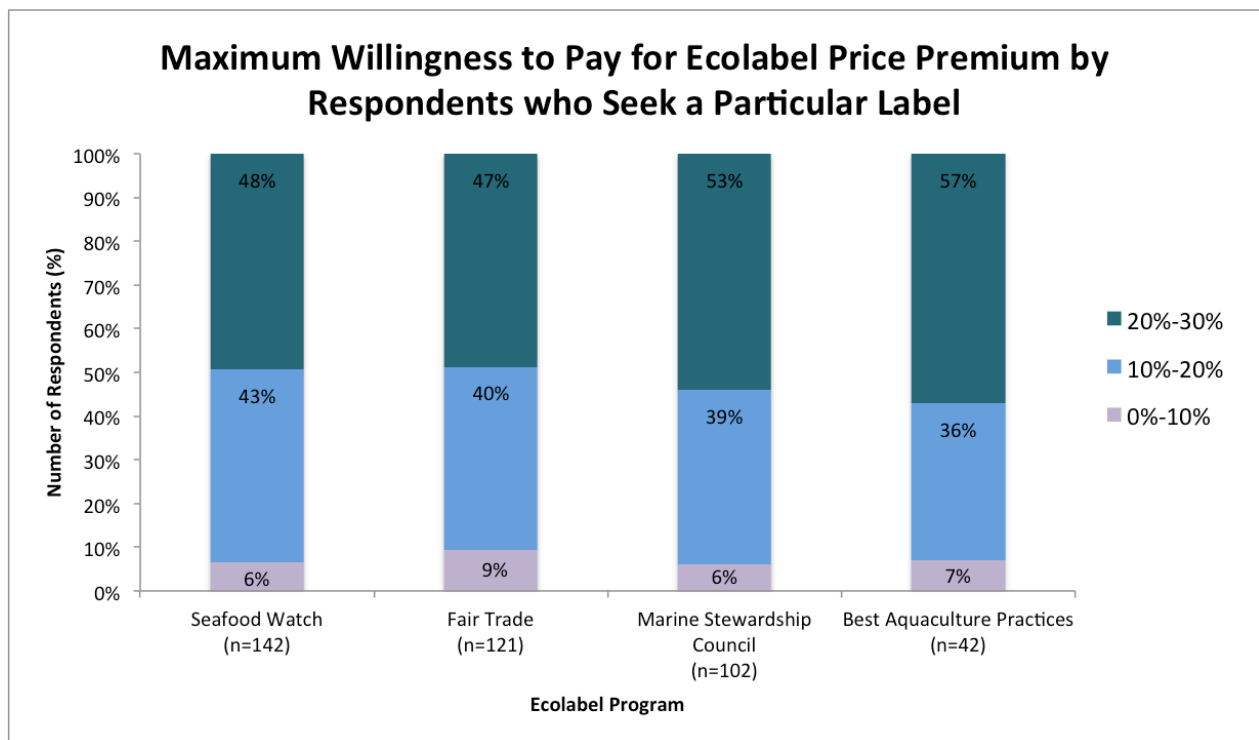
**FIGURE 6:** Label/rating program preference across five survey demographics.

#### 6.4 Survey respondents' willingness to pay for eco-labeled seafood

Just over one-third of all survey respondents (38%) said they would be willing to pay a maximum of 30% more for their usual seafood product if it were labeled as low in bycatch and wild-caught (**Figure 7**). Among those who seek Seafood Watch rated products, 48% were willing to pay a maximum of 30% more for low bycatch and wild-caught eco-labeled product (**Figure 8**). Compared to the revealed preference study, Poindexter et al., found a 58.1% price premium for products at Whole Foods locations sold with a Seafood Watch “Green” or “Yellow” label (**Appendix D.5**). For MSC-certified products, 39% of respondents who seek this label were willing to pay a maximum of 20% more (**Figure 8**). This aligns with the 18.2% MSC premium seen in-store, on average, over non-certified products of the same species (Poindexter et al., in prep) (**Appendix D.5**). Thirty-six percent of respondents who seek BAP products were willing to pay a maximum of 20% more, and an even greater percentage (57%) were willing to pay 30% more (**Figure 8**). This supports Poindexter et al.’s result of a 10.53% premium for BAP products, on average, over non-certified products of the same species (**Appendix D.5**).



**FIGURE 7:** Maximum willingness to pay per person for a low bycatch and wild-caught eco-label seafood product.

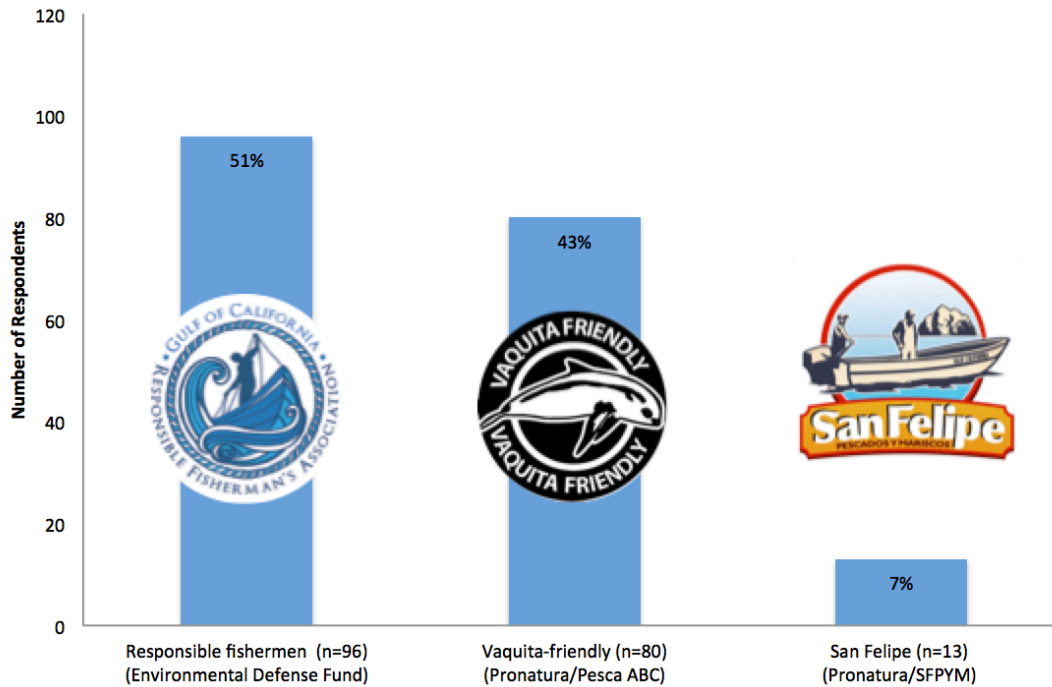


**FIGURE 8:** Maximum willingness to pay for an eco-label price premium by respondents who seek an existing label/rating program.

