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**SEAFOOD LABELING AND CONSUMER BEHAVIOR:
A FISHWISE CASE STUDY, SONOMA COUNTY, CA**

A Thesis

Presented to

The Faculty of the Department of Environmental Studies

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Alicia Ushijima Elsholz

December 2009

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A FISHWISE CASE STUDY, SONOMA COUNTY, CA

by
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ABSTRACT

SEAFOOD LABELING AND CONSUMER BEHAVIOR: A FISHWISE CASE STUDY, SONOMA COUNTY, CA

by Alicia Ushijima Elsholz

Decades of unsustainable commercial fishing have resulted in depletion of fish stocks, destruction of ocean habitats, and unintended capture and death of fish and marine mammals. In addition, unsustainable aquaculture practices threaten wild species and pollute surrounding natural habitats. In an attempt to combat these adverse impacts, FishWise, a seafood labeling program, was created to encourage consumers at health food stores and gourmet markets in the US to purchase seafood caught or farm raised in a sustainable manner. This study evaluates FishWise to determine its effectiveness in educating consumers about sustainable fishery issues and in influencing purchases of sustainable seafood at two gourmet markets in Sonoma County, California.

Results show that concerns about the negative impacts of unsustainable seafood as well as seafood familiarity were important to those who purchased sustainable seafood; however, seafood consumers were ultimately motivated by seafood attributes, such as taste and freshness, and health concerns regardless of the sustainability ranking of the seafood purchased. A couple of reasons for this outcome include lack of program promotion by seafood counter staff as well as ineffective seafood labels.

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Introduction

Problem Statement

More than seventy-five percent of the world's global fish stocks are overexploited or fished to maximum capacity as a result of decades of unsustainable commercial fishing (Food and Agriculture Organization of the UN [FAO], 2007). The Food and Agriculture Organization of the United Nations (2007) states that since the organization began keeping track of the health of the world's fish stocks in 1974, the number of global fisheries able to replenish its fish populations has been in steady decline. Between 1974 and 2005, there was a 15% decrease in the number of under- or moderately-exploited fisheries and a 15% increase in the number of over-exploited, depleted or recovering fisheries (Figure 1).

Adapted from FAO State of World Fisheries and Aquaculture 2006.

Figure 1. Status of Global Fish Stocks, 1974 and 2005.

Popular seafood species that are overfished from US fisheries include red snapper, bluefin tuna, atlantic halibut and monkfish (National Marine Fisheries Service, 2008).

Seafood consumption has increased globally over the past four decades and can be attributed to a rise in population growth and economic prosperity in developing

countries and a resulting dietary shift from grains to protein (FAO, 2007). However, changes in fish consumption patterns in industrialized nations are also a factor, as people become more health conscious and seek variety in their diet. Meat scares, such as “Mad Cow” disease, can also temporarily shift demand to other protein sources like fish. There has also been an increase in the production of value-added fish products that appeal to those who do not have time to prepare meals (FAO, 2007). Unfortunately while industrialized countries prosper, nations that rely on fish as their main protein source suffer. For some nations, such as Bangladesh, Indonesia, Myanmar and Sierra Leone, fish provides 50% or more of their total animal protein (FAO, 2007). Therefore, declining fish populations will have a greater impact on these local communities who depend on fish for their livelihood.

Declining fish populations also have important implications for businesses, such as seafood purveyors, restaurants and manufacturers of value-added seafood products. These businesses have a vested interest in making sure that global fish supplies are not depleted. For example, Unilever controls approximately one-quarter of the frozen fish market in both the United States and Europe, and in 1996, the company announced its commitment to sustainability as it recognized that conducting business in an environmentally friendly way would benefit the company’s longevity (Fowler & Heap, 1998; Uniliver, 2004).

Depletion of the world’s wild fish stocks is not the only negative effect of unsustainable fishing. Other impacts include the destruction of ocean habitats by commercial fishing equipment and the unintentional capture and death of other fish or

marine mammals (known as bycatch). Commercial fishing gear, such as bottom trawls and dredges, are particularly detrimental to ocean habitats as they scrape bottom of the sea floor and kill huge numbers of bottom dwelling species like coral and sponges (Marine Conservation Biology Institute, 2008). Trawls are also responsible for much of the bycatch associated with unsustainable fishing methods. Between 1992 and 2001, it is estimated that seven million metric tons of marine life were caught and discarded, and trawlers for shrimp and demersal finfish (e.g. sharks) accounted for approximately 63% of total estimated discards despite representing only 22% of landings recorded (Kelleher, 2005).

Aquaculture, or fish farming, accounted for just four percent of the world's total fish production in 1970 but may now be one of the fastest growing industries of food production, as nearly 50% of the seafood consumed worldwide are provided by fish farms (FAO, 2007; National Oceanic Atmospheric Administration, 2009). There exist a wide-range of sustainability issues associated with aquaculture that include the following: risk of escape of farmed species breeding or competing with wild species, risk of disease or parasites transferring to wild species, and concentrated waste and pollution affecting surrounding habitats and ecosystems. Another result of unsustainable fish farming is the use of wild-caught species for fishmeal and fish oil used to provide energy and essential fatty acids for farmed fish. FAO (2007) reports that 25% of the world's wild-caught fish production is for non-food products, primarily used for fishmeal and fish oil, and Tacon (2005) states that more than two-thirds of the farmed salmon diet is made up of these non-food products.

In an attempt to combat the adverse impacts from unsustainable fishing and aquaculture, the Sustainable Fishery Advocates (SFA) created FishWise, a seafood-labeling program implemented at the point-of-sale. SFA is a nonprofit organization based in Santa Cruz, CA that partner with fisherman, seafood purveyors, retailers and other stakeholders to provide seafood customers with a deeper understanding of where their seafood comes from and also increase consumption of sustainable seafood (Sustainable Fishery Advocates [SFA], 2008). The FishWise program aims to educate and encourage consumers to purchase seafood caught or farm raised in a sustainable manner by using a color-coded labeling system that shows the sustainability ranking for each fish sold at the seafood counter and to assist seafood purveyors with sourcing more environmentally responsible options (Figure 2).

With permission from Oliver's Market

Figure 2. FishWise Poster

The labels, located at the seafood counter, allow seafood customers counter and to make informed decisions about their seafood purchase (Figure 3).

Photo by Author

Figure 3. FishWise Seafood Labels at Oliver's Market

FishWise staff also educates seafood counter staff about the program and seafood sustainability issues so that employees may raise awareness about FishWise and the problems associated with unsustainable fishing.

Although FishWise does not directly analyze the data themselves, FishWise incorporates the same sustainability criteria used by the Monterey Bay Aquarium's Seafood Watch Program into its seafood labels, which examines wild-caught species and aquaculture species separately. Sustainability rankings for wild-caught seafood are determined by looking at a fish species' life history, such as age at maturity and how often individual fish reproduce, as well as whether it is classified as threatened or endangered. They are also determined by whether or not fishing methods are used for that species that result in excessive bycatch, habitat destruction or ecosystem disruptions,

and if the fishery is effectively managed to ensure its long-term health (Monterey Bay Aquarium [MBA], 2006a; SFA, 2006). Sustainability rankings for aquaculture species are determined differently. For farmed fish, the rankings weigh the potential risks of farmed species escaping and breeding with, competing with, or spreading disease to wild fish. The rankings also look at whether or not the fish farm uses more wild-caught fish (as feed) than it produces, the extent of concentrated waste pollution to surrounding ecosystems, and whether the farm is managed effectively (MBA, 2006b).

While results of past studies on point-of-purchase interventions and labeling programs show that these programs have not been successful at influencing change in consumer behavior (Dougherty, 1990; Hunt et al., 1990; Paine-Andrews et al., 1996; Robinson et al., 2002; Rodgers et al., 1994), results from the FishWise pilot program, implemented at a natural food store in Santa Cruz, CA, show significant changes in the sales for both sustainable and unsustainable seafood (Figure 4). Before the pilot program was implemented, data from July 2002 show that 50% of overall seafood sales were from sustainable seafood and 22% were from unsustainable seafood. Sales data taken a year and a half later in January 2004, show that sustainable seafood sales increased by 48% to 74% of overall seafood sales, and unsustainable seafood sales decreased by 59% to just nine percent of overall seafood sales. Changes in seafood sales at the pilot store may have been attributed to knowledge gained from the FishWise program, however data had not been gathered directly from store customers to support the inferences made from the sales data. Evaluation of the education component of the FishWise program will provide

concrete results and insights into an eco-labeling program's influence on consumer buying behavior by gathering data directly from seafood consumers.

Sustainable Fishery Advocates: 2004 Annual Report. www.fishwise.org.

Figure 4. Seafood Sales at Pilot Store from 2002-2004.

Related Research

Environmental Knowledge, Attitudes and Behavior among Seafood Consumers

In general, many seafood consumers in the US believe they do not know enough about the seafood they are buying (Seafood Choices Alliance [SCA], 2003). Until recently, consumers had no information on the seafood available to them, other than seafood name and price. In 2002, the US government passed legislation requiring retailers to provide Country of Origin Labels (COOL) on seafood. The labels are required to include the seafood product's common name, country of origin, and whether

it was farmed or wild caught (SFA, 2006). COOL, however, does not provide consumers with additional information about problems associated with unsustainable fishing, so seafood customers are left to make their own assumptions about sustainability. Past survey research was conducted in the early 2000s to determine knowledge, attitudes and purchase intent for sustainable seafood. A nationwide survey conducted by the Seafood Choices Alliance (SCA) of 1,000 seafood consumers shows that in 2001, survey respondents were generally unaware of the fishing problems associated with seafood, and only slightly more aware of the health benefits associated with seafood consumption (SCA, 2003), such as decreased risk and prevention of cardiovascular disease (Wu & Bechtel, 2008). An evaluation study of the Monterey Bay Aquarium's (MBA) Seafood Watch Program corroborates these findings. The Seafood Watch evaluation found that more than half of the 726 survey respondents sampled at the Monterey Bay Aquarium had no idea of the problems associated with certain types of unsustainable seafood, such as monkfish, lingcod, orange roughy and king crab (MBA, 2004).

The Seafood Choices Alliance survey (2003) found that only 20 percent of respondents felt they had enough information to enable them to identify fish species associated with unsustainable fishing. Greater than 65% of those surveyed expressed interest in learning more about the environmental impacts associated with fishing and claimed they would be willing to change their seafood purchases in light of this information. A majority of respondents claimed they would reduce seafood consumption for some of the most popular seafood species when asked if they would continue, reduce,

or stop buying seafood if they knew it was overfished or caught in a way that adversely impacted the ocean (Figure 5).

Figure 3.10: Likely Consumption of Fish and Seafood Upon Learning of Environmental Concerns

	Give up entirely	Eat less	Eat same	Total who would reduce consumption	% of Sample who currently eat this species
Atlantic salmon	28%	45%	28%	73%	65%
Swordfish	35%	35%	31%	70%	49%
Snapper	27%	39%	34%	66%	59%
Chilean sea bass	30%	35%	35%	65%	43%
Pollock	30%	35%	35%	65%	54%
Scallops	25%	39%	36%	64%	59%
Canned tuna	22%	42%	36%	64%	86%
Lobster	25%	37%	38%	62%	68%
Shrimp	21%	38%	41%	59%	87%

Question: For each of the following kinds of seafood, please tell me if you found out that it was overfished or caught in a way that is harmful to other sea creatures or the ocean environment how that would affect your decision about whether to eat that particular seafood. Would you give up eating that kind of seafood entirely, continue eating that kind of seafood but eat less, or would you continue eating the same amount of that kind of seafood? If you are not sure about a particular item, please say so.

With permission from Seafood Choices Alliance. The Marketplace for Sustainable Seafood Report. 2003.

Figure 5. Seafood Choices Alliance Survey Question and Results.

For example, of the 65 percent sampled that eat farmed Atlantic salmon, 73 percent said that they would reduce consumption in light of such information (Seafood Choices Alliance [SCA], 2003). The MBA survey results echo those of the SCA report with approximately two-thirds of MBA respondents showing strong indications that they would purchase seafood labeled sustainable over non-labeled seafood (MBA, 2004), though the actual likelihood could not be determined by either survey as both provide data on behavioral intent, rather than behavior documented where purchasing decisions and sales are made at the point-of-purchase.

Data from the two studies show that seafood consumers were largely uninformed about overfishing and other problems associated with unsustainable fishing. Despite this lack of knowledge, the studies indicate that there is interest among seafood consumers to learn more about seafood sustainability issues and that they are willing to change their purchase behaviors upon learning about any negative environmental impacts associated with the seafood they currently purchase. Sustainable seafood education programs, such as the Monterey Bay Aquarium's Seafood Watch and the Environmental Defense Fund's Seafood Selector programs attempt to influence seafood purchases via seafood guides that consumers may reference when making their purchasing decisions. The guides list seafood in three color-coded columns that emphasize what seafood species are acceptable to buy (green), buy with caution (yellow), or avoid (red). While the Monterey Bay Aquarium survey shows that a majority of people who use their Seafood Watch Cards claimed it had influenced their purchases at one time or another (MBA, 2004), little or no analysis has been done to determine the effects of the Seafood Watch card and other seafood guides on the market (Roheim & Sutinen, 2006). This research fills gaps in the literature by surveying consumers about their seafood purchases at the point-of-sale, which provides more accurate information than self-reported information about past purchases. This study also evaluates a point-of-purchase program specifically targeting the issues of seafood sustainability.

The Environmental Knowledge-Attitude-Behavior Model

Used by researchers across many disciplines, the Theory of Reasoned Action (TRA), created by Fishbein and Ajzen (1975), is commonly used when examining

relationships between environmental knowledge, beliefs, attitudes and behaviors (Bang et al., 2000; Chan, 1999). Fishbein and Ajzen contend that belief is a determining factor influencing attitudes and that attitudes, coupled with social norms, influence a person's intent to behave in a particular way (Fishbein and Ajzen, 1975). The theoretical framework used by Bang et al. (2000) modifies the TRA to include concern and knowledge as contributing factors to a person's beliefs. They contend that concerns of personal importance, such as global warming, will cause a person to seek information and find solutions to global warming. Knowledge gained from this research will lead to a belief that solutions, like renewable energy, can help stop global warming, and attitudes to take individual action, such as installing solar panels, will increase. The more favorable the attitude toward installing solar panels, the more likely it will be for a person to actually perform the behavior.

The Theory of Reasoned Action typically uses path analysis to explain behavior, however this case study research will use a simplified version of the Bang et al. (2000) framework. This study will examine the relationships of five independent variables (knowledge about seafood sustainability, knowledge about the information on the FishWise labels, beliefs about the impacts associated with purchasing sustainable and unsustainable seafood, attitudes toward buying sustainable seafood, and purchase motivators that influence seafood purchases) and their individual impacts on the dependent variable (consumer purchases of sustainable seafood) (Figure 6).

Figure 6. Modified Theory of Reasoned Action Applied to Seafood Purchase

In the modified TRA, V_1 is self-reported knowledge about the impacts of unsustainable and sustainable fishing and V_2 is knowledge about information on the FishWise label. Belief (V_3) is defined as consumer belief that his or her individual purchases of seafood have an impact on other consumers or the environment. Attitude (V_4) is defined as attitude toward purchasing sustainable seafood. While V_1 through V_4 are internal or personal factors that influence behavior, purchase motivators (V_5) are external factors comprised of variables such as price, health, concerns about seafood sustainability, and seafood attributes (taste, texture, freshness, etc.) that may also influence seafood purchases. Lastly, V_6 is the actual purchase of sustainable seafood.

