

## SASSI and the MSC:

How effective have they been with reaching consumers in Cape Town and raising their awareness?

*'I know the meaning of Plagiarism and declare that all of the work in the document, save for which is properly acknowledged, is my own'*

Dave Landey

LNDDAV005

University of Cape Town

Supervisor: Professor Astrid Jarre, MA-RE Institute, University of Cape Town (UCT)

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

## Table of contents

Acknowledgements.....	5
Chapter 1.....	6
Literature review.....	6
1.1 Introduction:.....	6
1.1.1 Fisheries: the past, the present, and the future?.....	6
1.1.1.1 History.....	6
1.1.1.2 Importance.....	6
1.1.1.3 Problems.....	7
1.1.1.4 Possible solutions.....	9
1.1.2 What has been done?.....	14
1.1.2.1 International case studies.....	14
1.1.2.2 South African case study.....	17
1.2 Research approach.....	19
1.2.1 Aims and objectives.....	19
1.2.2 Hypotheses.....	20
1.2.3 Thesis overview.....	20
<b>Chapter 2.....</b>	<b>21</b>
<b>The reach and impact of SASSI and the MSC on consumers in the Cape Town area, examining the top favoured seafood species.....</b>	<b>21</b>
<b>2.1 Abstract.....</b>	<b>21</b>
<b>Keywords.....</b>	<b>21</b>
<b>2.2 Introduction.....</b>	<b>21</b>
2.2.1 Aim and scope of the study.....	23
<b>2.3 Methods and materials.....</b>	<b>25</b>
2.3.1 Sample.....	25
2.3.2 Survey.....	25
2.3.3 Areas.....	26
2.3.4 Shops.....	26
2.3.5 Pilot study.....	27
2.3.6 Data analysis.....	27
2.3.6.1 <i>Data</i> .....	27
<b>2.4 Results.....</b>	<b>28</b>
2.4.1 Descriptive statistics.....	28
2.4.2 Results pertaining to the top five ranking seafood preferences.....	31
2.4.2.1 <i>Hake</i> .....	32

2.4.2.2 Prawns .....	32
2.4.2.3 Salmon .....	33
2.4.2.3 Kingklip .....	33
2.4.2.5 Snoek .....	34
2.3.2.6 Analytical statistics for the most favoured seafood .....	35
<b>2.5 Discussion .....</b>	<b>37</b>
<b>Appendix .....</b>	<b>39</b>
<b>S1: Supplementary information: Map of Cape Town and survey questions/recording sheet .....</b>	<b>39</b>
<i>S1.1 Map .....</i>	39
<i>S1.2 Survey .....</i>	40
<b>S2: Supplementary information: general survey results .....</b>	<b>43</b>
<i>S2.1 Properties of seafood considered when making a choice .....</i>	43
<i>S2.2 Information sources for SASSI and the colour classification .....</i>	43
<i>S2.3 Overall environmental awareness .....</i>	45
<i>S2.4 Respondents' income distribution .....</i>	46
<b>S3: Supplementary information: survey analysis .....</b>	<b>48</b>
<i>S3.1 Area .....</i>	48
<i>S3.2 Shop .....</i>	48
<i>S3.3 Age .....</i>	48
<i>S3.4 Gender .....</i>	49
<i>S3.5 Ethnicity .....</i>	49
<i>S3.6 Consumed seafood within the last 6 months .....</i>	50
<i>S3.7 Logo recognition .....</i>	51
<i>S3.8 Factors considered by consumers when choosing seafood .....</i>	51
<i>S3.9 Fish classification: colour classification and MSC certification .....</i>	51
<i>S3.10 Overall environmental awareness by consumers .....</i>	52
<i>S3.10.1 Recycling .....</i>	52
<i>S3.10.2 Public transport .....</i>	52
<i>S3.10.3 Choosing organic products .....</i>	52
<i>S3.10.4 Saving water .....</i>	53
<i>S3.10.5 Saving electricity .....</i>	53
<i>S3.10.6 Re-using plastic bags .....</i>	53
<b>S4: Supplementary information: results for the species with preference ranks 6-15 .....</b>	<b>54</b>
<i>S4.1 Calamari .....</i>	54
<i>S4.2 Tuna .....</i>	54
<i>S4.3 Yellowtail .....</i>	55
<i>S4.4 Any seafood .....</i>	56

<i>S4.5 Sole</i> .....	56
<i>S4.6 Crayfish</i> .....	57
<i>S4.7 Kob</i> .....	58
<i>S4.8 Mussels</i> .....	58
<i>S4.9 Angelfish</i> .....	59
<i>S4.10 Sushi</i> .....	60
<b>Discussion</b> .....	61
Chapter 3.....	64
3.1 Survey development.....	64
3.2 Surveying process.....	65
3.3 Analysis.....	66
3.4 Underestimating timelines.....	66
3.5 Improvements and future studies.....	66
3.6 Conclusions.....	67
<b>References:</b> .....	70

University of Cape Town

## Acknowledgements

I would like to express my deepest gratitude to everyone who has helped and supported me throughout this project. Firstly, to SARChi and my supervisor, Professor Astrid Jarre, and the MA-RE research institute, University of Cape Town. This project would not have been achievable, without your financial and moral support – I have always wanted to take the lead in a project I feel passionate about, thank you for trusting me and allowing me to embark upon this, at times bumpy but overall, amazing project.

To the University of Cape Town's Sociology Department, more specifically: Doctors Rajen Govender and Elena Moore. For letting me sit in on months of lectures, my constant stream of questions and request for meetings. You were both integral in this study, and assisting in bridging the gap between my knowledge of the biological sciences and, my recently learned, social sciences.

I have the utmost appreciation to all of the participants who took part in this study, as well as the store managers who allowed me to spend time in their shops. Thank you for allowing me to interrupt your shopping, and shoppers, and ask a few questions. Those ten minutes of your time meant so much to me, and for the completion of this project.

Then, lastly, to all my friends and family who have been with me along the way. A massive thank you for everything you have done for me during the course of this study. To say thank you seems like the smallest offering I can pass on to all the wonderful people who have assisted me. Without all of you, none of this would have been possible.

I would like to dedicate this thesis to my dad, and to all fathers.

*"Any man can be a father, it takes a special one to be a dad" - Anonymous*

## Chapter 1

### Literature review

#### 1.1 Introduction:

##### 1.1.1 Fisheries: the past, the present, and the future?

###### 1.1.1.1 History

Fishing is to water, what hunting is to land (Pauly *et al.* 2002). Both involve methods of capturing animals for human consumption and have been a part of human survival as far back as can be traced in our history, right back to our predecessors (Gartside and Kirkegaard 2007). There is much evidence to support this; bone fragments of fish have been found in areas which were inhabited by humans over 500 000 years ago in East Africa, graphical representation in the form of rock art which has been dated back to 40 000 years before present and written records of fishing from ancient Egypt date back to about 3500 BC (Gartside and Kirkegaard 2007). From the historical data one can see the evolution of commercial fishing as we know it today and up until the late 1800s there was little, or no, incentive to develop alternate harvesting methods as the driving forces behind fishing (human/animal muscle and wind) would not be able to provide enough power or speed to pull a trawl or dredge, which acts somewhat like an anchor when towed behind a vessel (Gartside and Kirkegaard 2007).

It was not until the availability of steam engines that the fishing industry truly began to develop (Gartside and Kirkegaard 2007). In addition to this, the introduction of diesel combustion engines and echo-sounding meant vessels could travel further, faster and be more effective at finding fish and when they did this location was shared, by radio, to the remainder of the fleet (Gartside and Kirkegaard 2007). It is no surprise that the fish catches improved over time, as vessels were becoming increasingly more efficient at locating and harvesting previously unexploited stocks, further out to sea, in deeper waters, for longer periods of time – their success had nothing to do with successful management (Pauly *et al.* 2005; Gartside and Kirkegaard 2007).

###### 1.1.1.2 Importance

Currently the annual global production of seafood is estimated at 133 million tons; comprised of wild caught fisheries and aquaculture (Pelletier and Tyedmers 2008). In 2002, these two industries alone provided employment for 38 million people directly and livelihoods for an additional 160 million, three percent of whom reside in developed countries (Botsford *et al.* 1997; Koldewey *et al.* 2009). Seafood, which has been regarded as the world's most important traded food source (Koldewey *et al.* 2009), accounts for about twenty percent of the globe's protein (Botsford *et al.* 1997; Pelletier and Tyedmers 2008). Over the last few decades, seafood exports, generally from developing to developed countries have risen by about 600 percent (Ponte 2007).

Many developed countries have become aware of the health benefits of eating fish, additionally there is an increasing status associated with the consumption of seafood which, as a result, is gaining popularity (Pauly *et al.* 2005; Pelletier and Tyedmers 2008; Cawthorn *et al.* 2011). The northern hemisphere fisheries cannot meet the demand, thus it depends on imports from the southern hemisphere to assist with making up the difference (Pauly *et al.* 2005). Seafood consumption has always been encouraged with fish being promoted as 'brain food', nutritional research has been conducted and the benefits of eating fish have been identified; the presence of good proteins, low levels of saturated fats and essential vitamins and minerals – the most important being identified as omega – 3 and – 6 (Verbeke *et al.* 2007).

South Africa has a rich and diverse history of fishing too. Today it is said to be one of the most important fishing countries in Africa, with the catch arising from four provinces; KwaZulu-Natal, Western Cape, Eastern Cape being the most important, with the Northern Cape contributing a mere 1% of the country's catches (Cawthorn *et al.* 2011). South Africa exported almost a quarter of its catch in 2007, making it the leading contributor into global fisheries from Africa, followed by Namibia and Angola (Cawthorn *et al.* 2011).

#### 1.1.1.3 Problems

The commercial nature of fishing and the ever growing demand for seafood is putting this valuable resource under pressure. To put it simply, over three quarters of the global fisheries have been exploited at a level above what they can support (FAO, 2010). If the demand continues to be met as it is currently, it is predicted that the resource will meet its demise within the next few decades (Pauly *et al.* 2005). Due to the increase in; population, global market and fishing industry, we have seen many examples of overfishing around the world (Jacquet and Pauly 2007). A population collapse has been defined as an ongoing period of very low catches, after a time of high catches (Mullon *et al.* 2005). An increase in fishing pressure can result in the collapse of target and/or non-target, or bycatch, species (Jacquet and Pauly 2007; Worm *et al.* 2009). Bycatch is not specifically non-target fish species, but applies to target species' juveniles and all accidentally captured species, such as: seals, sharks, seabirds and corals to name a few (Lewison *et al.* 2004).

It is no surprise the world's fish stocks are taking strain, in the past few decades the fish catches have increased fivefold, from 20 million tons in 1950 to 100 million tons in 1990 (Sargent 1997; Worm *et al.* 2009; Jacquet *et al.* 2009). As a result, by the 1980s, approximately one third of the world's oceans resources had been exploited beyond their sustainable limits (Sargent 1997). Fisheries have been decreasing since the mid-1980s by about 0.7 million tons annually (Koldewey *et al.* 2009), a trend which was previously overlooked as the People's Republic of China were over-reporting their annual catches (Pauly *et al.* 2005). Not only are the specific fisheries struggling, but a number of studies have found that the impact of fishing is greater than previously assumed (Pauly *et al.* 2005).

Looking at the fishery track record, many of which are: stagnant, declining or collapsed - indicating that the resource cannot keep up with the demand (Pelletier and Tyedmers 2008). Successful fisheries management is one which strives to ensure the continual exploitation of a stock and relies on a number of factors, one of the most fundamental of these being stock assessment models – these allow scientists to estimate the population

abundance of a species (Magnusson and Hilborn 2007). A fish 'stock' is a term used to encompass a group of fish, which is large enough to self-reproduce, all with similar life cycle characteristics (Begg and Waldman 1999). However, according to Botsford, Castilla and Petersen (1997) the catches of global marine fish are nearing their maximum, this overfishing combined with the side effects of fishing, show that fisheries management's goal for sustainability has been largely unsuccessful. Mullon *et al.* (2005) reviewed over one and a half thousand records of the main fisheries in the FAO catch database for the last five decades – it was found that a quarter of these fisheries have collapsed. This equates to one in every four fisheries, a total of almost 370 – indicating that there has been no improvement in fisheries management since the 1950s (Mullon *et al.* 2005).

Overfishing decreases biodiversity and can alter the way ecosystems function (Worm *et al.* 2009). This practice has been identified to cause environmental, social and economic problems in the marine environment (Worm *et al.* 2009). The main driver for this continued overexploitation of the ocean's fish stocks is the temptation for increased economic gain by industry, government and entrepreneurs (Sargent 1997). In an attempt to combat overfishing, institutions which oversee these industries have set goals to create 'sustainable fisheries', in which progress is often hindered by a general unwillingness to reduce fishing, which will incur short term economic and social costs (Worm *et al.* 2009). Certain fisheries worldwide are moving toward implementing an 'Ecosystem Approach to Fisheries' (EAF), which attempts to: identify the dependence on a specific resource, incorporating the known and unknown about this said resource and attempting to establish ecological boundaries to protect it (Garcia and Cochrane 2004). It is in this niche which sustainable seafood initiatives nestle themselves and act as incentives, or drivers, for those involved in harvesting marine resources to act in a more environmentally responsible manner.

The results from a consumer survey found that younger interviewees were more informed about the conflicting evidence between the benefits and risks of eating seafood, which was suggested as a reason they consume less fish (Verbeke *et al.* 2007). More recently, the issue of methylmercury contamination in fishes has been identified, although there is limited public knowledge on this matter, it is still better known than the health benefits, which can more than likely be attributed to the fact that unfavourable news is more far reaching with consumers (between 5 and 7 times more) when compared to favourable (Verbeke *et al.* 2007). Rembold *et al.* (2011) suggest even eating the most highly contaminated salmon is beneficial for your health. However, there are fish which are low in mercury, but high in omega-3 but there is a viewpoint that if people want to avoid toxins they must avoid fish (Mahaffey 2004). This finding highlights two main points; firstly there is an increasing amount of information available nowadays, which might help correct the misconception that we will never be able to exceed the bounty of our oceans (Sargent 1997). The second point is that with all of this information, there is often an incomplete understanding around the messages they are trying to convey (Mahaffey 2004).

There is a clear need for this message to be delivered to the public in a clear, responsible and understandable manner (Mahaffey 2004). Cawthorn *et al.*, (2011) reported that consumers would like to be better informed

about their food choices as they are concerned with their own health and with that of the environment. The general public were realising that fish are more than just a food source (Koldewey *et al.* 2009) and that without proper management and conservation we will not only lose millions of jobs but also a very important food source for humans and animals (Koldewey *et al.* 2009). In order for them to make the healthiest choices, for themselves and the environment, they need information to be made available, specifically: species, origin and production method (Cawthorn *et al.* 2011).

The South African fisheries, many of which have a long standing history and a large number of dependants, are embedded in many of the global fishing industries. According to the WWF Fisheries Facts and Trends South Africa (2011), South African fisheries play a vital role in the livelihoods of more than 140 000 people. An example to highlight the issues in South African fisheries can be taken from the handline fishery, which produces some of the best known, and most enjoyed species on the South African market (Cawthorn *et al.* 2011). However, of the hundred and fifty plus species harvested in this fishery only two populations are at an optimal level – snoek and yellowtail (Cawthorn *et al.* 2011). Geelbek and kob (kabeljou) are well known South African linefish species, both are often available in restaurants, while their populations are said to be overexploited and require rebuilding (Cawthorn *et al.* 2011), as reflected in their Southern African Sustainable Seafood Initiative (SASSI) classification (see below).

#### *1.1.1.4 Possible solutions*

There is a growing concern for the oceans and the animals within, a number of schemes started to protect this marine life, the beginning of which has been termed the 'sustainable seafood movement' (Roheim 2009). The earliest example is the dolphin-friendly tuna ecolabel which started in the late 1980s (Koldewey *et al.* 2009; Jacquet *et al.* 2009). Since this time there have been a wide number of boycotts, ecolabels and consumer awareness campaigns with the first consumer guide becoming available in 1998 (Roheim 2009). The main trend through all of these is to educate consumers, in an attempt to change patterns of household consumption, prevent animal cruelty, reduce overfishing and encourage sustainable fisheries (Jacquet *et al.* 2009). The idea behind this is that people need to understand that our behaviour has an impact on the environment (Oakley *et al.* 2008).

##### *1.1.1.4.1 Boycotts:*

Not only have there been attempts at assisting consumer purchases by: certifying selected fisheries, offering the public information and purchasing guidelines but there have also been attempts to blacklist the support of certain species, all with the intended end goal of increasing awareness and decreasing overexploitation (Roheim and Sutinen 2006; Jacquet *et al.* 2009). Since the late 1990s/early 2000s, there have been two main blacklisting attempts, more commonly known as boycotts – one to protect swordfish, the second was for Patagonian toothfish (Roheim and Sutinen 2006). The former was termed 'give swordfish a break'; in this many chefs were informed around the issues surrounding the overexploitation of this species, 700 of whom completely boycotted the use of swordfish for two years, until improvements were made in the fishery (Jacquet *et al.* 2009, Koldewey *et al.* 2009). The second boycott which has been highlighted is 'give the Chilean

seabass a pass', started in 2002 in an attempt to reduce the demand for this species mainly in the USA, this program was still in action in 2006 (Roheim and Sutinen 2006).

#### 1.1.1.4.2 Ecolabels:

Various practices which involve food production have been scrutinised due to outbreaks of diseases or production methods which are not deemed satisfactory by concerned consumers (Nilsson *et al.* 2004). Specific examples of these can be taken from Europe (including the European Union), which has been exposed to many different types of ecolabels. These programs are used to assure consumers of quality and environmental credibility (Nilsson *et al.* 2004). In these countries the spreading of various diseases, such as; mad-cow disease, salmonella and foot and mouth disease along with reported cases of animal cruelty, has resulted in the introduction of many ecolabels for terrestrial and aquatic products alike (Nilsson *et al.* 2004). These labels are used to communicate with consumers the quality and measures taken to ensure they meet specific standards, and indicate that the product is less harmful to the environment/animals than competitive products (Nilsson *et al.* 2004; Ponte 2006; Roheim and Sutinen 2006). By making use of these labels, it allows consumers the opportunity to support one brand/company over another, based on their ecological production methods depending on the presence of the ecolabel or not (Roheim & Sutinen, 2006; Hallstein & Villas-Boas 2009; OECD 2009; Thøgersen, Haugaard, & Olesen, 2010).

According to Jacquet *et al.* (2009) there are eight ecolabels which are involved with fisheries worldwide, the aims of these labels is to provide information about: the sustainability of the fish, on the contamination level of the fish (methylmercury) or as third party assessors (Jacquet *et al.* 2009). Specifically for these fishery ecolabels there are 3 types of 'party labels', according to Ponte (2006), these are:

- First party labels: initiated by individual companies, these are used to promote their own values and efforts to the public
- Second party labels: created by an industry, occasionally with inputs from conservation groups for use on the members products evaluation, can be verified
- Third party labels: developed by any institution but those involved directly with the seafood, requires the use of a certification system, a licensed label and accredited certifiers.

Two of the oldest of these ecolabels are: dolphin-friendly tuna and the Marine Stewardship Council (MSC), both of which originated towards the end of the 1980s and 1990s, respectively (Jacquet *et al.* 2009). Due to the apparent failure of the law, both internationally and locally, there seems to be to be a movement towards "voluntary codes of conduct and market based incentives" (Ponte, 2006), an example of which would be an ecolabel.

The accidental capture and killing of dolphins in the tuna industry resulted in public outcries and eventually led to the development of the dolphin-friendly ecolabel, which is displayed most commonly on tinned tuna (Koldewey *et al.* 2009). The dolphin-friendly tuna ecolabel was developed by the Earth Island institute Non-Government Organisation (FAO 2011a) and has expanded since its inception, with the scheme verifying 468

companies, in 66 countries, through 486 inspections during 2009 (Earth Island 2011). The main aim of this ecolabel was to promote animal rights, the protection of dolphins and the environment (Ponte 2006; Earth Island 2011). This ecolabel, which claims its guidelines are followed by more than 90% of tuna companies worldwide, has various criticisms – one of which is that they do not consider the stock status of the tuna (FAO 2011a).

The second oldest fishery ecolabel is the Marine Stewardship Council (MSC). It was founded in 1996 - 1997 as a joint venture between the World Wide Fund for Nature (WWF) and Unilever (Ponte 2007; Jacquet *et al.* 2010). The former is the biggest non-profit organisation in the world, while Unilever is considered one of, if not the biggest frozen seafood trader (Ponte, 2006). According to the MSC, a fishery must operate in a manner which will support an ongoing fishery without risking of overexploitation, in a well preserved and productive ecosystem, while abiding by all of the laws (Jacquet *et al.* 2010). This non-government organisation focuses on three main factors: target stock status, environmental impact of the fishery and fishery management (Ponte, 2006). During the voluntary MSC certification process, a fishery will undergo rigorous inspections by the third party assessors; if they are deemed competent they will be granted the right to use the MSC logo on their products to portray their support to consumers (MSC 2011).