### 6.5 Potential UGC label results

Respondents chose the Responsible Fisherman’s Association label developed by the Environmental Defense Fund (51%) to the Vaquita-Friendly (43%) and San Felipe (7%) UGC labels (**Figure 9**). When further queried, a majority of respondents selected their preferred label based on the meaning (64%), as opposed to the artwork (36%) or other reason (13%).

## Potential Upper Gulf of California Ecolabels (n=187)



**FIGURE 9:** Potential UGC labels developed by the Environmental Defense Fund (Responsible Fishermen), Pronatura/Pesca ABC (Vaquita-Friendly), and Pronatura/San Felipe Pescados y Mariscos (San Felipe).

## 7. DISCUSSION

### 7.1 Consumption habits of sample and global seafood production trends

The seafood consumption habits of this sample suggest that a majority (73%) of respondents typically purchase wild-caught seafood (**Appendix D.1**). However, the marine environment cannot meet this seafood consumption demand. Currently, more than 50% of all seafood produced for human consumption is supplied by commercial aquaculture operations—a percentage that continues to climb (NOAA, 2017). This survey statistic could be inflated by the fact that most respondents live in coastal California where wild-caught seafood is more accessible. In San Diego, 55% of all seafood products labeled with production method were wild-caught, and 58% of fresh products labeled with production method were wild-caught (Poindexter et al., in prep). Conducting this study in a different community may reveal results that are more representative of global seafood consumption trends.

American consumers eat a limited selection of seafood products (Kantor, 2016). In 2014, shrimp, salmon, canned tuna, tilapia, and Alaskan Pollock made up nearly three-quarters of total seafood consumed in the U.S. (Kantor, 2016). Low-cost farm-raised shrimp, salmon, and tilapia imports and the use of Alaskan Pollock in fast-food meals, fish sticks, and imitation crab have played major roles in increasing the popularity and affordability of these products (Kantor, 2016). This popularity is reflected among survey respondents who claim to eat salmon (47%) more frequently than any other seafood product (**Appendix D.2**).

Consumption habits may be limited by a number of factors, including a lack of knowledge about the health benefits of consuming seafood (Kantor, 2016). In 2014, seafood was the least consumed protein, accounting for 5% of total dietary protein (Kantor, 2016). This was considerably lower than the recommended 20% advised by the U.S. Department of Agriculture (USDA) (Kantor, 2016). Inexperience with preparing fish may be a factor why Americans consume less seafood or hesitate to experiment with unfamiliar fish products. Higher retail prices and concerns about mislabeling of imported products—a majority of the seafood Americans consume—could influence consumer-purchasing behavior. Another important factor could be the influence of the powerful U.S. meat lobby, which could be leading consumers to eat more land-based meat (Heid, 2016).

## 7.2 Effectiveness of four eco-label programs discussed in study

Based on the study results, respondents primarily purchase their seafood at restaurants (53%) and grocery stores (47%) (**Appendix D.3**). Results from Poindexter et al., reveal that most (67%) eco-labeled seafood products in San Diego are sold in grocery and natural grocery stores. This statistic—along with the results from the eco-label familiarity and seek graph (**Figure 4**)—confirm that a majority of respondents are well exposed to existing seafood label/rating programs, and therefore represent an informed population to provide insight on how to best improve market access for UGC fishers.

Respondents were most familiar with the Seafood Watch rating system and Fair Trade certification (**Figure 4**). In 2015, Fair Trade International conducted a global awareness and familiarity report in response to its label. In the U.S., 27% of respondents were familiar with the Fair Trade label and 88% of those trust this certification (Fair Trade, 2015). Fair Trade is a widely distributed label covering 4,500 products (Fair Trade, 2017). In a global consumer awareness study conducted by MSC, 37% of consumers recognize the MSC label, and among those, 86% claim to trust this label (MSC, 2016). MSC is credited as the most recognized seafood eco-labeling program in the world (NOAA, 2013). However, the percentage of respondents who were familiar with the MSC label is about 20% less than those who were familiar with Seafood Watch and Fair Trade.

While respondents overwhelmingly recognize and seek Seafood Watch rated products, a 2016 conversation with the Seafood Watch team revealed there has never been a study measuring consumer-purchasing behavior in response to its “Green” or “Yellow” labels. This is also true for BAP, which has never produced a consumer awareness study regarding its label, despite it being the most broadly distributed eco-label for fresh and frozen seafood products in San Diego County (Poindexter, et al., in prep). According to the survey results, BAP is not well recognized (19%) or sought after (12%) by consumers.

### 7.2.1 Explanation of San Diego fisher results

Fishers were the least likely to purchase eco-labeled seafood and were not responsive to the four eco-label programs (**Figures 5 & 6**). A common theme raised in conversation with this group was that they know where their seafood is coming from and they abide by the toughest fisheries management rules and regulations—which speaks to the sustainability of their catch—so therefore they do not rely on nor trust existing eco-label programs. This rhetoric made it quite difficult to allure fishers into taking the survey, even though those

who engaged in the focus group agreed that labeling their products as *local* or *San Diego-caught* would give them a competitive advantage in the marketplace.

Many San Diego fishermen, retailers, and chefs are committed to producing and providing sustainable seafood to the greater San Diego area. Sarah Mesnick, a NOAA Ecologist, touts San Diego as a leader in the sustainable seafood movement due to its “world-class marine scientists, talented fishermen, award-winning chefs, and educated consumers.” In recent news, two major events highlight San Diego’s commitment to providing locally produced sustainable seafood.

