HUMAN-SHARK INTERACTIONS:
EXPLORING INDIVIDUAL ATTITUDES TOWARDS SHARKS

A thesis submitted in partial fulfillment of the requirements
For the degree of Master of Arts in Anthropology

By

Katherine Palmer

May 2015
The thesis of Katherine Palmer is approved:

_____________________________________________  ______________________
Dr. Kimberly Kirner                                Date

_____________________________________________  ______________________
Dr. Christina J. Campbell                          Date

_____________________________________________  ______________________
Dr. Sabina Magliocco, Chair                       Date

California State University, Northridge
Acknowledgments

There are many people who made this thesis a reality. First and foremost, I would like to thank my father, Dr. A. Dean Palmer, for helping me decipher Smith’s S and for helping me make mathematical sense of all the data I collected. Thank you for providing invaluable assistance and advice with the statistical calculations as well as for the long hours spent editing my drafts. Thank you to my mother Cindy Palmer, who also spent long hours proofreading the first few drafts, and especially thank you for graciously putting up with all the different moods I went through in completing this research.

Thank you to my advisor Dr. Magliocco, who believed in me and helped to shape this project from beginning to end. Thank you to Dr. Kirner for your invaluable insight into the world of cognitive anthropology. Thank you Dr. Campbell for finding worth in my research and for the helpful comments. Thank you Dr. Snead for making me feel like my research was important and for always taking the time to fill me in on interesting shark research going on around the world.

I owe a debt to Nikki Cox for always keeping me on track and to Paige Plannette for patiently listening when I needed someone to just listen. I would like to say a big thank you to Tara Crow for her guidance and friendship at the aquarium. Finally, I would like to extend a heartfelt thank you to all the shark researchers who have dedicated their lives to shark conservation and who have simultaneously inspired me to join in the cause.
# Table of Contents

Signature Page .................................................................................................................. ii

Acknowledgments ........................................................................................................... iii

List of Figures .................................................................................................................. vi

Abstract .......................................................................................................................... vii

Chapter 1: Introduction ................................................................................................... 1

  The Problem .................................................................................................................... 3

  Bridging the Gap ............................................................................................................ 5

Chapter 2: Methodology ................................................................................................. 13

  The Aquarium ................................................................................................................ 13

  Encinitas, California ...................................................................................................... 15

  The Survey .................................................................................................................... 16

  In-Depth Interviews ..................................................................................................... 20

Chapter 3: Theoretical Perspectives .............................................................................. 22

  Cultural Ecology .......................................................................................................... 22

  Cognitive Anthropology and Local Ecological Knowledge ........................................... 24

Chapter 4: Data and Results .......................................................................................... 32

  Demographic Information ........................................................................................... 33

  Knowledge .................................................................................................................... 33

  Feelings ......................................................................................................................... 36

  Consumer Information/Habits ..................................................................................... 37

  General Information .................................................................................................... 37

Chapter 5: You’re Gonna Need a Bigger Boat ............................................................... 55
“Truth” and Power to Create.................................................................62
“Othering” the Shark.................................................................64
Fetishization..............................................................................66
Surfer Interview Analysis............................................................68
Fear......................................................................................68
Respect and Awe..................................................................73
Spirituality...........................................................................75
Are we Taught to Fear Sharks?............................................78
Chapter 6: Discussion and Conclusion........................................81
  A Case Study: The Day All the Sharks Died...............................81
  Shark Attack Survivors for Shark Conservation........................84
  Conclusion........................................................................85
Works Cited........................................................................89
Appendix A: Shark Survey: All Respondents.............................97
Appendix B: Shark Survey: Nonsurfers.......................................99
Appendix C: Shark Survey: Surfers..........................................101
List of Figures

4.1 Table of Response Data for Surfers ................................................. 42
4.2 Table of Response Data for Nonsurfers ........................................ 45
4.3 Table of Grouped Free-List Responses for Surfers ............................. 49
4.4 Table of Grouped Free-List Responses for Nonsurfers ........................ 49
4.5 Table of Category Roll-Up Results for Surfers ................................. 51
4.6 Table of Category Roll-Up Results for Nonsurfers ............................ 51
5.1 Shark Stroller ................................................................................. 67
Abstract

Human-Shark Interactions:
Exploring Individual Attitudes Towards Sharks

By
Katherine Palmer
Master of Arts in Anthropology

Humans and sharks have an important relationship, one that involves a mortal fear of being eaten alive. Yet it also involves an important ecological relationship where sharks, as a keystone species, directly impact human welfare by providing numerous ecosystem services. Biological data shows that humans are bringing sharks to the brink of extinction. My hypothesis is that the way most people think and feel about sharks is directly affected by the media and not by personal experience with sharks. The focus of my investigation was to understand what cultural knowledge is being transmitted about sharks through the investigation of what people know about, how they feel about, and how they interact with them. It is a small mixed-method study. Data was collected through face-to-face surveys of beachgoers combined with open-ended questions, in addition to in-depth interviews with California surfers. The data suggest that sharks are culturally constructed negatively through media portrayal and demonstrate how the cultural construction of what to fear plays an important part in vilifying sharks as a species. However, surfers who have actual interaction with sharks or with their ecosystem hold a place of respect for sharks, and that may hold the key to shark conservation.
Chapter 1: Introduction