The Environmental Knowledge-Attitude-Behavior Relationship

Results of past studies attempting to find evidence of the connection between environmental knowledge, attitude and behavior among green consumers, or people who buy environmentally friendly products, remain inconclusive. Martin and Siminitiras (1995) administered a questionnaire to university students in Britain that measured self-reported knowledge of a variety of specific green products, such as recycled paper, green laundry detergent and energy saving appliances, and their attitudes toward the products' performance. The authors define "product-line-specific environmental knowledge" as self-perceived knowledge of green products and how they impact the environment. "Product-line-specific environmental attitudes" are defined in this study as evaluations of green products' environmental impacts and whether consumers agree that the products provide environmental protection. The results of this study found no strong relationship between knowledge of specific green products and attitude toward the specific green products' impacts on the environment. A limitation noted in their study is that attitudes were measured by single-response survey questions, which may not have enabled complete and accurate measurements of product-specific knowledge and attitudes. In addition, the small sample size of 61 participants may have influenced the results. Lastly, Martin and Siminitiras (1995) did not examine the relationships among product-specific knowledge and purchasing behavior.

Mainieri et al. (1997) also examined variables thought to predict purchases of green products, such as beliefs about purchasing green products, attitudes toward general environmental issues, confusion about products' environmental claims, participation in

pro-environmental activities, and socio-demographics. The authors of this study used opinion statements such as, “We have a responsibility to avoid purchasing or using products that are known to be damaging to the environment” to define beliefs about purchasing environmentally friendly products. To define attitudes of general environmental concern, they used opinion statements such as “The balance of nature is very delicate and easily upset by human activities” and “I will not do something to help the environment if it takes too much effort.” Their study found that of all of the tested predictors, pro-environmental belief was the most significant factor influencing green purchases (Mainieri et al., 1997). The Bang et al. study (2000) support these findings, as their results found that consumers with higher levels of beliefs about the benefits of using renewable energy were more likely to pay more to use renewable energy.

In a study attempting to profile the characteristics of a green consumer in the 1990s, Roberts (1996) noted that although many adults report that they are concerned about the environment, they often do not engage in pro-environmental behavior that is consistent with their environmental concerns. Competing factors, such as price, quality, convenience, and mistrust and confusion about environmental claims influence their purchases more than environmental concerns. To address this disconnect between environmental concern and behavior, Roberts sampled 582 adults in a nationwide survey to gather data on ecologically conscious consumers. He found that the best predictor of ecologically conscious consumer behavior was perceived consumer effectiveness, or consumer belief that his or her individual behaviors can help solve environmental problems (Roberts, 1996).

Eco-Labels

Eco-labels are increasingly being used as a way to increase awareness and purchases of environmentally friendly products. However, research assessing the effectiveness of the labels is limited and results are inconclusive. In a study that aimed to describe the relationship between environmental attitudes and their influences on purchases of eco-labeled fruit, Clarke et al. (2000) found only small positive connections. Echoing the findings of Roberts (1996), the authors attribute the weak relationship to be due to variance in other factors, such as price, product availability, convenience and advertising that was unaccounted for in their study design. Research conducted by Wessells et al. (1999) also found that the success of an eco-labeling program is dependent upon factors such as consumer awareness as well as acceptance and preference for the eco-label. With regard to sustainable seafood, research shows that price, taste and quality, coupled with knowledge of fishing and its effects on the marine environment influence preference for particular seafood products (SCA, 2003; Wessells et al., 1999).

There is evidence that consumers can respond positively to eco-labels and Teisl et al. (2002) provide market-based evidence of this by analyzing the effects of the Dolphin-Safe tuna campaign on the tuna market. Their study found that market share of Dolphin-Safe canned tuna increased over several months between April 1988 and December 1995 due to a combination of the label and the negative media campaign that showed horrific images of dolphins dying in tuna nets. The findings in their report prove that sustainable seafood labels coupled with other media campaigns can be effective in informing the public of the negative impacts of unsustainable fishing, and can increase sales due to this

knowledge. However, the authors suggest that the success of an eco-label may take a while to have any effects because many customers may need several in-store exposures to the program before becoming aware of the labels and actually changing their buying habits. Also, some customers may notice the labels but not believe the information stated. A limitation noted in their study was that it is difficult to identify the true effect of the labels on seafood purchases because of the negative media that took place at the time the labels appeared. Teisl et al (2002) suggest that further research is needed examining eco-labeling programs in other markets.

Eco-Labels as Point-of-Purchase Interventions

During the 1990s, many point-of-purchase interventions were used to increase awareness and knowledge about the health risks associated with eating unhealthy foods, while at the same time marketing heart-healthy food products. Evaluation studies of these point-of-purchase interventions determined that while awareness among shoppers increased, little or no changes were reflected in the sales of the promoted healthy food products (Dougherty et al., 1990; Hunt et al., 1990; Paine-Andrews et al., 1996; Rodgers et al., 1994). More recently, supermarket interventions have begun to promote environmental issues. The Midwest Food Alliance (MWFA) in partnership with two grocery stores in Minnesota marketed a campaign to promote the purchase of sustainably produced foods. A key component to the program was the use of a “Midwest Food Alliance Approved” eco-label. Robinson et al. (2002) found that, similar to the evaluation results of the health marketing interventions, the campaign was effective at

increasing awareness of the campaign yet unsuccessful at persuading customers to increase their purchases of sustainably produced foods.

Reasons for these failures vary among each program. Researchers from one study cited that customers had limited exposure to the campaign, as the participating supermarket made no attempts to promote or publicize the program (Dougherty et al., 1990). Another study found it difficult to determine the program's actual influence on consumer behavior because of the dissemination of nutrition information in the media (Rodgers et al., 1994). With regard to the MWFA campaign, the intervention only lasted eight weeks and researchers felt the duration may have been too short to come to any concrete conclusions about consumer buying behaviors in the stores (Robinson et al., 2002). Due to the ambiguous findings of these and other studies, it is difficult to provide consistent results that can explain a point-of-purchase intervention's influence on customer purchasing behavior.

Objectives

The purpose of this study was to evaluate the education component of the FishWise program to determine its effectiveness in educating consumers about sustainable fishery issues and in influencing purchases of sustainable seafood. This study addressed the following research questions:

Research Questions

1. What purchase motivators significantly influence sustainable seafood purchases at the point of purchase?
2. To what extent do beliefs and attitudes influence sustainable seafood purchases at the point of purchase?

3. To what extent does consumer knowledge influence sustainable seafood purchases at the point of purchase?
4. How effective is the education component of the FishWise program?

Methods and Results

Study Site

At the time data were collected, the FishWise program was implemented at seventeen health food and gourmet markets throughout Northern California. A majority of the stores participating in the FishWise program are considered natural food markets, which often cater to consumers who are aware of and are concerned about the environmental and social impacts of conventional food production. The FishWise program is also implemented at gourmet markets that tend to cater to upper-middle class patrons who may or may not be environmentally- or ecologically-minded. Data for this research were collected at two gourmet supermarkets located in Cotati and Santa Rosa in Sonoma County, California in July and August 2006. These stores are owned by Oliver's Market, which sells both natural and conventional groceries, local organic produce, and natural meats and tends to cater to high-income people who may or may not be ecologically-minded. Data were collected at two stores to increase the validity of the FishWise program's impacts on seafood consumers. The seafood consumers that shop at Oliver's Market are generally representative of the larger population in Northern California, although these consumers are more likely to be older, wealthier and better educated than the average resident of Northern California. The 2000 US Census Bureau states that the populations of Santa Rosa and Cotati are predominantly Caucasian, 89.4% and 84.1%, respectively. In addition, the populations are well-educated with 35.2% of

Santa Rosa residents and 23.1% of Cotati's residents with Bachelor's degrees or higher. Lastly, the median household incomes in 1999 of Santa Rosa and Cotati were \$52,912 and \$52,297, respectively, compared to the national average of \$41,994 (US Census Bureau, 2000a and 2000b).

Target Population and Sample Size

The target population of this research was seafood customers comprised of those who consume seafood or are the primary household decision-makers of seafood purchases. From the target population, Oliver's Market seafood consumers were sampled from both stores. Adults, 18 years or older, were sampled because they make most of the household's seafood purchasing decisions (SCA, 2003; MBA, 2004). A stratified sampling method was used to organize seafood consumers into sub-groups based on their seafood purchases to identify the drivers of each type of purchase. The seafood purchase sub-groups are as follows:

- (1) People who buy only sustainable seafood (at the time of purchase)
- (2) People who buy only seafood with some concerns (at the time of purchase)
- (3) People who buy only unsustainable seafood (at the time of purchase)
- (4) People who buy any combination of the seafood listed above (at the time of purchase)

At least 50 seafood consumers for each sub-group were sampled, with the exception of those who purchased more than one type of seafood. Unfortunately, just twenty (or 10%) of the customers sampled bought any combination of seafood, therefore the difference in uncollected mixed purchases was substituted with customers who purchased seafood of any sustainability ranking. In all, 201 seafood consumers were sampled (100 at Cotati

and 101 at Santa Rosa) with 57 who purchased sustainable seafood, 67 who purchased seafood with some concerns, and 77 who purchased unsustainable seafood.

Data were collected directly from Oliver's Market seafood consumers using visual observations and written questionnaires. These consumer data were used to identify what purchase motivators (external factors) influence sustainable seafood purchases, as well as to determine the extent to which beliefs, attitudes, and knowledge (internal factors) influence sustainable seafood purchases (Research Questions 1-3). Observations and interviews of Oliver's Market staff were used to collect data to determine the effectiveness of the education component of the FishWise program (Research Question 4). Data collection, analysis and results for Research Question 4 are reported separately because the subjects and research question are different from Research Questions 1-3.

Research Questions 1-3

What purchase motivators most influence seafood purchases of Oliver's Market's customers, and to what extent do beliefs, attitudes, and knowledge influence sustainable seafood purchases?

Data Collection and Coding

Studies reviewed in the literature that use self-reported data to determine program impacts on consumer purchasing behavior are forced to rely on customer recollections that inherently make their study's findings less valid and reliable (Hunt et al., 1990; Robinson et al., 2002). In order to address this limitation, observations were used to directly verify customer purchases made at the seafood counter and to document the

name of the seafood purchased as well as the color of its sustainability ranking on an observation guide. Written questionnaires were used to measure customer knowledge about seafood sustainability and the FishWise labels, belief that his or her purchases impact the ocean environment, and the consumer's attitude toward purchasing sustainable seafood. The questionnaire also identified factors that motivated the customers' seafood purchases (Appendix A). Each day prior to customer observation and survey collection, all seafood available at the seafood counter and the information listed on the FishWise labels were documented. Label information included the common or species name; country of origin; price; whether it was farmed or wild; the catch method; and the sustainability ranking (or color) of the label.

In-store research was conducted from Friday to Sunday when seafood sales were purported to be the highest according to the General Manager (Tom, personal communication, June 2, 2006). Data were collected at both stores on weekends from 9:00 a.m. to 1:00 p.m. or 2:00 p.m. to 7:00 p.m. and weekends were alternated between stores. Data collection at the Cotati store began on the weekend of July 14, 2006 and began at the Santa Rosa store on the weekend of July 21, 2006. Observation and survey collection ended on August 25, 2006 at Cotati and on August 26, 2006 at Santa Rosa.

Observations. Researcher presence can influence the behaviors of customers being observed. Paine-Andrews et al. (1996) suggest that the researcher distance him or herself from the point of purchase, yet still be within view of the products. Therefore, observations at Oliver's Market were conducted from the end of the aisle closest to the seafood counter, which was far enough away to be unnoticed by customers who

approached the seafood counter yet close enough to hear the conversations between counter staff and customers. When the customers made their purchases, the type of seafood purchased and its sustainability ranking were recorded on observation guides (Appendix B). Each observation guide was numbered to identify the customer and match the observation guide with the appropriate written survey. In all, more than 65 hours of observations were completed for both stores in July and August 2006.

Written questionnaires. Immediately upon completion of the seafood purchase, customers were approached near the seafood counter to determine if he or she would complete a written questionnaire. Collecting data from customers immediately after their purchase allowed for documenting information regarding customers' recent seafood purchases with accuracy instead of relying on self-reported information of past purchases. The questionnaire was comprised of 31 closed-ended survey items and the main components of the written survey were broken up into seven categories: (1) Four questions used to measure the customer's level of self-reported knowledge about seafood sustainability issues, (2) Four questions testing the customer's level of knowledge about the information listed on the FishWise labels, (3) Five opinion statements pertaining to customers' beliefs in the consequences of individual purchases, (4) Three opinion statements measuring customers' attitudes toward purchasing sustainable seafood, (5) A list of nine potential factors, or purchase motivators, that influenced customers' seafood purchases, (6) Four questions measuring past purchasing behavior, and (7) Eight socio-demographic questions, including gender, age, income, education level, seafood purchasing frequencies, etc.

The survey tool was developed based on: (1) a review of past studies conducted to assess consumer knowledge, attitudes and behaviors about seafood, and (2) sustainable seafood criteria as defined by FishWise. It was pilot tested with 20 respondents (ten from each store) to determine if the questionnaire was understandable, readable, and easy to complete (Robinson et al., 2002). Revisions were made based on participant suggestions upon completion of the survey. Five-dollar gift certificates for Oliver's Market were offered to help with any difficulty in recruiting participants (Robinson et al., 2002) and to allow for a more representative sample.

The written survey took approximately five to ten minutes to complete and most customers completed the survey in-store. Three customers did not have the time to complete the survey in the store, but were interested in taking the survey home to complete when they had more time. All surveys that were not completed in-store were mailed back at a later date. Two hundred and one surveys in total were completed (100 from Cotati; 101 from Santa Rosa). The sustainability ranking (or label color) of seafood purchases was used as the dependent variable (Figure 7). Seafood purchases were divided into three outcomes based on the sustainability ranking of the seafood purchased. Twenty customers bought seafood with different sustainability rankings ("mixed purchases"), which constituted just ten percent of all purchases. Therefore, mixed purchases were put into seafood purchase segments depending upon the ranking of the most unsustainable purchase. For example, if both sustainable and unsustainable seafood were purchased, that purchase was considered an unsustainable purchase.

With permission from Sustainable Fishery Advocates. FishWise August 2006 binder.

Figure 7. Seafood Sustainability Ranking and Label Colors.

Responses to survey items were combined to create independent variables based on shared characteristics. Cronbach's Alpha was used to ensure that the survey items used in the composite variables were measuring the same thing. Norušis (2005) states that an alpha value close to zero means that the items on the scale are not measuring the same construct, while an alpha close to one indicates that the items are measuring the same thing. An alpha value greater than 0.80 is the baseline used in this study to indicate that the items in the scale measure the same thing (Norušis, 2005). Respondents were grouped into either a high or low category for the knowledge, belief and attitude variables. Response scores for these independent variables were created and the average scores from all related responses were used to determine the high and low groups. The whole numbers of each mean score were used as a cut-off for the low group, while the

subsequent whole numbers designated the high group. Those that had high levels of knowledge, beliefs or attitudes received a high score (Asquith, 2006). Conversely, low levels of knowledge and attitude received a low score. The average scores used to create the high-low groups were calculated using data combined from both the Cotati and Santa Rosa markets.

The scores of the survey questions examining the level of knowledge about the information on the seafood label were based on whether the customer answered the questions correctly (Table 1).

Table 1. Composite Variable: FishWise Label Knowledge

Composite Variable	Survey Questions*
Knowledge of the information on the FishWise labels	<ul style="list-style-type: none"> ○ Do you know if the seafood you bought today had a green, yellow, or red label? If yes, what color? ○ Do you know if the seafood you bought today was raised in a fish farm or caught in oceans and rivers? If yes, which was it? ○ Do you know which fishing method was used to catch the seafood you purchased today? If yes, what method(s) was used?
*Coding scheme: 0 = Answered incorrectly; 1 = Answered correctly	

One point was given for each correct answer and no points were awarded for incorrect or unanswered responses. The questions were combined to create a variable that measured the level of knowledge a customer had about the information presented on the FishWise labels. The highest possible score a respondent could receive for this composite variable was three and the lowest score was zero.