The first was in 2007, when the small, San Diego family-run American Albacore Fishing Association (AAFA) earned the title of the world’s first MSC certified tuna fishery (Bonello, 2007). The second came on August 2<sup>nd</sup>, 2015, when California’s first open-air, fisherman’s market—the Tuna Harbor Dockside Market (THDM)—opened for business. Previous to the THDM, California fishermen were not permitted to sell their catch directly to the public (Wei, 2016). Peter Halmay, a leading local fisherman, and Theresa Sinicrope Talley, a coastal specialist with California Sea Grant, set out to change that with the development of the Pacific to Plate bill (AB 226). The bill was signed by Governor Jerry Brown, and was the first bill to “streamline the operation of direct, local fishermen’s markets in California” (Wei, 2016). Thanks to Halmay and Sinicrope Talley, fishermen’s markets in California can now serve as food facilities, vendors can clean fish on location for direct sale, and groups of fishermen are allowed to establish markets under a single permit (Wei, 2016).

### *7.2.2 Eco-label price premium*

Prior to the 2015-16 revealed preference study conducted by Poindexter et al., there was little literature signaling a price premium for eco-labeled seafood products across multiple labels and product types. Poindexter et al., found evidence of a price premium across the three eco-labels discussed in this study (MSC, BAP, and Seafood Watch). Maximum willingness to pay results among respondents who seek products labeled/rated by one or more of these programs generally reflected the true premiums seen in-stores. Overall, a majority of consumers—particularly ones that seek eco-labeled products—are willing to pay a maximum of 20%-30% more for a wild-caught and low bycatch product.

### 7.3 Recommendations to improve market access

The results from this study can be distilled into four recommendations to improve market access for UGC fishers, which include the following:

#### *1. People like local*

Based on the focus group results, respondents like local or domestically caught seafood. Respondents recognize that the U.S. is a leader in marine mammal conservation and sustainable fisheries management. UGC fishers can appeal to respondents’ preferred geography by abiding by the new Marine Mammal Protection Act (MMPA) import rule requirements, which will soon be enforced for all foreign nations importing seafood into the U.S.

Issued by NOAA Fisheries, the MMPA final rule went into effect on January 1, 2017, which implemented import provisions of the MMPA (NOAA, 2016). The purpose of the rule is to reduce marine mammal bycatch associated with international commercial fishing operations (NOAA, 2016). This rule requires that all nations exporting fish and fish products to the U.S. be held to the same standards as U.S. commercial fishing operations (NOAA, 2016). This rule symbolizes a global effort towards the protection of marine mammals (NOAA, 2016).

Additionally, this rule creates a framework for evaluating a harvesting nation's regulatory program for reducing marine mammal bycatch, and defines the steps to gain import authorization for seafood products into the U.S. (NOAA, 2016). There is a five-year exemption period to provide foreign harvesting nations ample time to develop regulatory programs that satisfy U.S. import requirements (NOAA, 2016). If UGC fishers decide not to adhere to these requirements, they risk losing the entire U.S. market, which is where 90% of the large size classes of UGC shrimp are exported (Rojas-Bracho et al., 2006).

## *2. People pick what they know*

As indicated by the survey results, Seafood Watch is the most recognized and trusted program. Seafood Watch likely appealed to consumers because it is more of a holistic program, which takes into account the entire ecosystem rather than a single-species focus. Currently, all Mexican shrimp rated by the Seafood Watch program are in the avoid or "Red" category (Fisher, 2013). Once alternative fishing gear is developed and implemented in the region, UGC fishers should seek a future assessment from Seafood Watch. If the product receives a "Green" or "Yellow" rating, it will significantly expand market access across the U.S., and enhance consumer perception of the sustainability of the product.

Second to Seafood Watch, respondents recognize and seek Fair Trade products. This certification likely appealed to respondents because of its focus on worker rights and health and safety standards, which MSC and Seafood Watch do not consider at the present time. On the basis of these results, it would be advantageous of UGC shrimp fishers to seek a Fair Trade certification, which would provide increased market access.

## *3. People care about people*

Among the potential UGC eco-labels—ostensibly representing people, protected species, and place—respondents chose the Environmental Defense Fund's Responsible Fishermen's Association label. This label likely appealed to respondents because it conveys a message of people taking responsibility for protecting precious ocean resources. This is important feedback for the various NGOs whose label did not appeal to respondents. This choice also supports why respondents seek Fair Trade products because the human experience may be easier to relate to than a place many people have never visited or an animal they do not recognize outside of the UGC.

#### *4. People care about health and protected species*

Under the production method and nutrition categories, focus groups chose low bycatch and no additives. This may be something the Vaquita-Friendly label developers want to consider when finalizing a UGC eco-label.

#### *7.4 Study limitations and opportunities*

##### *7.4.1 Stated preference studies*

Some economists are partial to revealed preference studies because of the inherent bias with stated preference studies (Champ et al., 2003). While every effort was made to author questions without bias, there is still a risk of respondents' answering questions dishonestly, or having answers influenced by an experience immediately before taking the survey. For example, survey answers from Aquarium of the Pacific visitors may have been influenced by the vaquita conservation video in the Baja exhibit. If these visitors were asked the same survey questions months later, they may answer differently when the video is further from their memory. Economists that favor stated preference studies argue that if well designed, these studies are the most effective way to capture peoples' preferences (Manski, 2000).

##### *7.4.2 Sample group bias*

Survey groups were purposefully selected as left-leaning, environmentally concerned and educated people that eat seafood. This bias was intended to approximate the niche end market for this future product—an eco-labeled wild-caught and low bycatch UGC shrimp. As mentioned, in San Diego seafood markets UGC shrimp can be worth up to \$30 per pound (Poindexter et al., in prep). By targeting a niche market, this study could have missed people outside of this group who may also be interested in purchasing high quality, high cost UGC shrimp.

##### *7.4.3 Future research opportunities*

Future research should consider duplicating this study design in other parts of the country where UGC shrimp are sold. This effort would help increase the total sample size, and determine whether demand for a low bycatch and wild-caught UGC shrimp exists in other urban population centers, similar to the one sampled. Due to the expedited nature of this master's program, it would be worthwhile to run advanced statistics to determine the significance of my results. Moving forward, I plan to work with my committee members over the next year with the hope of publishing a final report. This publication could benefit the various label/rating programs discussed in the study, and encourage partnership—particularly among the Seafood Watch and Fair Trade programs—with UGC shrimp fishers.