The MSC gained independence from its two parent companies in 1999, and during 2000 and 2004 the MSC certified six fisheries, which produced approximately 0.5 million tons per annum (Jacquet *et al.* 2010). After this period there was an increase in certification rate and at present, the Marine Stewardship Council certifies just over 6 million tons of seafood per year. By the end of 2007, the MSC had 22 certified fisheries, with a further 30 under full assessment and over 1000 products on sale, in 34 countries, which equates to more than 7% of the world's edible fish being certified (FAO 2011a). Two years later, at the end of 2009, over two and a half thousand products were certified, which were available in 52 countries (FAO 2011a). The FAO realised that ecolabels were growing in popularity and in order to maintain uniformity they put a set of standardised voluntary guidelines into place for seafood labelling, which had minimum requirements for any ecolabels (Jacquet and Pauly 2007). According to FAO (2011b), the Marine Stewardship Council, is considered to be one of the best known and most trusted ecolabels. The Marine Stewardship Council reported a full consistency with the FAO's ecolabelling code of conduct guidelines in 2006 (MSC 2011), and according to the French authority, FranceAgriMer, who conducted investigations to start their own ecolabel, found the MSC to be the only program consistent with the FAO guidelines (OECD 2009).

Wal-Mart, a massive supermarket chain in the USA, which trades in about 30 million pounds of wild caught seafood annually, expressing their support of MSC in 2006, made a commitment that they would only sell certified fish by 2010 (Jacquet *et al.* 2010). Similarly Pick n Pay, which is a large retailer in South Africa, announced during Marine Week 2011 that their aim is to transform their entire seafood purchasing/sales strategy by 2015, having committed to only selling seafood which is deemed to be sustainable by the Southern African Sustainable Seafood Initiative, a local consumer awareness campaign, certified by the

Aquaculture/Marine Stewardship Council or from fisheries which are undergoing improvement projects (Pick 'n Pay 2011).

The Marine Stewardship Council is held in high stead by some, while conversely this same organisation is reported by others (the MSC, as well as the dolphin-friendly ecolabel) as not being as successful as they might appear, it is suggested that there are numerous improvements to be made if they wish to better their efficacy, in terms of sustainability (Ward 2008; Jacquet & Pauley 2010). In addition to this, it is suggested the MSC is 'lagging behind' in the certification of fisheries from developing countries, with only a few representatives from the lower income countries being certified – in spite of the fact that approximately 50% of all seafood is sourced from these areas (Ponte 2012). Foley (2012) makes the pertinent point that an industry gaining MSC certification is more than just a 'tool for sustainability' or 'gaining market access', it allows the organisations the control to accessing the resource and related products. He goes on to highlight that when looking at the shrimp industry in the Canadian provinces of Newfoundland and Labrador, even though the industry is certified by the MSC, the shrimp stocks appear to be changing and /or declining (Foley 2012, Foley 2013).

#### 1.1.1.4.3 Consumer awareness campaigns:

The Atlantic oceans' large predatory species have declined by about half since the 1950s, it is suggested that this is because fisheries managers have been too involved with the industry and dissociated from the conservation concerns (Koldewey *et al.* 2009). In an attempt to increase public awareness around these issues, conservation groups initiated methods to assist/encourage fisheries to improve (Koldewey *et al.* 2009). The first sustainable guide was in the form of a 'sustainable seafood' list displayed in the Monterey Bay aquarium in 1997 (Jacquet *et al.* 2009), while the first guide appeared in Audubon magazine in 1998. Both of these provided consumers with a list of ranked seafood and information to assist them in making environmentally sound choices (Roheim 2009). The published seafood guide made use of the traffic light system, which is simply: green – best choice, orange – acceptable alternatives and red – don't buy. Each species is scored against a pre-determined set of criteria, which will determine the colour category into which they are placed (Roheim 2009). These criteria according to Roheim (2009) will include: catch, harvesting methods and any associated impacts for wild catch species, and any impacts related to aquaculture. Thus, with people knowing a few simple things about the seafood (i.e. what it is, where it is from and how it was caught), they will be able to determine which category it falls into and whether it is an acceptable, eco-friendly, species to consume.

The Monterey Bay Aquarium was the first institution to print a consumer seafood guide in the form of a wallet card (Jacquet *et al.* 2009), a method which is commonly used today, with approximately 200 sustainable seafood guides available internationally (Roheim 2009). Many of which, were initiated by or have the backing of the World Wide Fund for Nature from their specific region (Jacquet *et al.* 2009). WWF South Africa developed its own consumer awareness campaign in late 2004; this program is known as the Southern African Sustainable Seafood initiative, or SASSI ([www.wwfsassi.co.za](http://www.wwfsassi.co.za)). SASSI is based on a collection of other international campaigns (Heyden *et al.* 2010; Cawthorn *et al.* 2011), such as the traffic light system and the scoring systems outlined above. SASSI was developed and began distributing information, which has taken

place in a number of ways, namely the 'SASSI wallet guide' (Cawthorn *et al.* 2011). According to the SASSI website (SASSI 2011), the program has three main goals:

- Encouraging consumers to comply with the laws voluntarily through education and awareness
- Promote sustainable options and move demand away from over-exploited species
- Improve knowledge around marine conservation issues

SASSI hopes that these goals will assist in reversing the damage done to fish stocks, by sharing information with consumers and hopefully changing their purchasing behaviour towards choosing more sustainable options (Cawthorn *et al.* 2011). In an attempt to disseminate information they have made use of a number of methods which include: consumer awareness drives, public talks, a unique SMS function (FishMS), and restaurant and retailer participation schemes (Basson 2010). In addition to working with restaurants and retailers, SASSI has partnered with the Two Oceans Aquarium (Cape Town, Western Cape), the uShaka Marine World Aquarium (Durban, KwaZulu-Natal) and the Johannesburg Zoo (Johannesburg, Gauteng). Members from these three institutions have been trained, equipped and are used as forums to reach members of the public and the restaurant/retailer schemes to further this awareness. Initially zoos and aquariums were only used for people's entertainment, more and more we are finding these institutions being used as places where people visit and learn about conservation issues (Kemmerly and Macfarlane 2009).

There is a rapid introduction of certification schemes and ecolabelling around the world, all of which is proving to increase consumer confusion and frustration – something which should be avoided (Pelletier and Tyedmers 2008). South Africa, might be in a better position as there are two main marine sustainable seafood programs, the Marine Stewardship Council which originally certified our demersal hake fishery in 2005, and again in 2010 (MSC website). The second is SASSI, which was initiated towards the end of 2004. Both of these are voluntary programs, and unless these (or any programs for that matter) are made compulsory, only fisheries (or institutions) who will receive some financial gain will pursue them (Jacquet and Pauly 2007). Jacquet *et al.* (2009), express their support of consumer awareness and people making educated choices, however they highlight that the investments (time and money), might be better suited elsewhere as the industry full of corruption, mislabelling, and cheating, with many retailers over promising and under delivering. According to Pelletier & Tyedmers (2008) "In the case of seafood ecolabelling/certification & consumer awareness programmes, peer-reviewed research regarding the efficacy of the criteria used in accessing & promoting sustainability is limited or non-existent".

Sustainability is a term which is gaining much weight in modern society, however the degree to which it can be applied is restricted by how relevant the term can be evaluated, thus requiring rigorous criteria and analytical investments (Oakley *et al.* 2008; Pelletier and Tyedmers 2008). The relevance of the criteria used to examine consumer awareness campaigns and ecolabels will express a function of their efficacy (Pelletier and Tyedmers 2008). To merit the continual investment into any of the consumer awareness campaigns/ecolabel, they should be able to produce various outcomes of the project, with a set of testable results – the numbers of consumers reached should not be quoted as a measure of success, unless it is coupled with the measurable

improvements in the wild capture fish stocks (Jacquet and Pauly 2007). Jacquet and Pauly (2007) suggest that seafood awareness campaigns should examine their efficacy, if there is little to indicate that the programs are performing, perhaps the focus should be shifted to improving the schemes rather than growing them.

### 1.1.2 What has been done?

Ecolabelling and consumer awareness campaigns are about providing information to consumers and allowing them to make their own decisions about which products to support. Ecolabels provide the certification that the products they are choosing are environmentally acceptable (Thøgersen *et al.* 2010), while consumer awareness campaigns merely provide guidelines to 'eco-conscious' consumers.

There have been a number of studies, which attempt to examine the efficacy of various sustainable seafood programs, internationally. Three such case studies are examined below:

#### 1.1.2.1 International case studies

##### 1.1.2.1.1 Thøgersen, Haugaard and Olesen (2010) – Consumer responses to ecolabels

Based on the premise that in order to attain the full benefit of ecolabelling, there is much needed research which should be done to examine, when and why consumers adopt these ecolabels. This study examined the adoption process of the Marine Stewardship Council ecolabel in the Danish market. It was found that people adopt schemes, at different stages – the 'early adopters' are said to be very important as they get the process started and promote the label to the more reluctant adopters, who then will eventually follow suit as it is part of human nature to copy others. Thøgersen *et al.*, (2010), found that people who had been exposed to ecolabels previously found that there were two extremes with consumer adoptions of ecolabels – they were either slower, i.e. consumers were more cautious and needed to learn more before accepting the scheme, or they adopted them quicker.

In Denmark, the first MSC certified seafood product was introduced into the market in late 2006. Nine months later, consumers could choose between 10 different MSC certified products, at a few supermarkets. The promotion of these products to customers was limited to seeing the label on the products, flyers at the supermarkets and some sparse media coverage. The introduction of the MSC and the MSC labelled products into the country was done using a slow penetration strategy, during a period when there has been many awareness campaigns in Denmark promoting ecolabels in general. Simply put, the MSC was introduced into a market which had been exposed to and which had experience with ecolabels.

For this study the authors set up and collected survey data in August 2007, in a shopping mall in Aarhus, Denmark. The questionnaires were completed by 443 candidates between the ages of 18 – 70, during the week and over weekends. The surveys started with demographic questions and fish consumption questions (for screening purposes), which were followed by questions examining: environmental awareness, sustainable fishing, MSC logo recall and an investigation into ecolabelled product support. The survey ended with examining the perceived credibility of WWF and a few demographic questions.

Thøgersen, Haugaard and Olesen state that decisions to purchase food, arise at the point of sale, thus recognition of a label is more important than recall. In their survey, consumers were asked which label they had seen before and which it meant – of the six which were displayed, the MSC logo was included. 34.2% recognised it, 15.3% said they had a basic understanding about what it meant and 4% understood it, thus over 45% had no recognition of the label. 15.3% of the surveyed persons mentioned they sometimes took the label into consideration when purchasing seafood – this finding aligns itself with the authors' expectations of the 'early adopters'.

*1.1.2.1.2 Kemmerly & Macfarlane (2009) – The elements of a consumer-based initiative in contributing to positive environmental change: Monterey Bay Aquarium's Seafood Watch Program*

The Monterey Bay Aquarium has a clear mission that is to "inspire conservation of the oceans". In an attempt to do so, the aquarium makes use of a number of methods to increase awareness and knowledge, while developing conservation values and conservation-related behaviours. Then, to empower their newly educated, motivated guests they supply them with the tools needed to follow through with this behaviour – enter the Seafood Watch Pocket Guide.

Seafood Watch was established in an attempt to provide the general public with the knowledge they would require to make informed decisions about their seafood purchases. Information, such as pocket guides were disseminated to people in a number of ways - from the aquarium itself and through a number of partner institutions. The ultimate goal was to shift the demand away from unsustainable seafood options, while creating awareness.

In 2003, three years after Seafood Watch's inception, an evaluation of the impact of the program was initiated. These studies were conducted in order to examine which components were effective, while highlighting areas which could be improved upon. This evaluation process made use of a number of strategies to make sense of the program's efficacy, which were combined to give an overall view of the results. The first step was to interview internal staff, partners and key informants (other members of the sustainable seafood movement and members from the seafood industry); this was followed by a survey of visitors to the aquarium. The on-site survey collected data from 726 visitors, who had voluntarily collected a seafood watch pocket guide. These surveys covered 28 items: seafood purchasing behaviour before attending the aquarium, knowledge about the issues (before and after the visit), interest in the sustainable seafood guides and demographic information. In addition to these surveys, focus groups were held with some of the groups being seafood guide holders, but all who volunteered were highly motivated individuals, who were concerned with environmental issues. As a result, they were not a representative sample of the population. Coupled with the focus groups, a collection of 26 local seafood restaurant and retailers were asked whether consumers were asking about sustainability and if the way their business operated had changed in response to this. During the exit survey, of the people who collected pocket guides, almost all of them considered themselves concerned about the environment with about a third of these people being knowledgeable around the issues facing some of the species on the 'avoid' list. 55% of the people mentioned that they had previously not purchased a certain type of seafood due to

various environmental concerns. Those people exiting the aquarium, already in possession of a pocket card, found a greater majority checking the origin of the product (81% versus 54%), similarly more than twice the number of people had questioned restaurant staff about the seafood (55% versus 18%) and not chosen seafood because of environmental concerns (86% versus 45%).

Four months after the on-site interviews, 400 of these visitors were contacted again telephonically. A similar interview was conducted to that in the aquarium, for some of the topics comparisons were made between behaviours before and after the aquarium visit. The telephonic interview included a few open ended questions assessing how the seafood guide was being used, what questions interviewees were asking retailers/restaurant staff and what species they were avoiding since receiving the guide. During the follow up interviews, over 90% of interviewees indicated that the pocket guide had influenced their thinking/awareness, with around a quarter of these people indicating that the guide had made them rethink the sustainability of seafood in restaurants, that it had helped them choose what to buy and that the guide had been influential in their seafood purchases.

The data were analysed in a number of ways depending on the type, independent t-tests, Chi-square and ANOVA were used to test the difference between demographics. Paired t-tests and/or McNemar tests were used to check the difference between aquarium and telephonic surveys, depending on the format of the questions. McNemar tests are employed when persons are surveyed more than once.

#### *1.1.2.1.3 Hallstein & Villas-Boas (2009) – Are consumers color blind? An empirical investigation of a traffic light advisory for sustainable seafood*

Hallstein and Villas-Boas investigated how consumers responded to the sustainable seafood recommendations from a supermarket chain in the United States of America, there were two treatment (i.e. those were the traffic light system had been introduced) stores and 8 control stores (i.e. those were the traffic light system had not been introduced). These recommendations are based on the traffic light system, where green is the best choice, yellow means caution and red is avoid. To examine the impact they looked at total sales of seafood, seafood sales by colour and seafood sales by colour and mercury content. The data were weekly sales information, from a 5 year period, which included sales before and after the sustainable seafood advisory's introduction.

Firstly all of the sales were examined pre- and post- introduction of the program, in the treatment stores versus the control stores. Secondly, all of the seafood sales were examined by looking at colour category and then the colour category combined with the mercury content. Unlike other studies this paper looks at consumers' actual behaviour by examining their purchases and not their attitudes towards sustainable seafood by means of surveys/questionnaires. According to Hallstein and Villas-Boas, a survey in 2005 found that almost 80% of consumers mention the importance of environmental concerns in their seafood purchasing, while 30% say they have chosen not to support unsustainable seafood, and almost half of the consumers questioned are willing to pay between 5 – 10% more for products which are environmentally labelled. A survey

conducted in 2008 amongst the top 20 supermarkets in the USA found that they sold significant numbers of species from fisheries which are considered to be highly unsustainable.

From the data obtained, there was no overall impact of the traffic light system between shops displaying the environmental sustainability advisory and those which did not. Those items which were labelled showed significant changes; green labelled products purchases went up by 29.3%, yellow went down by 27.5%, while the red labels did not seem to make a difference. Similar results were noticed with the inclusion of mercury content and the advisory, as the green low-mercury product sales increased by almost 30% and the yellow products sales decreased by about 24%. The green and red category fish not listed on the mercury list did not notice a change in sales, while the yellow category fish decreased sales by 53.1%.

The data from this study was applied to a difference-in-differences identification strategy, which allowed for estimates of the impact of traffic light system on consumers' purchases. To examine the overall effect of the presence of the advisory on sales, a standard difference-in-difference estimator was employed, which had fixed; store, product and week effects. The variables were adjusted depending on which factor was being examined (i.e. effect of label colour or mercury content).

#### *1.1.2.1.4 Summary of the international case studies:*

From these three examples, the following points are pertinent:

1. The amount of advertising, information dissemination, pre-existing schemes/ecolabels and early adopters can influence how long the program takes to diffuse into the market place
2. In the first two case studies, i.e. MSC in Denmark and Monterey Bay Aquarium, they used a sample size of 443 and 726 respectively and both made use of surveys/questionnaires: face-to-face, telephonically or both
3. Both sets of surveys included demographic information, which were conducted in one place (i.e. a shopping mall in Aarhus, Denmark and the Monterey Bay Aquarium)
4. The third case study made use of multiple methods, which were then combined to get an overall perspective of how effective the program was
5. The last study results' showed that the consumers surveyed did not make use of the provided seafood sustainability advisory, and concluded that products need to be physically labelled with their actual colour category

#### *1.1.2.2 South African case study*

##### *1.1.2.2.1 Evaluations of the South African sustainable seafood programs:*

In South Africa, there are two sustainable seafood programs - SASSI and the MSC. The Marine Stewardship Council has conducted no formal means of consumer survey in South Africa, while SASSI on the other hand have attempted to do so. They put together a monitoring and evaluation report in June 2010 (Basson 2010), the findings and main points from this are discussed below:

Since the inception of SASSI, the program has grown and developed, to such an extent that the listing was completely re-done, with all of the species included undergoing a more robust scientific assessment, which was reviewed by a panel of experts. Prior to 2010 the only consumer surveys which were conducted were at food shows, which were mainly hosted in Johannesburg, Cape Town, Durban and Knysna – it was mentioned that due to forum of these shows there is not much opportunity to talk to the attendees. The surveys generally included: if and where people had heard of SASSI, what their choice seafood was and if they are aware of any conservation issues around this species. The awareness of SASSI from these surveys had grown from 11% to 54% between 2006 and 2009.

The first national survey was conducted in 2010, in which an independent surveyor was employed to determine the main seafood consumers and their demographics, relative amount of people who have versus those who haven't heard about SASSI and whether SASSI has influenced their behaviour. During the survey, 2000 individuals of the South African public were questioned, in a face-to-face interview. Random suburb sampling was employed to select interviewees, who were interviewed in their homes. The results of this survey found that of the 70% of respondents who have purchased seafood in their lives, with the number one choice being canned, followed by frozen, with half never having bought fresh fish or gone to a fish restaurant. From the study, it was found that the main characteristics of the respondents that have purchased fish are: white, coloured, Indian or Asian, live in Cape Town, earn more than R15 000 as a household, are older than 50 and married.

67% of the respondents did not have an understanding around issues associated with fishing and sustainability, or care. This percentage represented coloured and black people, who are unemployed and live in the Eastern Cape. 60% of respondents mentioned the onus was on the retailers to ensure the fish is sustainable, while 70% of the respondents see their health taking precedent over that of the environment. 34% of the sample, who were determined to be the most environmentally aware were either White or Indian, older than 50, residing in Durban, well-educated and earning more than R15 000 per month, but only 36% of this group was aware of SASSI. The surveys also identified two other groups of people, the one group was most interested in the fashion statement made by eating seafood over the sustainability issues, the individuals in this group were surprisingly, young, black mothers, living in Gauteng who earn less than R2500 per month, themselves. The additional group relates to people who have little, or no, interest in environmental issues – they are more than likely black males who are unemployed or earn less than R8000 per month.

Overall, from the 2010 findings, SASSI found they were reaching more of their non-target market (6%), than their actual target market (5%) – although it was pointed out that these numbers might not differ significantly, and some investigation might assist in getting a more directed marketing plan and focus on the target market. The target market, which makes up 28% of metropolitan South Africa, includes people who purchase fresh fish or go to fish restaurants once or more a month. Those who purchased fresh seafood were mostly white, over the age of 50, lived in Cape Town or Durban, and earned more than R15 000 per month. While those who ate

at seafood restaurants were mostly white, earned ≥R15 000 per month, but were not limited to any town. The individuals who were most aware of SASSI were white and live in Gauteng (Basson 2010).

From this SASSI monitoring and evaluation report, we can see that generally speaking people who are concerned about the environment – tend to be those earning the ‘higher’ salaries.

## **1.2 Research approach**

It has been suggested that introducing a sustainable program into a region where many others previously exist, has a number of potential outcomes – either the uptake will be more rapid as people know what to expect, or it will be slower due to the fact that people are more cautious. In addition to these factors, attempting to alter or change human behaviour is a fairly challenging task (Jackson 2005). Jackson (2005) goes on to say that “habit often undermines the best of intentions”. In South Africa, we are in the situation where there are limited sustainable seafood ecolabels/campaigns – there are in fact only two: SASSI and the MSC. Both have been in the country since 2004, the question is: have they been effective at reaching consumers? Has their presence changed the peoples’ seafood purchases? Have members of the public been able to adjust their intentions and their behaviour?