The survey included an additional knowledge question: “Do you know the species of fish you purchased today? If yes, what species?” that would have been included in this variable, however, this question was removed due to the tremendous difficulty in answering this question correctly. According to the co-founder of FishWise, there are no standardized names for fish that are used uniformly by commercial fisherman, suppliers, retailers and consumers (Teresa Ish, personal communication, August 11, 2006). FishWise recommends that stores use the common names listed on the Food and Drug Administration’s “The Seafood List”, accessible on the Internet, which provides acceptable market names for imported and domestic seafood (US-FDA Seafood List, 2002), however Oliver’s Market did not use the common names on a consistent basis. This is a limitation in the survey question asked, and should have been worded in a way that would obtain whether the customer noticed the seafood name, not species name, on the label.

Four questions were aggregated to create a variable that measured the level of self-perceived knowledge about seafood sustainability issues and were based on a scale ranging from “Not at all” to “A great deal” (Table 2). The highest possible score a respondent could have for this composite variable was 20, while the lowest score was four. The questions and accompanying scales were taken directly from a past survey administered by the Seafood Choices Alliance (2003). Cronbach’s Alpha for knowledge about seafood sustainability was 0.802 and deemed a reliable scale.

Table 2. Composite Variable: Self-Reported Knowledge about Seafood Sustainability

Composite Variable	Survey Questions*
Self-reported knowledge or familiarity with seafood sustainability issues	<ul style="list-style-type: none"> ○ How knowledgeable are you about sustainable seafood? ○ How knowledgeable are you about habitat impacts from commercial fishing methods? ○ How knowledgeable are you about habitat impacts from aquaculture (or fish farming) methods? ○ How familiar are you with the term “bycatch”?
*Coding scheme: 0 = Not sure; 1 = Not at all; 2 = Hardly at all; 3= Some; 4= Quite a bit; 5= A great deal	

For attitude toward sustainable seafood purchases, the original intent was to create two separate variables to measure belief in the consequences of his or her individual purchases and attitude toward purchasing sustainable seafood using opinion statements based on a five-point Likert Scale ranging from “Strongly Disagree” to “Strongly Agree”. However, Cronbach’s reliability analyses showed an alpha of 0.635 for the five items used to create the composite variable belief and 0.604 for three items used for attitude. These scores are below the 0.80 baseline alpha used for this study. Therefore, items for belief and attitude were combined in the reliability analysis to determine which items would provide the highest alpha value (Table 3). In the end, three attitude items and two belief items from the survey were combined to create a variable that reliably measured a person’s attitude toward purchasing sustainable seafood (Cronbach’s Alpha = 0.805).

Table 3. Composite Variable: Attitude toward Sustainable Seafood Purchases

Composite Variable	Survey Questions*
Belief in the Consequences of Individual Seafood Purchase + Attitude toward Sustainable Seafood Purchases	<ul style="list-style-type: none"> ○ When buying consumer products, it is important to consider how their use of them would affect the environment and other consumers. ○ Buying seafood in a way that helps fish populations and ocean habitats can influence the fishing industry to stop using damaging fishing methods to catch fish. ○ It is important to consider the environmental impacts of fishing when purchasing seafood. ○ When given a choice between two equal seafood products, it is better to purchase the one that is less harmful to the environment. ○ If seafood is labeled “environmentally responsible” in a store or restaurant, it is better to choose that seafood over others.
*Coding scheme: 0 = Not sure; 1 = Strongly Disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree	

Customers were asked to rank the top three factors that influenced his or her seafood purchase from a list of nine potential purchase motivators. Items were combined to create separate categories, which include *price*, *health*, *seafood attributes*, *seafood sustainability*, *familiarity* and *other* (Table 4). Not all respondents ranked the factors influencing his or her seafood purchase, so the six purchase motivators were, instead, treated as indicator variables based on whether or not they were selected.

Table 4. Composite Variable: Purchase Motivators

Composite Variable	Responses to Survey Questions*
Factors influencing in-store seafood purchase	<ul style="list-style-type: none"> ○ Price ○ Health (nutritional benefits; contamination) ○ Seafood attribute (taste/texture; freshness/smell) ○ Seafood sustainability (overfishing, bycatch, habitat destruction) ○ Familiarity (eaten before) ○ Other
*Coding scheme: 0 = Not selected; 1 = Selected	

Statistical Analyses Techniques

Bivariate correlation. In order to ensure that the purchase motivator, *seafood sustainability*, was not highly correlated with the independent variables, *seafood sustainability knowledge* or *FishWise label knowledge*, Pearson *r* correlation coefficient was used to determine if there were linear relationships between variables using the response scores. Bivariate correlations are used to measure associations between two variables, and the Pearson product-moment correlation coefficient (or Pearson *r*) is most commonly used (Tabachnick & Fidell, 2001). The absolute value of the coefficient signifies the strength of the relationship and the positive or negative sign of the coefficient indicates the directionality of the relationship (Norusis, 2005). When coefficients in the correlation matrix are high, it demonstrates that the two variables are multicollinear, or represent similar measures of the same information. A bivariate correlation above .900 is considered too high and Tabachnick & Fidell (2001) recommend that one of two variables be removed. Some researchers, however, use

correlation coefficients indicating that a value greater than .700 is high and that a value less than or equal to .500 is low (Zady, 2000).

Chi-square test of independence. The Chi-square test of independence enables the researcher to determine if two discrete variables are independent or if they are related by examining the observed and expected frequencies in a crosstabulation table. The Pearson Chi-square value (also known as the probability value or p value) determines the level of statistical significance (Norušis, 2005). Confidence intervals, or margins of error, of 95% or 90% are commonly used to determine the statistical significance of the p value. A p value of 0.05 or below, or 0.10 or below, indicates that the relationship between two variables is significant at the 95% or 90% confidence interval, respectively.

A Chi-square test was used to determine if there were statistically significant relationships between the sustainability rankings of seafood purchase and knowledge about the information on the FishWise labels, self-reported knowledge about seafood sustainability issues and purchase motivators that influenced in-store purchases. In addition, the Chi-square test was used to examine if any socio-economic factors had statistically significant relationships with the sustainability rankings of seafood purchase. A significance level of less than 0.10 was used as the threshold.

Multinomial logistic regression. The Chi-square test can determine whether a relationship exists between two related variables but does not provide further insights into their association. Additional statistical tests must be used to draw any conclusions about the nature of the relationship between the variables. Multinomial logistic regression can be used to examine the relationship between a dependent variable and a set of

independent variables when the dependent variable is nominal (e.g. categorical values that are not ordinal) and has more than two outcomes (Norušis, 2005). Therefore, multinomial logistic regression was used to determine how the sustainability rankings of seafood purchase correlate with sets of independent variables that include: 1) knowledge about the information on the FishWise labels and attitude toward purchasing sustainable seafood, 2) self-reported knowledge about seafood sustainability issues and attitude toward purchasing sustainable seafood, and 3) significant purchase motivators that influence individual seafood purchases.

In order to identify which sets of independent variables would be good predictors of the sustainability rankings of seafood purchases, backward-stepwise elimination was used to automatically build a statistically significant model. Backward stepwise elimination includes all possible independent variables in the model and continuously removes the least significant variable from the model at each step until only variables that are statistically significant contributors to the model remain. Similar to the Chi-Square analyses, a 90% confidence interval was used to determine the level of significance.

Results

Socioeconomic data. The descriptive analysis of the survey data shows that a majority of the 201 respondents in the sample were between the ages of 40-59 years (58.7%), well-educated (41.8% had a graduate degree or above), female (62.7%), and had a household annual income of at least \$100,000 (44.8%) (Table 5).

Table 5. Demographic Data for Sample and General Populations

SAMPLE POPULATION	GENDER		AGE	INCOME	EDUCATION
SOURCE	Male	Female	Median Range	Median Household Income Range	Bachelors Degree or Higher
Study Sample - Cotati	41%	59%	40-49	\$75k - 99,999	64%
Study Sample - Santa Rosa	33%	67%	50-59	\$100k - 149,999	73%

GENERAL POPULATION	GENDER		AGE	INCOME	EDUCATION
SOURCE	Male	Female	Median	Median Household Income	Bachelors Degree or Higher
Sonoma County California	50%	50%	38.5	\$60,821.00	30%
San Francisco Bay Area	50%	50%	38.2	\$70,463.00	42%

Taken from "2006 American Community Survey Estimates," US Census Bureau (2006a, b)

When comparing the data of Oliver's Markets' store patrons to its county and San Francisco Bay Area populations, Oliver's Markets' customers were older, wealthier and had higher degrees of education. Comparing socioeconomic data for each store, the customers at the Santa Rosa Oliver's Market were slightly older, wealthier and more educated than Cotati's customers.

No demographic data was found to have a statistically significant relationship with seafood purchase, with the exception of income levels at the Cotati store. A Chi-square test reveals that people who had income levels below \$100,000 or above \$150,000 tended to purchase unsustainable seafood. Seafood customers who made between \$100,000 and \$150,000 tended to purchase seafood with some concerns (Appendix C). Although the Chi-square relationship showed significance ($p=.006$), limited variation in income levels and the small number of respondents who made less than \$50,000 or more than \$150,000 caused three cells to have expected counts less than five which artificially

inflates the Chi-square statistic. This relationship would, therefore, need to be investigated further before final conclusions are drawn. A summary of demographic data for the sample population is provided in Appendix D.

Research question 1. What purchase motivators most influence seafood purchases of Oliver's Market's consumers? Seafood consumers from both markets overwhelmingly selected *seafood attributes*, such as taste and texture and freshness and smell, and *health* risks and benefits as reasons motivating individual seafood purchases. More than 70% of customers from both stores selected *seafood attribute* as a factor influencing their seafood purchase and 67% of customers chose their seafood because of *health* reasons (Figure 8).

Figure 8. Purchase Motivators Influencing Seafood Purchase by Store

Notable differences between stores arise when *price* and *seafood sustainability* motivators were chosen. Customers were more concerned about *price* at the Cotati market (45%) than at the Santa Rosa store (34%), however Santa Rosa customers (37%)

showed slightly more concern about *seafood sustainability* than Cotati customers (30%). The majority (59%) of Cotati customers who had household annual incomes of less than \$100,000 compared to 58% of Santa Rosa customers who had incomes of \$100,000 or more explain the increased concern about *price* at the Cotati store. Approximately one-fourth of seafood consumers from both stores purchased seafood because they were familiar with it and had eaten it before. Thirteen percent of Santa Rosa customers and five percent of Cotati customers indicated other reasons motivating seafood purchases, such as “needed it for a recipe”, “wife’s request”, and “too hot to cook.”

When comparing purchase motivators by sustainability ranking for customers at both stores, data show that 73% of customers at both the Cotati and Santa Rosa stores cited *seafood attribute* and *health* reasons as motivators influencing individual seafood purchases no matter what sustainability ranking (Figures 9a, b). As noted earlier, interesting comparisons arise when looking at *price* as a purchase factor. A greater percentage of Cotati customers who purchased unsustainable (58%) and sustainable seafood (50%) were more concerned about *price* than Santa Rosa customers (46% and 24%, respectively). The percentages of customers who purchased seafood with some concerns and cited *price* as important were similar at both stores.

Figure 9a. Purchase Motivators by Sustainability Ranking for Cotati

Figure 9b. Purchase Motivators by Sustainability Ranking for Santa Rosa

Contrary to a common assumption that sustainable seafood is more expensive than unsustainable seafood, on average, unsustainable seafood was the most expensive seafood available to customers and unsustainable seafood prices were found to be significantly different (at a 95% confidence interval) than prices for seafood with some concerns and sustainable seafood (Table 6).

Table 6. Average Prices of Available Seafood by Sustainability Ranking

	Store					
	Cotati			Santa Rosa		
	Label Color			Label Color		
	Red	Yellow	Green	Red	Yellow	Green
Price	12.06	9.46	8.55	13.23	9.42	9.78

Comparisons of Column Means^a

	Store					
	Cotati			Santa Rosa		
	Label Color			Label Color		
	Red	Yellow	Green	Red	Yellow	Green
	(A)	(B)	(C)	(A)	(B)	(C)
Price	B C			B C		

a. Results are based on two-sided tests assuming equal variances with significance level 0.05. For each significant pair, the key of the smaller category appears under the category with larger mean.

The Comparison of Column Means table illustrates which pairs of means are significantly different by placing the key (or letter) of the smaller mean in the column of the larger mean. High prices for unsustainable seafood were driven by seafood items such as wild and fresh Ahi tuna, crab meat, Chilean seabass, and lobster tails (all priced on average \$18.99 per pound or more). When examining prices for actual seafood purchased by Oliver's Market customers, seafood with some concerns were the most expensive at both stores. Higher prices for seafood with some concerns were mainly associated with purchases of wild King salmon and wild Alaskan halibut, both of which were \$17.99 per pound when not on sale. Statistical differences were only found at the Cotati store where the average price for seafood with some concerns (\$13.40) was found to be significantly higher than those of unsustainable (\$10.39) and sustainable seafood (\$9.82). Similar

results were found when isolating purchases of those who indicated that *price* was a factor influencing his or her seafood purchase, as seafood with some concerns were the most expensive seafood purchased. Interestingly at the Cotati store, the average price of seafood with some concerns (\$12.57) was only significantly higher when compared to the average price of sustainable seafood (\$8.35), which explains why 50% of those who bought sustainable seafood at the Cotati store indicated that *price* was important to them.

Seafood sustainability concerns resonated more with customers who purchased sustainable seafood at the Cotati and Santa Rosa markets (39% and 38%, respectively) and seafood with some concerns (38% and 46%, respectively) than unsustainable seafood (18% and 27%, respectively). A factor worth mentioning with respect to Cotati customers is *familiarity* (whether they have eaten it before). This purchase motivator is more important to those who purchased sustainable seafood (31%) compared to customers who bought seafood with some concerns (26%) and unsustainable seafood (19%).

All six categories of purchase motivators were included in the regression model to determine which purchase motivators were significantly correlated with sustainable seafood purchases. The backward elimination results show that the purchase motivators *seafood sustainability* and *familiarity* are the variables best able to predict sustainable seafood purchases at the Cotati store ($p=.004$) (Table 7). It is 4.63 times less likely that unsustainable seafood (red label) would be purchased in comparison to sustainable seafood (green label) if *seafood sustainability* were selected as a reason for an individual's seafood purchase.

Table 7. Cotati Parameter Estimates for Purchase Motivators that Influence Seafood Purchase(a)

			Sig. (p value)		β	Exp(β)
Cotati Model fit = .004	Red	Intercept	0.018		1.243	
		Seafood Sustainability	0.014	**	-1.533	0.216
		Price	0.923		-0.052	0.950
		Familiarity	0.013	**	-1.529	0.217
	Yellow	Intercept	0.034		1.140	
		Seafood Sustainability	0.320		-0.606	0.546
		Price	0.030	**	-1.261	0.283
		Familiarity	0.126		-0.965	0.381

(a) The reference category is: Green.

* $p < 0.10$; ** $p < 0.05$; Exp(B) = odds ratio

N=100

The data also reveal that it is 4.61 times less likely that unsustainable seafood would be purchased in comparison to sustainable seafood if *familiarity* were selected as an influential purchasing factor. Lastly, *price* can predict purchases of seafood with some concerns (yellow label), as it is 3.52 times less likely that seafood with some concerns would be purchased when compared to purchases of sustainable seafood. No purchase factors had statistically significant relationships with sustainability rankings of seafood purchase at the Santa Rosa store.

The model for the Cotati store shows a statistically significant model fit ($p = .004$) at a 90% confidence interval. The Nagelkerke R-Square value is .194 indicating that the purchase motivators, *seafood sustainability*, *price* and *familiarity*, can explain 19% of the variation in the sustainability rankings of seafood purchases. The overall classification was unimpressive with just 54% of seafood purchases at the Cotati store that were

accurately predicted. The model is much better at predicting purchases of unsustainable seafood with 47% of unsustainable purchases correctly classified compared to just 20% of sustainable seafood purchases that were accurately predicted.