## **8. CONCLUSION**

The planet is experiencing the worst rash of extinction events since the loss of dinosaurs 65 million years ago (CBD, 2017). However, in this sixth and currently extinction humans are the agent of planetary destruction, not asteroids colliding with earth, volcanic eruptions, or natural climate shifts—the causes of past extinction events (CBD, 2017). By mid-century, it is projected that 30% to 50% of all species will go extinct due to destructive human



activities, like clear-cutting critical habitat, introducing exotic species—and in the case of the vaquita—our consumption habits (CBD, 2017, Dirzo et al., 2014).

As many people in the scientific community understand, when one species goes extinct, the complex ecological web it once supported is thrown off-kilter. While we may be running out of time to save the vaquita, it is not too late to make changes to protect the 650,000 other by-caught species around the globe (NRDC, 2014). We need to rethink the ways in which we protect vulnerable bycatch species.

There is an opportunity to re-establish the UGC shrimp fishery—gillnet free—with a high valued product, like a low bycatch blue or brown shrimp with an eco-label demonstrating responsible stewardship and traceability. As mentioned, 90% of the large size classes of uncertified UGC shrimp are imported into the U.S. due to their high quality and preferred taste, which could signal a demand for a similar product (Rojas-Bracho et al., 2006). An eco-labeling scheme could incentivize changes in fishing practices without impacting income, if fishermen are able receive more revenue—to cover potentially higher costs of alternative gears, gas, and lower yield—for a sustainably-sourced and traceable product.

As my results reveal, consumers are willing to pay for the true costs of producing sustainable seafood. In a situation where government action is not effectively regulating resource use, consumers can play a critically important role by creating demand for a sustainable fisheries future in the UGC and elsewhere. This approach could mark a rare instance where conservation goals and the needs of fishing communities are equally met. Together, we can curb biodiversity loss with the simple act of watching what we put in our mouths, everyday, by choosing to *eat with a porpoise*.

## 9. ACKNOWLEDGEMENTS

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## 11.APPENDIX

### Appendix A

Appendix 1: Eco-label breakdown				
	Fair Trade (seafood certification est. 2014)	MSC (became independent in 1999)	BAP (2003)	Seafood Watch (1999)
<b>Eco-label program</b>	Eco-label: 3rd party (Type II)	Eco-label: 3rd party (Type II)	Eco-label: 3rd part (Type II); tiered ranking system (4 stars=most compliant)	Rating system: "Green" (best choice), "Yellow" (good alternative), "Red" (avoid)
<b>Founder</b>	Solidaridad, a Dutch development agency	World Wildlife Fund (WWF) and Unilever- once one of the world's largest seafood buyers.	Global Aquaculture Alliance (GAA)- owned by Darden Restaurants (Red Lobster, Olive Garden, among others), U.S. Foodservice, Monsanto, and Cargill	Monterey Bay Aquarium-the product of an exhibit on Fishing for Solutions which ran from 1997-1999 and produced a list of sustainable seafood
<b>Certifying body</b>	Fair Trade Fisheries Advisory Council (FAC): 13 members from various seafood NGOs, consulting firms, and foundations. The Certification and Assurance Bodies that Fair Trade USA works with include: SCS, Oregon Tilth, Elevate, and Arche Advisors.	300 expert organizations and individuals around the world. The Accreditation Services International (AS) managed the accreditation of Cabs to conduct MSC assessments.	Aquaculture Certification Council (ACC), which only certifies farmed fish and produces certification criteria species-by-species	SFW is not a certifying body. Recommendations are based on government reports, journal articles, white papers, and expert information from fisheries and fish farms. The decision-making body is made up of 14 members and seven stakeholder groups.
<b>Cost (high, med, low)</b>	Small: 6% of ex vessel price for blue, brown, and white shrimp. 3% of ex vessel price for Skipjack tuna, and \$0.15/kg whole fish \$0.30/kg clean loin for Yellowfin tuna	High: Fisheries pay US\$20,000-\$100,000 for a recommendation. \$75,000 for annual audits.	Medium: The facility pays a program-based fee, which is generated based on total annual seafood production.	Not disclosed
<b>Who pays?</b>	Fishery	Fishery	Seafood processors are certified separately from farms, feed mills, and hatcheries, who are certified as a multi-star production group	Industry
<b>Price Premium?*</b> <small>*Comparing means of prices and not controlling market effect</small>	Yes- tracks payment of community development premiums back to fishing communities	Yes	Yes	Yes
<b>Who benefits?</b>	Workers and the environment: focus on labor rights, occupational health and safety, community development, improved terms of trade, and resource management.	The marine environment: focus on increasing fish stocks, improving management, reducing bycatch, expanding environmentally protected areas, and increasing knowledge about ecosystem impacts amongst fishers.	Workers and the environment: focus on production chain: farms, processing plants, hatcheries, and feed mills (only aquaculture certification that encompasses the entire production chain)	The marine environment: focus on increasing fish stocks, reducing bycatch, and maintaining/improving ecosystem health. Efforts underway to develop a human rights risk tool.
<b>Standards/requirements</b>	Fair Trade Standards for fisheries (6 standards <b>Structural requirements</b> (outline the duties and requirements for parties involved in Fair Trade, including the cert. holder, fisher association, and Fair Trade committee), <b>Empowerment and community development</b> (guide how cert holder and the FTC will collect, manage, and distribute the Fair Trade Premium to the benefit community and fishery), <b>Fundamental human rights</b> (help prevent discrimination and abuse, eliminate forced labor and human trafficking, protect children, and ensure workers have freedom to organize), <b>Wages, working conditions and access to services</b> (help standardize and improve wages and benefits, as well as working conditions including health and safety and working hours), <b>Resource management</b> (ensure that fisheries are managed legally and responsibly, and require documentation, stock assessments, biodiversity/ecosystem protections, and proper waste management)...	3 major principles: <b>sustainability of the target fish stock; low impacts on the ecosystem; and effective management.</b> Under each of these principles there are a number of "performance indicators" that address specific aspects of the principles. Minimum passing level= 60 (out of a possible 100), average scores are 80. Follows UN FAO guidelines, ISEAL Code of Good Practice and the Worth Trade Organization Technical Barriers to Trade Agreement.	4 pillars of responsible aquaculture: <b>food safety, social welfare, environmental, and animal health and welfare.</b> Follows UN FAO guidelines, ISEAL Code of Good Practice and the Worth Trade Organization Technical Barriers to Trade Agreement.	<b>Wild capture fisheries-</b> 4 standards: impacts of the fishery on the species under assessment, impacts on other capture species, effectiveness of management, impacts on the habitat and ecosystem. <b>Aquaculture-</b> 10 standards: data, effluent, habitat, chemical use, feed, escapes, disease, pathogen and parasite infection, source of stock-independence from wild fish stocks, predator and wildlife mortalities, escape of unintentionally introduced species.
<b>Standards/requirements continued...</b>	Trade requirements (provide a framework for tracing Fair Trade products and ensure Fair Trade agreements btw fishers, the CH, and other are bound by a contract).			
<b>How often are partner fisheries audited/assessed?</b>	3-year 'certification cycle', during which at least two more audits are conducted – one 'surveillance audit' and one 'renewal audit'. If the first certification cycle is concluded successfully, Fair Trade will issue a new certificate.	Annual audits. Fisheries are recertified every 5 years.	Annual audits. No recertification process.	Standards revised every 4 years. The consumer guides are updated twice annually (winter and summer). Website content updated more frequently.
<b>Products</b>	Thousands of products from wild-caught seafood, to apparel and home goods, to beans and grains, to body care, and more.	Wild-caught seafood: Feb 2016-20,000 seafood products. May 2016-280 fisheries, 90 under assessment	Farmed seafood: labeled products in 120 retail and food service companies worldwide	Farmed and wild-caught seafood: 1,200 seafood ratings since 1999. More than 260 partner restaurants, and 1,000 businesses reference SFW science, more than 160 zoos, aquariums, museums, and other NGOs partner with SFW
<b>Location of products</b>	Sold globally	Sold globally	Sold globally	United States -Whole Foods only