When I was a young child in the early 1980s I stumbled across the movie *Jaws*. In this film a huge white shark with a grudge against humans and a taste for them stalks a small beach town. This movie instantly became my favorite of all time and remains so to this day. It also gave me a crippling fear of the water. However, I did not just fear the ocean, I developed a completely irrational fear of water in general. As a 10-year-old, I was afraid that the shark in *Jaws* would appear in the bathtub, and do not get me started on the pool. As embarrassing as all this sounds, I am not alone. I have shared this fear with many people who confided that they too were terrified of *Jaws* in the bathtub and are still irrationally afraid that sharks lurk in the deep end of the pool. This is an intriguing phenomenon that gets to the heart of my thesis. Yet, in spite of the fear, the movie created in me a love affair with sharks.

The movie *Jaws* takes place on Amity Island, a fictitious small town off the coast of New York State. The story begins with a killer great white shark that violently devours a woman skinny-dipping in the ocean. What were once pieces of her body are found washed up on the sand. In the next few days the shark devours three more individuals including a little boy. Police Chief Brody, recently transferred from the big city, realizes he has a giant, man-eating shark terrorizing his town. He then hires shark researcher Matt Hooper from the oceanographic institute to help Amity Island’s sheriff deal with a great white shark feeding in the island waters. Brody also hires Quint, a local shark fisherman, to hunt and kill the shark.

A couple of days into the expedition, Brody and Hooper find out that Quint is a *USS Indianapolis* survivor. In actual events during World War II, the *Indianapolis* was
torpedoed and sunk by a Japanese submarine after dropping off the Hiroshima nuclear bomb. Roughly 900 men made it into the water alive but, by the time help arrived four days later, only 316 men were left alive. The majority of them were eaten by sharks, which began feeding at sunrise the first day and continued until every survivor was extracted from the water. Quint gives what is commonly heralded as one of the greatest movie monologues in history (The site www.film.com; www.thescriptlab.com) describing his *Indianapolis* trauma for almost ten minutes. However, Woody Eugene James, an actual *Indianapolis* survivor, described the trauma in just five short sentences: “Sharks were around, hundreds of them. You’d hear guys scream, especially late in the afternoon. Seemed like the sharks were the worst late in the afternoon than they were during the day. Then they fed at night too. Everything would be quiet and then you’d hear somebody scream and you knew a shark had got him” (www.ussindianapolis.org). Due to this extreme trauma, the fictional character Quint has developed a vendetta against all sharks and this one in particular. His hatred ends up sinking the ship that he, Brody, and Hooper are on and he gets slowly eaten by the shark. In a last ditch kill-or-be-killed ending, Chief Brody manages to kill the shark, and he and Hooper heroically swim back to shore.

At one point in the film Hooper says:

I love [sharks], I love them. When I was twelve years old, my father got me this boat and I went fishing off of Cape Cod. And I hooked a scup. And as I was reeling it in, I hooked a four and a half-foot baby thresher shark who proceeded to eat my boat. Ha, ha. He ate my oar, hooks, and uh, my seat cushions, he turned an inboard into an outboard. Scared me to death. And I swam back to shore. And when I was on the beach, I turned around and I actually saw my boat being taken apart. And ever since then, why yes, I have been studying sharks.
Two things are clear to me here. First, I have been culturally conditioned to fear sharks intensely. Like the character Mr. Hooper, this fear has sparked in me a great love and respect for sharks. Second, interaction with the ocean and the predators contained within may be a small key to understanding how to create effective educational programs aimed at shark conservation. This research is therefore dedicated to all the sharks, large and small, that dwell in the oceans of planet earth, and I hope my research will be a force to help save them.

The Problem

Humans and sharks (Subclass Elasmobranchii, Bonaparte 1838) have an important relationship. It is one that involves a mortal fear of being eaten alive as well as an important ecological relationship where sharks, as a keystone species, directly impact human welfare by providing numerous ecosystem services. Biological data shows that humans are bringing sharks to the brink of extinction, and shark conservationists are working to stop this process and educate the public about the importance of sharks to the complex ocean ecosystem (Worm et al. 2006; Dulvy et al. 2014).

Through my research I became aware that what is missing in the study of humans and sharks is an inquiry into individual knowledge of sharks and feelings for them, including folk knowledge among Southern California beachgoers and surfers. It has been my direct observation that people relate the term “shark” to large, man-eating predators while the reality is that there are over 400 species of shark (Beckman 2013:53), and only a handful of those are the stigmatized, large, man-eating predators. In fact, the odds of being killed by a shark are estimated to be between 1 in 280 million and 1 in 300 million (Cloud 2008). John Cloud puts those odds into perspective by explaining, “Your chances
of dying in a car accident are about 1 in 6,700. In other words, you would have to swim in the ocean 41,000 times a year (or 112 times a day, or seven times every waking hour) before swimming in shark habitats became as dangerous as driving your car a single time” (Cloud 2008).