Research question 2. To what extent do beliefs and attitudes influence sustainable seafood purchases? There was no variability in Oliver's seafood customers regarding both beliefs about the impacts of individual seafood purchases and having a favorable attitude toward purchasing sustainable seafood. Greater than 90% of Oliver's customers overall had favorable beliefs and attitudes (Table 8).

Table 8. Frequencies for Belief and Attitude Survey Responses

	Cotati %	Santa Rosa %	Overall %
Belief in Impacts of Individual Purchases			
Strongly disagree/Disagree	4%	1%	2%
Neutral/Not sure	8%	7%	8%
Agree/Strongly Agree	88%	92%	90%
Favorable Attitude toward Purchasing Sustainable Seafood			
Strongly disagree/Disagree	2%	1%	1%
Neutral/Not sure	7%	6%	7%
Agree/Strongly Agree	91%	93%	92%

N=201 (Cotati, n=100; Santa Rosa, n=101)

The Cronbach's reliability test showed that the five belief items and three attitude items in the survey were measuring the same concept, therefore the variables were combined and the analysis was rerun. Analysis of the combined variable found that it was still not significant at either store indicating that favorable beliefs and attitudes cannot be used to predict sustainable seafood purchases.

Research question 3. To what extent does consumer knowledge influence sustainable seafood purchases? Overall, customers from both stores were more cognizant

of whether the seafood purchased was farmed or wild (approximately 60%), however just 6% knew the correct catch method and 12% knew the correct label color (Table 9).

Table 9. Frequencies for FishWise Label Knowledge Survey Responses

Label Knowledge	Cotati %	Santa Rosa %	Overall %
Do you know if seafood bought today had a green, yellow or red label?			
0 = Not answered correctly	86%	90%	88%
1 = Answered correctly	14%	10%	12%
Do you know what fishing method was used to catch seafood you purchased today?			
0 = Not answered correctly	94%	95%	94%
1 = Answered correctly	6%	5%	6%
Do you know if seafood bought today was raised in a fish farm or caught in oceans/river?			
0 = Not answered correctly	39%	36%	37%
1 = Answered correctly	61%	64%	63%

Cronbach's Alpha was, therefore, extremely low for label knowledge (0.335). Despite the low alpha, knowledge of information unique to the FishWise labels (catch methods and label colors) were used for the composite variable in order to capture the limited number of people who were knowledgeable about the catch methods and label colors of their individual purchases. Although information on whether the seafood was farmed or wild is not unique to the FishWise label and not a measurement of seafood sustainability, farm-raised fish is often perceived as sustainable and thought to alleviate overfishing of wild-caught species (Reichert, 2005). Therefore, it was also included in the label knowledge variable as consumer perceptions of products may be influential even though the information is not fact-based (Martin & Siminitiras, 1995).

Analyzing data from seafood customers from both markets, the mean score ($\alpha = 0.81$) from the three questions were calculated using data combined from both the Cotati

and Santa Rosa stores and used to determine the high and low groups. As a result, the group with low levels of FishWise label knowledge is comprised entirely of people who did not answer any of the three items correctly. A majority of customers (approximately 60%) at both the Cotati and Santa Rosa markets had higher levels of knowledge about the information listed on the FishWise label of their individual seafood purchases compared to the average based on the two stores combined. Customers from the Santa Rosa store had a slightly higher than average level of knowledge about the information on the FishWise label (64%) than those at the Cotati store (59%) (Table 10).

Table 10. Frequencies for High-Low Groups of FishWise Label Knowledge

Oliver's Market			Count	Percent	Valid Percent	Cumulative Percent
Cotati	Valid	Low Level of Label Knowledge	33	33.0	35.9	35.9
		High Level of Label Knowledge	59	59.0	64.1	100.0
		Total	92	92.0	100.0	
	Missing	System	8	8.0		
	Total		100	100.0		
Santa Rosa	Valid	Low Level of Label Knowledge	30	29.7	31.6	31.6
		High Level of Label Knowledge	65	64.4	68.4	100.0
		Total	95	94.1	100.0	
	Missing	System	6	5.9		
	Total		101	100.0		

When examining the relationship between the level of knowledge about the information on the FishWise labels and the sustainability ranking of seafood purchases, data show that people who are uninformed about the information on the labels are more likely to purchase unsustainable seafood, however people who are knowledgeable are not necessarily more likely to purchase sustainable seafood. The Chi-square analysis of customers at the Cotati market shows a statistically significant relationship ($p=.016$)

between the sustainability ranking of seafood purchase and the level of knowledge a customer has about the information on the FishWise label of his or her seafood purchase. The analysis of observed versus expected counts indicates that more people than expected (61%) who had a lower than average level of knowledge of the FishWise label bought unsustainable seafood. Label knowledge was not particularly significant for customers who purchased seafood with some concerns or sustainable seafood. The relationship between FishWise label knowledge and the sustainability ranking of seafood purchases made at the Santa Rosa store were insignificant ($p=.587$). Appendix E shows the SPSS output for the Chi-square test.

Using a regression model comprised of FishWise label knowledge and attitudes toward sustainable seafood purchase, analysis shows a statistically significant relationship at the 90% confidence interval ($p=.016$) (Table 11). Customers at the Cotati market who have a higher than average level of label knowledge are less likely to purchase unsustainable seafood (red label) than seafood with some concerns (yellow label) or sustainable seafood (green label). Specifically, customers who have a higher than average level of label knowledge are 2.86 times less likely to buy unsustainable seafood than sustainable seafood. Similarly customers who have a higher than average level of label knowledge are 4.26 times less likely to purchase unsustainable seafood than seafood with some concerns. As with the Chi-square analysis, none of the independent variables in the regression model were significant at the Santa Rosa store.

Table 11. Cotati Parameter Estimates for Label Knowledge, Attitude, and Seafood Purchase(a)

			Sig. (p value)	β	Exp(β)
<u>Cotati</u>	Red	Intercept	0.025	2.100	
		Label Knowledge	0.057*	-1.050	0.350
Model fit = .016					
	Yellow	Intercept	0.632	-0.553	
		Label Knowledge	0.532	0.399	1.491

(a) The reference category is: Green.

* $p < 0.10$; ** $p < 0.05$; Exp(B) = odds ratio

N=100

The backward elimination method used in the regression analysis for customers at the Cotati store presented a good fit model (discrimination among groups) when just the label knowledge remained ($p = .016$). Nagelkerke's psuedo R-square value was .097 indicating that the model could explain roughly ten percent of the variation, and the overall classification was unimpressive with just 41% of all purchases being accurately predicted. With three outcomes this means that the model only does an eight percent better job of correctly predicting purchase outcome than random chance. The model does not help determine predictors of sustainable purchases as 0% were accurately predicted. This indicates that other factors, not captured in this model, are driving sustainable seafood purchases at Oliver's Market in Cotati.

Responses from four questions on the survey were used to measure the level of knowledge a customer reported to have about seafood sustainability issues. Similar to the knowledge variable indicating level of knowledge about the FishWise label, data of seafood customers from both markets were combined and average scores were used to determine the high and low groups ($\alpha = 10.69$). Customers at the Cotati market (52%)

were reportedly more knowledgeable about seafood sustainability issues compared to customers at the Santa Rosa store (44%) (Table 12).

Table 12. Frequencies for Knowledge of Seafood Sustainability Issues

Oliver's Market			Count	Percent	Valid Percent	Cumulative Percent
Cotati	Valid	Low Level of Sustainable Seafood Knowledge	48	48.0	48.0	48.0
		High Level of Sustainable Seafood Knowledge	52	52.0	52.0	100.0
		Total	100	100.0	100.0	
Santa Rosa	Valid	Low Level of Sustainable Seafood Knowledge	57	56.4	56.4	56.4
		High Level of Sustainable Seafood Knowledge	44	43.6	43.6	100.0
		Total	101	100.0	100.0	

Due to the lack of variation between high and low groups, self-reported knowledge about seafood sustainability did not have a significant relationship with seafood purchase at either store.

Research Question 4

How effective is the education component of the FishWise program? To address the effectiveness of the educational component of the FishWise program, observations and interviews were conducted with Oliver's Market management and seafood counter staff and analyzed. Results follow the Data Collection and Analysis section.

Data Collection and Analysis

Observations at in-store trainings. FishWise program staff conducted two separate in-store trainings in December 2005 for the Santa Rosa and Cotati Oliver's Markets before the labels were implemented and the program was launched. As part of an exploratory process, observations of the FishWise training were conducted to

determine what information is communicated to store management and staff. The trainings included a 15-minute PowerPoint presentation, which began by describing the goals and objectives of the FishWise program. It also explained counter staff's role in the program which is to (1) "Become an expert on sustainable seafood", (2) "Be empowered to interpret sustainability information from your purveyor", (3) "Be a customer resource for sustainable seafood", and (4) "Act as the representative of FishWise to your customer" (SFA, 2005). The presentation also gave an overview of seafood sustainability issues by defining the FishWise criteria for sustainability, which takes into account (1) whether fish populations can sustain the current level of fishing or if they are overfished, (2) whether catch methods are injuring or killing other marine animals unintentionally or damaging the surrounding ocean environment, and (3) the negative effects of uncontained aquaculture. Lastly, the presentation provided detail on the FishWise program materials such as the labels, signage, brochures and flowchart, which is used by store staff to determine the sustainability ranking (or color code) for each fish. Other materials provided by FishWise to the seafood departments include a 100-page binder filled with additional information on each fish species, fishing seasons, seafood alternatives, glossary of terms, etc, and a flip card to be used as a quick reference when customers have questions about sustainable seafood, catch methods and substitutions for unsustainable seafood. Analysis was unnecessary, as data collected from these observations were purely informational and used to describe the design of the FishWise program.

Observations at the seafood counter. To gather data on seafood sustainability knowledge passed from counter staff to seafood customers, non-intrusive visual observations were conducted near the seafood counter. In particular, data were gathered on customer questions about the labels or seafood sustainability, how accurately these questions were answered, and whether counter staff were providing information on the FishWise labels or seafood sustainability without prompting from customers. To minimize the risk of influencing the behavior of seafood counter staff, counter staff were told that data were being collected on consumer response to the FishWise program. A total of over 65 hours of observations were completed at both stores during July and August 2006.

Patterns in behavior and communication were examined to help identify the transfer of sustainable seafood knowledge from seafood counter staff to seafood customers and similar concepts were coded with the same name (Priest et al., 2002). As patterns and themes developed, similarities were examined in the context with which these perspectives occurred. Comparisons were made between individuals and their responses to generate any meanings behind them (Babbie, 1995; Esterberg, 2002; James et al., 2006; Priest et al., 2002).

Interviews with FishWise staff. Interviews were conducted with Sustainable Fishery Advocates' co-founder and FishWise's program manager to obtain background information on the FishWise program. Ideas for the open-ended interview questions were obtained from Evaluation A Systematic Approach (Rossi, Lipsey & Freeman, 2004) and the questions were tailored to fit the FishWise program. The two interviews focused

on different aspects of the program therefore both were asked a different set of open-ended questions. The interview with SFA's co-founder provided a big-picture view of the FishWise program, and data were gathered on the program's short- and long-term goals, as well as its main components and activities (Appendix F). The interview with the FishWise program manager focused on how the program worked at the store level (Appendix G). In particular, the relationships among FishWise and Oliver's Market were examined. Interviews with FishWise program staff were administered over the telephone. The consent form was read to each interviewee and both granted verbal approval to be interviewed. No analysis was used for the data obtained from the telephone interviews with FishWise staff. The data from these interviews were purely informational and used to describe the design of the FishWise program.

Interviews with Oliver's Market management and counter staff. A total of 19 interviews were conducted with Oliver's Market's store management and staff to obtain information about the FishWise program from the store level. Cotati's General Manager, Seafood Department Manager, and six counter staff were interviewed in August and September 2006. Santa Rosa's Store Manager, Seafood Department Manager, and nine counter staff were also interviewed during this time frame. All interviews took place in-store and were comprised of a series of open-ended questions. Slightly different interview guides were used depending upon staff level (Appendices H, I and J). The interview with Oliver's Market General Manager differed in that it aimed to obtain information on why he decided Oliver's Market should participate in the FishWise program. From a store manager's perspective, management interviews provided data on

the responsibilities delegated to their employees with respect to the FishWise program. Data were also gathered to assess management's impressions of how they thought their staff felt about the FishWise program. Although different interview guides were used for management and its staff, questions about his or her perceptions of the FishWise program were the same which allowed me to determine if management and staff had similar views about the FishWise program.

Interview data were analyzed using the Long-Table Approach, which encourages researchers to identify any patterns or themes in the comments, decide how to weight them (e.g. frequency of similar comments), and summarize them. They must decide whether analysis should focus on themes that cut across interview questions or on the interview questions themselves. Researchers can then arrange them accordingly into categories that will help answer their overarching research question(s) (Babbie, 1995). For this study, four interview questions were analyzed to determine whether perceptions of and experiences with the FishWise program are similar across the hierarchy of Oliver's Market staff (Table 13).

Table 13. Interview Questions Used in Analysis.

INTERVIEW QUESTIONS
What do you think are the main goals and objectives of the FishWise program?
Do you think that educating customers about seafood sustainability and the seafood labels can influence them to buy or not buy certain types of seafood? Why or why not?
How active have you been in promoting the program to store staff and to customers? What are your reasons for promoting or not promoting the program?
What are the strengths of the program? Weaknesses?

Answers to interview questions were printed on blue-, pink- and green- colored paper to represent the different employment levels of Oliver's Market staff (Babbie,

1995). This allowed for easy identification of the hierarchical nature of the store staff and helped determine if the perceptions of higher-level employees transferred to seafood counter staff. The comments were then cut and pasted onto flip-chart paper organized by interview question. Frequencies, or the number of times a comment was said, were used as a way to weight the comments. Key insights were also emphasized if they were particularly compelling regardless of the number of times the comment was said.

FishWise quiz. During interviews with seafood counter staff, a FishWise quiz was administered to determine the level of knowledge about seafood sustainability & the FishWise program. The quiz, created by the Sustainable Fishery Advocates, included a total of 20 multiple-choice and true-false questions (Appendix K). The quiz took approximately five to ten minutes to complete. The range for the scores was zero (none answered correctly) to 20 (all answered correctly) and were analyzed by calculating the number of correct answers to get a sense of the seafood counter staff's level of FishWise knowledge.

Results

Staff promotion of FishWise program. Evidence from over 65 hours of observations showed that no seafood counter staff at either store promoted the program or educated customers about seafood sustainability indicating that the FishWise program was not effective in educating Oliver's Market's seafood consumers about seafood sustainability. When asked if staff was actively promoting the program, most claimed they were not very active in promoting the program (60% at Santa Rosa, 50% at Cotati) and that they usually provide information only if the customers ask questions (Table 14).

Table 14. Summary of Staff Responses to FishWise Program Promotion Question

% = percentage of staff responses		Cotati %	Santa Rosa %
<i>"How active have you been in promoting the program to store staff and to customers?"</i>	1. Very active	17	10
	2. At times	33	20
	3. Not really	50	60
	4. No	0	10
	Valid	100	100
	Missing	1	0
Total			

A couple of seafood counter staff responded that, at times, they will show customers the FishWise poster, and just a couple of counter staff (one at each store) said they were "very active." However, based on data from observations at the seafood counter, no seafood counter staff ever mentioned the FishWise program or made references to seafood sustainability.

The general consensus among counter staff, as well as the General Manager and Santa Rosa store manager, is that program promotion occurred more when the program was first implemented. The most common reason for lack of program promotion, stated by eight out of 19 interviewees, is that counter staff are busy, thus they do not have time to promote the program. Forty-five percent of staff members at the Santa Rosa store, and 38% at the Cotati store made this claim. Others feel that customers are either busy or uninterested in hearing about the FishWise program. Another reason given was lack of knowledge about the FishWise program or the issues. "I don't know enough about FishWise and don't want to give customers false information" (Jessica, personal communication, September 21, 2006). "I don't know enough to answer questions" (Matt, personal communication, September 21, 2006). This is despite the fact that these two

counter staff scored the highest of all staff who took the FishWise quiz. Overall, seafood counter staff from both stores scored well on the quiz with a mean of 80%, which indicates that seafood counter staff at both stores are knowledgeable enough to educate seafood consumers about the FishWise program and talk about the issues of seafood sustainability.