## Appendix B

*(Place board game on table without chips)*

### **I. Introduction (:02 minutes)**

Thank you for taking the time to join our focus group. Today, we'll be discussing a future eco-labeled seafood product from the Upper Gulf of California, Mexico. You have been selected to participate because of your interest in fisheries conservation and sustainable seafood. Your answers will help us understand whether a market-based approach has the potential to be an effective policy instrument in the Upper Gulf of California and elsewhere.

As some of you may be aware, many fisheries interact with protected species, which results in non-target fish, marine mammal, and other bycatch. Eco-labels have become a potentially valuable tool to promote sustainable fishing practices and provide economic incentives to producers. With the growing popularity of eco-labels and other certification schemes, consumers have more tools by which to make informed decisions about the product they purchase based on specific attributes displayed on the label. Today, we hope to gain some insight on what label attributes you value most when purchasing an eco-labeled seafood product.

A few things before we get started...

- This discussion will be casual, relaxed, and relatively informal
- There are no right or wrong answers
- We have a lot of ground to cover, so we'll move quickly at times, but if anyone has a thought they wish to share that hasn't already been expressed, feel free to speak up
- We are recording the conversation to collect data that is not captured in our written survey, and will be taking photos of the board game for later analysis
- My purpose is to ask a few questions, get your reactions, and be a good listener. You are the experts today!
- Please talk one at a time so that everyone can hear
- Everyone participate and say what you believe, whether or not anyone agrees with you

### **II. Exercise (:12 to :15 minutes)**

*(Place the geography chips on the table)*

In front of you is a board game with four eco-label categories: geography, production method, nutrition, and existing eco-label programs. There are also several chips spread across the table. Each chip represents an eco-label within that particular category. There are four rounds to cover each of the categories. Each round has a new batch of eco-labels that are associated with that particular category, including a wildcard. Once I call out the category and read the eco-label options, as a group I will give you 3 minutes to discuss and choose one eco-label that you feel best represents that category. You may choose the blank wildcard eco-label and write in your answer if the available eco-label options do not appeal



to the group. Assume that all of these eco-labels abide by existing fisheries management rules and regulations. At the end of the four rounds, I will take a picture of the board to record the results.

- In front of you is the geography category, which represents where the seafood was caught. There are six eco-label options, which include: Upper Gulf of California caught, Mexico caught, U.S. caught, low carbon footprint, local (read definition), and a wildcard. Please discuss and choose one eco-label as a group by placing your chip on the geography category. Remember, if none of the available eco-label options appeal to the group, feel free to write your answer on the wildcard. I will call “time” after 3 minutes.

*(Place the production method chips on the table)*

- In front of you is the production method category, which represents how the seafood was caught. There are seven eco-label options: wild, farmed, low bycatch, a picture of fisherman, a picture of fisherwoman, small-scale fishery (read definition), and a wildcard. Please discuss and choose one eco-label as a group by placing your chip on the production method category. I will call “time” after 3 minutes.

*(Place the nutrition chips on the table)*

- In front of you is the nutrition category, which represents the health and condition of the seafood caught. There are six eco-label options: non-GMO, no preservatives, high in omega 3, low mercury, fresh (read definition), and a wildcard. Please discuss and choose one eco-label as a group by placing your chip on the nutrition category. I will call “time” after 3 minutes.

*(Place the existing eco-label chips on the table)*

- In front of you is the existing eco-label programs category, which represents existing seafood labels or certifications. There are five eco-label options: The Monterey Bay Aquarium’s Seafood Watch label (assume only the green “best choice” or yellow “good alternative” labels apply), Fair Trade, Marine Stewardship Council, Best Aquaculture Practices, and a wildcard. Please discuss and choose one eco-label as a group by placing your chip on the existing eco-label program category. I will call “time” after 3 minutes.

*(Take a picture of the board game and remove the chips)*

### **III. Questions (:10 minutes)**

*(Pass around surveys)*

- Each of you has a survey in front of you. Please read the directions carefully and respond to the best of your ability. You will have 10 minutes to complete the survey.

#### **IV. Wrap Up (:02 to :05 minutes)**

- Do you have any final thoughts about seafood eco-labeling or feedback relating to the exercise?
- Thank you for participating in this survey. We will share the results with you once we complete the final report

#### **Definitions**

**Local:** Traveled less than 300 miles. The average distance a piece of imported seafood travels is over 5000 miles (Greenberg, 2014).