In an attempt to collect this information from people, there are many methods which may be used – for this study however, surveys have been employed. These popular methods of data collection are used by many different establishments/individuals to gather the information they seek (such as feelings, values and behaviour) and can take many different forms (face-to-face, self-administered, electronic and telephonic) (Fink, 2009). The person(s) surveying must decide on the purpose of the survey and the questions to ask, as they are responsible for processing, analysing and interpreting the obtained data (Fink, 2009). To ensure the planned survey questions and methods are effective, it is important to pilot these (David & Sutton, 2004). David and Sutton (2004), go on to mention the steps required to take before going ahead with the full scale survey – the first is to show the themes and questions to colleagues and field experts, followed by a pilot study, in this a small sample of the target group will be surveyed. These steps are necessary as they will help identify problem areas which can be corrected, ultimately avoiding faulty questions which lead to faulty data (David & Sutton, 2004).

### **1.2.1 Aims and objectives**

In order to examine whether or not what people are saying and doing correlates, a multi-pronged methodological approach was chosen for this study. This study made use of surveys for consumers which examined the reach of SASSI and the MSC, by means of logo recognition and the consumers’ subject matter knowledge tested, following the approach of Thøgersen, Haugaard and Olesen (2010) and Kemmerly & Macfarlane (2009). Not only was their knowledge examined but also the forum in which it was gained, possibly assisting these schemes to focus their outreach in the longer term.

This study, aims to offer some insight to these schemes, whether or not their investments are indeed having an impact on consumer purchasing behaviour, who they are reaching, how they are reaching the audience and how successful they have been in educating and changing the purchasing behaviour of the consumers reached. In a wider perspective, the results could assist these programs make improvements and potentially allow for a larger study, with a wider geographical range to take place.

### 1.2.2 Hypotheses

Three main hypotheses that were aimed to be investigated were:

- H1:** There is no recognition of SASSI and/or MSC by the target market
- H2:** There is no difference in recognition of either program, between consumers at SASSI and non-SASSI retailers
- H3:** There has been no change in consumer behaviour (i.e. purchasing or asking questions in stores/restaurants), towards making 'greener' seafood choices

As no study similar to this has been conducted within the same framework (i.e. a face-to-face consumer survey conducted in retail outlets, focusing on middle to upper class areas), outlined below, there is no base line to use as a starting point. As this is so, all of the hypotheses assume the lowest possible recognition/influence of either of the programs. In keeping with the standard practice of semi-structured interviews, there were a number of questions included – some of which might appear to be outside the scope of the study (i.e. seemingly unrelated to the hypotheses). This was done for a number of reasons; to allow time to build rapport, encourage the flow of conversation (i.e. consumer participation), possibly to uncover any relationships and keep in line with the fact that this study was initiated with the potential of forming the basis for a larger study, one day.

This will be explained in Chapter 2, the project was scoped to be carried out in Cape Town and to target households with a minimum income which exceeds R5000, per month.

### 1.2.3 Thesis overview

In line with the University of Cape Towns' Faculty of Science requirements, the findings of this project are presented in the form of a draft journal article, which makes up chapter 2, and the corresponding appendices. Chapter 3 presents a personal evaluation of the project and conclusions for possible future work.

## Chapter 2

### **The reach and impact of SASSI and the MSC on consumers in the Cape Town area, examining the top favoured seafood species**

This Chapter presents the results of the project, prepared for submission to the South African Journal of Science. The journal accepts articles of 6000 words in length and a maximum of 10 figures and/or tables, while allowing for the publication of supporting or supplementary information in appendices. In order to maintain uniform appearance of the thesis, citations are not yet formatted in journal style.

#### **2.1 Abstract**

The 'sustainable seafood movement' is over 20 years old, and has made use of numerous methods in an attempt to educate consumers about seafood. In South Africa, there are two such campaigns: the Marine Stewardship Council (MSC) and the Southern African Sustainable Seafood Initiative (SASSI). This study aimed to investigate the awareness of consumers at major retail outlets in Cape Town of these initiatives, and to link awareness with seafood consumption behaviour. It used face-to-face surveys, which were conducted at all times of the week in outlets of three major supermarket chains located at five middle-class shopping centres. Aspects investigated included consumers': recognition of the MSC and SASSI; preferred seafood species; production method(s); and favoured sources of seafood. The data were analysed by means of chi-squared ( $\chi^2$ ) analysis. The MSC label was recognised by slightly over a tenth of the consumers and SASSI by just less than half. Overall it was found that shoppers were more concerned about the quality and value for money, than the type, sustainability and size of their seafood. Consumers who shopped at the retail outlets which have a working relationship with SASSI did not show a higher awareness of SASSI. Even the consumers who were the most aware of SASSI and/or the MSC, and indicated that they considered sustainability a factor when making seafood choices, still favoured species from fisheries the sustainability of which is classified as problematic. The results point to raised awareness, yet unchanged purchasing behaviour.

#### **Keywords**

Sustainable seafood movement; Marine Stewardship Council (MSC); Southern African Sustainable Seafood Initiative (SASSI); Cape Town, South Africa

#### **2.2 Introduction**

The unsustainable utilisation of marine resources has resulted in a growing concern for the oceans, and the animals within. In response to this a number of schemes started to protect this marine life, the beginning of

which has been termed the 'sustainable seafood movement' (Roheim 2009). The earliest examples are the: dolphin-friendly tuna and Marine Stewardship Council ecolabels which started in the late 1980s and early 1990s, respectively (Koldewey *et al.* 2009; Jacquet *et al.* 2009). Since the inception of these programs, there have been a number of boycotts, ecolabels and consumer awareness campaigns initiated globally (Roheim 2009). All of these have the main theme: to educate consumers, in an attempt to change patterns of household consumption; prevent animal cruelty; reduce overfishing and encourage sustainable fisheries (Jacquet *et al.* 2009), the key idea to make people understand that their behaviour has an impact on the environment (Oakley *et al.* 2008).

Boycotts are initiatives which attempt to blacklist the support of certain species, all with the intended end goal of increasing awareness and decreasing overexploitation (Roheim and Sutinen 2006; Jacquet *et al.* 2009). Ecolabels are used to communicate with consumers the quality and measures taken to ensure they meet specific standards, and indicate that the product is less harmful to the environment/animals than competitive products (Nilsson *et al.* 2004; Ponte 2006; Roheim and Sutinen 2006). By making use of these labels, it allows consumers the opportunity to support one brand/company over another, based on their ecological production methods depending on the presence of the ecolabel or not (Roheim and Sutinen 2006; OECD 2009; Hallstein and Villas-Boas 2009; Thøgersen, Haugaard and Olesen 2010).

Consumer awareness campaigns are formed on the basis that with people being more educated about seafood (i.e. what it is, where it is from and how it was caught), they will then be able to determine whether it is an acceptable, eco-friendly, species to consume. The first sustainable guide was in the form of a 'sustainable seafood' list displayed in the Monterey Bay aquarium in 1997 (Jacquet *et al.* 2009), while the first guide appeared in Audubon magazine in 1998. Both provided consumers a list of ranked seafood and information to assist them in making environmentally sound choices (Roheim 2009). Each ranked species was scored against a pre-determined set of criteria (catch, harvesting methods and any associated environmental impacts), which determined the colour category into which they were placed. The published seafood guide made use of the traffic light system, which is simply: green – best choice, orange – acceptable alternatives and red – don't buy. The Monterey Bay Aquarium was the first institution to print a consumer seafood guide in the form of a wallet card (Jacquet *et al.* 2009), a method which is commonly used today, with approximately 200 sustainable seafood guides available internationally (Roheim 2009), many of which were initiated by or have the backing of the World Wide Fund for Nature from their specific region (Jacquet *et al.* 2009).

However, attempting to alter or change human behaviour is a fairly challenging task with "habit often undermining the best of intentions" (Jackson 2005).

In South Africa there are two main sustainable seafood programs, the Marine Stewardship Council (MSC) and the Southern African Sustainable Seafood initiative (SASSI). The MSC ecolabel originally certified the South African demersal hake fishery in 2005, and again in 2010 ([www.msc.org](http://www.msc.org)). The second is a consumer awareness

campaign, SASSI ([www.wwfsassi.co.za](http://www.wwfsassi.co.za)) and was developed in late 2004, by WWF South Africa, based on a collection of other international campaigns (Heyden *et al.* 2010; Cawthorn *et al.* 2011).

Pelletier and Tyedmers (2008) and Jacquet *et al.* (2009), express their support of consumer awareness programs, however they highlight that it is essential that the efficacy should be examined to validate continual investment (time and money) into the programs. There have been a number of attempts to examine the impacts of various sustainable seafood programs outside of South Africa. These studies have made use of a number of methods: face-to-face surveys, telephonic interviews and examination of sale data. In South Africa, at the time of this study, SASSI had conducted one formal survey to examine their impact in June 2010 (Basson 2010), while the MSC had not.

### 2.2.1 Aim and scope of the study

This study focussed on Cape Town, South Africa's second largest city and metropolis of the Western Cape Province with important industrialised and small-scale fisheries. It is aimed at offering some insight to consumer knowledge of SASSI and the MSC: who they are reaching and how successful they have been in educating and changing the purchasing behaviour of the consumers reached. As no study has been conducted within the same focussed framework before; there is no base line to use as a starting point, and the lowest possible recognition/influence of either of the programs was assumed. In order to address the various questions, I investigated three hypotheses:

**H1:** There is no recognition of SASSI and/or MSC by the target market

**H2:** There is no difference in recognition of either program, between consumers at SASSI and non-SASSI retailers

**H3:** There has been no change in consumer behaviour (i.e. purchasing or asking questions in stores/restaurants), towards making 'greener' seafood choices

An international study found consumers who earned a higher monthly income (>\$75 000/annum) had a greater chance to support sustainable seafood when compared to those consumers who were not in the same income bracket (i.e. <\$40 000/annum) (Kemmerly and Macfarlane 2009). According to Professor Simpson, of the University of Cape Town's Faculty of Commerce, (pers. comm. 2011) only the top 13% of the South African public (i.e. those which earn >R5500.00 per month) are in the position, financially speaking, to choose which food to buy. The remainder is reported to be limited to priorities which do not include environmental considerations. The study targeted middle-class income households following international and local advice.

When examining the breakdown of the South African households, it is clear to see that there is an array of income brackets (Figure 1), according the South African Advertising Research Foundation's (SAARF) All Media and Products Survey (AMPS), extracted from Eighty20 (Eighty20 2011). Eighty20 is a South African based online company which provides access to market based research; the information comes from data-rich reports. Western Cape households are well represented within all income classes, with the mode falling within the R5000 to R7999 brackets. Figure 2, looks solely at the household income within Cape Town.

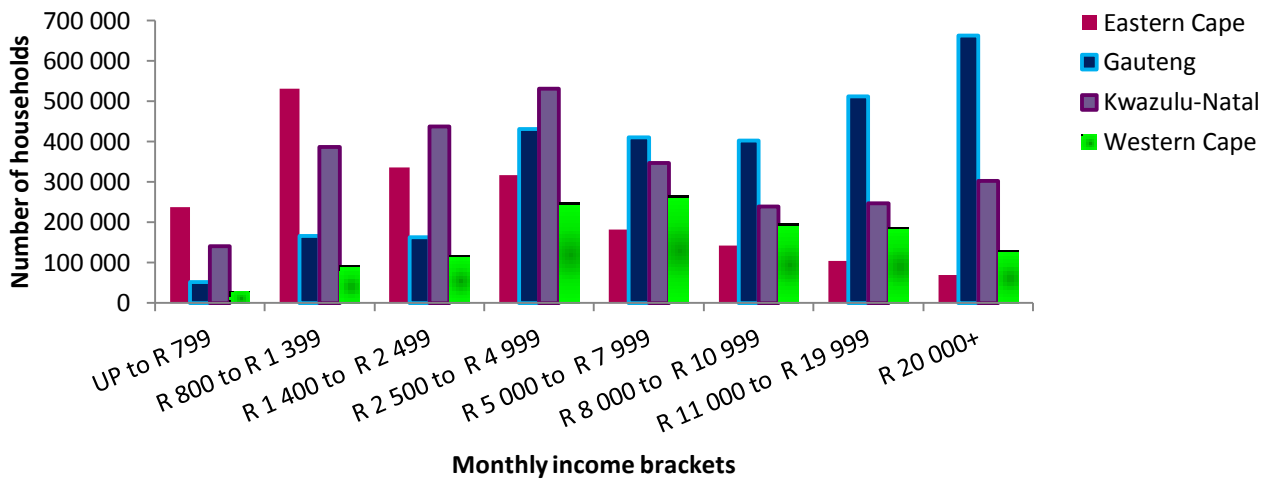


Figure 1: The average monthly household income brackets for the South African economy, extracted from Eighty20 (Eighty20 2011). This focuses on 3 coastal provinces which contribute the most to the South African fisheries (Eastern Cape, KwaZulu-Natal and Western Cape) and the wealthiest province in the country (Gauteng).

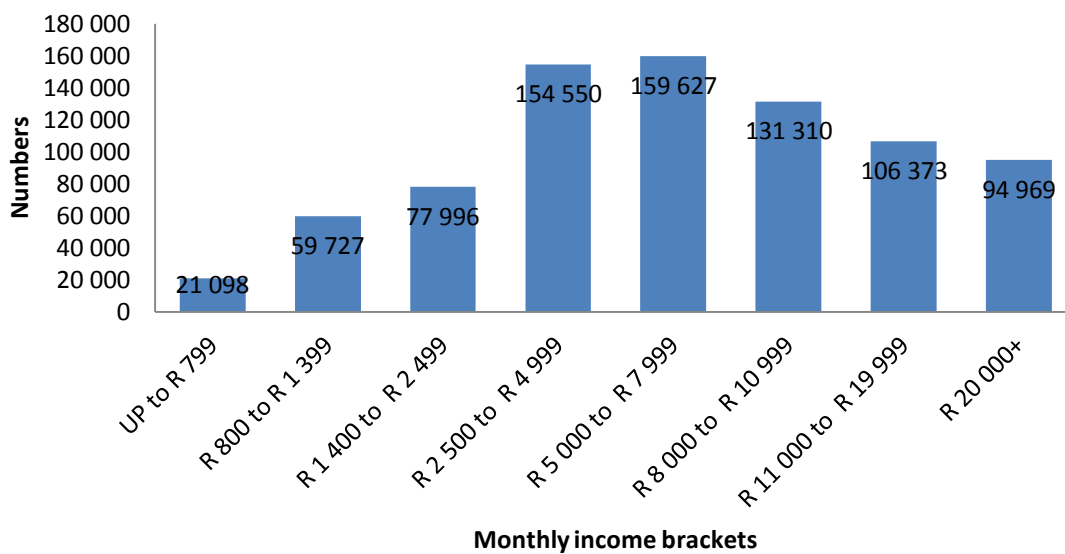


Figure 2: The average monthly household income brackets for Cape Town, Western Cape, extracted from Eighty20 (Eighty20 2011).

According to Cawthorn *et al*, (2011), restaurants and retailers are the most common channels through which seafood produce travels to reach the South African public. Therefore, I aimed the survey at consumers in retail outlets in areas which fall within the middle to upper class income bracket.

## 2.3 Methods and materials

### 2.3.1 Sample

A sample size of 375, randomly selected, individuals was chosen to be interviewed, who fall into the middle to upper class average monthly household income brackets (>R5000/month). To ensure a random selection of candidates, the entire floor of the shop chosen was patrolled, avoiding the bias of favouring areas where 'seafood/fish buyers' would frequent. In addition to this, to avoid any potential candidate bias, every sixth to eighth person passed, was approached and the appropriate introductions were made, which included; greeting the consumer, an introduction of the interviewer and the project and an estimated time frame for the survey. If a potential candidate declined, the selection process was initiated again.

For simplicity, I use the term 'seafood' to apply to both finfish and all other resources harvested from the marine environment, unless specified otherwise.

### 2.3.2 Survey

Popular methods of data collection are surveys, which are used to gather the information (feelings, values and behaviour) and may take many different forms (face-to-face, self-administered, electronic and telephonic) (Fink, 2009). The survey comprised of 16 questions, which were set up as semi-structured interviews. The number of questions and/or time required was kept to a minimum, this was done to: avoid candidate fatigue and concentration span, surveyor fatigue and time constraints. The author was solely responsible for conducting all of the surveys, ensuring there was no variation in the interview style.

To make sure that there was no bias between the time of the day and week when people were surveyed, surveys were conducted during the week as well as on weekends and public holidays. Sampling during the week took place at three different periods; morning (09:00 – 12:30), afternoon (14:00 – 17:00) and evening (18:00 onwards). Sampling on weekends and public holidays was not separated. To maintain a level of continuity throughout all of the shops, 25 surveys were conducted per store, per area. These were broken down as follows:

- 15 surveys (5 per session) during the week
  - Morning, afternoon and evening sessions
- 10 over a weekend and/or public holiday

The survey (Appendix S1) was comprised of a variety of questions, which included demographic information, favoured seafood, preferred production methods and sources of seafood, logo recognition, factors considered when choosing seafood, general knowledge of either of the programs and environmental considerations. This material which may appear was somewhat peripheral, was collected for context but also as material to contribute to improved outreach of one, or both, of the sustainable seafood programs (Kemmerly & Macfarlane, 2009; Thøgersen, Haugaard and Olesen 2010). Questions considered more sensitive (race, age and

average monthly household income were recorded by observation or left to the end of the survey. When enquiring about the factors considered when choosing seafood, consumers were given a selection of seven factors (sustainability, quality, freshness, smell, size, type and price). To ensure all persons surveyed had the same understanding of 'sustainability' a basic definition was given during the surveying process to all candidates:

- Sustainability: making sure there are lots left in the sea without causing severe environmental damage, so fishing can continue

Logo recognition was achieved by offering consumers a selection of six logos, all of which they would encounter during their daily lives, two of which were SASSI and MSC. If SASSI/MSC logos were not recognised, the following prompts were offered:

- SASSI: is the organisation which has grouped fish species into green (go), orange (think twice) and red (avoid)
- MSC: is the Marine Stewardship Council, they are an organisation which certifies sustainable seafood

All of the questions were conducted orally, with the author completing all of the surveys, ensuring that all of the questions were completed and fully understood. At no time was any pressure applied to consumers to answer any questions. If there was the slightest indication of unease or hesitation, the question was skipped and returned to at a later stage once the situation/dynamic felt more comfortable.

### 2.3.3 Areas

Five different areas were selected which were identified as predominantly more 'wealthy/upmarket' according to anecdotal evidence, the areas chosen were (Appendix: Map of Cape Town):

- Blouberg area
- Canal Walk, Century City
- Rondebosch Mall, Main Road
- Kenilworth Centre, Kenilworth
- Blue Route Mall, Tokai

### 2.3.4 Shops

SASSI works with a number of large retailers. In these 'partner' stores, there is informational material provided for consumers in the form of a fish classification poster and wallet cards. Those shops which do not work with SASSI do not provide their consumers with such educational information. MSC ecolabelled products are stocked by all retailers. Pick n Pay and Woolworths have a working relationship with SASSI, while Checkers has not. The SASSI partner stores make up the treatment groups and the non-partner stores, are the control group. One outlet of each was surveyed, per area. To ensure a similar consumer base was surveyed, reducing

the number of influential variables, the treatment and control shops chosen were within a close proximity to one another, where possible within the same shopping centre.

### 2.3.5 Pilot study

In line with good survey practice (David & Sutton, 2004), a pilot study was carried out. Prior to the surveying process being initiated, the questionnaire was tested approximately 20 times, during the hours proposed for the study, in the areas where the full study would be taking place. Once completed a few minor changes were made to increase interviewing speed, an efficient questioning technique was established, as well as a few adjustments to improve the data capturing process.

### 2.3.6 Data analysis

#### 2.3.6.1 Data

The data obtained from the survey, were analysed accordingly in Microsoft Excel, and a specialised statistical software package – IBM's SPSS version 20 (<http://www.ibm.com/software/analytics/spss>). The latter required coded data imported from the Microsoft Excel spreadsheets. These coded data (i.e. nominal, non-parametric) were analysed with Pearson's Chi-Squared distribution ( $\chi^2$ ). Chi-squared was chosen as it is one of the tests used to analyse nominal/coded data, with tests run to ascertain whether associations exist between two or more group (i.e. the variables which were covered in the surveying process) and if this was the case, the significance and strength thereof. The methods for coding and inputting data were carried out in accordance with the guidance laid out in 'Discovering statistics using SPSS' (Field 2009). A 95% cut off was applied to determine significance.

The test variables which showed significant relationships are reported, along with their statistics (chi-squared value ( $\chi^2$ ), degrees of freedom (df), level of significance (P)). The test variable was named as such purely for clarity/simplification, in no way does this indicate that this variable was in-/dependant, neither of these are applicable in chi-squared tests.