Reasons were also given as to why some staff members do promote the program. At the Cotati store, one employee said, “I have a personal interest in it...and educate myself” (Pete, personal communication, September 12, 2006). Another said, “Sometimes I feel like giving excellent customer service” (Brent, personal communication, September 12, 2006).

FishWise goals and objectives. The long-term goal of the FishWise program is to reduce sales of unsustainable seafood (Teresa Ish, personal communication, August 11, 2006.). When seafood counter staff were asked what they thought were the goals and objectives to the FishWise program, a majority (76%) thought the objective was to educate customers about seafood sustainability. Fifty-three percent also responded that FishWise hoped to influence purchases of sustainable seafood, and 41% specified that the goal was to give customers the “choice” to buy sustainable seafood. Other comments from seafood counter staff include shifting market demand for sustainable seafood and changing fishing industry practices, as well as big picture goals such as preserving the environment or helping the ecosystem and fight extinction. Comparing responses by store, comments were similar with the exception that more staff at the Cotati store, 43% of interviewees thought the goal was to give customers a choice in their seafood

purchase, while just 30% made this claim at the Santa Rosa store. Confusion about the goal of the program was evident when one staff member from the Santa Rosa store said that the goal of the program was to “help people understand about mercury and seafood” (Tammy, personal communication, September 7, 2006).

Seafood education effectiveness. When asked whether counter staff thought that education and awareness about seafood sustainability could influence seafood purchase, both the general manager and the store manager for Santa Rosa store believed it could influence seafood purchases but thought that it would not be effective with all customers (Tom, personal communication, August 17, 2006; Eric, personal communication, September 12, 2006). Those sentiments resonated with counter staff as well. Fifty percent of counter staff at Santa Rosa and 43% at Cotati felt the same as their superiors (Table 15).

Table 15. Summary of Staff Responses from Seafood Education Effectiveness Question

% = percentage of staff responses		Cotati %	Santa Rosa %
<i>“Do you think that educating customers about seafood sustainability can influence them to buy or not buy certain types of seafood?”</i>	1. Yes	57	40
	2. Yes, for those already concerned/aware of FishWise	43	50
	3. No	0	10
	Valid	100	100
	Missing	0	0

There was general consensus that the education could be effective for those customers who already care about the issues. For those that do not already care about the issue, the

Santa Rosa department manager said, “It may sway those that don’t care by how many times they purchase a red [fish]. They may not eat it as much but they’ll still buy it” (Randy, personal communication, August 26, 2006). A counter staff member at Cotati thought it seemed reasonable that concern for the environment or animal rights could spill over to concern about seafood sustainability, stating that “For people who care about humane and environmental issues, those cares still apply to seafood” (Derek, personal communication, September 21, 2006). Two counter staff from the Santa Rosa store mentioned that toxic contaminants such as mercury are a concern of customers. “People watch for mercury and are influenced by that” (Casey, personal communication, September 7, 2006). Another is under the assumption that the red labels mean that the seafood has mercury. She stated that education “helps them a lot in making decisions. Many with kids do not get red [labeled] fish” (Tammy, personal communication, September 7, 2006).

Program strengths and weaknesses. When asked what are the strengths and weaknesses of the program, most of the staff (60%) and both the General Manager and Santa Rosa Store Manager agree that the strength of the program is the education it provides to seafood customers (Tom, personal communication, August 17, 2006; Eric, personal communication, September 12, 2006). Fifty percent of counter staff at Santa Rosa and 29% at Cotati feel that the FishWise labels, posters and brochures are the program’s strength and they note that the FishWise materials are “well thought out” and “easy to understand.” A Santa Rosa staff member lauded the education component of the program saying that the education is based on fact and is neutral in its opinion (Beau,

personal communication, September 7, 2006). A Cotati staff member complimented that the FishWise program keeps improving. “It’s always getting better. They send updates all the time that addresses questions that keep coming up” (Vince, personal communication, September 12, 2006).

Counter staff at both stores noted significant program weaknesses. The main complaint from employees from both stores is that there is not enough customer exposure to, and not enough consumer awareness about, the FishWise program (30% at Santa Rosa, 57% at Cotati). A complaint coming from department heads is that there is not enough involvement from FishWise. For example, the department manager at Santa Rosa stated that a FishWise representative had only visited the store once to perform an audit (Mitch, personal communication, August 26, 2006). Another complaint coming from the general manager, Cotati’s seafood department manager, as well as another Cotati employee is that they need more suppliers who offer sustainable options (Tom, personal communication, August 17, 2006; Steve, personal communication, August 17, 2006; Pete, personal communication, September 12, 2006). They expressed disappointment as they were under the impression that FishWise would connect them with suppliers that offered sustainable seafood.

The consensus is clear regarding solutions to some of the problems presented by Oliver’s seafood department employees. They would like to see more in-store visits from FishWise staff to perform audits, as well as directly promote the program to customers, and they would also like FishWise to interact with the staff more often and offer more trainings. In addition, Oliver’s management sees a need for FishWise to provide them

with more suppliers of sustainable seafood. This is particularly important once consumers become more informed about seafood sustainability and their preferences shift toward more sustainable options.

Discussion and Conclusion

The original theoretical framework included five independent variables: knowledge about seafood sustainability, knowledge of the FishWise labels, belief in the impacts of individual seafood purchases, attitude toward sustainable seafood purchases, purchase motivators, and their relationships to the dependent variable: sustainable seafood purchase. This study found that greater than 90% of Oliver's customers overall had favorable beliefs and attitudes no matter what type of seafood was purchased indicating that beliefs and attitudes cannot be used to predict sustainable seafood purchases among Oliver's Market's seafood consumers. This is contrary to some studies results that found that the more consumers believe their actions can alleviate environmental problems, the more likely they are to participate in behaving in ecologically conscious behavior (Bang et al., 2000; Manieri et al. 1997; Roberts, 1996).

Self-perceived knowledge about seafood sustainability also cannot be used to predict sustainable seafood purchases. Although there were more sustainable seafood purchases among those who had a high level of knowledge about the information on the FishWise label than those who had low levels of label knowledge, the study found that those in the low knowledge group were greatly skewed toward unsustainable purchases while those in the high knowledge group were pretty evenly distributed (Figure 10).

Figure 10. FishWise Label Knowledge by Seafood Purchase at Cotati

This indicates that low levels of label knowledge can be used to predict unsustainable purchases, but high levels of label knowledge cannot be used to predict sustainable purchases. The effects of knowledge on purchases of sustainable seafood refutes findings in the Bang et al. study (2000), which found that higher levels of knowledge about renewable energy were significantly related to consumers' willingness to pay more for renewable energy.

Seafood purchases at Oliver's Markets are overwhelming driven by *seafood attributes* such as taste, texture, freshness and smell and perceived *health* benefits no matter what type of seafood was purchased. This corroborates results of past research which indicate that competing factors unrelated to sustainability, such as price, taste, quality and convenience are more important to consumers than environmental concerns (Clarke et al., 2000; Roberts, 1996; Wessells et. al., 1999). With respect to predictors of sustainable seafood purchases, the purchase motivators, *seafood sustainability* and

familiarity are the only factors found to be significant predictors of sustainable seafood purchases (Figure 11).

Figure 11. Factors Influencing Seafood Consumer Behavior at Cotati

The finding that Oliver's Market's seafood consumers who were concerned about *seafood sustainability* were more likely to purchase sustainable seafood corroborates results from Wessells et.al. (1999). Their study showed that consumers who believed there were sustainability issues with Atlantic cod indicated they were more likely to buy cod that was eco-certified. The finding that seafood consumers at Oliver's Markets were more likely to purchase sustainable seafood than unsustainable seafood because they have eaten it before is unique to this study. Since this study did not examine the reasons why sustainable seafood consumers tend to make purchasing decisions based on familiarity, an interesting opportunity for future research is provided that could prove useful in examining other approaches to marketing sustainable seafood, such as providing

customers with sustainable seafood recipes that encourage seafood consumers to try new and more sustainable varieties.

Raising Awareness of the FishWise Program

The FishWise program differs from other seafood sustainability programs, such as Monterey Bay Aquarium's Seafood Watch and Environmental Defense Fund's Seafood Selector, because it aims to educate seafood consumers and influence seafood purchases at the point of sale. However, it is evident from the data that consumer awareness of the FishWise program at Oliver's Markets was limited. Survey data confirmed that consumer knowledge about the catch method and label color associated with his or her individual seafood purchase was low, showing that just six percent of consumers knew the correct catch method and 12% knew the correct label color of the seafood purchased. One major reason for these results is the lack of program promotion by seafood counter staff. Fifty percent of Cotati seafood counter staff and 60% of Santa Rosa counter staff answered "not really" when asked if they promote the FishWise program, and evidence from over 65 hours of observations showed that no staff at either store promoted the program or educated customers about seafood sustainability. Interviews with counter staff revealed that the main reason for not promoting the program is that counter staff are busy and do not have time to promote the program. Another reason mentioned for not promoting the program is that customers often already know what they want and many are in hurry. Survey data confirms this showing that 60% of seafood customers at the Cotati store and 58% at the Santa Rosa store came to the counter already knowing what seafood they wanted to purchase and over 90% of these (93% in Cotati; 97% in Santa

Rosa) did purchase the seafood they had in mind. It is, therefore, unlikely that seafood counter staff would start a discussion about the FishWise program or seafood sustainability with consumers who already know what they want.

In addition to the lack of program promotion by counter staff, FishWise materials such as the labels, poster and brochures were likely unnoticeable to most customers. Results from surveys, such as the Seafood Watch Evaluation, show that 91% of respondents would find signs and seafood labels as extremely or very helpful when making seafood purchases (MBA, 2004). Data gathered from Oliver's Market illustrate that seafood labels are not helpful to seafood consumers if sustainability information is not noticeable to them. It is imperative that information, such as catch method and sustainability ranking (or color) are made obvious to seafood consumers so that they may make informed decisions about their purchases. This is particularly important when seafood consumers must rely solely on the information provided on the labels, as was the case at Oliver's Market where seafood counter staff failed to educate consumers about the FishWise program or seafood sustainability. At Oliver's Market, informative labels could have prompted seafood consumers to inquire about the catch method picture or the label color, thus starting a dialogue between counter staff and customer about seafood sustainability.

The FishWise program allows participating stores some flexibility regarding the placement of FishWise materials. It also gives stores the option to design its own labels as long as the labels contain the common seafood name, origin, sustainability ranking (or label color), and catch method. The labels designed by Oliver's Markets, while

attractive, do not make the sustainability ranking or catch methods very noticeable as both are placed away from the most important information sought by consumers: the seafood name and price. In addition, the text indicating “Managers Special” inside the yellow border of the King Salmon label overshadows the actual label color (Figure 12).

Photo by Author

Figure 12. Labels for Unsustainable Seafood and Seafood with Some Concerns (left to right)

As mentioned in the results section, the most correctly answered item in the label knowledge composite variable was the question asking if the customer knew whether the seafood he or she purchased was raised in a fish farm or wild caught (approximately 60%), and any significance associated with the label knowledge variable resided with this issue. Figure 13 shows a picture of three seafood labels at the Cotati market that clearly display the words “Wild” or “Farmed” before the seafood name, providing further evidence that placing the label color and catch method picture away from the area that people look at most makes that information less noticeable.

Photo by Author

Figure 13. Example of Seafood Labels Indicating “Wild” or “Farmed”

The FishWise program, therefore, needs to create more stringent guidelines for their labels to ensure that pertinent sustainability information is noticeable to customers.

The FishWise brochures could be a helpful tool in raising awareness of the program, especially for the 40% of seafood consumers who did not know what they wanted and to those who may spend time lingering at the seafood counter. There were problems, however, with the display of the FishWise brochures and each store had a different set of issues. At the Santa Rosa store, the seafood counter simply did not have the counter space to display the brochures. The Cotati store did have shelf space adjacent to the seafood counter and had FishWise brochures on display, however they were competing for counter space with other pamphlets and were actually hidden behind the other brochures.

The FishWise poster could also be an excellent complement to the labels as it provides information on the sustainability rankings and explains what the colors and pictures of the catch methods represent. At both stores, the FishWise poster was placed on the wall behind the seafood counter, yet observations revealed that customers typically walk up to the seafood counter looking at the displayed seafood and not at the wall behind the counter where the poster is placed. As noted earlier, 60% of Oliver's seafood consumers already know what they want and do not usually spend a lot of time at the counter, thus making it likely that 60% of seafood customers are not noticing the poster. Ultimately, the FishWise materials (brochure, labels and posters) must be more noticeable to customers.

One way to raise more awareness of the program is for a FishWise representative to make periodic store appearances. Teisl et al. (2002) explain that impacts from a labeling program may not be immediately apparent, as it may take several in-store exposures for most customers to become aware of the labels. Since the seafood counter staff at Oliver's Market are not raising awareness of the FishWise program, regular store appearances would help address the issue of store staff being too busy to educate customers as well as addressing those customers who already know what they want when they approach the seafood counter. An in-store promotion by FishWise could also resolve any conflicts seafood counter staff may have about discouraging the purchase of less sustainable seafood. The visits should be complete with a FishWise banner and a table with brochures, sustainable seafood recipes, and other take-home materials with seafood sustainability education. It is important to also include the stores' green, yellow

and red FishWise labels to show customers exactly what to look for at the seafood counter.

Using Salient Issues to Influence Seafood Purchases

Low Salience for Environmental Issues

A problem associated with environmental issues is that they are not salient for most Americans. When Americans are asked in Gallup polls open-ended questions about the top five issues facing the nation, "...environmental concerns seldom break the top five issues mentioned..." (Carlson, 1995). Issue salience can be defined as the degree of interest a person has to an issue and an issue can be considered salient when it is "on the mind" of that person and not just given thought when asked about it (Lester, 1995). Gallup's "Pulse of Democracy: The Environment" states that the degree of concern Americans have for the environment depends on the importance of other issues affecting Americans, such as the economy or war, and currently just two percent of Americans named the environment as one of the top two problems they would like the government to address (Gallup, Inc. 2008a).

A large majority of Oliver's Markets' seafood consumers had positive beliefs and attitudes toward sustainable seafood. Unfortunately, the percentage of those who chose *seafood sustainability* concerns, such as fishing impacts on fish populations or the ocean environment, as a purchase motivator was never more than third most popular. The two most popular responses were *seafood attribute* and *health* concerns regardless of the sustainability ranking of the seafood purchased corroborating results from other studies that indicate that pro-environmental behavior is not always consistent with environmental

concern because other competing factors are more influential (MBA, 2004; Roberts, 1996; SCA, 2003; Wessells et al., 1999). An evaluation of Monterey Bay Aquarium's Seafood Watch program (2004) found that although people reportedly used the Pocket Guide when they purchased seafood, they still continued to buy unsustainable seafood. The results of this study indicate that although Oliver's Markets' seafood consumers indicate a propensity toward purchases of sustainable seafood, other factors such as seafood attribute, health, and price prove more important drivers of seafood purchase.

High Salience for Health Benefits and Risks

Salmon are known to have high amounts of omega-3 polyunsaturated fatty acids and antioxidants, which are thought to help decrease or prevent cardiovascular disease (Wu & Bechtel, 2008). Therefore, eating salmon or salmon by-products is widely thought to provide great health benefits. Data from Oliver's Market show that 30% of the 201 seafood purchases documented were of King, Sockeye and Atlantic salmon (23% of which were King salmon purchases). Of the 67% of seafood consumers who chose health as a factor influencing his or her seafood purchase, 36% purchased salmon (42% at Cotati and 29% at Santa Rosa).