Lauren Latchford (2013) conducted surveys on individuals in a Chinese community who eat shark fin soup and, as a result of them, she found that shark education, through television or traditional educational venues, such as aquariums, helps to halt shark consumption on the part of the one being educated, and in fact, a late-breaking notice by Zuckerman in National Geographic indicates that education and awareness in China is beginning to reduce the volume of shark finning there (Zuckerman: 2015: [14]). To promote that same awareness here, Latchford posits that, in light of the value of apropos education, the annual Discovery Channel’s Shark Week programming could shift its focus to why we should advocate shark conservation. Such a change could help reduce human consumption of foods made from sharks and perhaps even modify cultural attitudes and behavior. Like mine, Latchford’s was a small study with large implications of what a little ethnography in conjunction with science could do in terms of conservation. As Jacques aptly points out, “Without an integrated social-marine science, theories of human-related drivers of marine change will remain overly simplistic, and management may be confined to reactionary or ineffective measure, leaving core contingencies for human-shark interactions unaddressed” (Jacques 2010:193).

In personal communication with Dr. Jacques, I shared my hypothesis that humans have an irrational fear of sharks due to movies, the media, and folk narratives. His response, in some ways, provided a focus for my work. He replied, “What would be new
is if there was a way to tie in public misunderstanding to some kind of action (fishing, conservation, policies on sharks)” (email to the author, December 13, 2013). This made me start to think about what I could add to the emerging dialogue on shark conservation. First, I would need to investigate the question of whether there really is a public misunderstanding about sharks. To answer this question, I developed a methodology in which I use the tools of free listing and surveying, and the question itself provided first an objective and later a direction for my research. That objective became simply to find out if there was a way to motivate people to participate in active shark conservation. To answer the question about how to motivate people to support and participate in shark conservation, my research objectives were threefold.

The first objective was to understand what people know about sharks and how they feel about them; this objective included investigating the Local Ecological Knowledge (LEK) held by Southern California surfers about sharks. The second objective was to explore individual consumer behaviors that affect shark population health and numbers. The third objective was to contrast individuals who have habitual contact with the ocean with those who have only occasional contact with it in order to develop both a concept of what a shark is and also what the main beliefs about them are within each group. To do this, I selected two groups: surfers who enter the ocean all the time and occasional beach-going members of the general public who do not.

**Bridging the Gap**

The biological sciences have called on the social sciences to collaborate on conservation issues because there is an unfilled gap in the process. In fact, British anthropologist Kay Milton asserts that environmental anthropology rests upon a need for
an interdisciplinary approach to research (Milton 1999:6). With respect to shark conservation, the most compelling literature I came across was by Muter et al. (2013). These authors look at 300 articles in 20 various newspapers in Australia and the U.S. from 2000-2010. What they find is that clearly sharks captivate the public’s attention globally, even though there are animals that kill far more people annually than sharks do. In fact, as far as human deaths attributed to animals go, sharks rank rather low on that list, beneath hippopotami, bison, crocodiles, snakes, and even mosquitoes. Interestingly though, deaths occurring from crocodile incidents rarely, if ever, make global news. Sharks kill an estimated 10 people a year, while hippopotami kill an estimated 3,000 people in the same amount of time (www.mnn.com). Conversely, humans kill an estimated 270,000 sharks daily. This shows that people have distinct negative feelings towards sharks—or that sharks have a significant commercial value— but conservation biologists and oceanographers require the means to find out how to temper these views and commercial interests in order to prevent the disappearance of the shark species along with its concomitant devastation of the oceanic environment. They contend that, “Assessment of human attitudes, beliefs, and behaviors related to sharks would provide some much-needed insight into media effects on public attitudes towards sharks and their conservation” (Muter et al. 2013:195) and call on social scientists to provide this insight through fieldwork and cultural knowledge.

Sunderland et al. contend, “Greater engagement with the social sciences and applied anthropology would arguably significantly increase the capacity of conservation science to be more effective” (Sunderland et al. 2009:551). A main reason for such is that the gap in information is clear to oceanographers and conservation biologists, and
there remains a desire to fill that gap whether or not one can speak authoritatively on it. Dr. Peter Jacques contends that “the lack of social science in oceanography has driven some physical scientists to attempt to courageously fill the void, but this comes with similar dangers as a social scientist attempting to write authoritatively about the complex causes of tuna larvae distribution” (Jacques 2010:192). Though his comment is humorous, it is also serious and deserves attention.

My thesis bridges this gap between anthropology and conservation biology. Just as Ian Scoones suggests that an interdisciplinary approach can bridge the gap between science and social science, or as he specifically asserts, “Interaction between these two perspectives--socially constructed perceptions and representations and real processes of biophysical change and ecological dynamics--that is key to policy and practice” (Scoones 1999:497), so also does Milton argue that, since the 1980s, anthropology has had a positive environmental impact on the world. She contends that anthropologists, through participant observation and ethnography, have given consumers invaluable information about detrimental environmental impacts resulting from their own individual choices. This has given consumers the ability to engage in active conservation and enact environmental policy change through their own decisions and demands.