*Post-hoc* tests are not available for nominal, non-parametric data; instead layered analyses were run to further investigate the occurrence of additional associations. In an attempt to explain a layered analysis, one could use the following example: of the people aware of *x*, how many of them do so because of *y* and *z*. From this it can be seen that by selecting only the people aware of *x*, this will automatically exclude those who are not. Then on this, smaller, more specific group of people, a test is run.

## 2.4 Results

### 2.4.1 Descriptive statistics

During the survey it was found over 90% of the consumers had eaten seafood within the last six months, which exceeds the findings discussed by Basson (2010), with a majority classifying themselves as the shoppers in the household – either solely or shared with their spouse/partner/housemates. Almost all of the respondents were South African, or had lived with in the country for long enough to consider themselves South African (Table 1).

In two surveys, gender and ethnic observations were not recorded, in the analyses which examined gender and ethnicity these two surveys were not included, therefore totals were 373, and not 375. Two thirds of the consumers interviewed were women. White consumers made up the majority of the ethnic groups surveyed closely followed by Coloured consumers, then Black, Indian and Asian consumers (Figure 3). The age of consumers interviewed ranged between 18 and 92 (Figure 4).

**Table 1:** Summary statistics for the basic statistics obtained from the surveying process

	Yes		No	
	Percentage (%)	Actual	Percentage (%)	Actual
<b>Eaten seafood in the last 6 months</b>	91	341	9	34
<b>Household shopper</b>	92	344	8	31
<b>South African</b>	98	368	2	7



**Figure 3:** Gender (left) and ethnic (right) breakdown of the consumers interviewed.

In response to the question on their favourite seafood and production method, where responses were not limited to one, 37 species were named and three groups ('SASSI green fish', 'sushi' and 'eats any seafood'). These groups include consumers who mentioned that they would only support/purchase seafood which was 'green-listed' according to the SASSI colour classifications; a favoured seafood dish was sushi; and/or they said they would eat any kind of seafood. For the consumers who mentioned sushi without elaborating, the type of

seafood used in the sushi was sought after; this along with their initial response (sushi) were included (Figure 5).

In contrast to Basson (2010), where tinned (i.e. pre-prepared seafood) was the most popular, in this study fresh seafood was the most favoured (66.6%), followed by frozen (30%) and then pre-prepared (21%), i.e. tinned fish and seafood prepared at shops and/or restaurants. The sources of their seafood ranged from supermarket chains to catching it themselves. The top five sources for seafood included; the two treatment retail outlets, Pick n Pay and Woolworths (34.6% and 24.8%, respectively). These were followed by restaurants (17.1%), the control retail outlet, Checkers (14.4%), and fish mongers and fish shops (12.3%, for both) (Figure 6).

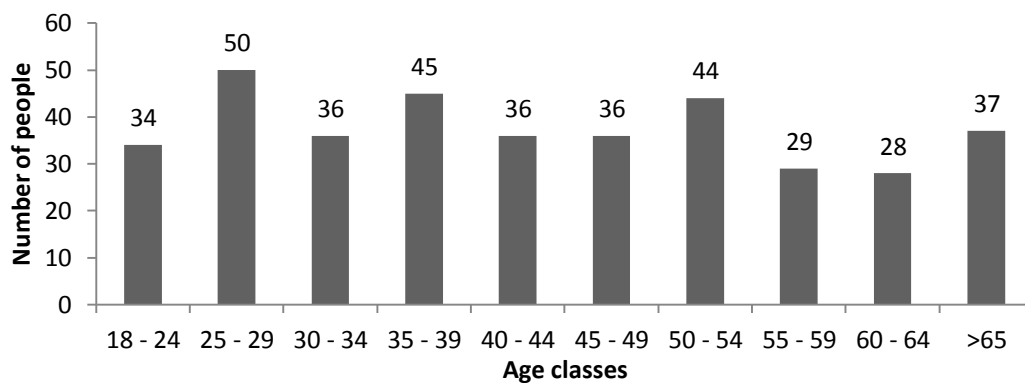


Figure 4: Age class distributions of the consumers which took part in the survey

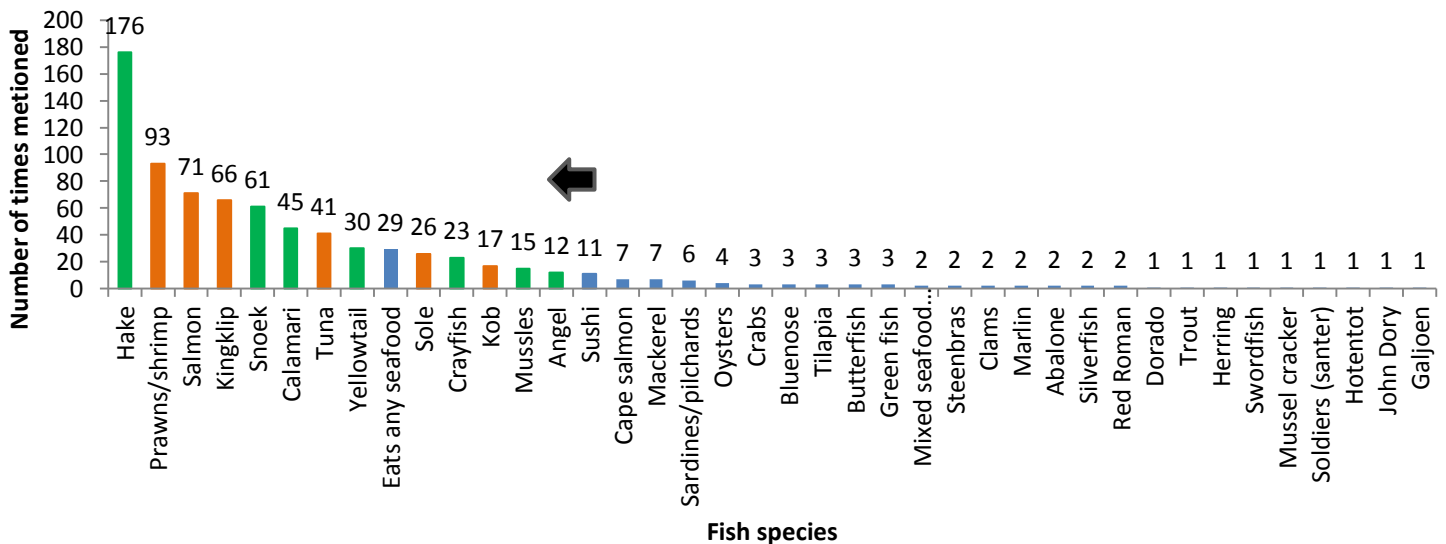
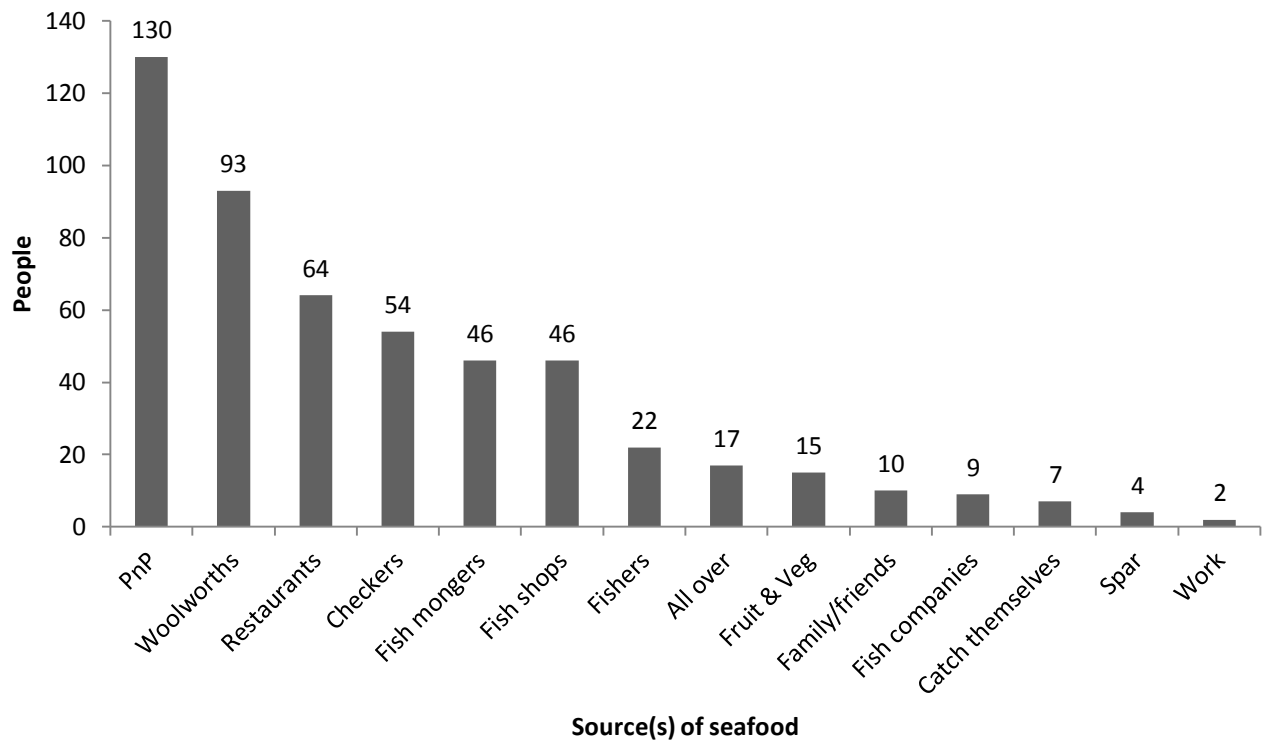


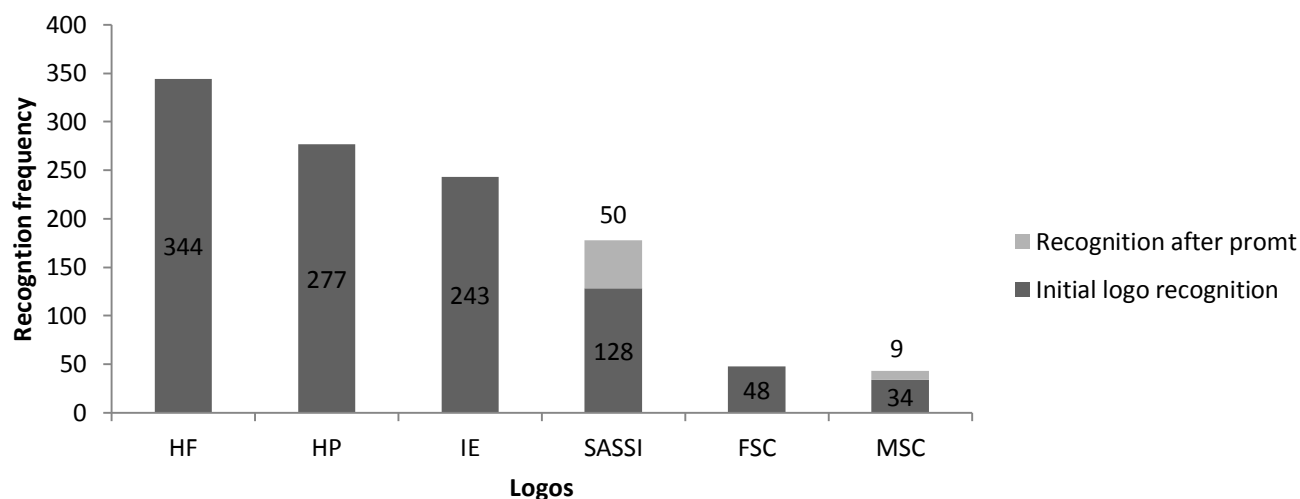
Figure 5: Frequency of the consumers favoured seafood species highlighting the top 15 species/groups; additionally the coloured bars indicate the species SASSI colour classification, where applicable. Note: choices were not limited to one.



**Figure 6:** Frequency of the consumers' seafood sources mentioned during the surveying process. Note: choices were not limited to one.

The recognition of SASSI was somewhat higher than that noted in Basson (2010), where ~12% of the sample size was aware of the program. From this study, 34% of the consumers recognised the SASSI logo after seeing it, and 13.5% mentioned they had heard of the program once they received a prompt, increasing the recognition to 47.5% overall. It would be expected that this level of recognition would be from consumers at both partner and non-partner stores, which would relate to around 119 (250\*47.5%) consumers showing recognition at the partner stores and about 59 (125\*47.5%) consumers at the non-partner stores. It was found that recognition was higher than expected at the partner stores, 126 (50.4%), and lower than expected at the non-partner stores, 52 (41.6%). However, the chi-squared test found no significant difference between non-/partner stores, i.e. expected values and actual results ( $\chi^2 = 6.34$ ,  $df = 4$ ,  $P = 0.175$ ). 9% of the interviewees (34) recognised the MSC logo, with a further nine candidates indicating they had heard about it once prompted, which increased the recognition to 11.5% (Figure 7). Consumers' recognition of the individual programs ranged from having seen it previously to being able to give specific information about it.

White and Indian consumers showed the highest overall awareness of SASSI, which was followed by Coloured Black and Asian consumers, thus showing a significant difference between ethnicities ( $\chi^2 = 28.95$ ,  $df = 8$ ,  $P < 0.001$ ). As expected, consumers who had eaten seafood within the last six months were more likely to recognise the SASSI label than those who had not ( $\chi^2 = 7.398$ ,  $df = 2$ ,  $P = 0.025$ ).



**Figure 7:** Logo recognition of the consumers interviewed, initial and once a prompt had been offered (HF = The Heart Foundation, HP = Hewlett Packard, IE = Internet Explorer, SASSI = Southern African Seafood Initiative, FSC = Forestry Stewardship Council, MSC = Marine Stewardship Council)

Consumers who indicated their recognition of either SASSI or the MSC were given the option to classify ten fish species into the various SASSI colour categories, and ascribe the MSC certification, if applicable. This was attempted by more than half of these customers (95), 16 of whom scored between 0 - 49%, the remaining 79 scored between 50 – 100%. Two people attempted ascribing MSC; one consumer said yes to all of the species being MSC certified, while the other seemed to guess haphazardly.

Underlining the limited awareness of the green-labels, the results for factors which were deemed most important by consumers for their choice of seafood, in order of importance, were: quality (92%), freshness (91.7%), smell of the seafood (80%), price (53.6%), seafood type (50.4%), sustainability (34.1%) and the (legality of the caught) size (18.7%).

Additional descriptive statistics of the survey are provided in Appendix S2.

#### 2.4.2 Results pertaining to the top five ranking seafood preferences

This section presents results pertaining to the top five favoured seafood choices, in order of popularity. These are discussed below with their specific relationships found discussed and reported in Tables 2 and 3, below. Table 2 focuses on the variables; preferred production method(s), source(s) of seafood, and consumer awareness. Table 3 focuses on the factors considered by consumers when making their seafood choices. These relationships could be either positive or negative (e.g. there was a significant lack/amount of recognition by consumers). As the specific species were not outlined/identified during the surveying process, the type of seafood was only referred to by their common name, thus no scientific names are included here.

#### 2.4.2.1 Hake

Almost half (46.9%) of the interviewees indicated that a favourite choice of seafood was hake, the most popular form being fresh. Hake was most popular amongst the consumers in the upper half of the age categories (45 to +65), with over half (53.84%) of the consumers in this age bracket indicating this preference, with the most popular sources being Pick n Pay and Checkers. This same age bracket mentioned the type (Table 3, hake, type a) and price (Table 3, hake, price a) of seafood purchased was important, while they showed no significant concern for the size (Table 3, hake, size a) nor recognition of the MSC.

The consumers' levels of awareness around SASSI and the MSC (Table 2, hake, MSC b), found that they were unaware of one, or both of the programs. Of those who favoured hake and were unaware of either program, a majority were from Tokai and Canal Walk, followed by Kenilworth, Blouberg and Rondebosch. In addition to this, the consumers who favoured hake were less likely to take note of the (legality of the) size (Table 3, hake, size b) of the seafood they were purchasing, i.e. the analyses showed a significant relationship with consumers answering 'no' more often when asked whether size was considered.

Price was a factor which was considered and was also associated with shopping area (Table 3, hake, price b). Of the consumers who favoured hake and considered price, a majority were from Canal Walk, followed by Kenilworth, Tokai, Blouberg and then Rondebosch (Table 3, hake, price c). In a similar order, it was found that hake consumers, who otherwise did not consider the type (Table 3, hake, type b) of seafood eaten, were mostly from Canal Walk and Tokai, followed by those in Kenilworth, Rondebosch and Blouberg.

#### 2.4.2.2 Prawns

A quarter of consumers interviewed (24.9%) mentioned prawns as a favourite, a majority of which indicated frozen prawns were preferred (Table 2). Out of the consumers who favoured prawns, female interviewees showed the greatest preference (76.3%). They were also found to be less concerned with the cost or sustainability of their seafood purchases. This was surprising, as the women who favoured prawns were the most likely to have heard about the MSC.

A relationship was noticed between the lack of awareness of SASSI and area amongst consumers who favoured prawns (Table 2, prawns, SASSI a). A majority of these consumers were from Blouberg, followed by those in Tokai, Rondebosch, Canal walk and Kenilworth. The consumers who favoured prawns and recognised SASSI, once a prompt was offered were mainly from Kenilworth, followed by those in Canal Walk (Table 2, prawns, SASSI b). In addition to this, the prawn consumers from the different areas showed no consideration for the type of seafood.

#### 2.4.2.3 Salmon

The third most popular seafood was salmon, with around one in five people favouring it and preferentially fresh (which could include thawed produce too). Salmon was most likely to be sourced from either Woolworths or Fruit and Veg City.

Overall, there was a significant awareness of SASSI (Table 2, salmon, SASSI a) among consumers who mentioned salmon as one of their favourites. However, there was a difference in awareness around SASSI between ethnicities (Table 2, salmon, SASSI b), with Indian, White and Asian consumers favouring salmon most frequently out of those who indicated they were not aware of SASSI. In addition to this, there was also a lack of recognition around the MSC with consumers who shopped at the various retailers, with Woolworths having the highest number of consumers who were not aware of the MSC. This was followed by Pick n Pay and Checkers.

Consumers surveyed in the different retail outlets, mentioned the type of seafood was an important consideration (Table 3, salmon, type a). The consumers, who indicated this, were found in Woolworths, followed by Pick n Pay and then Checkers. Type was found to be an important factor considered amongst the various ethnic groups. Between these different groups, salmon was the most popular with all of the Asian respondents, followed by the White and Indian consumers (Table 2, salmon, type b). Similarly, there was an expressed concern for type between the different areas surveyed, of these salmon was favoured most in Blouberg, Canal Walk and Rondebosch (Table 3, salmon, type c).

Consumers' consideration of size found that it was to be an important factor. Out of those who favoured salmon and took size into consideration, most of the consumers shopped at Woolworths. Lastly, it was found that neither price nor sustainability of seafood played a role in salmon consumers' seafood selections at various retailers, with those who shopped at Woolworths, followed by Pick n Pay and Checkers.

#### 2.4.2.3 Kingklip

Kingklip was mentioned to be a favourite by just under a fifth of the consumers, and was preferred fresh. The consumers in the upper age classes (45 to +65) favoured kingklip, considering the price and type (Table 3, kingklip, type a) important factors, while being the least aware of SASSI (Table 2, kingklip, SASSI a), the MSC (Table 2, kingklip, MSC a) and not considering sustainability (Table 5, sust. a) or size (Table 3, kingklip, size a) in their seafood choices. Most of the kingklip was purchased from Woolworths or Fish Mongers.

Although there were no initial differences in SASSI recognition between ethnicities, an association with Indian and White consumers emerged after a prompt was offered (Table 2, kingklip, SASSI b). Of the individuals who indicated that size was an important factor, a relationship was noticed with the area of those who favoured kingklip - it was found that a majority were from Blouberg, then Canal Walk and then those in Rondebosch (Table 3, kingklip, size b). Another relationship with size (Table 3, kingklip, size c) emerged between genders,

with women being less likely to consider this factor. Additionally, women who mentioned kingklip as preference were less likely to consider type (Table 3, kingklip, type b) or sustainability (Table 3, kingklip, sust. b) when purchasing their seafood. However, in contrast to the results for prawns, women preferring kingklip were less aware of the MSC (Table 2, kingklip, MSC b).

#### *2.4.2.5 Snoek*

Of the people who highlighted snoek as a favourite (16.3%), the preferred method of production was fresh, with the most common source being directly from fishers/middlemen.

Overall, there was a lack of concern about seafood sustainability by consumers who favoured this species (Table 3, snoek, sust. a). A number of relationships were noticed between the various ethnic groups who indicated they favoured snoek, which was clearly favoured by Coloured consumers. These relationships showed these respondents were; unaware of SASSI and/or the MSC and they indicated type, size and sustainability (Table 3, snoek, sust. b) were not factors they took into consideration when selecting seafood. However, price was a factor which was considered.