Since health issues are much more salient to seafood consumers than seafood sustainability, the two issues should be linked to both promote the purchase of sustainable seafood and discourage the purchase of unsustainable seafood by including health benefits and risks on the labels. The Environmental Defense Fund provides a great example of this on its Pocket Seafood Selector (Figure 14). The pocket guide has a green dot next to any sustainable seafood that is high in omega-3 fatty acids and low in toxic

contaminants. Similarly, there is a red dot next to any seafood with some concerns as well as unsustainable seafood, which indicates that it is high in mercury or PCBs.

POCKET
**SEAFOOD
SELECTOR**

Fish choices that are good
for you and the ocean

e
ENVIRONMENTAL DEFENSE FUND
finding the ways that work

BEST CHOICES

- Abalone (farmed)
- Anchovies
- Barramundi (U.S.)
- Catfish (U.S.)
- Caviar (farmed)
- Char, Arctic (farmed)
- Clams (farmed)
- Clams, softshell
- Cod, Pacific (bottom longline)
- Crab, Dungeness
- Crab, stone
- Crawfish (U.S.)
- Halibut, Pacific
- Lobster, spiny (U.S., Australia, Baja)
- Mackerel, Atlantic
- Mahimahi (U.S. troll/pole)
- Mullet (U.S.)
- Mussels (farmed)
- Oysters (farmed)
- Pollock (Alaska)
- Sablefish/black cod (Alaska, Canada)
- Salmon, wild (Alaska)

- Salmon, canned pink/sockeye
- Sardines
- Scallops, bay (farmed)
- Shrimp, pink (Oregon)
- Shrimp (U.S. farmed)
- Squid, longfin (U.S.)
- Striped bass (farmed)
- Sturgeon (farmed)
- Tilapia (U.S.)
- Trout, rainbow (farmed)
- Tuna, albacore (U.S., Canada)
- Tuna, yellowfin (U.S. troll/pole)
- Wreckfish

● Indicates fish high in omega-3 fatty acids and low in environmental contaminants.

www.edf.org/seafood

Cover image: "Endangered Ocean"
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The same kind of fish may appear on more than one list of choices, depending on where it comes from, whether it was caught or farmed, and the type of fishing gear used. To learn more about choosing ocean-friendly fish, visit

www.edf.org/seafood

e
ENVIRONMENTAL DEFENSE FUND
finding the ways that work

This guide is produced in collaboration with the Monterey Bay Aquarium.
www.seafoodwatch.org

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WORST CHOICES

- Basa/tra/Vietnamese catfish
- Clams (wild)
- Cod, Pacific (trawl)
- Crab, blue
- Crab, king (U.S.)
- Crab, snow/tanner
- Flounder/sole (Pacific)
- Haddock (hook-and-line)
- Lobster, American/Maine
- Mahimahi (U.S. longline or imported troll/pole)
- Oysters (wild)
- Sablefish/black cod (CA, OR, WA)
- Salmon, wild (CA, OR, WA)
- Scallops, sea (New England, Canada)
- Shrimp (U.S. wild)
- Shrimp, northern (U.S., Canada)
- Squid (except U.S. longfin)
- Swordfish (U.S.)
- Tilapia (Latin America)
- Tuna, bigeye/yellowfin (imported troll/pole)
- Tuna, canned light
- Tuna, canned white/albacore

- Caviar (imported wild)
- Chilean seabass
- Cod, Atlantic
- Crab, king (imported)
- Crawfish (China)
- Flounder/sole (Atlantic)
- Grouper
- Haddock (trawl)
- Halibut, Atlantic
- Mahimahi (imported longline)
- Monkfish
- Orange roughy
- Rockfish (Pacific trawl)
- Salmon, farmed or Atlantic
- Shark
- Shrimp/prawns (imported)
- Skate
- Snapper, red or imported
- Swordfish (imported)
- Tilapia (Asia)
- Tuna, bigeye/yellowfin (longline)
- Tuna, bluefin

● Indicates fish high in mercury or PCBs.

With permission from Environmental Defense Fund.

Figure 14. Seafood Selector Pocket Guide.

If FishWise could capture this in its label, it has the potential of resonating more with seafood consumers.¹

High Salience for Price and Value

With 86% of Americans stating that the economy is getting worse and 44% saying they are increasingly worried about money, consumer spending will decrease as will concern for environmental issues (Gallup, Inc, 2008b). Data from this study confirm that people who have tighter incomes will be more concerned about price and less concerned about the environment, as more seafood consumers at the Cotati store noted that *price* was an important purchase factor and a greater number of seafood consumers at the Santa Rosa store indicated that seafood sustainability issues influenced his or her seafood purchase.

Data from this study also reveal that, on average, unsustainable seafood was the most expensive, and sustainable seafood was the least expensive seafood available at Oliver's Market. Although individual seafood prices will vary, stores participating in the FishWise program could combine value and seafood sustainability in its marketing effort to reach out to the increasing number of consumers concerned about money and promote purchases of sustainable seafood.

¹ FishWise attempted to include information on pollutants in seafood on their labels, but it was deemed too confusing for customers (Teresa Ish, personal communication, February 21, 2009). Instead, FishWise (in partnership with the Environmental Defense Fund) created the "Low Mercury List", which only lists seafood that are low in mercury and ranked as either sustainable or seafood with some concerns (SFA, 2006). The list is typically attached to the glass of the seafood counter for customers to view (Tobias Aguirre, personal communication, March 4, 2009). Since this study only evaluated the seafood sustainability aspect of the FishWise program, the Low Mercury List and its effects on consumer behavior were not examined.

Importance of Program Support among Store Staff

When data were gathered in 2006, the FishWise program was implemented at 17 gourmet and health food markets throughout Northern California. In 2008, the FishWise program had been implemented at 42 gourmet markets and co-ops and natural foods markets in six states and the program hopes to eventually reach out to supermarket chains, such as Safeway and Albertsons. As the data from FishWise's 2004 pilot study illustrate, the program can be successful at influencing purchases of sustainable seafood and decreasing purchases of unsustainable seafood, especially in co-ops and natural foods markets where environmentally conscious people tend to be employed and consumers are actively seeking green products. Unfortunately, the results of this study illustrate the challenges that gourmet markets and supermarkets may face where its staff and customers may or may not care about environmental issues.

At Oliver's Market, the general manager was very supportive of the program while department managers were less enthusiastic about the program citing that while the program is a complement to the store, it was "force fed to everyone" and that the program "doesn't help my work load." One seafood counter staff person said that his work is just work and stated, "I just want to put in my eight hours and go home" (Dennis, personal communication, September 12, 2006). Since the General Manager at Oliver's Market does not work directly with seafood counter staff, any support for the program is not being transferred directly to seafood counter staff. On the other hand, there is evidence that the FishWise program can be successful at gourmet markets, where one particular chain's store management has been extremely proactive. For example, the chain made

sure that all 1,200 employees were trained by FishWise and the department manager works directly with the FishWise program manager (Rich Boot, personal communication, September 25, 2006).

FishWise could encourage store management to become more involved in ensuring that seafood counter staff are talking about the FishWise program or seafood sustainability. One suggestion is for management to create incentives for seafood counter staff to promote the program, such as offering bonuses (monetary or otherwise) to staff if sales of sustainable seafood increase over time. Since this study did not aim to evaluate the effects of store management on staff engagement in the FishWise program, opportunities exist for future research on this topic.

References

- Asquith, D. (2006). *Sociology 104 Spring 2006 course reader*. San Jose State University Associated Students Print Shop.
- Babbie, E. (1995). *The practice of social research*. Belmont, CA: Wadsworth Publishing Company.
- Bang, H., Ellinger, A.E., Hadjimarou, J., & Traichal, P.A. (2000). Consumer concern, knowledge, belief, and attitude toward renewable energy: An application of the reasoned action theory. *Psychology & Marketing*, 17(6), 449-468.
- Carlson, D.K (2005). Public priorities: Environment and economic growth: Age and politics influence attitudes. Retrieved July 28, 2008, from http://www.gallup.com/poll/15820/Public-Priorities_Environment-vs-Economic_Growth.aspx
- Chan, R.Y.K. (1999). Environmental attitudes and behavior of consumers in China: Survey findings and implications. *Journal of International Consumer Marketing*, 11(4), 25-52.
- Clarke, A., Harvey, M.L., & Kane, D. (2000). Attitudes and behavior: Are produce consumers influenced by eco-labels? *Proceedings at the International Institute of Fisheries Economics and Trade (IIFET) Conference*. Retrieved December 2, 2005, from <http://www.ssi.nrcs.usda.gov/SSIEnvPsy/nrcs/ecolabel.pdf>.
- Dougherty, M., Wittsten, A., & Guarino, M. (1990). Promoting low-fat foods in the supermarket using various methods, including videocassettes. *Journal of the American Dietetic Association*, 90, 1106-1109.
- Esterberg, K.G. (2002). *Qualitative methods in social research*. Boston, MA: The McGraw-Hill Companies, Inc.
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Food and Agriculture Organization of the United Nations. (2007). *The State of World Fisheries and Aquaculture 2006*. Rome, Italy: Sales and Marketing Group, Information Division FAO.
- Fowler, P. & Heap, S. (1998). Learning from the Marine Stewardship Council: A Business-NGO partnership for sustainable marine fisheries. *Greener Management International*, 24, 78-90.

- Gallup, Inc. (2008a). *Gallup's Pulse of Democracy: The environment*. Retrieved July 27, 2008, from <http://www.gallup.com/poll/1615/Environment.aspx>
- Gallup, Inc. (2008b). *Consumers increasingly worried about money, Basic consumer confidence also continues to erode*. Retrieved September 28, 2008, from <http://www.gallup.com/poll/110539/Gallup-Daily-Consumers-Expressing-More-Worry-About-Money.aspx>
- Hunt, M., Lefebvre, C., Hixson, M., Banspach, S., Assaf, A., & Carleton, R. (1990). Pawtucket heart health program point-of-purchase nutrition education program in supermarkets. *American Journal of Public Health*, 80, 730-732.
- James, S.A., Fowler-Brown, A., Raghuanathan, T.E., & Van Hoewyk, J. (2006). Life-course socioeconomic position and obesity in African American women: The Pitt county study. *American Journal of Public Health*, 96(3), 554-560.
- Kelleher, K. (2005). Discards in the world's marine fisheries: An update. *FAO Fisheries Technical Paper 470*. Rome, Italy: Sales and Marketing Group, Information Division, FAO.
- Lester, J.P. (1995). *Environmental politics and policy: Theories and evidence*. Durham, NC: Duke University Press.
- Mainieri, T., Barnett, E.G., Valdero, T.R., Unipanm, J.B. & Oskamp, S. (1997). Green buying: The influence of environmental concern on consumer behavior. *The Journal of Social Psychology*, 137(2), 189-201.
- Marine Conservation Biology Institute. (2008). Bottom trawling impacts, clearly visible from space. *Marine Conservation Biology NEWS*. Retrieved September 21, 2008, from http://www.mcbi.org/news/trawling_18feb2008.htm
- Martin, B. & Simintiras, A. (1995). The impact of green product lines on the environment: Does what they know affect how they feel? *Marketing Intelligence & Planning*, 13(4), 16-23.
- Monterey Bay Aquarium. (2004). *Seafood Watch evaluation: Summary report, June 30, 2004*. Monterey, CA: Author.
- Monterey Bay Aquarium. (2006a). *Seafood Watch capture fisheries evaluation, May 6, 2006*. Monterey, CA: Author.

- Monterey Bay Aquarium. (2006b). *Seafood Watch aquaculture evaluation*, May 6, 2006. Monterey, CA: Author.
- National Marine Fisheries Service. (2008). *2007 status of US fisheries*. Silver Spring, MD: Author.
- National Oceanic and Atmospheric Association. (n.d.). *NOAA Aquaculture Program*. Retrieved March 1, 2009, from <http://aquaculture.noaa.gov/>
- Norušis, M.J. (2005). *SPSS® 14.0 statistical procedures companion*. Upper Saddle River, NJ: Prentice Hall Inc.
- Paine-Andrews, A., Francisco, V., Fawcett, S., Johnston, J., & Coen, S. (1996). Health marketing in the supermarket: Using prompting, product sampling, and price reduction to increase customer purchases of lower-fat items. *Health Marketing Quarterly*, 14, 85-99.
- Priest, H., Roberts, P. & Woods, L. (2002). An overview of three different approaches to the interpretation of qualitative data. Part 1: theoretical issues. *Nurse Researcher*, 10(1), 1351-5578.
- Reichert, J. (2005). *A farm-raised fish tale*. Retrieved December 23, 2008, from http://www.pewtrusts.org/news_room_detail.aspx?id=23586
- Roberts, J.A. (1996). Green consumers in the 1990s: Profile and implications for advertising. *Journal of Business Research*, 36, 217-231.
- Robinson, R., Smith, C., Murray, H., & Ennis, J. (2002). Promotion of sustainably produced foods: Customer response in Minnesota grocery stores. *American Journal of Alternative Agriculture*, 17, 96-104.
- Rodgers, A., Kessler, L., Portnoy, B., Potosky, A., Patterson, B., Tenney, J., et al. (1994). "Eat for Health": A supermarket intervention for nutrition and cancer risk reduction. *American Journal of Public Health*, 84, 72-76.
- Roheim, C.A. & Sutinen, J.G. (2006). Trade and Marketplace Measures to Promote Sustainable Fishing Practices. *ICTSD Natural Resources, International Trade and Sustainable Development Series Issue Paper No. 3*, Geneva, Switzerland: International Centre for Trade and Sustainable Development and the High Seas Task Force.
- Ross, N., Anderson, M., Goldberg, J., & Rogers, B. (2000). Increasing purchases of locally grown produce through worksite sales: An ecological model. *Society for Nutrition Education*, 32(6), 304-313.