**Fresh:** According to the Food and Drug Administration (FDA), the term "fresh" implies that the food is unprocessed and that it is in its raw state and has not been frozen or subjected to any form of thermal processing or any other form of preservation. Fresh-never-frozen seafood accounts for less than half of today's fresh seafood sales.

**Small-scale fishery:** Supplies seafood to local markets, generally using traditional fishing techniques and small boats or pangas (Jacquet and Pauly, 2008). Both small-scale and commercial fisheries catch the same amount of fish for human consumption (30 million tons), yet small-scale fisheries employ 25 times the number of fishers (over 12 million people), and use an eighth the amount of fuel annually as compared to commercial fishery operations (Jacquet and Pauly, 2008).

Geography

**Upper Gulf of CA  
caught**



**Mexico caught**



**LOCAL**

**Low carbon  
footprint**



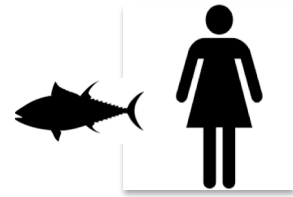
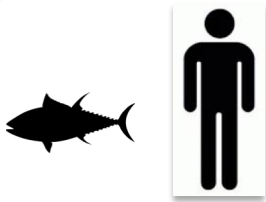
**U.S. caught**



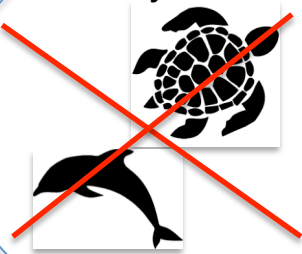
**WILD CARD**

**Production Method**

**Farmed**



**Low bycatch**

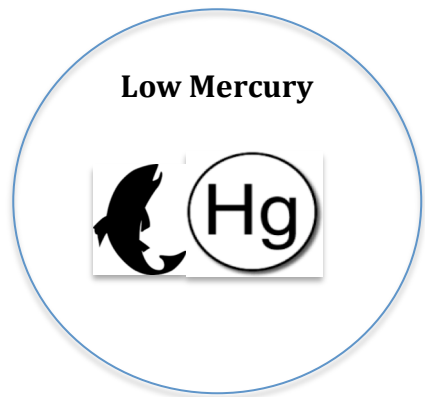


**Small-scale  
fishery**



**WILD CARD**

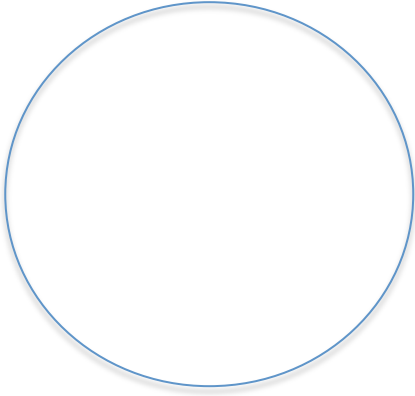
Nutrition



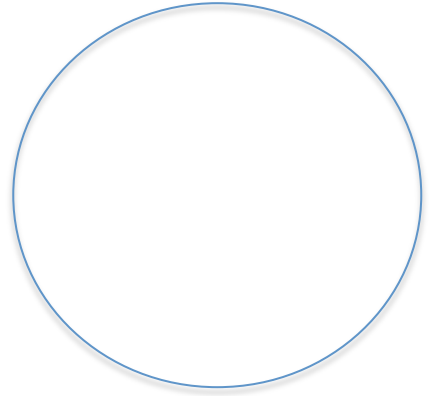
**Existing Eco-label Programs**



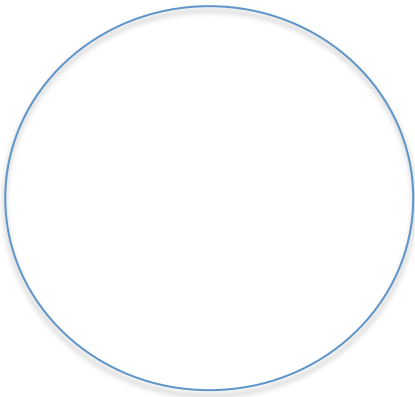
**Geography**



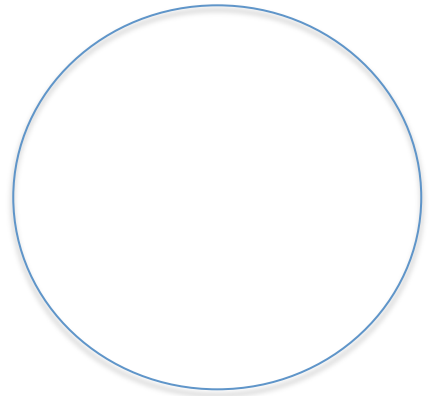
**Production Method**



**Existing Label/Rating  
Programs**



**Nutrition**



## Appendix C

**Directions:** Please read each question carefully and respond to the best of your ability. Write or circle your answers clearly.

1. How often do you eat seafood? (Circle one)

- a. Weekly                      b. Monthly                      c. Never

2. Where do you purchase your seafood? (Circle all that apply)

- a. Grocery store (e.g. Vons)                      b. Specialty fish market  
c. Natural grocery store (e.g. Whole Foods)                      d. Restaurant  
e. Wholesale/discount market (e.g. Costco, Food 4 Less)                      f. Catch your own

3. What seafood product do you usually purchase most? (Choose one from the following options or write your answer clearly).

- a. Shrimp                      b. Salmon                      c. Tuna                      d. Other \_\_\_\_\_

4. Is your usual seafood product farmed or wild-caught? (Circle one)

- a. Farmed                      b. Wild

5. How often do you purchase eco-labeled seafood products? (Circle one)

- a. Always                      b. Sometimes                      c. Never

6. Would you be willing to pay 20% more for your usual seafood product if it were eco-labeled as wild-caught with low bycatch? (Circle one)

- Yes                      No

7. If yes, would you be willing to pay 30% more? (Circle one)

- Yes                      No

8. If no, would you be willing to pay 10% more? (Circle one)

- Yes                      No

9. Are you familiar with this eco-label? (Circle one)

- Yes                      No

10. If yes, do you seek out this eco-label? (Circle one)

- Yes                      No

11. Are you familiar with this eco-label? (Circle one)

- Yes                      No

12. If yes, do you seek out this eco-label? (Circle one)

- Yes                      No





**Directions:** Please read each question carefully and respond to the best of your ability. Write or circle your answers clearly.