Additional findings of the analysis, as well as the results for the species ranking six to fifteen in terms of preference, are provided in Appendices S3 and S4.

2.3.2.6 Analytical statistics for the most favoured seafood

Table 2: Analytical statistics table for the top five species, showing the variables, preferred production methods and sources of seafood, as well as sustainable seafood recognition. All significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

		Variable	Production method	Sources of seafood		Sustainable seafood program awareness			
Hake	<b>Statistics</b>	<b>Age</b>	<b>Fresh</b>	<b>Pick n Pay</b>	<b>Checkers</b>	<b>SASSI</b>	<b>MSC (a)</b>	<b>MSC (b)</b>	
	$\chi^2$	20.99	6.43	14.70	7.85	10.49	20.86	10.92	
	df	9	2	1	1	4	9	4 <sup>1</sup>	
	P	0.013	0.011	<0.001	0.005	0.034	0.017	0.027	
Prawns	<b>Statistics</b>	<b>Gender</b>	<b>Frozen</b>			<b>SASSI (a)</b>	<b>SASSI (b)</b>	<b>MSC</b>	
	$\chi^2$	4.612	5.47			16.41	15.55	4.36	
	df	1	1			4	4	4	
	P	0.032	0.019			0.003	0.004	0.037	
Salmon	<b>Statistics</b>		<b>Fresh</b>	<b>Woolworths</b>	<b>Fruit &amp; Veg</b>	<b>SASSI (a)</b>	<b>SASSI (b)</b>	<b>MSC</b>	
	$\chi^2$		10.34	28.18	4.52	9.04	9.89	11.36	
	df		1	1	1	2 <sup>2</sup>	4	4	
	P		< 0.001	<0.001	0.034	0.011	0.042	0.003	
Kingklip	<b>Statistics</b>	<b>Age</b>	<b>Fresh</b>	<b>Woolworths</b>	<b>Fish mongers</b>	<b>SASSI (a)</b>	<b>SASSI (b)</b>	<b>MSC (a)</b>	<b>MSC (b)</b>
	$\chi^2$	26.21	8.018	4.34	4.11	22.71	8.28	24.54	4.57
	df	9	1	1	1	9	3 <sup>3</sup>	9	1
	P	0.002	0.005	0.037	0.043	0.007	0.041	0.04	0.03
Snoek	<b>Statistics</b>	<b>Ethnicity</b>	<b>Fresh</b>	<b>Fishers</b>		<b>SASSI</b>		<b>MSC</b>	
	$\chi^2$	12.53	5.905	10.42		10.23		9.89	
	df	4	1	1		1		1	
	P	0.014	0.015	0.001		0.037		0.042	

<sup>1</sup> Area

<sup>2</sup> Including prompt

<sup>3</sup> Ethnicity\*SASSI

**Table 3:** Analytical statistics table for the top five species, showing all of the factors considered by consumers while making seafood purchases. All significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

	Factors considered								
<b>Hake</b>	<b>Statistics</b>	<b>Size (a)</b>	<b>Size (b)</b>	<b>Price (a)</b>	<b>Price (b)</b>	<b>Price (c)</b>	<b>Type (a)</b>	<b>Type (b)</b>	
	$\chi^2$	18.93	5.76	20.97	11.91	11.11	19.1	12.10	
	df	df = 9	1	9	1	4	9	4	
	P	0.026	0.016	< 0.013	< 0.001	0.025	0.024	0.017	
<b>Prawns</b>	<b>Statistics</b>	<b>Size</b>		<b>Price</b>		<b>Type</b>		<b>Sustainability</b>	
	$\chi^2$	8.75		5.86		12.22		4.22	
	df	1		4		4		4	
	P	0.003		0.028		0.016		0.04	
<b>Salmon</b>	<b>Statistics</b>	<b>Size</b>		<b>Price</b>	<b>Type (a)</b>	<b>Type (b)</b>	<b>Type (c)</b>	<b>Sustainability</b>	
	$\chi^2$	9.14		9.24	15.62	17.71	11.41	8.98	
	df	2		2	2	4	4	2	
	P	0.01		0.01	<0.001	0.001	0.022	0.011	
<b>Kingklip</b>	<b>Statistics</b>	<b>Price</b>	<b>Size (a)</b>	<b>Size (b)</b>	<b>Size (c)</b>	<b>Type (a)</b>	<b>Type (b)</b>	<b>Sust. (a)</b>	<b>Sust. (b)</b>
	$\chi^2$	19.25	25.6	10.77	5.38	21.03	4.40	20.68	4.32
	df	9	9	4	1	9	1	9	1
	P	0.023	0.02	0.029	0.02	0.012	0.036	0.014	0.038
<b>Snoek</b>	<b>Statistics</b>	<b>Size</b>		<b>Type</b>		<b>Price</b>	<b>Sust. (a)</b>		<b>Sust. (b)</b>
	$\chi^2$	15.7		13.71		11.59	6.78		13.21
	df	4		4		4	1		4
	P	0.003		0.008		0.021	0.009		0.01

## 2.5 Discussion

Roughly half of all the respondents recognised SASSI, while just over a tenth recognised the MSC, with the levels thereof ranging from having seen the SASSI/MSC logo previously to being able to offer information about the program(s). This noticeable difference between the two schemes was expected, as SASSI has had more focus within the borders of South Africa while it is suggested that MSC certification was mainly undergone for export purposes of our fish to the overseas market. This refutes H1 with respect to SASSI and in some way with the MSC. Both of these schemes have, and continue to run, consumer awareness drives with the Marine Stewardship Council increasing the amount of these over the last few years, which may have contributed to the increased awareness over that which was reported in Basson (2010). It was found that those who had eaten seafood in the last six months were more likely to recognise SASSI, which confirmed expectations.

According to SASSI, of the five species examined here hake and snoek are classified as green, while prawns, salmon and kingklip are in the orange category. The two green-listed species were sourced either from Pick 'n Pay, Checkers or directly from fishers. Pick 'n Pay is one of the retailers who works with the SASSI program, while Checkers and individual fishers/middlemen do not. Another of the SASSI partners is Woolworths, which was the one of the sources associated with two orange listed species: salmon and kingklip, alongside Fruit and Veg and fish mongers. Of those who purchased prawns, there was no favoured source, with consumers occasionally mentioning that they would happily shop around for this product. This result was unexpected, as it was thought that those who frequented the shops, which partnered with SASSI and had the educational information displayed, would have shown a stronger support for sustainable seafood. However, confirming the second hypothesis, significant relationship was found between consumers' recognition of SASSI and SASSI non-partner/partner stores, which could possibly explain why the support for the green-labelled species was not 'stronger' at the partner stores. It also draws the SASSI consumer's tools, (i.e. the poster and wallet cards) into question, in line with Hallstein & Villas-Boas (2009).

Consumers who purchase the green-labelled seafood showed little recognition of either of the sustainable seafood initiatives, while those who mentioned they purchase the orange listed species did. This indicates that the consumers, who favour the orange listed species, are more aware of the environmental/sustainability issues yet choose these species anyway. To relate this to the third hypothesis, one can say that although the two sustainable seafood initiatives (and particularly SASSI with its focus on South Africa) have by and large reached consumers, they seem to have had little effect on consumers' seafood purchasing preferences in Cape Town. This finding is in contrast to what was discovered by Kemmerly and McFarlane (2009), who found people who were more aware of the Seafood Watch program made more environmentally sustainable choices.

The consumers who favoured the green-listed seafood (i.e. sustainable), were the same consumers who indicated price was a factor they considered, perhaps due to the fact that they are generally the less 'exotic' (i.e. lower valued) seafood, and their prices suit a limited consumers' budget better. These findings suggest it is possible that middle-class consumers in Cape Town who favour sustainable seafood are doing so because they are generally less expensive and not for sustainability awareness, as they showed no significant recognition of either of the sustainable seafood initiatives. The respondents, who favoured the orange listed species, did not consider price a determining factor in their purchases. Those who favoured kingklip and fell in the upper age bracket, did indicate price as a factor they considered and it is suspected that these consumers look for kingklip 'specials', since they were conscious of the price and type of seafood selected.

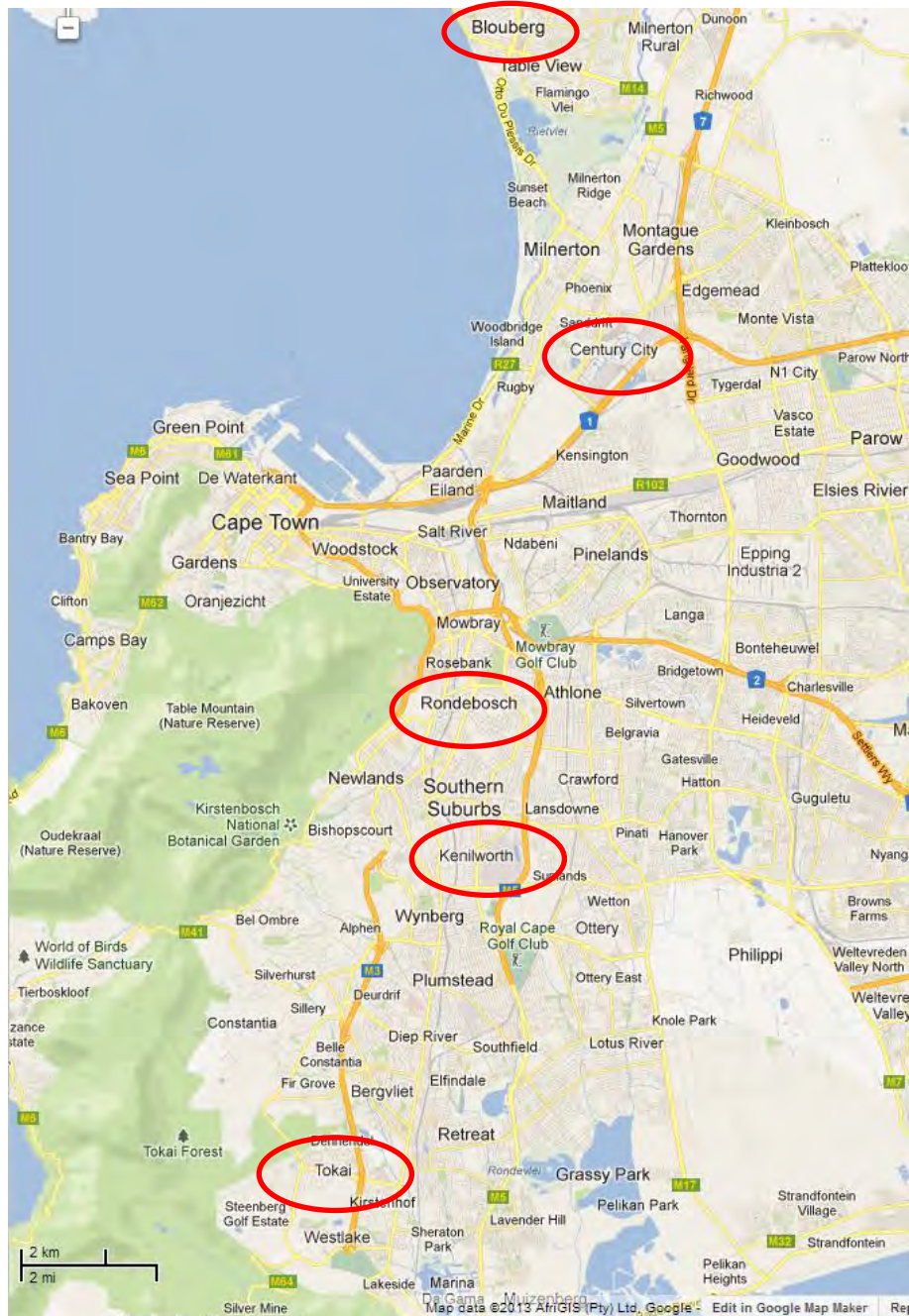
When examining the factors considered by consumer when making seafood purchases, other than price, the relationships are less consistent. Once the data has been analysed and undergoes interpretation, one must be cautious not to confuse causal and spurious relationships. Determining causality was outside of the scope of this study, and further research will be required to shed more light on these less consistent associations.

The surveys were found efficient and practical to conduct, and extending the study to the two other South African metropolitan areas, Gauteng and Durban, would be of interest. I would hypothesise a similar level of recognition of SASSI (but increased since Basson (2010)) and the MSC, no direct impact of SASSI partnership retailers on sustainability-related preference and, in parallel to the findings for middle-class consumers in Cape Town, price and/or type consciousness overriding sustainability considerations in seafood choices.

## Appendix

### S1: Supplementary information: Map of Cape Town and survey questions/recording sheet

#### S1.1 Map



S1.2 Survey

1. Have you eaten, or bought, any seafood products within the last 6 months?

Yes	
No	

2. Are you the person responsible for the shopping in your household?

Yes	
No	

3. Are you a male or female?

Male	
Female	

4. Country of origin?

---







5. What age group do you fall into?

A	18 – 24		F	45 – 49	
B	25 – 29		G	50 – 54	
C	30 – 34		H	55 – 59	
D	35 – 39		I	60 – 64	
E	40 - 44		J	+ 65	

6. What is your favourite type of fish?

---

7. Which of the following logos do you recognise?

1. 		4. 	
2. 		5. 	
3. 		6. 	

8. What do SASSI (number 1) and the Marine Stewardship Council (number 4) mean to you?

---



---



---



---

9. What factors do you look for when choosing fish?

Freshness		Size	
Quality		Type (species)	
Sustainability		Price	
Smell		Other...	

If other, please specify...

---

10. Can you rank these species into their colour categories and state if their fisheries are MSC certified?

<i>Species</i>	<i>Green</i>	<i>Orange</i>	<i>Red</i>	<i>MSC</i>	<i>Unsure</i>
Hake (SA)					
Prawns					
Geelbek/Cape salmon					
Mussels					
Red steenbras					
Dorado					
Sardines					
Monk					
Calamari					
Galjoen					

11. How did you hear about either of these campaigns?

TV		Friends	
Internet		Restaurants	
Magazines		Shops	
Aquarium		Twitter	

Newspaper		Facebook	
Food fair		Other...	

If other, please specify...

---

12. Which of the following activities do you do, or make use of?

Activities	Y/N	How often?			Factor 1	Factor 2	Own Reason
Recycling		D	W	M	Price	Environ	
Public transport		D	W	M	Price	Environ	
Choose organic		D	W	M	Price	Environ	
Save water		D	W	M	Price	Environ	
Save electricity		D	W	M	Price	Environ	
Re-use shopping bags		D	W	M	Price	Environ	
Other activities/notes							

13. What is your average monthly household income, in rands?

A	0 – 799		E	5000 – 7999	
B	800 – 1399		F	8000 – 10 999	
C	1400 – 2499		G	11 000 – 19 999	
D	2500 - 4999		H	+ 20 000	

14. Would you consider taking part in a follow up interview, which will be about 20 - 30 minutes in length, at a later stage? If so, please fill in one or more of your contact details below:

Cell	
Home	
Email	

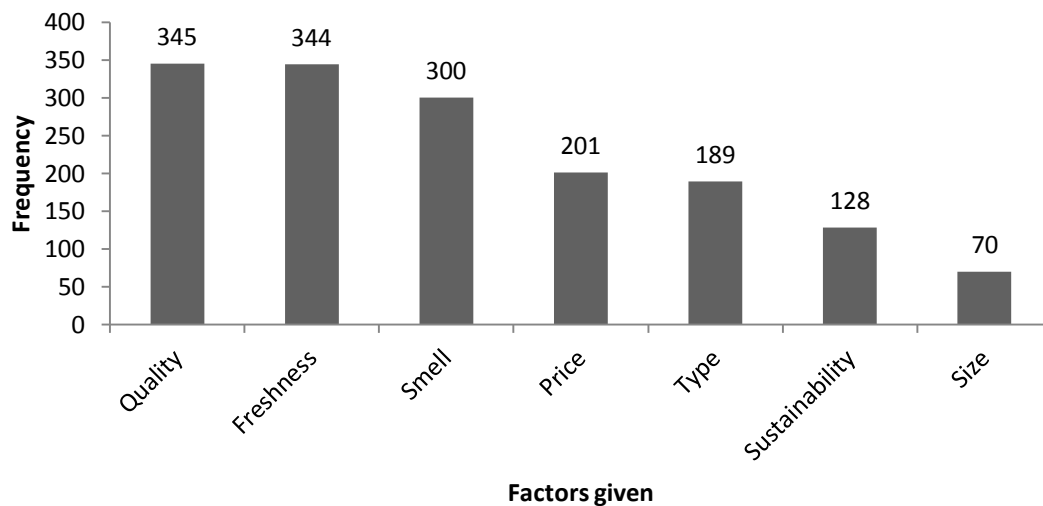
## S2: Supplementary information: general survey results

*\*Note: all data are made available on a CD, available from author or supervisor*

This section presents additional findings of the interviews which for reasons of conciseness could not be included in the main paper. I believe that they are nevertheless relevant in understanding consumer's attitudes and choices and can possibly be used in further developing either of the sustainable seafood programs.

### *S2.1 Properties of seafood considered when making a choice*

A list of seven factors was offered to people to determine what is considered when purchasing seafood; quality, freshness and smell were the top scoring. This was then followed by the 4 'key' factors, which were identified as the most important prior to the start of this study, in terms of environmental awareness: price, type of species, sustainability and size. Size was only considered if the individual mentioned they were against eating undersized fish as "it is wrong" or for legal reasons (Figure 2).



**Figure S2-1:** Response frequency to the seven factors offered to the shoppers to determine which are most commonly considered when making seafood purchases. Note that more than one choice was possible.

### *S2.2 Information sources for SASSI and the colour classification*

Those consumers who were aware of SASSI were asked what methods they would explore to find out the colour classification of a seafood species. Of those which had an idea, the majority indicated they would make use of the popular internet search engine, Google. This was followed by consumers indicating they would ask the staff in store. The first indication of consumers mentioning they would make use any of the SASSI consumer tools was the mobile service, FishMS, which was mentioned almost two and half times less than Google. The reminder of the responses covered (in order of frequency): making use of the SASSI wallet card, checking the SASSI website and poster,

examining the packaging (Woolworths labels their products, none of the other stores do), asking SASSI then asking the Government, followed lastly by checking the SASSI mobile (mobi) site (Figure S2 2).

When investigating where people had initially heard about either of the sustainable seafood programs, it was found that the most common place was the indicated as 'other', which was followed by newspapers, restaurants and magazines. These sources were followed by television, the aquarium, learning about them from family and friends and at the shops. A few consumers indicated they had learnt about these programs from the internet and the radio, one consumer at a food fair, but not one through either of the most popular social media platforms, Facebook and Twitter (Figure S2 3).