I define conservation as Anderson does: “any deliberate use or management of resources that preserves them in such shape that there will be resources left for others” (Anderson 2014:46). When I refer to someone actively engaging in conservation, this can mean many things. The first is obviously the actual conservation of sharks. This can be through vowing not to eat shark meat or other fish that represent a higher than average number of shark bycatch. If the individual is a fisherman, this can also be done by
discontinuing fishing for sharks. Another act of conservation can be going online and signing petitions for shark reserves and bans on shark fishing. Still another act of conservation is to discontinue the personal use of plastic bags. If individuals use plastic bags, they must make sure to recycle them instead of throwing them in the trash where they may ultimately end up in the ocean. Sharks can ingest the bags because they mistake them for edible marine life. My research on sharks provides this much needed information about peoples’ knowledge about sharks and feelings towards them as well as an individual’s indirect impact on shark populations. This will empower individuals to make better, more informed decisions about such topics as plastic bag use, what to eat, and, conversely, what not to eat. For example, Milton cites that changes in consumer purchases have resulted in “dolphin-friendly tuna” and a ban on importing any products made from baby seals (Milton 1999:5).

In order for changes in consumer habits to take place, we must understand how individuals feel towards these target animals--and anthropology is uniquely suited for such an investigation. Since my research methods survey how individuals feel about sharks and what biological knowledge they possess about them, including present shark population numbers, I can bridge the gap in knowledge between their assumptions and the hard biological data. I strongly agree with Moran, who suggests we use “the application of anthropological theory and method to [find] solution[s to] human problems” (Moran 2000:133) and likewise with Orlove and Brush who argue that “these multiple roles and forms of engagement are one of the promising features of the involvement of anthropologists with biodiversity and conservation” (Orlove and Brush 1996:347).
The famous naturalist Philippe Cousteau (1970) wrote, “[The shark’s] enormous number makes their extermination extremely difficult, if not impossible. This, in turn, makes the shark one of the last of the animals dangerous to man and still uncontrolled” (1970:22). This research is timely and crucial because, unlike Cousteau’s comments, sharks are disappearing from the oceans at an alarming rate. This is alarming because they play an important role in the biosphere as a whole and directly impact human welfare by providing many ecosystem services that keep the oceans clean and prevent disease and sickness from spreading.

Sharks are important. Since the dawn of man, sharks have been a source of myth, ritual, and creation stories. “Many indigenous societies also wove them into the social, cultural, spiritual, and political fabrics of their lives” (Owen 2009:24). They have been totem animals for indigenous tribes in Australia, part of the Tongan creation story, gods to the Hawaiians, and even a part of Aztec rituals (Owen 2009:39–49). In indigenous tribal life, sharks have varied meanings. They are good, they are bad, they are gods, they are demons. According to Kirch’s archaeological fieldwork in Hawaii:

Hawaiians were superb observers of nature. They saw [that] the ocean, like human society, has its hierarchy . . . At the pinnacle is the shark, who takes anything below him but is prey to no other creature (except man of course). Sharks are the kings of the ocean. It is not surprising, then, that the Hawaiians, compared their chiefs and kings to sharks, especially the feared tiger shark with its gaping mouth and razor-sharp teeth, [are] even able to take man. In the eyes of his people, the king was a shark who traveled on the land. (Kirch 2012:221)

Today, however, shark numbers are declining rapidly due to global overfishing, habitat destruction, pollution, and shark-finning practices.

What sets my research apart is that the focus of my investigation has been to understand the cultural knowledge being transmitted about sharks through the
investigation of what people know about, how they feel about, and how they interact with them. In order to explore this complex relationship between sharks and humans, I include an examination of Western folk knowledge, which I explore through LEK about sharks among Southern California beachgoers and surfers. LEK is similar to Traditional Ecological Knowledge (TEK). Fikret Berkes defines TEK as “a cumulative body of knowledge, practice and belief evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (Berkes et al. 2000). Biologist Joshua Drew claims that a benefit of TEK is that it allows the researcher to identify how individuals relate themselves to, perceive, and categorize the natural world around them (Drew 2005). I used LEK to explore the complex relationships that exist between the subculture of surfers and their ocean environment. Taylor refers to surfers as a “tribe,” though: “The tribe is unnamed and little noticed because the scholarly fashion is to stress national, regional, ethnic, and gender differences rather than commonalities, connections, and bridges” (Taylor 2010:219).

I argue that sharks are culturally constructed negatively through media portrayal and demonstrate how the cultural construction of what to fear plays an important part in fomenting apathy towards these much-maligned fish. My hypothesis is that the way most people think and feel about sharks is directly affected by the media and not by personal experience with sharks. When I use the term “media” I mean all forms of media: movies, television, literature, news, and magazines. I argue as Owen does that the huge success of the book and movie *Jaws* across America and worldwide solidified the view of sharks as savage, vengeful, and demonic predators (Owen 2009:270). Fear affects how
safe or secure an individual feels at any given time. The notion of fearing one thing over
another is a notion created by one’s culture, and the data collected through my fieldwork
allows me to demonstrate that we have been culturally conditioned to have an irrational
fear of sharks.