13. Are you familiar with this eco-label? (Circle one)

Yes                  No



14. If yes, do you seek out this eco-label? (Circle one)

Yes                  No

15. Are you familiar with this eco-label? (Circle one)

Yes                  No

Monterey Bay Aquarium  
**Seafood Watch**

16. If yes, do you use the Seafood Watch App or consumer guides when purchasing seafood? (Circle one)

Yes                  No



17. The Upper of Gulf of California, Mexico is home to the vaquita, the world's most endangered marine mammal. The vaquita is accidentally caught by gillnets. We are considering the use of an eco-label as a conservation tool to ensure seafood products from this region do not use gillnets, and therefore do not harm the vaquita.

Which of these labels do you like best? (Circle one)



a.



b.



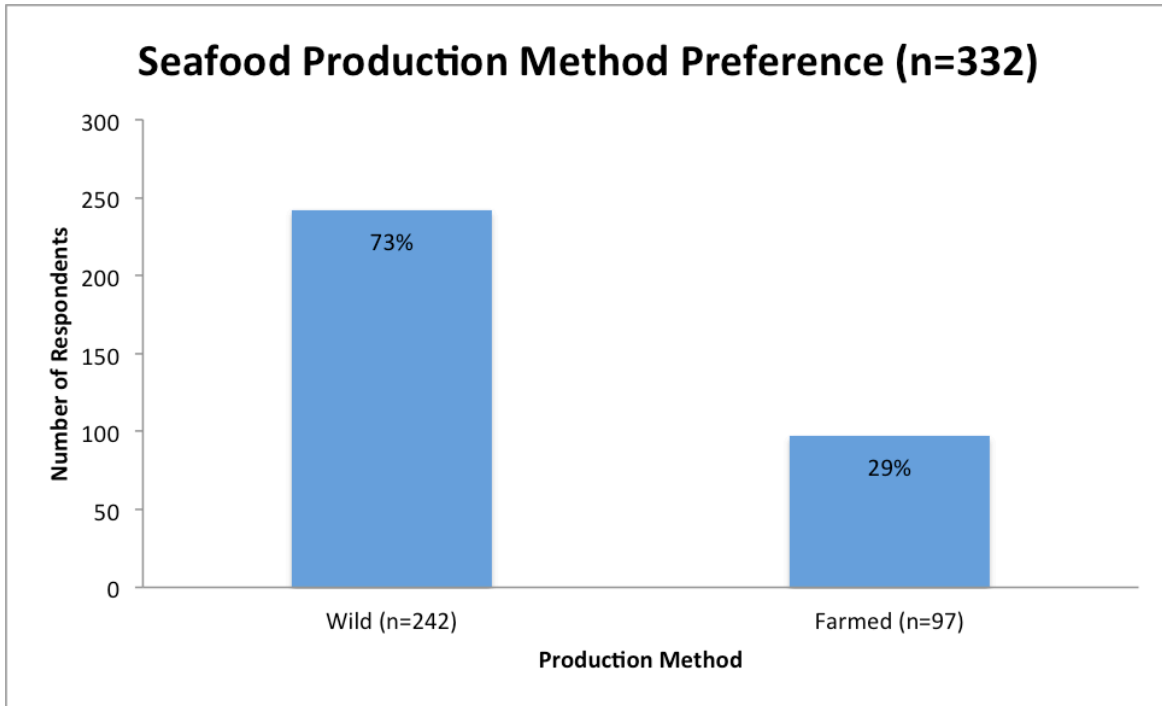
c.

18. Why did you select the above eco-label? (Circle one or write your answer clearly).

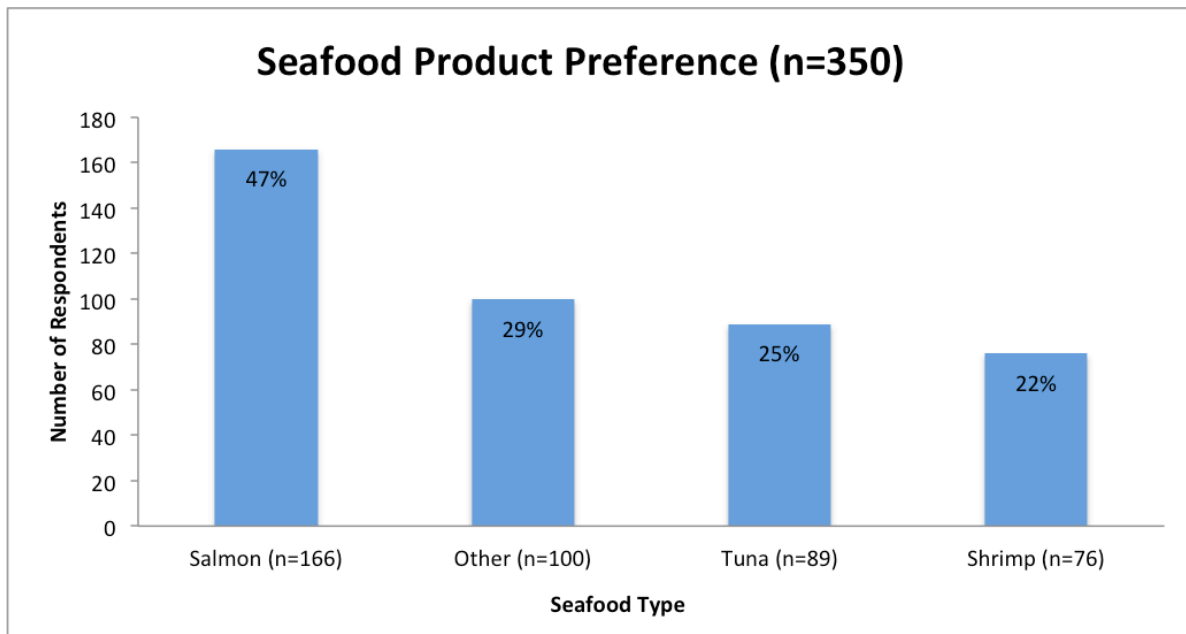
- a. Appreciate the artwork
- b. The label provides meaning
- c. Other: \_\_\_\_\_