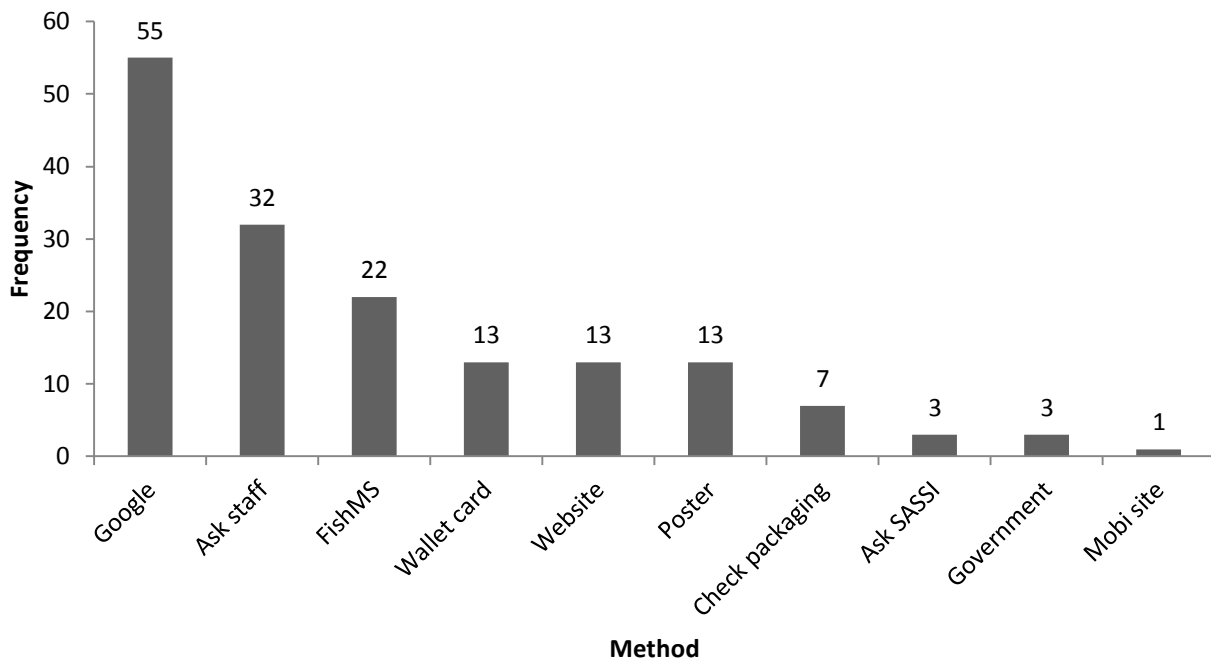
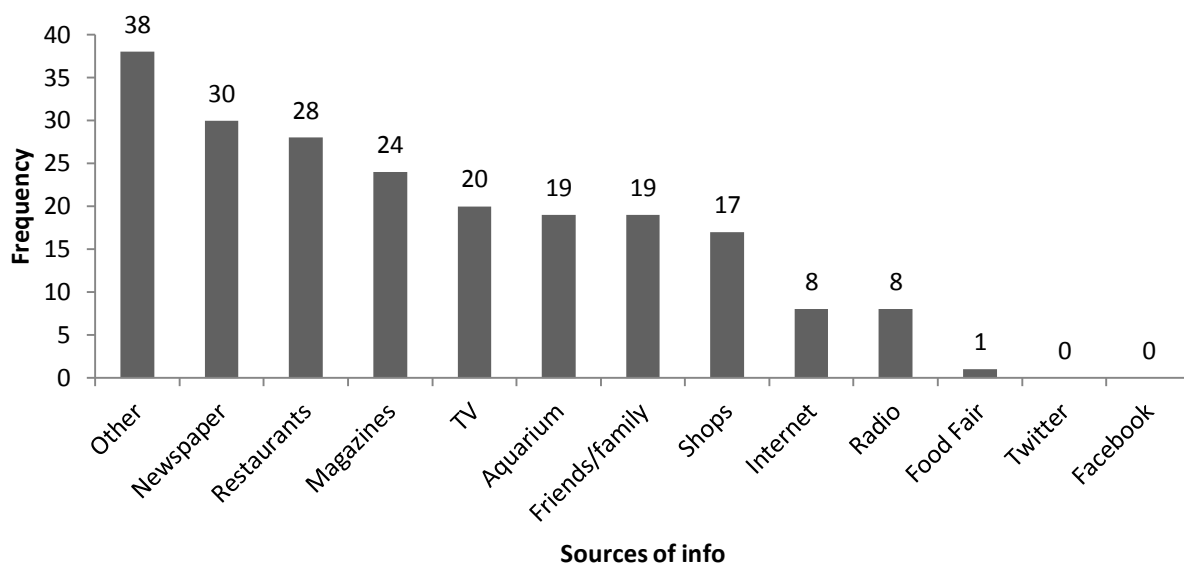


Figure S2-2: Frequency of avenues suggested by candidates, which they would explore to ascertain the SASSI colour classification of seafood



**Figure S2-3:** Frequency of the sources of information where consumers had learnt/heard/seen either of the sustainable seafood programs

### S2.3 Overall environmental awareness

Consumers' overall environmental awareness was examined (Table S2 1). During this process, it was found that of all of the interviewees, a majority mentioned that they recycled with the main reason being to aid the longevity of the environment. A number of the interviewees mentioned that they recycled in their area as it was convenient to do so, with the municipality supplying services. Almost two times as many of the respondents highlighted the reason they recycle was due to the fact that their children/grandchildren insist they do so.

One third of the consumers interviewed made use of public transport (train, busses or taxis) daily, weekly or monthly, with the main reasons for doing so being for convenience and to curb costs. A fraction, in comparison mentioned they did so for the environment. Of those respondents who indicated they chose organic foods did so as they indicated the health benefits of choosing such foods, five times more than the number of people who indicated they made this choice for the environment.

Over 95% of the interviewees mentioned they tried to save both water and electricity where possible. When looking at those who indicated they save water, over half say they do so to save money, while almost two thirds mentioned they save water for the environment. Those respondents which indicated they save electricity, found almost two thirds doing so to save money and just less than half doing so for the sake of the environment. It was often said after asking why people try save water and electricity that by doing so they were 'killing two birds with one stone, saving money and helping the earth'.

The last question asked was if consumers re-use their plastic bags. Over 80% mentioned they did, with under a third saying they did to save money and over a third mentioning they did so for the environment. Those who indicated they re-used plastic bags mentioned they did so by making use of the bags for dustbins or to clean up after their dogs.

**Table S2-1:** Summary of the consumers’ overall environmental awareness, examining the six factors investigated – all percentages given are in relation to the overall number of people surveyed. The number of ‘Yes’s’ alongside a factor, is not a sum of the four adjacent columns (‘price’, ‘convenience’, ‘environment’, ‘other’) – these were recorded if a person mentioned why they took part in one of the factors. Note answers were not limited to one response.

	Yes		Price		Convenience		Environment		Other	
	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%
<b>Recycling</b>	264	70.4	4	1.1	19	5.1	208	55.5	30	8.0
<b>Public transport</b>	125	33.3	45	12.0	76	20.3	5	1.3	-	-
<b>Choosing organic</b>	213	56.8	3	0.8	-	-	31	8.3	144	38.4
<b>Saving water</b>	361	96.3	193	51.5	-	-	232	61.9	5	1.3
<b>Saving electricity</b>	361	96.3	227	60.5	-	-	186	49.6	6	1.6
<b>Reuse plastic bags</b>	310	82.7	111	29.6	12	3.2	146	38.9	12	3.2

#### *S2.4 Respondents’ income distribution*

The target group of consumers to survey were those whose average monthly household income was above R5500. During the interviewing process, 16 consumers were not willing to share this information, thus the sample size for this section was,  $n = 359$ . Of those who responded, it can be seen (Figure S2-4) that over 80% fall within the target average monthly household income for this study, >R5000 per month, as it is suggested these households are theoretically able to make more ‘environmentally-friendly’ choices. The highest majority of consumers interviewed fell within the two, upper most average monthly household income brackets, ‘11 000 – 19 999’ and ‘+20 000’, thus all of the consumers interviewed, were included in all of the analyses.



**Figure 5:** The breakdown of the consumers' monthly income ( $n = 359$ ), 81.9% (294) of which fell within the income bracket which was considered the target group for this study ( $\geq R5000$ /month/household).

University of Cape Town

### **S3: Supplementary information: survey analysis**

#### *S3.1 Area*

The relationship between area and age, was found to be significant ( $\chi^2 = 89.3$ ,  $df = 4$ ,  $P < 0.001$ ). In Rondebosch, Tokai, Canal Walk and Blouberg the highest proportion of consumers fell within the lower half of the age categories (18 to 44), while in Kenilworth the upper half (45 to +65) of the age bracket was dominant.

Of the five areas sampled, it was found that these areas are favoured by certain ethnic backgrounds ( $\chi^2 = 66.7$ ,  $df = 16$ ,  $P < 0.001$ ). The top two ethnic groups per area, are highlighted here. Kenilworth had the highest proportion of Coloured consumers interviewed (56%), which was followed by White consumers (22.7%). Rondebosch, Tokai and Canal Walk found the most White interviewees (41.3%, 47.3% and 48%, respectively), followed by Coloured consumers (22.7%, 40.5% and 30.7%, respectively). In Rondebosch, the number of Black respondents equalled that of the Coloured interviewees (22.7%). Blouberg had the highest number of White consumers (66.2%), with the next highest number of interviewees were Black (16.2%).

#### *S3.2 Shop*

The monthly income of the consumers was investigated and It was found that there was a significant relationship between the shops in which the surveys were conducted and their monthly income ( $\chi^2 = 29.95$ ,  $df = 28$ ,  $P = 0.018$ ). Whereas, in all of the cases the top two income brackets, showed the highest proportion of shoppers at the three selected shops (Pick n Pay, Woolworths and Checkers). Pick n Pay and Checkers found that a majority of the shoppers to fall within the second highest ('11 000 – 19 999') income bracket (32.8% and 27.4%, respectively), with the second largest groups were those in the upper income bracket, '+20 000' (28.8% and 26.6%, respectively). In contrast, Woolworths found the opposite to be the case, with the highest proportion of shoppers (48%) falling into the upper income bracket, +R20 000, which was almost two and a half times as much as the next group (19.2%) in the '11 000 – 19 999' bracket.

#### *S3.3 Age*

Within the age classes there is a significant relationship between age and the preference in seafood preparation (i.e. fresh, frozen or pre-prepared), more specifically fresh fish ( $\chi^2 = 35.86$ ,  $df = 18$ ,  $P < 0.001$ ). From all of the respondents which indicated freshness of their seafood as an important factor, over half (55%) fell into the upper age bracket (45 to +65). On a similar note, an interesting, yet not significant, relationship was seen between age and the people who mentioned they were happy consuming any type of seafood. 7.7% of the people (29) indicated this was the case, over half (19) came from the upper age classes (45 to +65). This should be followed up with a larger sample size.

The relationship between age and sources of seafood showed to be significant, with those in the upper age classes (45 to +65), indicated fishmongers as their preferred source of seafood – with over 70% of indicating this as such ( $\chi^2 = 25.06$ ,  $df = 117$ ,  $P = 0.003$ ).

A significant relationship between age and the monthly income was noted ( $\chi^2 = 137.61$ ,  $df = 63$ ,  $P < 0.001$ ). Overall, it was found that a majority of the consumers fell into the top two income brackets (11 000 – 19 999 and +20 000). In the '18 – 24' age class, a majority of the candidates fell into the '1400 – 2499' category, followed by the '+ 20 000' category. This could possibly be due to the fact that they either live alone or still live at home with their parents – hence the big income differences. The '40 – 44' age class had the highest proportion within the upper income bracket, with the second place tied between the '8000 – 10 999' and '11 000 – 19 999'. The last age class (+65), had a tied first place between those with a monthly household income of '5000 – 7999' and '11 000 – 19 999', with the second highest place going to those in the '8000 – 10 999' bracket. I take this to mean that pensioners are generally less affluent, than the mid-career Cape Townians, represented in the middle to upper class shopping centres.

The interviewees within the upper age classes did show a majority of concern for the sustainability of seafood, as this was one of the factors they considered in their purchases. Indian and White consumers were found to consider sustainability the most, followed by Asian, Coloured and Black consumers ( $\chi^2 = 20.59$ ,  $df = 4$ ,  $P < 0.001$ ), which was in line with findings of Basson (2010).

#### *S3.4 Gender*

A significant association between gender and shop in which the interview was conducted was found ( $\chi^2 = 11.1$ ,  $df = 2$ ,  $P = 0.004$ ), with the fraction of female interviewees at each of the three shops being: Pick n Pay (56%), Woolworths (71.8%) and Checkers (74.2%), from a general 67%. Almost 92% of the female respondents said they were responsible for the shopping in their households.

#### *S3.5 Ethnicity*

The preparation (fresh, frozen or pre-prepared) of seafood amongst the ethnic groups showed a significant relationship for fresh ( $\chi^2 = 17.55$ ,  $df = 8$ ,  $P = 0.002$ ) and pre-prepared ( $\chi^2 = 11.32$ ,  $df = 8$ ,  $P = 0.023$ ). Coloured respondents showed the highest demand for fresh fish (75.9%), while Asian consumers favoured pre-prepared food most frequently (33.3%).

The seafood favoured by the various ethnicities found significant relationships with snoek and kob ( $\chi^2 = 12.53$ ,  $df = 56$ ,  $P = 0.014$  and  $10.96$ ,  $df = 56$ ,  $P = 0.027$ , respectively). Snoek was favoured by a quarter of the Coloured (25%) and Black consumers (20.4%), followed by Indian (11.8%) and White respondents (10.7%). Kob, although significant, the number of times it was mentioned were much lower with White (7.1%) and Coloured (4.3%) consumers indicating this as a favourite species – none of the other ethnicities mentioned this species.

With regard to the relationship between ethnicity and sources of seafood, a number of significant relationships presented themselves. In no particular order, the sources were as follows:

- Woolworths ( $\chi^2 = 26.02$ ,  $df = 4$ ,  $P < 0.001$ )
  - The highest proportion of consumers were Indian (38.2%), followed by White consumers (33.9%), these were both twice as much as the next closest group

- Spar ( $\chi^2 = 14.72$ ,  $df = 4$ ,  $P = 0.005$ )
  - The highest proportion of Asian seafood consumers (16.7%), the next closest group was White consumers (1.2%), but note the low sample size
- Direct from fishers ( $\chi^2 = 15.29$ ,  $df = 4$ ,  $P = 0.004$ )
  - Coloured interviewees indicated that they purchased the most seafood from fishers (12.9%), which was more than three times higher than Black people, which was the next closest ethnic group (4.1%).
- Restaurants ( $\chi^2 = 11.47$ ,  $df = 4$ ,  $P = 0.022$ )
  - Asian consumers sourced the greatest percentage of seafood from dining establishments (50%), which was more than twice as much as the second and third place: White (20.8%) and Black consumers (20.4%).
- Shopped around ( $\chi^2 = 10.57$ ,  $df = 4$ ,  $P = 0.032$ )
  - The last source of seafood was for those people who mentioned they did not have a specific source of seafood, but in fact shopped around. This was led by Coloured (9.5%) and followed by Indian customers (5.9%).

Examining ethnicity and the average monthly household income of the candidates, a significant relationship was found ( $\chi^2 = 121.35$ ,  $df = 32$ ,  $P = <0.001$ ). In all of the various ethnic groups surveyed, barring one, the highest proportion of candidates fell into the two upper income brackets, '11 000 – 19 999' and '+ 20 0000'. The one group where this was not the case was Asian people, where a third of this group fell into the '0 – 799' bracket and half were in the upper most income bracket. This is more than likely attributed to the fact that some students did not see bursaries/allowance being considered monthly income.

### *S3.6 Consumed seafood within the last 6 months*

Of the consumers surveyed, nine out of every ten mentioned that they had eaten seafood within the 6 months prior to taking part. Of these consumers, significant relationships were found between four of the 15 favourite species; hake ( $\chi^2 = 6.45$ ,  $df = 14$ ,  $P = 0.011$ ), prawns ( $\chi^2 = 7.17$ ,  $df = 14$ ,  $P = 0.007$ ), salmon ( $\chi^2 = 4.15$ ,  $df = 14$ ,  $P = 0.042$ ) and tuna ( $\chi^2 = 4.59$ ,  $df = 14$ ,  $P = 0.032$ ), but not for snoek or kingklip.

Of those who had eaten seafood in the last six months, there were significant relationships with all methods of preparation: fresh ( $\chi^2 = 6.67$ ,  $df = 1$ ,  $P = 0.01$ ), frozen ( $\chi^2 = 4.23$ ,  $df = 1$ ,  $P = 0.04$ ) and pre-prepared ( $\chi^2 = 5.18$ ,  $df = 1$ ,  $P = 0.023$ ). The most frequently mentioned production method was fresh, which was expected based on the general respondents profile. This was followed, in order of popularity by frozen and pre-prepared seafood.

When examining the sources of seafood of the consumers who had eaten seafood in the last six months it was found that there were significant relationships with: Woolworths ( $\chi^2 = 7.18$ ,  $df = 1$ ,  $P = 0.007$ ) and fish shops ( $\chi^2 = 5.23$ ,  $df = 1$ ,  $P = 0.022$ ). Upon closer inspection of the Woolworths consumers, of those who had eaten seafood in six months prior to the survey, they were over 4 times more likely to get their seafood from this

shop/retailer than from one of the other sources. Fish shops were found to be supplying to consumers, who had eaten seafood within six months prior to the survey, only.

### *S3.7 Logo recognition*

SASSI showed significant relationships between both ethnicity ( $\chi^2 = 28.95$ ,  $df = 8$ ,  $P < 0.001$ ) and with those people who had eaten seafood in the last six months ( $\chi^2 = 7.4$ ,  $df = 1$ ,  $P = 0.025$ ). The initial recognition of the SASSI logo between ethnicity found the highest recognition by Indian (44.1%) and White (39.3%) consumers, which were followed by Coloured (27.6%), Black (24.5%) and Asian (16.7%). Once a prompt had been offered to those who indicated they were unsure of the logo, the overall positive recognition of the logo found the highest recognition amongst White (59.5%) and Indian (52.9%), followed again by Coloured (37.1%), Black (28.6%) and Asian (16.7%) consumers. Overall, the greatest recognition of SASSI was between Indian and White consumers.

There was no significant relationship found between recognition of the Marine Stewardship Council's logo and any of the following: area, age, shop, gender or ethnicity.

### *S3.8 Factors considered by consumers when choosing seafood*

There were significant relationships between sustainability with age ( $\chi^2 = 29.71$ ,  $df = 9$ ,  $P < 0.001$ ), as well as people who had consumed seafood in the last 6 months ( $\chi^2 = 4.52$ ,  $df = 6$ ,  $P = 0.033$ ). The lower half of the age classes' (18 to 44) consideration of this factor was significantly lower overall (29.9%), than that of the upper age classes' (45 to +65, 40.7%). Consumers who had eaten seafood within the last six months were twice as concerned about the sustainability of the fish they were choosing (35.8%) as opposed to those who hadn't (17.6%).

Additionally, sustainability in seafood choices was associated with ethnicity ( $\chi^2 = 20.59$ ,  $df = 16$ ,  $P < 0.001$ ). Indian consumers most frequently mentioned this as a consideration, (44.1%), followed by White (43.5%), Asian (33.3%), Coloured (27.6%) and Black (12.2%).

Gender and size (legally caught) of seafood showed a relationship ( $\chi^2 = 4.46$ ,  $df = 6$ ,  $P = 0.035$ ); the size of the seafood was highlighted to be an important factor by more men (24.6%), than women (15.5%).

### *S3.9 Fish classification: colour classification and MSC certification*

Consumers, who had indicated they aware of SASSI and/or the MSC, were asked to assign the status/colour classification of the pre-selected seafood options, as well as prescribe MSC certification if applicable.

Consumers who had consumed seafood within the past six months were more willing to attempt the classification ( $\chi^2 = 7.48$ ,  $df = 1$ ,  $P = 0.006$ ), and scored more often within the fifty to 100 percent bracket (5.18,  $df = 1$ ,  $P = 0.023$ ).

### *S3.10 Overall environmental awareness by consumers*

#### S3.10.1 Recycling

The first and only one of the test variables which showed a significant relationship with recycling was found between it and ethnicity, more specifically between those who do and don't recycle ( $\chi^2 = 20.20$ ,  $df = 8$ ,  $P = 0.01$ ) and those who do so for environmental reasons ( $\chi^2 = 16.97$ ,  $df = 5$ ,  $P = 0.03$ ). Indian and White respondents most frequently indicated they recycle (79.4% and 79%, respectively), followed by Asian (66.7%), Coloured (62.1%) and Black (59.2%) respondents.

The top two groups which indicated they recycled for environmental purposes (rather than for cost cutting purposes) were Asian (66.7%) and White (64.1%), these were followed by Indian (58.8%), Coloured (45.7%) and Black (44.9%).

#### S3.10.2 Public transport

The first set of significant relationships which were identified was between age and public transport. These relationships were between age of the candidates and the use of public transport ( $\chi^2 = 26.71$ ,  $df = 9$ ,  $P = 0.002$ ), for costs/savings purposes ( $\chi^2 = 47.8$ ,  $df = 9$ ,  $P = 0.008$ ) and for the environment ( $\chi^2 = 43.86$ ,  $df = 9$ ,  $P = 0.021$ ). When looking at the age and public transport, generally it can be noticed that younger age classes (18 to 44) make use of public transport most often, with this same group indicating that they made use of this service as it was the cheaper transport option and although not many people indicated that they chose this option for environmental reasons, the majority of people who did, fell within the lower age classes too.

The second set of significant relationships identified which included public transport, was between it and ethnicity – those who choose it versus those who don't ( $\chi^2 = 91.02$ ,  $df = 4$ ,  $P < 0.001$ ), those who do so for cost saving purposes ( $\chi^2 = 94.33$ ,  $df = 4$ ,  $P < 0.001$ ), and those who do so to protect the environment ( $\chi^2 = 93.74$ ,  $df = 4$ ,  $P < 0.001$ ). The group of which indicated they made use of public transport the most were the Black respondents (85.75%), which was more than twice as much as the next ethnic group, Coloured respondents (39.7%). Similarly, the top two groups who mentioned they made use of this transport for costs saving reasons were Black (28.6%) and Coloured (18.1%) consumers. The only groups which at all said they used this method of getting around for environmental reasons were Black (6.1%) and White (1.2%).

#### S3.10.3 Choosing organic products

When looking at those candidates who indicated they chose organic products, a significant relationship was found between this and the shop in which the survey was undertaken ( $\chi^2 = 6.841$ ,  $df = 2$ ,  $P = 0.033$ ). Most of the candidates which mentioned they chose organic were surveyed in Woolworths (66.4%), which was followed by Checkers (52.4%) and Pick n Pay (52%). The reasons for their choices (the costs/savings or the environment) did not show significant associations.