- Rossi, P, Lipsey, M., & Freeman, H. (2004). *Evaluation: A systematic approach*. Thousand Oaks, CA: Sage Publications, Inc.
- Seafood Choices Alliance. (2003). *The marketplace for sustainable seafood: Growing appetites and shrinking seas, June 2003*. Silver Spring, MD: Author.
- Sustainable Fishery Advocates. (2004). *Sustainable Fishery Advocates: 2004 annual report*. Santa Cruz, CA: Author.
- Sustainable Fishery Advocates. (2005). *FishWise PowerPoint presentation, December 2, 2005*. Santa Cruz, CA: Author.
- Sustainable Fishery Advocates. (2006). *FishWise informational binder, August 2006*. Santa Cruz, CA: Author.
- Sustainable Fishery Advocates. (2008). Retrieved October 26, 2008, from <http://www.sustainablefishery.org>
- Tabachnick, B.G. & Fidell, L.S. (2001). *Using multivariate statistics*. Needham Heights, MA: Allyn & Bacon.
- Tacon, A.G. (2005). State of information on salmon aquaculture feed and the environment. *Proceedings of the US World Wildlife Fund Salmon Aquaculture Dialogue*. Retrieved September 20, 2008, from http://www.worldwildlife.org/oci/pubs/Feed_final_resaved2.pdf
- Teisl, M., Roe, B., & Hicks, R. (2002). Can eco-labels tune a market? Evidence from Dolphin-Safe labeling. *Journal of Environmental Economics and Management*, 43, 339-359.
- Unilever. (2004). *Environmental report 2004*. Unilever PLC/Unilever NV 1998-2009.
- US Census Bureau. (2000a). *American FactFinder*. Retrieved June 26, 2006, from http://factfinder.census.gov/servlet/SAFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=95409&_cityTown=95409&_state=&_zip=95409&_lang=en&_sse=on&pctxt=fph&pgsl=010
- US Census Bureau. (2000b). *American FactFinder*. Retrieved June 26, 2006, from http://factfinder.census.gov/servlet/SAFFacts?_event=Search&geo_id=86000US95409&_geoContext=01000US%7C86000US95409&_street=&_county=&_cityTown=&_state=&_zip=94931&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=860&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qtr_name=null®=null%3Anull&_keyword=&_industry=

- US Census Bureau. (2006a). *2006 American Community Survey*. Retrieved December 9, 2007, from http://factfinder.census.gov/servlet/ADPTable?_bm=y&-zip=94931&-context=adp&-qr_name=ACS_2006_EST_G00_DP2&-street=Cotati%20avenue&-ds_name=&-city=Cotati&-tree_id=306&-redoLog=false&-all_geo_types=&-geo_id=05000US06097&-format=&-_lang=en&-IS_ADDRESS_VALID=N&-IS_GEO_FOUND=N&-states=California
- US Census Bureau. (2006b). *2006 American Community Survey*. Retrieved December 9, 2007, from http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=31000US41860&-qr_name=ACS_2006_EST_G00_DP5&-context=adp&-ds_name=&-tree_id=306&-_lang=en&-redoLog=false&-format=
- US Food and Drug Administration, Seafood Products Research Center, Center for Food Safety & Applied Nutrition. (n.d.) *Regulatory Fish Encyclopedia (RFE)*. Retrieved May 3, 2008, from <http://www.cfsan.fda.gov/~frf/rfe0.html>
- Wessells, C., Johnston, R., & Donath, H. (1999). Assessing consumer preferences for ecolabeled seafood: The influence of species, certifier, and household attributes. *American Journal of Agricultural Economics*, 81, 1084-1089.
- Wu, T.H. & Bechtel, P.J. (2008). Salmon by-product storage and oil extraction. *Food Chemistry*, 111 (868-871).
- Zady, M.F. (2000). *Z-STATS 12: Correlation and simple least squares regression*. Retrieved December 23, 2008, <http://www.westgard.com/lesson42.htm>

Appendices

Appendix A. Seafood Customer Survey

I am conducting a brief survey on consumer knowledge, attitudes and behavior regarding seafood. You were selected because you purchased seafood from Oliver's Market today. Your personal help would be very much appreciated. All of your responses will be kept confidential. The survey is also voluntary. You may refuse to participate and no service of any kind, to which you are otherwise entitled, will be lost or jeopardized if you choose not to complete the questionnaire. If you decide to complete the questionnaire, you are free to withdraw at any time. In addition, you do not have to answer questions you do not want to answer.

Should you wish to complain about any aspect of the survey, please contact Rachel O'Malley, Associate Professor and Department Chair, Department of Environmental Studies at (408) 924-5424. Questions about the research subjects' rights or research-related injury may be presented to Pamela Stacks, Ph.D., Associate Vice President, Graduate Studies and Research at (408) 924-2480.

Thank you very much.

Alicia Ushijima
SJSU Master's Student

For the following items, please check the best answer that applies to you. THERE ARE NO RIGHT OR WRONG ANSWERS. IT'S YOUR OPINIONS AND EXPERIENCES THAT COUNT. Thank you.

1. Purchasing seafood accurately labeled "environmentally friendly" is good for fish and ocean habitats.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
2. The consumer has the power to force products that damage the environment off the market.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
3. When buying consumer products, it is important to consider how their use of them would affect the environment and other consumers.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
4. Since one person cannot have any effect upon natural resource problems, it doesn't make any difference what I do.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure

5. It is important to consider the environmental impacts of fishing when purchasing seafood.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
6. When given a choice between two equal seafood products, it is better to purchase the one that is less harmful to the environment.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
7. If seafood is accurately labeled “environmentally responsible” in a store or restaurant, it is better to choose that seafood over others.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure
8. Buying seafood caught in a way that helps fish populations and ocean habitats can influence the fishing industry to stop using destructive fishing methods.
☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐ Not sure

For the items below, please check the best answer that applies to you.

9. How familiar are you with the term ‘bycatch’?
☐ A great deal ☐ Quite a bit ☐ Some ☐ Hardly at all ☐ Not at all
10. How knowledgeable are you about habitat impacts from commercial fishing methods?
☐ A great deal ☐ Quite a bit ☐ Some ☐ Hardly at all ☐ Not at all
11. How knowledgeable are you about habitat impacts from aquaculture (or fish farming) methods?
☐ A great deal ☐ Quite a bit ☐ Some ☐ Hardly at all ☐ Not at all
12. How knowledgeable are you about sustainable seafood?
☐ A great deal ☐ Quite a bit ☐ Some ☐ Hardly at all ☐ Not at all

For the items below, please check the best answer that applies to you.

13. How many times have you decided NOT to purchase a type of seafood because of the environmental impacts of fish or fish farming?
☐ Always ☐ Many times ☐ Sometimes ☐ Never

14. How many times have you decided NOT to buy a certain kind of seafood because you were concerned about contamination or food safety?

☐ Always ☐ Many times ☐ Sometimes ☐ Never

15. How often do you CHECK THE LABELS at grocery stores to get information about where or how the seafood is fished or farmed, or what species it is?

☐ Always ☐ Many times ☐ Sometimes ☐ Never

16. How often do you ASK STAFF at grocery stores or restaurants for information about where or how the seafood is fished or farmed, or what species it is?

☐ Always ☐ Many times ☐ Sometimes ☐ Never

For the items below, please check either 'Yes', 'No', or 'Not sure' for part (a). Then, answer part (b) in your own words.

17. (a) Before shopping today, did you know what seafood you were going to purchase?

☐ Yes ☐ No ☐ Not sure

(b) If you checked YES, what seafood were you going to purchase?

18. (a) Did you buy the seafood you intended to purchase?

☐ Yes ☐ No ☐ Not sure

(b) If you checked NO, what seafood did you purchase?

19. (a) Do you know what SPECIES of fish you purchased today? (For example, if you bought tuna was it yellowfin or blue tuna?)

☐ Yes ☐ No ☐ Not sure

(b) If you checked YES, what species of fish did you purchase today?

20. (a) Do you know if the seafood you bought today was/were raised in a fish farm or caught in oceans and rivers?

☐ Yes ☐ No ☐ Not sure

(b) If you checked YES, was the fish you bought today raised in a fish farm or caught in oceans and rivers or both?

For the items below, please check either 'Yes', 'No', or 'Not sure' for part (a). Then, answer part (b) in your own words.

21. (a) Do you know which fishing method(s) was used to catch the seafood you bought today?

☐ Yes ☐ No ☐ Not sure

(b) If you checked YES, which fishing method(s) was used to catch the seafood you bought today? _____

22. (a) Do you know if the seafood you bought today had a green, yellow or red label(s)?

☐ Yes ☐ No ☐ Not sure

(b) If you checked YES, which color(s) was on the label?

23. Please rank the top 3 factors (e.g. 1st, 2nd, 3rd) that influenced your decision to buy the seafood you purchased today.

____ Price
 ____ Health and nutritional benefits
 ____ Whether the species is overfished (catching so many the species is being depleted)
 ____ Taste and texture
 ____ Freshness and smell
 ____ Whether this fish is caught in a way that harms other marine creatures
 ____ Possibility of contamination with bacteria or harmful chemicals
 ____ Whether you have eaten that kind of fish before
 ____ Whether the fish is caught in a way that harms the environment
 ____ Locally caught
 ____ Wild caught
 ____ Other

The remaining questions have to do with a few personal preferences and background characteristics. This is just to see if people with different experiences and backgrounds have different preferences or opinions.

24. About how often would you say you buy fish or other seafood (from grocery stores, restaurants, or elsewhere)?

☐ Never ☐ Once a year ☐ Twice a year ☐ Once a month ☐ Once every 2 months
☐ Once a week ☐ More than once a week ☐ Not sure

25. About how often would you say you buy seafood from Oliver's Market?
- ☐ Never ☐ Once a year ☐ Twice a year ☐ Once a month ☐ Once every 2 months
☐ Once a week ☐ More than once a week ☐ Not sure
26. How much responsibility do you have for making your family's decisions about what seafood to buy?
- ☐ Completely responsible ☐ Partly responsible ☐ Not at all responsible ☐ Not sure
27. Gender
- ☐ Male ☐ Female
28. Age
- ☐ 19 or under ☐ 20-29 ☐ 30-39 ☐ 40-49
☐ 50-59 ☐ 60 or above
29. Highest education level completed
- ☐ Less than high school ☐ High school ☐ Trade/vocational school
☐ Associate/Junior College ☐ Bachelor ☐ Graduate or above
30. Approximate annual household income before taxes
- ☐ Less than \$20,000 ☐ \$20,000-39,999 ☐ \$40,000-49,999 ☐ \$50,000-59,999
☐ \$60,000-74,999 ☐ \$75,000-99,999 ☐ \$100,000-149,999 ☐ \$150,000 or above
31. Member of a conservation organization (Which one?)
- ☐ Yes ☐ No ☐ Not sure

Thank you very much for your time and your help with this survey. PLEASE use the space below for any comments you may wish to add.

Appendix B. Observation Guide

Identification No. _____

Store Location: _____

Date: _____

OBSERVATION	Y	N	COMMENTS
Did customer look at the FishWise materials posted at or near counter?			
Did customer ask questions about the FishWise materials and/or labels?			
Did customer ask questions about seafood...			
...sustainability?			
...catch method?			
...health benefits?			
...health risks?			
Did staff adequately answer customer's question?			
Did staff refer to informational binder?			
Did staff refer customer to brochure or other FishWise materials?			

SEAFOOD PURCHASED <i>(List to include all seafood sold at store)</i>	COLOR INDEX	COMMENTS
Atlantic Salmon	G Y R	
Farmed Shrimp	G Y R	
Dungeness Crab	G Y R	
Tilapia, Farmed	G Y R	
Swordfish	G Y R	
Snapper	G Y R	
Tuna, Albacore	G Y R	

Appendix C. Chi-Square Output for Income and Seafood Purchase

Oliver's Market				Label Color of Seafood Purchase			
				Red	Yellow	Green	Total
Cotati	Income 49,999 or under	Count	9	4	5	18	
		Expected Count	7.1	6.1	4.7	18.0	
		% within Income	50.0%	22.2%	27.8%	100.0%	
	50k - 99,999	Count	16	10	10	36	
		Expected Count	14.2	12.3	9.5	36.0	
		% within Income	44.4%	27.8%	27.8%	100.0%	
	100k - 149,999	Count	2	15	6	23	
		Expected Count	9.1	7.8	6.1	23.0	
		% within Income	8.7%	65.2%	26.1%	100.0%	
	150k or above	Count	9	2	3	14	
		Expected Count	5.5	4.8	3.7	14.0	
		% within Income	64.3%	14.3%	21.4%	100.0%	
	Total	Count	36	31	24	91	
		Expected Count	36.0	31.0	24.0	91.0	
		% within Income	39.6%	34.1%	26.4%	100.0%	
Santa Rosa	Income 49,999 or under	Count	4	3	6	13	
		Expected Count	4.7	4.5	3.8	13.0	
		% within Income	30.8%	23.1%	46.2%	100.0%	
	50k - 99,999	Count	9	13	4	26	
		Expected Count	9.3	9.0	7.6	26.0	
		% within Income	34.6%	50.0%	15.4%	100.0%	
	100k - 149,999	Count	8	9	10	27	
		Expected Count	9.7	9.4	7.9	27.0	
		% within Income	29.6%	33.3%	37.0%	100.0%	
	150k or above	Count	12	7	7	26	
		Expected Count	9.3	9.0	7.6	26.0	
		% within Income	46.2%	26.9%	26.9%	100.0%	
	Total	Count	33	32	27	92	
		Expected Count	33.0	32.0	27.0	92.0	
		% within Income	35.9%	34.8%	29.3%	100.0%	

Chi-Square Tests

Oliver's Market		Value	df	Asymp. Sig. (2-sided)
Cotati	Pearson Chi-Square	17.905 ^a	6	.006
	Likelihood Ratio	19.307	6	.004
	Linear-by-Linear Association	.002	1	.962
	N of Valid Cases	91		
Santa Rosa	Pearson Chi-Square	7.461 ^b	6	.280
	Likelihood Ratio	7.460	6	.280
	Linear-by-Linear Association	.512	1	.474
	N of Valid Cases	92		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is 3.69.

b. 3 cells (25.0%) have expected count less than 5. The minimum expected count is 3.82.

Appendix D. Summary of Demographic Variables

Variable	Cotati %	Santa Rosa %	Overall %
Gender			
1 = Male	40.4	33.7	37.0
2 = Female	59.6	66.3	63.0
Age			
1 = 39 or under	24.2	21.8	23.0
2 = 40-49	31.3	24.8	28.0
3 = 50-59	31.3	30.7	31.0
4 = 60 or above	13.1	22.8	18.0
Education			
1 = Trade/Jr. college or under	35.4	26.7	31.0
2 = Bachelor's degree	25.3	28.7	27.0
3 = Graduate degree or above	39.4	44.6	42.0
Income			
1 = \$49,999 or under	19.8	14.1	16.9
2 = \$50,000 to \$99,999	39.6	28.3	33.9
3 = \$100,000 to \$149,999	25.3	29.3	27.3
4 = \$150,000 or above	15.4	28.3	21.9
Member of Conservation Organization			
1 = Yes	28.9	26.1	27.5
2 = No	71.1	73.9	72.5
Responsibility of Seafood Purchase			
1 = Not at all	1.0	2.0	1.5
2 = Partly	37.8	43.6	40.7
3 = Completely	61.2	54.5	57.8
Seafood Purchase Frequency			
1 = Once a month or less	31.0	25.7	28.4
2 = Once a week	47.0	44.6	45.8
3 = Once a week or more	22.0	29.7	25.9
Oliver's Seafood Purchase Frequency			
1 = Once a month or less	56.2	48.0	52.1
2 = Once a week or more	43.8	52.0	47.9

Appendix E. Chi-Square Outputs for FishWise Label Knowledge

Is there a relationship between the level of knowledge about the information on the FishWise labels and the sustainability ranking of seafood purchases?

				Label Color of Seafood Purchase			
Oliver's Market				Red	Yellow	Green	Total
Cotati	Answered Correctly: Farmed or Wild?	No	Count	23	6	8	37
			Expected Count	15.2	11.3	10.5	37.0
			% within Farmed or Wild	62.2%	16.2%	21.6%	100.0%
		Yes	Count	16	23	19	58
			Expected Count	23.8	17.7	16.5	58.0
			% within Farmed or Wild	27.6%	39.7%	32.8%	100.0%
		Total	Count	39	29	27	95
			Expected Count	39.0	29.0	27.0	95.0
			% within Farmed or Wild	41.1%	30.5%	28.4%	100.0%
Santa Rosa	Answered Correctly: Farmed or Wild?	No	Count	14	9	12	35
			Expected Count	13.2	12.1	9.6	35.0
			% within Farmed or Wild	40.0%	25.7%	34.3%	100.0%
		Yes	Count	23	25	15	63
			Expected Count	23.8	21.9	17.4	63.0
			% within Farmed or Wild	36.5%	39.7%	23.8%	100.0%
		Total	Count	37	34	27	98
			Expected Count	37.0	34.0	27.0	98.0
			% within Farmed or Wild	37.8%	34.7%	27.6%	100.0%

Chi-Square Tests

Oliver's Market		Value	df	Asymp . Sig. (2- sided)
Cotati	Pearson Chi-Square	11.630 ^a	2	.003
	Likelihood Ratio	11.830	2	.003
	Linear-by-Linear Association	6.881	1	.009
	N of Valid Cases	95		
Santa Rosa	Pearson Chi-Square	2.234 ^b	2	.327
	Likelihood Ratio	2.268	2	.322
	Linear-by-Linear Association	.169	1	.681
	N of Valid Cases	98		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.52.

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.64.