## Appendix D

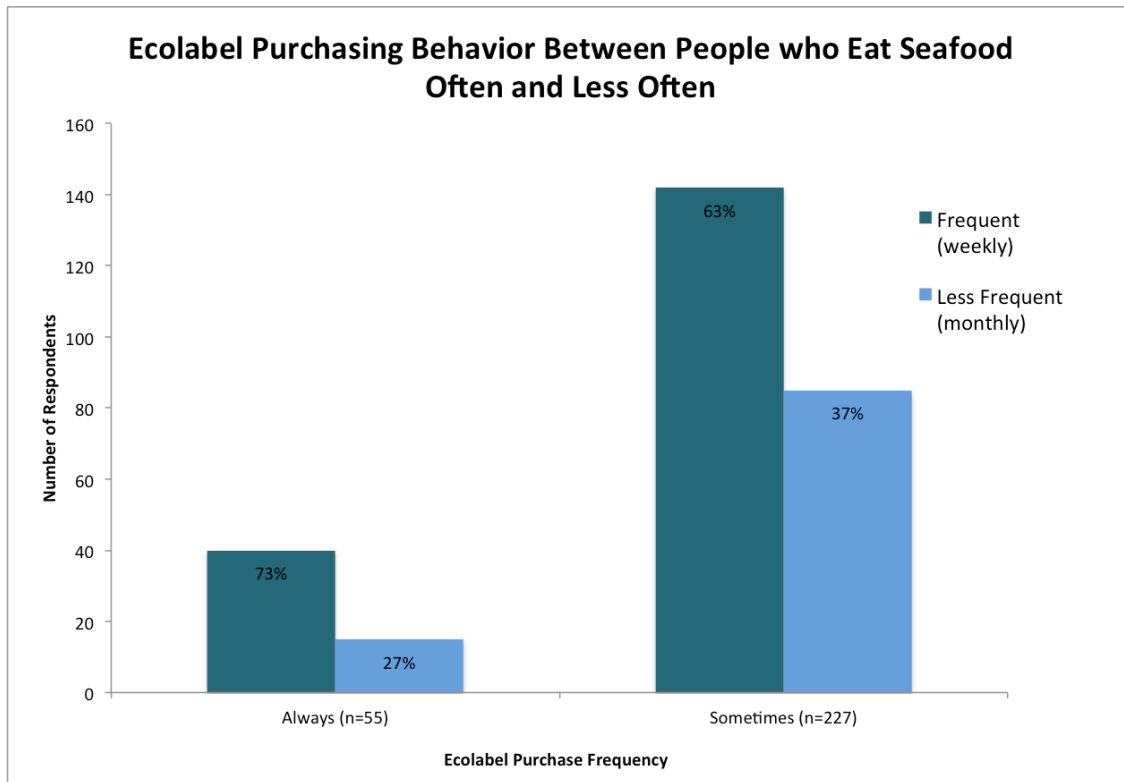
### 1. Seafood production method



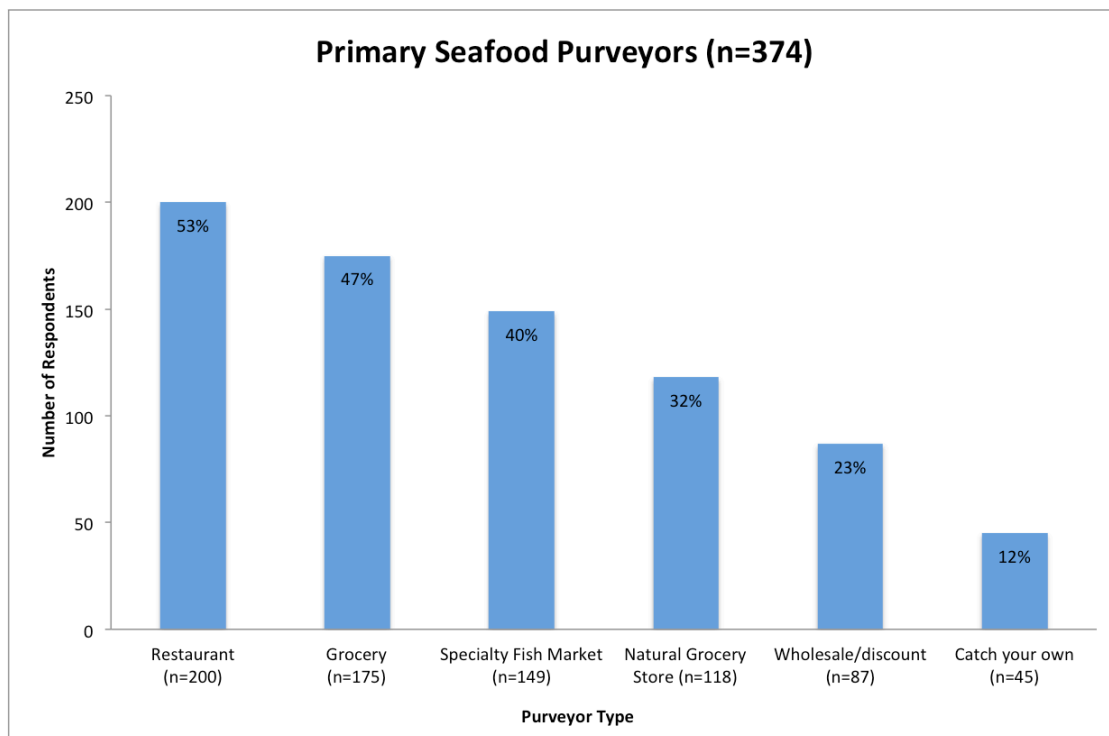
### 2. Seafood product preference



### 3. Ecolabel purchasing behavior between people who eat seafood often and less often



### 4. Primary seafood purveyors



**5. Eco-label price premium data comparing means of prices and not controlling market effect (Poindexter et al., in prep). Seafood Watch on-product labels are only seen at Whole Foods locations.**

Eco-labels:

Average prices of eco-labeled & non-labeled products of same species (6X)