#### S3.10.4 Saving water

The top three groups which indicated they saved water for budget purposes were Coloured respondents, (59.5%), followed by White (52.1%) and Indian (50%) consumers. Respondents in these categories were between one and a half and two times as likely to make these statements as respondents in the remaining two groups, Black (34.7%) and Asian (33.3%).

Of those which mentioned they saved water for environmental purposes, the order changed somewhat with Asian consumers taking the lead (83.3%), followed by White (70.1%), then Indian (61.8%), Black (59.2%) and Coloured consumers (50%).

#### S3.10.5 Saving electricity

There was a significant relationship found between the ethnic groups and people who highlighted in the surveys that they saved electricity for environmental reasons ( $\chi^2 = 19.64$ ,  $df = 4$ ,  $P = 0.012$ ). The order of the ethnic groups is as follows: Asian (83.3%), White (58.7%), Indian (55.9%), Black (40.8%) and Coloured (36.2%).

#### S3.10.6 Re-using plastic bags

Overall, it was found that over eighty percent of respondents indicated they reuse plastic shopping bags, with thirty percent doing so to save money while almost forty percent do so for the sake of the environment. Significant relationships were found between ethnic groups, the first was people who said they re-used plastic bags to try cut costs ( $\chi^2 = 32.82$ ,  $df = 4$ ,  $P < 0.001$ ), and the second were people who did so for environmental reasons ( $\chi^2 = 18.73$ ,  $P = 0.016$ ). Asian interviewees (66.6%) were almost twice as likely to reuse plastic bags to reduce expenditure as opposed to the next ranking group, Coloured consumers (38.8%). Those who indicated they tried to re-use plastic bags for environmental reasons found that White interviewees (48.5%) led, which was followed by Indian (41.2%), then Coloured, Black and Asian consumers (31.9%, 24.5% and 16.7%, respectively).

#### S4: Supplementary information: results for the species with preference ranks 6-15

##### S4.1 Calamari

Calamari, chokka or squid, are some of the more common names for this type of seafood. Consumers, who mentioned they enjoy this seafood (12%), prefer to get it pre-prepared which is generally sourced from restaurants. Calamari was mentioned to be a favourite amongst a number of people from various ethnic backgrounds, who were aware of SASSI. See table 3, below, for all the summary statistics for calamari.

The consumers who indicated size was an important factor, and favoured calamari were mainly found in Pick 'n Pay, followed by those in Woolworths and then Checkers.

**Table 3:** Summary statistics table for calamari, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Calamari</b>	Production method	<b>Pre-prepared</b>	
		$\chi^2 = 8.59$ , df = 1, P = 0.003	
	Sources of seafood	<b><math>\chi^2 =</math> Restaurants</b>	
		$\chi^2 = 9.56$ , df = 1, P = 0.002	
	Sustainable seafood program awareness	<b>SASSI</b>	<b>MSC</b>
		$\chi^2 = 11.77$ , df = 1, P = 0.019	$\chi^2 = 11.65$ , df = 1, P = 0.009
	Factors considered	<b>Size</b>	
$\chi^2 = 7.32$ , df = 2, P = 0.026			

##### S4.2 Tuna

The candidates who expressed their favourite seafood (10.9%) to be tuna showed no preference for the production method, recognition of SASSI nor any significant consideration of a few 'key' factors. The most common source of this seafood was from Fruit and Veg City, with consumers indicating they would more likely to buy it from this store. See Table 4, below, for all the summary statistics for tuna.

Of the consumers who favoured tuna, a relationship was found between gender and the type of seafood chosen (Table 4, type a), with women being more likely to mention that the type of seafood plays an important role in their selection. When examining the other factors, it was found that while price was considered, neither size nor type of seafood was.

When examining the ethnic backgrounds of consumers and their recognition of SASSI, no relationships were found. However, once a prompt was offered to those who favoured tuna, Black consumers showed the highest level of recognition, followed by Coloured and White interviewees.

**Table 4:** Summary statistics table for tuna, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Tuna</b>	Production method	<b>N/A</b>			
	Sources of seafood	<b>Fruit and Veg</b>			
		$\chi^2 = 8.05, df = 1, P = 0.005$			
	Sustainable seafood program awareness	<b>SASSI</b>			
		$\chi^2 = 7.81, df = 3, P = 0.05$			
	Factors considered	<b>Size</b>	<b>Price</b>	<b>Type (a)</b>	<b>Type (b)</b>
$\chi^2 = 12.72, df = 1, P = 0.013$		$\chi^2 = 12.79, df = 1, P = 0.012$	$\chi^2 = 8.37, df = 1, P = 0.004$	$\chi^2 = 11.58, df = 1, P = 0.021$	

#### S4.3 Yellowtail

Those candidates who favoured yellowtail (8%) showed a significant preference for fresh fish, with nine out of ten people saying yellowtail being fresh was an important factor. This species is mainly sourced from Spar or from family and/or friends. See Table 8 below, for all the summary statistics for yellowtail.

None of the consumers showed any significant recognition of the two sustainable seafood programs. In fact, there was a definite lack of awareness of SASSI from individuals of the various ethnic groups. The consumers also indicated that they did not consider the type or price of seafood to be important factors in their choices.

**Table 5:** Summary statistics table for yellowtail; all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Yellowtail</b>	Production method	<b>Fresh</b>	
		$\chi^2 = 10.27, df = , P = 0.001$	
	Sources of seafood	<b>Spar</b>	<b>Family/Friends</b>
		$\chi^2 = 9.69, df = 1, P = 0.002$	$\chi^2 = 6.76, df = 1, P = 0.009$
	Sustainable seafood program awareness	<b>SASSI</b>	
		$\chi^2 = 12.21, df = 4, P = 0.016$	
Factors considered	<b>Price</b>	<b>Type</b>	
	$\chi^2 = 15.78, df = 4, P = 0.003$	$\chi^2 = 11.10, df = 4, P = 0.025$	

#### S4.4 Any seafood

People, who indicated they enjoyed all types of seafood (7.7%), mentioned they would be more likely to either buy it from fish shops or catch the species themselves. These candidates did not show any awareness about either SASSI or the MSC, if anything, there was a significant lack of awareness around SASSI, especially male candidates. Similarly to those who favoured yellowtail, they did not consider any of the 'key' factors, when choosing their seafood, except for size. It was found that the women interviewed were more like to consider this factor, in their choices. See Table 9 below, for all the summary statistics for those consumers who indicated they would choose any seafood.

**Table 6:** Summary statistics table for those consumers who indicated they favoured all and any types of seafood, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Any seafood</b>	Production method	<b>N/A</b>	
	Sources of seafood	<b>Fish shops</b>	<b>Catch themselves</b>
		$\chi^2 = 10.29$ , df = 1, P = 0.001	$\chi^2 = 4.34$ , df = 1, P = 0.037
	Sustainable seafood program awareness	<b>SASSI</b>	
		$\chi^2 = 5.61$ , df = 1, P = 0.018	
	Factors considered	<b>Size</b>	
$\chi^2 = 4.06$ , df = 1, P = 0.044			

#### S4.5 Sole

Candidates who favoured sole (6.9%) preferred it to be pre-prepared, with almost half mentioning this. This fish was purchased most frequently from Spar, fish mongers and restaurants. See Table 7 below for all the summary statistics for Sole.

A relationship was noticed between the lack of recognition of SASSI and the various ethnicities who favoured sole, with the most frequent being White consumers followed by Coloured consumers. Initially these were no recognition of the MSC, however once a prompt was offered half of the male consumers indicated they did.

The consumers indicated that the size and type of seafood was important amongst those who favoured sole, with those interviewed in Woolworths indicating this was the case, followed by those in Pick n Pay. On the other hand, it was found that amongst the various ethnicities, there was no consideration of sustainability by those who favoured sole.

**Table 7:** Summary statistics table for sole, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Sole</b>	Production method	<b>Pre-prepared</b>		
		$\chi^2 = 7.580, df = 2, P = 0.006$		
	Sources of seafood	<b>Spar</b>	<b>Fish mongers</b>	<b>Restaurant</b>
		$\chi^2 = 11.62, df = 13, P = 0.001$	$\chi^2 = 5.58, df = 13, P = 0.018$	$\chi^2 = 12.58, df = 13, P < 0.001$
	Sustainable seafood program awareness	<b>SASSI</b>		<b>MSC</b>
		$\chi^2 = 13.75, df = 4, P = 0.008$		$\chi^2 = 3.94, df = 1, P = 0.047$
Factors considered	<b>Size</b>	<b>Type</b>	<b>Sustainability</b>	
	$\chi^2 = 8.67, df = 2, P = 0.013$	$\chi^2 = 6.12, df = 2, P = 0.047$	$\chi^2 = 13.01, df = 4, P = 0.011$	

#### S4.6 Crayfish

Of all of the interviewees who mentioned crayfish as a favourite (6.1%), there was no preference for production method, no significant recognition for either of the two sustainable seafood initiatives, nor any consideration of size, price, type and/or sustainability. The consumers were more likely to purchase it from wherever it is available or catch it themselves for personal consumption. See Table 8 below, for all the summary statistics for crayfish.

There was a lack of awareness around the MSC between the different ethnic groups, who favoured crayfish with Coloured and White consumers being the only two groups which were found to enjoy this seafood and who were unaware of the program.

**Table 8:** Summary statistics table for crayfish, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Crayfish</b>	Production method	<b>N/A</b>	
	Sources of seafood	<b>Catch themselves</b>	<b>All over</b>
		$\chi^2 = 16.71, df = 1, P < 0.001$	$\chi^2 = 16.76, df = 1, P < 0.001$
	Sustainable seafood program awareness	<b>MSC</b>	
		$\chi^2 = 9.71, df = 4, P = 0.046$	
Factors considered	<b>N/A</b>		

#### S4.7 Kob

Of the consumers who showed a preference for kob (4.5%), almost all highlighted that they preferred fresh produce, which was most likely to be sourced from either from fishing companies or caught by the interviewee. Consumers, who purchased seafood from Pick n Pay, stated that they would be less likely to buy kob from this store. See Table 9 below, for all the summary statistics for kob.

Male respondents were found to be the most aware of SASSI, they also indicated that size was considered when choosing their seafood. The consumers surveyed at the various retail outlets who favoured Kob, considered size of seafood important when making their choices. White consumers were the only group which was found to enjoy this seafood and did not take price into consideration.

**Table 9:** Summary statistics table for kob, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Kob</b>	Production method	<b>Fresh</b>		
		$\chi^2 = 5.95, df = 1, P = 0.015$		
	Sources of seafood	<b>Pick n Pay</b>	<b>Fishing companies</b>	<b>Catch themselves</b>
		$\chi^2 = 4.12, df = 1, P = 0.042$	$\chi^2 = 6.67, df = 1, P = 0.010$	$\chi^2 = 9.52, df = 1, P = 0.002$
	Sustainable seafood program awareness	<b>SASSI</b>		
		$\chi^2 = 5.60, df = 1, P = 0.018$		
	Factors considered	<b>Size</b>		<b>Price</b>
$\chi^2 = 6.48, df = 6, P = 0.039$		$\chi^2 = 9.95, df = 6, P = 0.041$		

#### S4.8 Mussels

The interviewees, who favoured mussels (4%), showed no preference for the production of the species, however they did show surprisingly, that the most favoured source of this seafood was directly from fishing companies. Initially they did not show any awareness about the two sustainable seafood programs, however when a prompt was offered, half of the males recognised the MSC. There was no consideration of size, price, type or sustainability. See Table 10 below, for all the summary statistics for mussels.

**Table 10:** Summary statistics table for favoured mussels; all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Mussels</b>	Production method	<b>N/A</b>
	Sources of seafood	<b>Fishing companies</b>
		$\chi^2 = 7.974$ , df = 13, P = 0.005
	Sustainable seafood program awareness	<b>MSC</b>
		$\chi^2 = 3.94$ , df = 1, P = 0.047
Factors considered	<b>N/A</b>	

#### *S4.9 Angelfish*

There was no preferential production of angelfish (3.2%), with the most common sources being both Fruit and Veg City and/or directly from their work. A lack of awareness of the MSC was noticed, between the various areas and the consumers who favoured angelfish which was the most popular amongst those in Tokai (Table 11, MSC a). However, when examining the different ethnic backgrounds (Table 11, MSC b), there was a significant recognition between the various ethnicities and the MSC. See Table 11 below, for all the summary statistics for angelfish.

Consumers at the various retailers considered sustainability during seafood purchases (Table 11, sust. a), with Checkers having the most consumers who mentioned this and chose angelfish, followed by Pick 'n Pay. There were no representatives from Woolworths who chose angel and mentioned sustainability as a factor. There was however no consideration of this factor and consumers of the various ethnic backgrounds (Table 11, sust. b).

**Table 11:** Summary statistics table for favoured angelfish, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Angelfish</b>	Production method	<b>N/A</b>	
	Sources of seafood	<b>Fruit and Veg</b>	<b>Work</b>
		$\chi^2 = 5.18, df = 1, P = 0.023$	$\chi^2 = 14.22, df = 1, P < 0.001$
	Sustainable seafood program awareness	<b>MSC (a)</b>	<b>MSC (b)</b>
		$\chi^2 = 12.58, df = 4, P = 0.014$	$\chi^2 = 11.65, df = 3, P = 0.009$
	Factors considered	<b>Sustainability (a)</b>	<b>Sustainability (b)</b>
$\chi^2 = 6.28, df = 4, P = 0.043$		$\chi^2 = 10.17, df = 4, P = 0.038$	

#### S4.10 Sushi

Consumers who mentioned they enjoy sushi (2.9%) prefer it pre-prepared and/or purchased from restaurants. These consumers were not concerned about the type of seafood chosen, with males being the least likely to take this factor into consideration. What consumers between the various areas did consider about sushi was the price. See Table 12 below, for all the summary statistics for those consumers who indicated they favoured sushi.

From the anecdotal evidence (i.e. asking consumers more specifically what they liked in their sushi) it was found that most people favour: salmon, tuna and prawns in their sushi.

**Table 12:** Summary statistics table for sushi, all significant relationships are noted here, with their chi-squared values ( $\chi^2$ ), degrees of freedom (df) and significance levels (P).

<b>Sushi</b>	Production method	<b>Pre-prepared</b>	
		$\chi^2 = 7.64, df = 1, P = 0.006$	
	Sources of seafood	<b>Restaurants</b>	
		$\chi^2 = 11.25, df = 1, P < 0.001$	
	Sustainable seafood program awareness	<b>N/A</b>	
	Factors considered	<b>Type</b>	<b>Price</b>
$\chi^2 = 4.27, df = 1, P = 0.039$		$\chi^2 = 11.59, df = 6, P = 0.021$	

## Discussion

In addition to the points raised in the main text, it was found that although a large number of interviewees were aware of SASSI, there is a general unawareness around the consumer tools SASSI has developed. All of the consumers were asked how they would determine the colour classification of any seafood they were not familiar with. The most common response was to make use of Google; their next source was to ask staff in the restaurant and/or retail outlet. Just over a tenth of respondents indicated they would use one of the SASSI tools, the FishMS function, while less than one tenth of the overall number said they would make use of three more of the SASSI tools: wallet card, poster and the website. Immediately this highlights a few key areas, firstly – what are people searching for on Google. They must be getting their answers from somewhere, but are seemingly unaware about the SASSI website. The second issue this raised is, what information are the consumers' receiving from the staff at the stores they purchase their seafood from, i.e. what training have the staff had and what information do they pass along to the shoppers. Both areas could be examined in more depth to provide a better, more holistic, understanding.

This leaves scope for an improvement of the general awareness, for SASSI to promote their consumer tools, which are seemingly currently underutilised. In addition to this, it was surprising to notice from an audience who is so quick to use the internet as a source of information that not one consumer mentioned they had learned about either of the sustainable seafood programs on any of the online, social media platforms, namely Facebook and Twitter. These avenues could be the essential next step for the programs to promote themselves freely, to a massive audience. In today's day and age, these platforms can be very powerful if harnessed efficiently and can provide companies/institutions/organisations a free and open window to access a large number of consumers, relatively easily. This could be especially useful for organisations which are unable or not allowed to pay for advertising space.

Consumers' most common response to where they had learned about either of the sustainable seafood programs, was 'other sources', as in the consumers could not recall where they had originally learned about the programs. Print media and restaurants were the most commonly recalled sources of information followed by TV, with a number of consumers mentioning a certain Carte Blanche episode which aired in the last quarter of 2008. It is interesting to note that over 10% of people who were aware of the sustainable seafood programs, originally learned about them on a television insert which aired four years prior to the survey, showing the vast reach and power of TV broadcasting.

In addition to potentially making use of the internet and/or TV to reach an audience, both of these programs could take into consideration their involvement at a primary and/or high school level. During a large number of interviews, the respondents indicated that their children and/or grandchildren were the only reasons they were aware of a number of environmental issues. They continued to indicate that it was solely because of them that they now take the steps required to live a more environment friendly lifestyle. Some went so far as to say they were afraid to step out of line, as their grand-/children act as environmental law enforcement

officers. Educating children and empowering them to share this information with their families, is a step in the right direction, which could be achieved by rolling out school education programs and/or including this information in school syllabuses.

One has to ask, is educating consumers really going to make a difference? Thus far it has been found that consumers, who were aware of the programs, continue to make the least sustainable choices. I believe that education should continue as is, with consumer outreach programs. Changing consumer's actions is a difficult task (Jackson 2005), a challenge which could be compounded by the fact that South African consumers have not been exposed to initiatives such as these previously which could increase the time required between the concept being adopted by 'early adopters' and 'reluctant adopters' (Thøgersen, Haugaard and Olesen 2010).

In addition to this continued outreach, a serious attempt should be made to get these programs into the school syllabus too. Based on what a large number of interviewees mentioned during the surveys and based on personal observation, children have a large influence on parent(s) and/or guardians' purchases and they are more 'open' to change (i.e. they are not 'set in their ways' yet) . This is an area, which I feel, would have definite positive outcomes when used in conjunction with the outreach programs run at present, such as those at various retail outlets.

One of the three retail outlets, Pick 'n Pay, showed a relationship with Kob, where people who favoured it were significantly less likely, as much as three times, to purchase it from Pick 'n Pay. This could be linked to the fact that retail outlets often stock kob which is caught as bycatch in the inshore trawl fishery, for which there is no minimum legal size, in contrast to the hand line fishery. A significant number of people who purchase kob highlighted the importance of size when choosing their seafood; hence their hesitance to purchase kob from selected outlets. The second item which stood out was from those who indicated they favour all kinds of seafood, these consumers said they would either catch the seafood themselves or source it from fish shops.

In comparison to the top five species detailed in the main text in chapter 2, the popularity of the ten species discussed here is somewhat less. The most popular in this section being calamari, favoured by just over a tenth of the consumers while the fifteenth most popular, sushi, being mentioned by just under three percent. Of these ten species, five are on the SASSI green list (calamari, yellowtail, crayfish<sup>4</sup>, mussels and angelfish), the remaining species are either on the orange list (sole), more than one list (tuna and kob), or unsuitable to be classified (sushi and those who eat any seafood) due to their ambiguous descriptions. The seafood highlighted here was sourced from various retailers/outlets (Spar, Fruit and Veg City, fish mongers, work, family and friends and fishing companies), none of which (at the time of survey), have working relations with SASSI. These findings show that due to the smaller sample sizes used in these analyses, no firm conclusions can be drawn.

---

<sup>4</sup> Crayfish is classified as orange, however it was green at the time of the survey after having undergone reassessment

In an attempt to extract something tangible from this data, it was found that there is limited awareness and the groupings of who are aware and the factors considered during seafood purchases, are haphazard. In addition to this, there is no clear pattern of those who shop at the retail outlets, working closely with SASSI, exhibiting greater consumer awareness and it appeared consumers were more concerned about the health benefits of eating seafood and making sure they were getting the best deal (i.e. the cheapest), than any other factors. Further research, continued sampling and analysis are required, to notice any trends or for more steadfast conclusions to be drawn.

Overall, the outstanding message of this appendix (supplementary S4) seems to indicate a further need for research, and outreach by both of the sustainable seafood programs. This could be done in an attempt to educate all persons who make use of this resource, consumers and staff at the retail outlets, in attempt to increase awareness and continue striving for a change in overall purchasing behaviour

University of Cape Town

## Chapter 3

In compliance with the University of Cape Town's, Faculty of Science requirements, concerning a minor-dissertation's structure, this chapter reflects on the investigation, problems faced and lessons learnt. In addition to this, it will draw comparisons from the international literature and studies, with the study at hand.

A study, such as this, which mixes the social sciences and natural sciences, was a very steep learning curve. It is one which the author was eager to be part of and learn from, as in today's day and age, in my personal opinion, the boundaries between faculties are starting to blur, a very exciting step forward. When I was allowed, and encouraged, to incorporate social science into my project I knew I had chosen the right project and supervisor. Since inter-disciplinary projects are fairly new in South Africa, finding people who were able to assist was a challenging process for both student and supervisor, both with a biological background. Albeit a bit of a struggle initially, it was found to be very rewarding, as many doors were opened new, fresh experience gained and contacts met, which will hopefully encourage more inter-departmental projects in time to come.