I demonstrate that a distinct difference exists between the way that surfers and
nonsurfers\(^1\) feel about sharks. This, in turn, allows me to argue that individuals who have
habitual and direct interaction with the ocean tend to think a little differently about sharks
than those who do not. Specifically, surfers hold sharks in a place of respect. The type
of respect I refer to is best articulated by cultural ecologist E.N. Anderson: “[Respect] is
a sense that we are all in this together and have to be as decent to each other as possible
to keep the situation functional . . . humans and other-than-human persons depend on
each other” (Anderson 2014:77). In some cases this respect is a sacred love and awe for
sharks and this particular data is not new. As I will explore in my analysis,
anthropologist Bron Taylor, in his fieldwork on surfing culture, argues that surfing can be
described as spiritual and religious. A great majority of surfers themselves have also
defined surfing as a religious experience. Some even refer to themselves as “soul
surfers” to which Taylor argues the validity by asserting, “Surfers have myths, rituals,
symbols, terminology, [and] . . . a sense that some places, animals, and plants are
especially sacred” (Taylor 2010:124-125). However, what is new is comparing and
contrasting the feelings of surfers with the general beach-going public to provide much-
needed data to assist with shark conservation education.

\(^1\) The word “nonsurfer” is not in the dictionary. I may have invented it. Because the vast preponderance of
words with the “non-” prefix are not hyphenated in any dictionary (Cf. W3: 1535-39), I have chosen not to
hyphenate it here.
Through my fieldwork, I observed that once individuals are educated about the
typical behavior of sharks, that is, that the majority of sharks do not pose a danger to
humans, people begin to acknowledge their own misconceptions about these fish. Thus,
this paper will investigate when, how, and why the term “shark” has become synonymous
with a large man-eating predator, particularly the great white (*Carcharodon carcharias*).
It will also attempt to bridge the gap between conservation biology and cultural
anthropology in order to provide suggestions from an individual-centered anthropological
perspective to strengthen shark conservation educational programs.
Chapter 2: Methodology

I focused on human-shark interactions by exploring individual attitudes towards sharks through ethnographic fieldwork. I utilized three phases of inquiry over the course of my project. The first was 100 hours of participant observation as an educational volunteer at a small aquarium on the Southern California coast, observing how individuals interacted with the live sharks on display. Additionally, I spent a week among surfers in Encinitas, California. The second phase consisted of interacting with beachgoers along the Southern California coast. I surveyed them in Santa Monica, Encinitas, and Oxnard, California regarding what they know and feel about sharks, their consumer habits that can affect sharks, and whether they have had any personal experience with sharks. This research also had a component devoted to common shark folklore: I asked individuals to tell me about any folk stories they had heard about sharks. I conducted 40 surveys total. Of the 40, 29 were nonsurfers and 11 were surfers. The third phase of my research was to conduct in-depth interviews with surfers, of which I accomplished 11 altogether. By doing these things along the Southern California coastline, I was able to determine what type of information about sharks people have and how they obtained it.

The Aquarium

I conducted participant observation at a small aquarium on the Los Angeles coast where the aquarium’s main objective is to teach people about the importance of marine ecosystems, marine life, and its conservation. Instead of being an aquarium patron myself, I found it far more useful to volunteer in order to conduct insider ethnography. The process of becoming a volunteer, however, was more difficult than I had expected.
First I submitted a volunteer application online with the organization. They called me in for an interview that included a teaching component in which I prepared a five-minute lecture on sharks and the importance of shark conservation. Once accepted, I was required to attend 16 hours of intense training over eight evenings culminating in a final examination. Once training was completed, I was required to volunteer a minimum of 100 hours, which I did over a period of one year from October 2013 through October 2014.

On the day I interviewed for the volunteer position, my initial impression of the aquarium was that it was a dank, humid space that was very small. However, over time my impression changed. I began to see it as a place with a wealth of knowledge on Southern California marine life. The full-time staff is passionate about marine education, and what I initially saw as dark and dank became cozy. It was an environment that became like family. The aquarium is situated underneath a popular pier, and there is nonstop foot and car noise emanating from above. It has two rooms. There is a main room where most of the marine life is housed, and a smaller room with a few small tanks used mostly for teaching young school groups. Instead of a wall, the two rooms are divided by a large tank filled with a wide array of life one would find under the pier, including juvenile leopard sharks (*Triakis semifasciata*) and large ochre sea stars (*Pisaster ochraceus*).