Fishing Method*Label Color of Seafood Purchase Crosstabulation

Oliver's Market				Label Color of Seafood Purchase			
				Red	Yellow	Green	Total
Cotati	Answered Correctly: Fishing Method	No	Count	37	32	22	91
			Expected Count	36.6	30.0	24.4	91.0
			% within Answered Correctly: Fishing Method	40.7%	35.2%	24.2%	100.0%
		Yes	Count	2	0	4	6
			Expected Count	2.4	2.0	1.6	6.0
			% within Answered Correctly: Fishing Method	33.3%	.0%	66.7%	100.0%
		Total	Count	39	32	26	97
			Expected Count	39.0	32.0	26.0	97.0
			% within Answered Correctly: Fishing Method	40.2%	33.0%	26.8%	100.0%
Santa Rosa	Answered Correctly: Fishing Method	No	Count	35	30	28	93
			Expected Count	35.1	30.4	27.5	93.0
			% within Answered Correctly: Fishing Method	37.6%	32.3%	30.1%	100.0%
		Yes	Count	2	2	1	5
			Expected Count	1.9	1.6	1.5	5.0
			% within Answered Correctly: Fishing Method	40.0%	40.0%	20.0%	100.0%
		Total	Count	37	32	29	98
			Expected Count	37.0	32.0	29.0	98.0
			% within Answered Correctly: Fishing Method	37.8%	32.7%	29.6%	100.0%

Chi-Square Tests

Oliver's Market		Value	df	Asymp. Sig. (2- sided)
Cotati	Pearson Chi-Square	5.977 ^a	2	.050
	Likelihood Ratio	6.914	2	.032
	Linear-by-Linear Association	2.120	1	.145
	N of Valid Cases	97		
Santa Rosa	Pearson Chi-Square	.258 ^b	2	.879
	Likelihood Ratio	.272	2	.873
	Linear-by-Linear Association	.110	1	.741
	N of Valid Cases	98		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.61.

b. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.48.

Crosstab

Oliver's Market				Label Color of Seafood Purchase			
				Red	Yellow	Green	Total
Cotati	Answered Correctly: Label Color?	No	Count	36	27	23	86
			Expected Count	34.4	27.5	24.1	86.0
			% within Answered Correctly: Label Color	41.9%	31.4%	26.7%	100.0%
	Yes		Count	4	5	5	14
			Expected Count	5.6	4.5	3.9	14.0
			% within Answered Correctly: Label Color	28.6%	35.7%	35.7%	100.0%
	Total		Count	40	32	28	100
			Expected Count	40.0	32.0	28.0	100.0
			% within Answered Correctly: Label Color	40.0%	32.0%	28.0%	100.0%
Santa Rosa	Answered Correctly: Label Color?	No	Count	34	34	21	89
			Expected Count	32.4	31.5	25.2	89.0
			% within Answered Correctly: Label Color	38.2%	38.2%	23.6%	100.0%
	Yes		Count	2	1	7	10
			Expected Count	3.6	3.5	2.8	10.0
			% within Answered Correctly: Label Color	20.0%	10.0%	70.0%	100.0%
	Total		Count	36	35	28	99
			Expected Count	36.0	35.0	28.0	99.0
			% within Answered Correctly: Label Color	36.4%	35.4%	28.3%	100.0%

Chi-Square Tests

Oliver's Market		Value	df	Asymp. Sig. (2- sided)
Cotati	Pearson Chi-Square	.948 ^a	2	.623
	Likelihood Ratio	.972	2	.615
	Linear-by-Linear Association	.887	1	.346
	N of Valid Cases	100		
Santa Rosa	Pearson Chi-Square	9.686 ^b	2	.008
	Likelihood Ratio	8.784	2	.012
	Linear-by-Linear Association	5.805	1	.016
	N of Valid Cases	99		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.92.

b. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 2.83.

Label Knowledge – High/Low Groups*Label Color of Seafood Purchase

				Label Color of Seafood Purchase			
Oliver's Market				Red	Yellow	Green	Total
Cotati	Label Knowledge - High/Low Groups	Low Level of Label Knowledge	Count	20	6	7	33
			Expected Count	13.6	10.4	9.0	33.0
			% within Label Knowledge - High/Low Groups	60.6%	18.2%	21.2%	100.0%
		High Level of Label Knowledge	Count	18	23	18	59
			Expected Count	24.4	18.6	16.0	59.0
			% within Label Knowledge - High/Low Groups	30.5%	39.0%	30.5%	100.0%
	Total		Count	38	29	25	92
			Expected Count	38.0	29.0	25.0	92.0
			% within Label Knowledge - High/Low Groups	41.3%	31.5%	27.2%	100.0%
Santa Rosa	Label Knowledge - High/Low Groups	Low Level of Label Knowledge	Count	12	8	10	30
			Expected Count	11.4	10.1	8.5	30.0
			% within Label Knowledge - High/Low Groups	40.0%	26.7%	33.3%	100.0%
		High Level of Label Knowledge	Count	24	24	17	65
			Expected Count	24.6	21.9	18.5	65.0
			% within Label Knowledge - High/Low Groups	36.9%	36.9%	26.2%	100.0%
	Total		Count	36	32	27	95
			Expected Count	36.0	32.0	27.0	95.0
			% within Label Knowledge - High/Low Groups	37.9%	33.7%	28.4%	100.0%

Chi-Square Tests

Oliver's Market		Value	df	Asymp. Sig. (2- sided)
Cotati	Pearson Chi-Square	8.219 ^a	2	.016
	Likelihood Ratio	8.299	2	.016
	Linear-by-Linear Association	4.886	1	.027
	N of Valid Cases	92		
Santa Rosa	Pearson Chi-Square	1.065 ^b	2	.587
	Likelihood Ratio	1.082	2	.582
	Linear-by-Linear Association	.052	1	.819
	N of Valid Cases	95		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.97.

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.53.

Appendix F. Interview Guide for FishWise Co-Founder

1. What are the immediate and long-term goals and objectives of the FishWise program?
 - a. Is there a timeline with which the program is working?
 - b. Where do you envision the FishWise program to be in 5 years?
 - c. 10 years?
2. What are the changes the program aims to bring about?
 - a. What are your expected outcomes?
3. Who are the program's target population?
 - a. What are the procedures and/or criteria for selecting the stores?
 - b. Geographically, how far would FishWise like to branch out? US only? Canada?
 - c. Is there a goal to implement FishWise at supermarket chains, such as Safeway and Albertson's?
4. What are the main components, activities and functions of the program?
 - a. Does each store receive the same training and services?
 - b. Are the education/training and round table discussions still held once/year?
 - c. Are both Oliver's Markets communicating weekly with SFA to confirm sustainability status of "new" seafood being offered by suppliers?
 - d. How are the monthly updates distributed? (e.g. via email, snail mail or is it up to the store to access the website)
 - e. Are employees and mgmt. filling out training session evaluations?
 - f. Is FishWise still auditing stores every other month, or 6 times/year?

5. In your vision of a perfectly run program, who in the store would be responsible for making sure that:
 - a. new employees see the Training Video?
 - b. the monthly updates and/or new information is disseminated throughout the meat department?
 - c. the education being communicated to customers are accurate?
 - d. the FishWise brochures and Seafood Watch Cards are ordered when supplies run out?
6. What criteria do FishWise use to determine the effectiveness of its program?
7. Do you require stores to work with suppliers you are working with? Or do you make it a point to work with the suppliers they work with?
 - a. How does FishWise work with individual fishermen?
 - b. How does it work with distributors?
 - c. Are the fisheries with which they work MSC certified fisheries?
 - d. How does it seek sustainable sources?
 - e. How does it source better options within a fishery?

Appendix G. Interview Guide for FishWise Program Manager

1. Could you tell me about the relationship between FishWise and suppliers, such as Tides and Pacific Seafood? In particular, how does FishWise work with the suppliers? What services do they provide?
2. In your vision of a perfectly run program, what would be the relationship between Oliver's Market and Tides/Pacific Seafood? In particular, how would the Markets work with the suppliers? What services would they ask of the suppliers?
3. In your opinion, how receptive have Anthony and Tony been to the program? Are they easy or hard to work with?
4. How do the suppliers seek sustainable sources/options?
5. Has FishWise received any sales data from Olivers? Have the stores been audited?
6. Could you clarify for me how FishWise updates, newsletters, etc. are distributed to the stores? How are they supposed to be distributed to staff in the meat/seafood departments? Who is in charge of ordering more brochures, etc. when stores run out?

Appendix H. Interview Guide for Oliver's Market General Manager

1. How long have you been working at Oliver's Market? Were you hired as general manager?
2. How did you hear about the FishWise program? Was it your decision to participate?
3. What are your reasons for participating and implementing the program at Oliver's Market?
4. What do you think are the main goals and objectives of the FishWise program?
 - a. What changes do you think the FishWise program aims to bring about?
5. Do you think that educating customers about seafood sustainability and the seafood labels can influence them to buy or not buy certain types of seafood? Why or why not?
6. Do you think that customers are responding to the FishWise program? In your opinion, are (or would) they be pleased to know that Oliver's has adopted the FishWise program?
 - a. How active have you been in promoting the program to store staff and to customers? Right after program implementation vs. now?
 - b. Have you seen an increase or decrease in sales of sustainable seafood and unsustainable seafood, or have seafood sales stayed relatively the same?
7. What are the strengths of the program? Weaknesses? How easy or difficult is it to implement the labels?
 - a. Is the FishWise flow chart easy or difficult to read?
 - b. Are the other FishWise materials easy or difficult to interpret?
 - c. How long does it take to set up/change the labels?
8. How do you feel about your job now that the FishWise program has been implemented at your store? Do you feel like it is a complement or a burden?
9. In your opinion, how does your meat/seafood counter staff feel about the program?

10. Are you satisfied with your interaction with FishWise program staff?
 - a. Are your questions and concerns dealt with in a timely and adequate fashion?
11. Is there much turnover with meat/seafood counter staff? How do you handle introducing new hires to the FishWise program?
12. In your opinion, do you think the FishWise training in December was easy to follow and comprehend?
13. How are monthly updates and/or changes to information and labeling distributed to the meat/seafood staff?
 - a. Are you the one (and only one) receiving FishWise materials?
 - b. How is that information distributed to the meat/seafood staff?
 - c. Would you like FishWise to distribute and/or contact others in the department, i.e. Steve and/or others in the department?
 - d. Have you received the survey Rich has been sending to the stores that asks for staff's perceptions of the FishWise program?
14. Who is responsible for reading/interpreting the flow chart and making the labels?
15. Who is directly involved with the program and what are his/her responsibilities?

Appendix I. Interview Guide for Oliver's Market Santa Rosa Store Manager

1. How long have you been working at Oliver's Market? Were you hired as store manager?
2. What do you think are the main goals and objectives of the FishWise program?
 - a. What changes do you think the FishWise program aims to bring about?
3. Do you think that educating customers about seafood sustainability and the seafood labels can influence them to buy or not buy certain types of seafood? Why or why not?
4. Do you think that customers are responding to the FishWise program? In your opinion, are (or would) they be pleased to know that Oliver's has adopted the FishWise program?
 - a. How active have you been in promoting the program to store staff and to customers? Right after program implementation vs. now?
 - b. Have you seen an increase or decrease in sales of sustainable seafood and unsustainable seafood, or have seafood sales stayed relatively the same?
5. What are the strengths of the program? Weaknesses? How easy or difficult is it to implement the labels?
 - a. Is the FishWise flow chart easy or difficult to read?
 - b. Are the other FishWise materials easy or difficult to interpret?
 - c. How long does it take to set up/change the labels?
6. How do you feel about your job now that the FishWise program has been implemented at your store? Do you feel like it is a complement or a burden?
7. In your opinion, how does your meat/seafood counter staff feel about the program?
8. Are you satisfied with your interaction with FishWise program staff?
 - a. Are your questions and concerns dealt with in a timely and adequate fashion?

9. Is there much turnover with meat/seafood counter staff? How do you handle introducing new hires to the FishWise program?
10. Were you present for the FishWise training in December? Was the training easy to follow and comprehend? If not, were you introduced to the FishWise program? If yes, how and by whom? If not, how you familiarize yourself with the program?
11. How are monthly updates and/or changes to information and labeling distributed to the meat/seafood staff?
 - a. Are you the one (and only one) receiving FishWise materials?
 - b. How is that information distributed to the meat/seafood staff?
 - c. Would you like FishWise to distribute and/or contact others in the department, i.e. Steve and/or others in the department?
 - d. Have you received the survey Rich has been sending to the stores that asks for staff's perceptions of the FishWise program?
12. Who is responsible for reading/interpreting the flow chart and making the labels?
13. Who is directly involved with the program and what are his/her responsibilities?

Appendix J. Interview Guide for Oliver's Market Seafood Counter Staff

1. How long have you been working at Oliver's Market?
2. Were you present for the FishWise training in December? Was the training easy to follow and comprehend? If not, were you introduced to the FishWise program? If yes, how and by whom? If not, how you familiarize yourself with the program?
3. What do you think are the main goals and objectives of the FishWise program?
 - a. What changes do you think the FishWise program aims to bring about?
4. Do you think that educating customers about seafood sustainability and the seafood labels can influence them to buy or not buy certain types of seafood? Why or why not?
5. Do you think that customers are responding to the FishWise program? In your opinion, are (or would) they be pleased to know that Oliver's has adopted the FishWise program?
 - a. How active have you been in promoting the program to store staff and to customers? Right after program implementation vs. now?
 - b. What are your reasons for promoting or not promoting the program?
 - c. Are customers asking questions about the FishWise materials and/or labels...with staff's active promotion and without?
 - d. Have you seen an increase or decrease in sales of sustainable seafood and unsustainable seafood, or have seafood sales stayed relatively the same?
6. What are the strengths of the program? Weaknesses?
7. Who is responsible for reading/interpreting the flow chart and making the labels? How easy or difficult is it to implement the labels? How long does it take to set up/change the labels?
 - a. In your opinion, is the FishWise flow chart easy or difficult to read?
 - b. Are the other FishWise materials easy or difficult to interpret?
 - c. Where is the informational binder located?

8. How do you feel about your job now that the FishWise program has been implemented at your store? Do you feel like it is a complement or a burden?
9. In your opinion, how do you think Tom feels about the program? What has he communicated to you about the program?
10. Are you satisfied with your interaction with FishWise program staff?
 - a. Are your questions and concerns dealt with in a timely and adequate fashion?
11. Do you work with the suppliers? In your opinion, have they been receptive to the FishWise program and offering sustainable seafood options?

Appendix K. FishWise Quiz for Oliver's Market Staff
(Created by Sustainable Fishery Advocates)

1. What is NOT included in the definition of sustainable seafood?
 - a. How long the fish lives
 - b. The health of the stocks
 - c. How much mercury is in the fish
 - d. How much fishmeal is fed to the farmed fish
2. FishWise labels provide which of the following information
 - a. How the fish was caught
 - b. The sustainability of the fish
 - c. The specific name of the fish
 - d. All of the above
3. Which fishery has the highest bycatch?
 - a. Tilapia farming
 - b. Salmon trolling
 - c. Shrimp trawling
 - d. Tuna purse seines
4. Catch method is important because
 - a. It determines habitat and bycatch impacts
 - b. It tells us how many fish are caught each year
 - c. It tells us how fast the fish grow
 - d. It provides information about the amount of mercury in the fish
5. The low mercury list shows
 - a. Fish with the highest mercury
 - b. Fish that people should not eat
 - c. Fish that are on sale
 - d. Fish that are sustainable and low in contaminants
6. Using FishWise (there may be two correct answers here)
 - a. Will be really hard
 - b. Is just too confusing
 - c. Will make your customers happy, and make you their information source
 - d. Will make you beautiful

7. Uncontained aquaculture is
 - a. Always a sustainable option
 - b. Nets or pens that are open to natural water bodies
 - c. A low risk way to farm fish
 - d. The main way of farming US catfish

8. A low impact fishing method is
 - a. Hook and line
 - b. Bottom Trawling
 - c. Longlines
 - d. All of the above

9. What is the ranking of
 - a. Cod from Canada caught with a handline?
 - b. Softshell clam caught in the Atlantic using a dredge?
 - c. Bluefish in a gilnet?