### 3.1 Survey development

After much reading and discussion with various experts, a few key elements to any successful survey were learnt. Firstly, it is important to establish what would ultimately like to be obtained from the survey, preferably broken down into key points. Each point may have a few questions attached to it which draw the required information out of each respondent. This initial planning process may seem tedious at times, but the more planning and refining which goes into it will provide for the most effective survey. This efficacy applies to both, data collection and time usage. On this last point, it is essential to make sure that the surveys are kept as brief as possible to avoid the respondents becoming bored or agitated, as well as for the individual doing the surveying.

Once the key areas are defined, and all of the questions are written out – they should be ordered in such a way that the easiest, 'conversation starters' are in the beginning but at the same time prioritised so that the most important questions aren't all in the end. It should be taken note here that consumers might call an end to a survey at any time, if this does happen the data collected can still be used so it is essential to make sure that the answers which yield the most important information come early on

Once the first draft set of questions is completed, it is crucial to make sure it is piloted before the survey is finally rolled out. How often this piloting is conducted lies with the judgement of the surveyor, however a target of 5 – 10% of the total planned sample size is acceptable. Initially this should be tested on peers, friends and family. Eventually, this can be tested on to a sample of the target audience before the final survey is rolled out. It is during this piloting process that the final refinements can be made; examples of such refinements to

the survey will be removing all 'technical' terminology from the survey, or printing the text larger for varying sight capabilities.

### 3.2 Surveying process

Much will be learnt about the actual surveying process from the pilot study, these are skills which are difficult to capture, but will be learnt very quickly and will serve well throughout the project. From this project some of the lessons learnt are as follows:

- Effective face-to-face surveying is all about the initial 30 seconds and developing a good rapport with the interviewee. The key is being confident, calm and polite in your approach. I also found it important to speak clearly at all times.
- During the introductory phase, a number of interviewees will try and avoid partaking in the survey. Effective communication is essential, make it known what the survey is about, what it will contribute towards and that you are not trying to sell something. What was also found to be helpful, was being clear about what would be required of them – examples of which could be “I only have 12 questions to ask”, or “It will take about 6 minutes of your time”.
- Once one has established a connection and the surveying process is underway, it is very important to keep a keen eye on the interviewees’ body language. If it is noticed that their body language indicates they are ready/trying to leave (i.e. they begin walking away, arms crossed, checking the time), make sure this is countered with positive feedback about how much they are helping, an estimate of how much longer the process is going to be or anything positive and supportive. A great tip would be to echo a sentiment a person has responded with, especially if you make it known that a point they have raised is very interesting and even make a note of it and express that you are interested in it and want to learn more.
- When surveying in retail outlets, there are definite ‘no-go’ areas. These would be spaces which are very busy, such as small aisles, near the check-out areas, or near/between open fridges. These are areas where people are the least inclined to focus their attention.
- Timing is key. When conducting surveys in retail outlets, especially those which sell food, avoid all meal times. Interviews between half past 12 and 14:00, as well as 17:00 to 18:30, are very difficult times. It is harder to get people to partake and if they do, they are always seemingly in a rush. In addition to avoiding meal times, stay clear stores during opening sales and when big sporting events are on; rugby tests, soccer matches and so on.
- The surveyor needs to be prepared to do some on the fly thinking, surveys such as these will have questions for interviewees but these people can and will have some of their own questions. Do not dismiss their conversation/questions, but be careful not to stray too far off the course of the survey. Also, peoples’ vocabulary is vastly different, be prepared to adopt unfamiliar words for certain things. The more the person surveying can do to make the other party feel comfortable, the better.

- Surveying consists of talking to people, a seemingly simple and easy-to-achieve task. This process is underestimated, it is very taxing on the person(s) surveying – mentally and physically. Aiming for conducting more than 30 surveys daily is an unsustainable approach to surveying, especially if there is one person solely involved with conducting the interviews. It was found that, for this type and length survey, 20 per day was a good amount and ensured the full attention of the person interviewing, as well as a positive energy.

### **3.3 Analysis**

The actual analysis itself, was done in a statistical analysis program called SPSS (Statistical Package for Social Sciences), which is a fairly user-friendly program – when there is some background understanding, either from text or having had it explained. This study made use of both of these resources, text and guidance.

### **3.4 Underestimating timelines**

When initially planning the timelines of this study, there was no prior knowledge of time frames. As a result of such, they were seriously underestimated, in all aspects. Developing a consumer survey is not something that can be put together in a day, nor even a few days – this is especially the case if a person, has experience in other fields, such as biological science, as was the case in this study. There is nothing in any of the text about time frames in which surveys were developed, the execution of said surveys, and the analysis which follows.

To clarify, during this study, which is more than likely the case with most projects – the estimated time frames were underestimated. However, since funding and support for the project were received throughout the duration of the entire project – the challenges were happily taken on by all involved. To outline some of the difficulties faced by those involved (and some timelines), they are as follows: locating someone who was offer assistance on survey development and a basic introduction to the statistical software and the pilot study (almost four months). This was such, as in order to be assisted by amazingly helpful staff in the Sociology department, at the University of Cape Town (UCT), it was decided that a six week social sciences statistical and introduction to surveying course was attended, before any one-on-one assistance was received. The target was set at 400 surveys, after the pilot study this figure was adjusted to 375. A target which was thought to be attainable in two to three weeks, took over a month. A suggestion, after the completion of this study, is that projects of this nature are possibly better suited to a full dissertation, unless the timeline is able to be adjusted and funding ascertained, as was the case here.

### **3.5 Improvements and future studies**

Designing a survey is, as discussed, an extensive process. The main aims should be to extract all of the information needed from a respondent, using the fewest questions possible, in the most non-invasive way, in the quickest time possible. The choice of wording is essential, especially if respondents are filling out the

surveys themselves. This study set up in an interview style with the surveyor scribing all of the responses, by doing so it is possible to make sure all questions are answered, and any ambiguities are explained clearly. This method was found to be effective; however it is very physically and mentally taxing.

It is suggested in literature that, at an international level, the response rate is fairly similar between all types of surveys. This would be interesting to examine in South Africa and how the country and its residents compare. The findings of this could assist in future studies.

To summarise the poignant points from literature and improvements that could be made from the learning in this project, the points are as follows:

- Supplement reading and research with seeking assistance from an expert, or someone who has experience in the field. Literature, or perhaps the authors thereof, might not capture the full story, with many of the nuances of a survey being overlooked due to the authors' experience
- Do not rush the survey creating process; the longer spent developing a water-tight, well thought out survey, the better. A good, clear, simple yet effective survey will benefit the study in time to come
- As can be expected, do not bank on estimated timelines. It is more than likely that these will be too short and the process will take twice as long (or more in some cases)
- Make sure that the person doing the survey is in a good mood, people being interviewed or surveyed will mirror the surveyors' mood. If the person is too tired, rather take a day off. It might set the project back some time, but the benefits thereof will be great.
- When thinking back to the data gained from this project, it might have been beneficial to differentiate between consumers favoured species and their most regularly consumed species.

### **3.6 Conclusions**

The above methodological considerations notwithstanding, this study has revealed that there was a higher recognition of SASSI by consumers, in comparison to the MSC. The recognition of the former, SASSI, surpasses that which was obtained in a study of the MSC logo on a Danish market (Thøgersen, Haugaard and Olesen 2010); however the recognition of the MSC locally was lower than this. Even though consumers: were aware of one or both of the sustainable seafood initiatives, considered sustainability an important factor when choosing seafood and scored in the upper half of the fish classification - they favoured SASSI orange listed species, indicating that although consumers were aware of the program(s), their purchasing behaviour had not been influenced (i.e. moving away from orange to green listed species). Generally speaking, if the consumers who recognised SASSI were in a position where they wanted to investigate the colour classification of a seafood species – the first channels explored were Google and asking the staff, highlighting an overall lack of awareness around the carefully developed, most useful SASSI consumer tools. A majority of respondents could not recall where they learnt about either of the programs. Those who had the highest recall remembered

seeing the initiatives on TV, four years prior to the study, while many of the consumers indicated they had learnt about the programs from their children/grandchildren.

The top five favoured species, found the first and fifth being classified as green, while the second through fourth were classified as orange. The consumers who indicated price was a consideration in seafood purchases, generally leaned towards the greener (less exotic, i.e. cheaper); it was these consumers who showed the lowest recognition of either of the initiatives and fell within the second highest average monthly household income bracket sourced their seafood from: fish retailers, Checkers and Pick 'n Pay. Those who were less likely to consider price an important factor were found to fall within the upper average monthly household income bracket and favour the orange species, even though they showed the highest awareness around the sustainable seafood initiatives. These findings indicate that there is no clear difference between the consumers at the various retail outlets, with and without working relationships with SASSI. In addition to this, there has been no definite move towards the more sustainable seafood options, in fact it was found to be quite the opposite – it appeared the more aware consumers were of the programs, the less sustainable their choices. This finding is the opposite of what was found during Kemmerly and MacFarlane' (2009), where the elements of a consumer-based initiative in contributing to positive environmental change were examined – during this study it was found that people who were aware of the initiative made more environmentally choices of seafood.

The SASSI evaluation, from 2010 found that just shy of three quarters of the consumers who took part in the survey consumed seafood, at least once in their lives. The most popular forms of which, in order of priority, were: canned, frozen, fresh and/or from a restaurant. Those who were mainly purchased seafood fell into very specific ethnic groups, income brackets, locations, and age classes. This project, when examining consumers in Cape Town, found that a greater percentage of consumers had purchased seafood more frequently than suggested by the aforementioned study. They favoured all of the methods of production, however the order of preferences were somewhat different. The interviewees from this study, who purchased seafood, were not as specific as was the case in the SASSI evaluation – here it was found that a majority of people, regardless of ethnicity, average monthly household income or age purchase seafood. However, this study would need to be rolled out in additional provinces, say Gauteng and KwaZulu-Natal, to get a wider distributed sample, in order to make firmer conclusions.

To examine the hypotheses, stated initially for this study: the first hypothesis (**H1**) was rejected, as it was found that there was recognition around both of the sustainable seafood initiatives, SASSI and MSC. This being said, the amount of which varied between the two. I was unable to reject the second (**H2**) and third hypotheses (**H3**), as there was no difference in recognition between consumers at SASSI and non-SASSI retailers and as it appears there has not been a change in consumer behaviour (i.e. a shift to 'greener' species).

In a similar context and with respect to SASSI and the MSC, the further development of both of these sustainable seafood initiatives investigated, might possibly benefit from a few suggestions developed in this

study. There are varying degrees of awareness amongst consumers in Cape Town's middle to upper class areas depending on the initiative, indicating a clear need for further education. This could either spread the knowledge around the initiatives further, or identify methods to potentially result in consumers making use of this knowledge and choosing more sustainable seafood.

It was seen that the potentially beneficial, SASSI consumer tools are currently fairly underutilised. This was also found in Hallstein & Villas-Boas (2009), where consumers did not make use of the seafood sustainability advisory (i.e. their consumer tools). These tools should be promoted more, or in a different manner to increase recognition and usage by consumers, especially amongst those who are already aware of the program. This definite need for education should possibly be tailored for specific consumers. Those who are already purchasing green listed fish could possibly be educated on the benefits of continuing with what they are doing, while those who favour orange listed species could be educated to shift their preferences to green listed species. These differing education programs could be rolled out at a school level and different retail outlets.

In addition to school and in store outreach programs which can be labour/funding intensive, these initiatives might consider increasing their online presence, especially on the various social media platforms. This is suggested for a number of reasons, namely because a common response to researching classification was to simply Google the seafood, which indicates making use of the internet is something people are fairly accustomed to and use often. The second reason is that no one mentioned either of the most commonly known social media platforms, Twitter and Facebook. Both of which are free to make use of, have a very extensive reach and influence on a number of people in today's day and age.

This study has investigated seafood consumers' preferences around seafood. It focussed on three hypotheses, but has additionally provided results that may be useful in further developing SASSI and/or the MSC. The surveys were found efficient and practical to conduct, and extending the study to the two other South African metropolitan areas, Gauteng and Durban, would be of interest. I would hypothesise a similar level of recognition of SASSI (but increased since Basson (2010)) and the MSC, no direct impact of SASSI partnership retailers on sustainability-related preference and, in parallel to the findings for middle-class consumers in Cape Town, price and/or type consciousness overriding sustainability considerations in seafood choices.

## References:

- Basson J. (2010) *The sustainable fisheries programme, monitoring and evaluation report*.
- Begg G.A. and Waldman J.R. (1999) An holistic approach to fish stock identification. *Fisheries Research* **43**, 35-44.
- Botsford L.W., Castilla J.C. and Petersen C.H. (1997) The Management of Fisheries and Marine Ecosystems. *Science* **277**, 509-515.
- Cawthorn D.-M., Steinman H.A. and Witthuhn R.C. (2011) Evaluating the availability of fish species on the South African market and the factors undermining sustainability and consumer choice. *Food Control* **22**, 1748-1759.
- OECD: organisation for economic co-operation and development (2009) *Round table on eco-labelling and certification in the fisheries sector*. Netherlands.
- David M. and Sutton C.D. (2004) *Social research: an introduction*. London, SAGE.
- Earth Island (2011) Available at: [www.earthisland.org](http://www.earthisland.org) [Accessed August 2011].
- Eighty20 (2011) Eighty20. Available at: <http://www.eighty20.co.za/databases/index.cgi> [Accessed November 2011].
- FAO (2010) *The state of world fisheries and aquaculture 2010*. Rome, Italy.
- FAO (2011a) Ecolabels and marine capture fisheries. Available at: <http://www.fao.org/docrep/013/i1948e/i1948e04.pdf> [Accessed October 2011].
- FAO (2011b) Environmental certification schemes and initiatives. Available at: <http://www.fao.org/docrep/010/ai002e/AI002E14.htm> [Accessed October 2011].
- Fink A. (2009) *How to conduct surveys: a step-by-step guide*. Los Angeles, SAGE.
- Field A. (2009) *Discovering statistics using SPSS*. London, SAGE.
- Foley P. (2012) The political economy of Marine Stewardship Council certification: processors and access in Newfoundland and Labrador's inshore shrimp industry. *Journal of Agrarian Change*. **12**, 436 - 457.
- Foley P. (2013) National government responses to the Marine Stewardship Council (MSC) fisheries certification: insights from Atlantic Canada. *New Political Economy*. **18**, 284 - 307
- Garcia S.M. and Cochrane K.L. (2005) Ecosystem approach to fisheries: a review of implementation guidelines. **62**, 311 – 318.
- Gartside D.F. and Kirkegaard I.R. (2007) *The role of food, agriculture, forestry and fisheries in human nutrition - a history of fishing*, 2nd edn (Vol. II).
- Hallstein E. and Villas-Boas, Sofia B. (2009) *Are Consumers Color Blind ? An Empirical Investigation of a Traffic Light Advisory for Sustainable Seafood*. Berkeley.

- Heyden S.V.D., Barendse J., Seebregts A.J. and Matthee C.A. (2010) Misleading the masses : detection of mislabelled and substituted frozen fish products in South Africa. *ICES Journal of Marine Science* **12**, 176 - 185.
- Jackson T. (2005) *Motivating Sustainable Consumption: A review of the consumption debate and its policy implications*, (Vol. 15). Surrey.
- Jacquet J. and Pauly D. (2007) The rise of seafood awareness campaigns in an era of collapsing fisheries. *Marine Policy* **31**, 308-313.
- Jacquet J., Hocevar J., Lai S., et al. (2009) Conserving wild fish in a sea of market-based efforts. *Oryx, the International Journal of Conservation* **44**, 12.
- Jacquet J. and Pauly D. (2010) Seafood stewardship in crisis. *Nature* **472**, 28 - 29
- Jacquet J., Pauly D., Ainley D., Holt S., Dayton P. and Jackson J. (2010) Seafood stewardship in crisis. *Nature* **467**, 28-9.
- Kemmerly J.D. and Macfarlane V. (2009) The elements of a consumer-based initiative in contributing to positive environmental change: Monterey Bay Aquarium's Seafood Watch program. *Zoo biology* **28**, 398-411.
- Koldewey H.J., Atkinson J. and Debney a (2009) Threatened species on the menu? Towards sustainable seafood use in zoos and aquariums. *International Zoo Yearbook* **43**, 71-81.
- Lewis R., Crowder L., Read A. and Freeman S. (2004) Understanding impacts of fisheries bycatch on marine megafauna. *Trends in Ecology & Evolution* **19**, 598-604.
- MSC (2011) Marine Stewardship Council. Available at: <http://www.msc.org/about-us/credibility/how-we-meet-best-practice> [Accessed August 2011].
- Magnusson A. and Hilborn R. (2007) What makes fisheries data informative? *Fish and Fisheries* **8**, 337-358.
- Mahaffey K.R. (2004) Fish and shellfish as dietary sources of methylmercury and the omega-3 fatty acids, eicosahexaenoic acid and docosahexaenoic acid: risks and benefits. *Environmental research* **95**, 414 - 428.
- Mullon C., Freon P. and Cury P. (2005) The dynamics of collapse in world fisheries. *Fish and Fisheries* **6**, 111-120.
- Nilsson H., Tuncer B. and Thidell A. (2004) The use of eco-labeling like initiatives on food products to promote quality assurance—is there enough credibility? *Journal of Cleaner Production* **12**, 517-526.
- Oakley I., Chen M. and Nisi V. (2008) *Motivating Sustainable Behavior*. Funchal, Madeira, Portugal.
- Pauly D., Christensen V., Guénette S., et al. (2002) *Towards sustainability in world fisheries*, (Vol. 418). Vancouver, British Columbia, Canada.
- Pauly D., Watson R. and Alder J. (2005) Global trends in world fisheries: impacts on marine ecosystems and food security. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences* **360**, 5-12.

- Pelletier N. and Tyedmers P. (2008) Life cycle considerations for improving sustainability assessments in seafood awareness campaigns. *Environmental management* **42**, 918-31.
- Pick 'n Pay (2011) Available at:  
[http://www.picknpay.co.za/picknpay/content/en/news?oid=213078&sn=Detail&pid=10563&utm\\_source=OctoberNewsletterMailer&utm\\_medium=Email&utm\\_campaign=OctoberNewsletter SS](http://www.picknpay.co.za/picknpay/content/en/news?oid=213078&sn=Detail&pid=10563&utm_source=OctoberNewsletterMailer&utm_medium=Email&utm_campaign=OctoberNewsletter%20SS)  
[Accessed November 2011].
- Ponte S. (2006) Ecolabels and fish trade : Marine Stewardship Council certification and the South African hake industry. *International Studies*.
- Ponte S. (2007) Greener than Thou: The Political Economy of Fish Ecolabeling and Its Local Manifestations in South Africa. *World Development* **36**, 159-175.
- Ponte S. (2012) The Marine Stewardship Council (MSC) and the making of a market for 'sustainable fish'. . *Journal of Agrarian Change* **12**, 300 - 315.
- Rembold C.M., Hites R.A., Foran J.A., Carpenter D.O., Hamilton M.C., Knuth B.A. and Schwager S.J. (2011) The Health Benefits of Eating Salmon. *Advancement Of Science* **305**, 475.
- Roheim C.A. (2009) An Evaluation of Sustainable Seafood Guides : Implications for Environmental Groups and the Seafood Industry. *Marine Resource Economics* **24**, 301-310.
- Roheim C.A. and Sutinen J.G. (2006) Trade and Market-Related Instruments to Reinforce Fisheries Management Measures to Promote Sustainable Fishing Practices. *Development*.
- SASSI (2011) SASSI website. Available at: [www.wwf.sassi.co.za](http://www.wwf.sassi.co.za) [Accessed August 2011].
- Sargent J.R. (1997) Fish oils and human diet. *The British journal of nutrition* **78**, 5-13.
- Simpson J. (2011) University of Cape Town, Faculty of Commerce. Personal communication.
- Thøgersen J., Haugaard P. and Olesen A. (2010) Consumer responses to ecolabels. *European Journal of Marketing* **44**, 1787-1810.
- Verbeke W., Sioen I., Pieniak Z., Van Camp J. and De Henauw S. (2007) Consumer perception versus scientific evidence about health benefits and safety risks from fish consumption. *Public Health Nutrition* **8**, 422-429.
- Ward T. (2008) Barriers to biodiversity conservation in marine fishery certification. *Fish and Fisheries* **9**, 169 - 177.
- Worm B., Hilborn R., Baum J.K., *et al.* (2009) Rebuilding global fisheries. *Science* **325**, 578-85.
- WWF Fisheries Facts and Trends South Africa (2011) WWF website. Available at:  
[http://www.wwf.org.za/media\\_room/news/?4900/fisheriesfactstrends](http://www.wwf.org.za/media_room/news/?4900/fisheriesfactstrends) [Accessed November 2011].