The main room has a small, shallow shark tank filled with horn sharks (*Heterodontus francisci*) and swell sharks (*Cephaloscyllium ventriosum*). At or near this tank was where I spent the bulk of my volunteer hours. My primary responsibility was to teach aquarium patrons about the sharks and about the various other marine life in the
tanks around the shark tank area. I educated visitors on several different topics: first, that the sharks in the main shark tank represent two different and interesting species. They have small needle-like teeth, are not dangerous to humans and, unlike the majority of sharks, do not need to swim to breathe. Each shark is named after its specific defense mechanism. The horn shark has a hard and sharp horn on each fin so that if a predator tries to eat it, the horn will puncture the roof of the predator’s mouth, and if the mechanism works as it has evolved to, the predator will promptly spit the shark out. The swell shark is so named because it has the ability to take in enough water or air to swell up to twice its size. It can either swell in between rocks to evade capture or, if a predator has bitten it, it can swell up to a size so large that the predator may be forced to spit it out. Swell sharks are by nature sedentary fish. Rather than biting humans, swell sharks have a habit of practicing their defense mechanism through the intake of water from the tank and then spitting out that water at many an unsuspecting visitor’s face with impressive accuracy. Another important aspect of my position was to share with the visitors the number of sharks killed daily by humans in contrast to the number of humans that sharks kill annually.

**Encinitas, California**

I arrived by train to conduct fieldwork at the beach in Encinitas as a participant observer. I brought my 18-year-old niece who wanted to learn how to surf, and we lived with a couple of surfers for a week in August 2014. The beach in Encinitas seems to be right out of a scene in the television show *Baywatch*. Surfers here love the water. Every day had a similar pattern. Up first is surfing in the morning. Then comes breakfast, a nap, or watching television. Next is the decision of which beach to go to that day. A
couple of days we drove down to San Diego to go snorkeling and then back to Encinitas for dinner. Every evening was spent at the Encinitas beach watching the sunset. I did not do any surfing on this trip, but having surfed once before in the 1990s, I can see that the call of the waves is addictive here. One male surfer I was going to interview on the beach, Bodhi, realized that he did not bring the surfboard he wanted and ran back to his house a half-mile away to get a different board. It was not until he was back with it some 20 minutes later that he realized he had forgotten the leash connector. Deciding that the lack of a leash connector was not going to keep him off the waves, he used seaweed from the beach to connect it. However, as anyone might assume, it lasted a mere five minutes in the water before it broke and he returned sheepishly announcing, “I’m not MacGyver.”

It was at this moment that his roommate arrived in hospital scrubs with her surfboard in hand announcing, “Just got off work, time to get in the water!”

After a week at the beach in Encinitas, I started to realize that surfing is much more than just a sport or just a pastime and I could not help but think of Taylor’s aforementioned *Dark Green Religion*. My mind was swirling with questions. What does surfing really mean to these individuals? Does it simply just fill the gaps in the day or does it somehow impact their views of life, spirituality, and the ocean? These were questions I made it a point to discuss with the surfers I subsequently interviewed in Santa Monica and Oxnard, California.

**The Survey**

I used convenience sampling to collect data at the individual level with a personal face-to-face survey. This is a type of nonprobability sampling that allowed me to select individuals in the vicinity of my fieldwork who were willing to participate voluntarily.
The study population included only adults age 18 years and older. I identified myself as a graduate student and asked individuals in the study population if they would like to participate in a survey for my thesis research. Each survey took approximately 10-15 minutes and volunteers were not compensated for their participation. I used face-to-face personal surveys, because they provide the opportunity to probe deeper into the questions, they can aid in explaining confusing concepts, and the surveys afford the opportunity to reach those whom one would not be able to reach otherwise (Bernard 2011). Surveys were done between July 2014 and October 2014.

The survey I created served multiple purposes and was divided into six sections. I set out to discover what individuals know about sharks, how they feel towards them, and what stories they have heard about them. Defining terms such as “knowledge” and “feelings” is difficult, perhaps problematic, and, of course, is up for interpretation depending on the theoretical perspective to which one subscribes. I define feelings the same as Milton’s “perceptions of emotions” (Milton 2002:80). I use a variation on what Arlie Hochschild calls “feeling rules” (1979) in the way that Frank Furedi builds on them: “These ‘feeling rules’ influence behaviour; they instruct us on what we ought to fear, and how we ought to fear it” (Furedi 2007:2). In trying to define such abstract concepts, Arlie Hochschild poignantly discerns, “That we can single out such a thing as ‘feeling rules’ is itself a commentary on the ironic posture of the self legitimated in modern culture” (Hochschild 1979:563).

Knowledge is defined simply by what a person actually knows in contrast to Scientific Ecological Knowledge (SEK). I fully recognize that knowledge is tricky to define. Many questions emerge such as, whose knowledge matters? Whose knowledge is
correct, or, for that matter, can one person’s knowledge be more correct than another’s? Gadgil et al. argue, “Knowledge is an outcome of model-making about the functioning of the natural world” (Gadgil et al. 1993:151). Many theorists argue that Western scientific knowledge, or SEK, is problematic, because “western scientific education gives privileged status to objective information only and specifically excludes emotional and spiritual dimensions.” (Kimmerer 2002:435-436).

These are valid arguments and points of view. Western science is rather objective, whereas we acknowledge that many things are not so black and white. In practice, there is much subjectivity that exists. However, for the purpose of my survey, I picked questions that fall more into the objective category of knowledge. For example, my own experience and marine biology informs us that there are numerous shark species that are incapable of hurting humans. Thus, not all species of sharks are dangerous to humans, and therefore, this true-or-false question is reasonably objective in that the answer is “false.”

I collected in the first section of the survey what I felt was pertinent demographic information to include gender, age, and highest education. I did not collect any identifying information such as names.

The second section began with free listing and this was a tool I found most informative to understand what people think when they hear the word “shark.” Thus, the free listing of the word “shark” was used to find the emerging salient issues that people share about sharks. After the free listing, I gathered some general information. I asked whether the individual or someone they know had had an experience with a shark. I asked respondents whether they surfed or not and how often they entered the ocean annually.
Additionally, I found it important to ask whether they had seen the movie *Jaws* and whether they watched the *Discovery Channel’s* annual *Shark Week* programming. I will discuss at length the importance of the movie *Jaws* to my project further on in chapter five, the importance of which I can allude to in one respondent’s remark: “I used to go swim far out in Malibu, and when I got tired I’d float on my back and didn’t think anything of it. But I never did that again after I saw *Jaws.*”

The third section was used to survey respondents’ general knowledge about sharks. This included biological questions and questions about the proclivity of sharks to be dangerous to humans. This is important because I do not stipulate the species of shark. As mentioned, there are over 450 species of shark and only a handful of those are the large man-eating predators that are perpetuated in folklore and popular culture.

The fourth section investigated respondents’ feelings towards sharks, surveying whether the individuals are frightened of, care about, or think sharks or shark conservation is important.

The fifth section was mostly used to determine which behaviors individuals engage in that directly and adversely affect shark population numbers. Humans kill roughly 270,000 sharks daily. This includes sharks being killed for their fins or their meat, sharks being caught as bycatch to another target species, such as swordfish (*Xiphias gladius*), and sharks dying from ingesting plastic bags they mistake for edible marine life. For this reason I asked each individual whether he or she supported the Los Angeles City ban on plastic bags and whether he or she had eaten shark meat, shark fin soup, or swordfish.
The final section was an open-ended question on whether they had heard any stories about sharks and whether they had any additional comments or questions.

**In-Depth Interviews**

The final phase of fieldwork was in-depth interviews with surfers in Encinitas, Santa Monica, and Oxnard, California. I used snowball sampling beginning with surfers whom I already knew and they, in turn, referred me to other surfers. I used the same parameters as I had in the survey given to nonsurfers in that it was completely voluntary, I only spoke to individuals 18 years of age or older, and no one was compensated. I first surveyed each surfer and then proceeded to conduct an in-depth interview following the survey. These interviews lasted from 20-90 minutes. Through these in-depth interviews I was able to investigate the traditional folk beliefs held about sharks by surfers, including their individual feeling towards sharks. To do this I began the interview with the prompt questions, “Do you think about sharks when you are surfing?” “How do you feel about sharks?” and “How do you feel about shark attack survivors who devote their lives to conserving sharks?” Just as the surveys were anonymous, so too were the interviews. Therefore, in order to weave a coherent narrative, in the analysis chapter I have given each of the surfers a pseudonym.

I use various methods of analysis. Using the surveys and interviews, I conducted narrative analysis. I utilize transcription analysis by highlighting exemplar quotes throughout this thesis to support the data and my arguments. I use schema analysis to examine the frequency of free-listed words for a cultural consensus to find emerging common themes individuals share about sharks. To measure the salience of the free-list items I have written all the words used to describe sharks and looked for repetition both
in exact words and word-meaning semantics. These tools were useful in creating what
Nason refers to as a “meta-shark [that] has become a sublimation of fear itself, and it is
this fear that establishes its prohibitive agency over the encroachments of terrestrial
humanity” (Nason 2012:87). This meta-shark is a model created by the narratives of
those I surveyed and interviewed. Furthermore, I argue that the meta-shark model for
surfers is not the same as that for nonsurfers. For nonsurfers I describe what Nason has
also observed:

This meta-shark has greater prohibitive power than the physical shark. Although each physical encounter changes the way humans see sharks, the sensationalized, historicized perception of the shark in the American mind is exponentially more effective in its reach. While the real shark is occasionally seen by those who wade into the beach, or by those who fish for sharks or scuba dive in their marine habitat, the meta-shark percolates deep into landlocked middle-America. [Nason 2012:88]

E.N. Anderson argues that we have a “world ecological crisis” with a strong
economic angle to it. However, there is a far less studied and extremely important
“psychological dimension” to it (Anderson 1996:14). This is a concept central to shark
conservation and this “psychological dimension” is precisely what I am endeavoring to
understand through my surveys and interviews.
Chapter 3: Theoretical Perspectives

People seem almost unable to control themselves when there are fish to be taken. [Anderson 2010:3]

“Conservation literature is rich in calls to preserve the beauty of nature, but the actual responses of people to analyze [are lacking]” (Anderson 1996:14). Anderson observes that in cases that require conservation, the real objective should be to manage the people, not necessarily the resources or endangered species that needs conserving. This is because humans typically cause the problems we face, so human behavior needs to drastically change. He argues that while humans have the capability and knowhow to conserve resources, the real problem then becomes how to get them motivated to do so (Anderson 1996:123). “Motivating people to act responsibly is the key” (Anderson 2014:17). But as Anderson contends further, and as I have observed, motivating people to act responsibly to conserve the natural environment is a difficult endeavor.

Cultural Ecology

Julian Steward is credited with creating cultural ecology, whereby he posited that a culture must also be studied in conjunction with the people’s environment (Steward and Setzler 1938). This idea stuck, and in 1962 Paul Baker proposed Steward’s theoretical paradigm of cultural ecology as a way to understand the complex relationship that people have with their environment. Written seven years after Steward coined the term, Baker’s paper argued that a complete rejection of biology in anthropology is a disservice to the concept of culture and to the discipline in general. The basis of his argument lies in the fact that humans are animals and, as such, they are tied to their environment and this must play into the academic anthropological equation. Like Steward, he strongly proposed that culture must be studied in conjunction with the culture’s environment.
While examining the role of ethnography in cultural ecology, cognitive anthropologist and cultural ecologist Charles Frake posited that the observer must not just catalog “components of a cultural ecosystem according to the categories of Western science” (Frake 1962:55), but instead must categorize a cultural ecosystem the way the people being observed do. He argues that for ethnography to be successful it must be able to get inside the mind of the observed informant. This is how the ethnographer can observe the way the environment affects cultural behavior (Frake 1962:55). Thus, in one of the first appeals for an interdisciplinary approach, Frake concludes by calling for the methodology of ethnography to be used in the cultural ecology framework alongside hard scientific environmental data.

Today, cultural ecology centers on a concern for the environment and works to provide solutions to the modern problems we face today. Anderson argues, “Environmental problems are due to a mix of reason and passion, and that solutions must also be such” (Anderson 1996:vii). Like me, Anderson is concerned with how humans and the environment interact, especially with respect to how culture plays into it. He makes a pertinent observation whereby “urban life decouples most of us from direct experience with ecological reality, and overspecialization decouples even the rural workers from broad ecological view” (Anderson 1996: 125).

Little argues that use of the term “environment” in anthropology poses a problem. The term is used with confusion and an operational definition must be provided. He thus defines environmentalism as “an active concern with the relationship between human groups and their respective environment” (Little 1999:254). His paper distinguishes between ecological anthropology and the anthropology of environmentalism. Ecological
anthropology is an approach used to study human groups and their relationship with their environment, or as Orlove defines it, “the study of relationships among the population dynamics, social organization, and culture of human populations and the environments in which they live” (Orlove 1980:235). The anthropology of environmentalism employs ethnographic skills and methods to study people in active participation. Doing anthropology of environmentalism, I explore the interrelationships between the general public, surfers, and sharks that exist in their Southern Californian environment. Thus, in a new century of anthropological research where ecological-environmental specializations are becoming increasingly popular, the required result is a discipline that advantageously fuses human and biological ecology.

**Cognitive Anthropology and Local Ecological Knowledge**

Biologists created the field of ethnobiology, defined as “the scientific study of dynamic relationships among peoples, biota, and environments,” and anthropology was quick to embrace it (Wolverton 2013:21). The adoption of ethnobiology by cognitive anthropologists is no surprise given, as we have just seen that human-environment relations have had a long history in anthropology. Eugene Hunn published a paper titled “Ethnobiology in Four Phases” that considers the ethnobiological application to biodiversity conservation. In it he asserts, “the key issues for Ethnobiology III are the links between knowledge and action, in particular, with respect to resource/habitat management” (Hunn 2007:4).

Wolverton asserts that ethnobiology has transformed into an “age of application” and that application is biodiversity conservation through the use of TEK and LEK (Wolverton et al. 2014:125). Hunn discusses that it is through the use of LEK that the
researcher can understand the way in which people relate to the natural environment around them by “understand[ing] how people conceptualized that environment” (2014:147). This is because, as Hunn argues, the relationship people have with nature is the motivation for conservation (Hunn 2014:147). What this suggests, just like the data I present later suggests, is that, if individuals have no relationship with sharks, then they would have no motivation to conserve them.

In *Loving Nature*, Milton asserts that her informants were aware that their love of nature came from acquiring information about nature and this leads to a direct connection between this acquisition of knowledge and emotion. She argues that people can become interested and excited about conservation through interpersonal relationships (Milton 2002:70). Like Anderson (1996), she posits that emotion is tied to conservation, or at the least the motivation for it. She also points out that emotion has been ignored by academics studying motivation for conservation causes.

D’Andrade’s seminal book on cognitive anthropology (1995) discusses schema theory in depth. In schema theory, people have “default values” that are the “prototypes” their minds immediately conjure up in response to some stimulus or reference. Schemas are empty “slots” in their minds that still need to be filled in order for their brains to complete the picture initialized by the stimulus or reference (D’Andrade 1995:124). Therefore, one can effectively identify “cultural schemas” through certain research (D’Andrade 1995:126). I propose that the data my free listing provides identify a cultural schema of sharks by delineating consistent default values that conjure quite similar prototypes in many different individuals surveyed.
D’Andrade ultimately presents a situation in which a person’s actions are the end result of the thoughts in his or her mind. He argues, “There is a major direction of causation which runs from *perception* to *thought* to *feeling* to *wish* to *intention* to *action*” (D’Andrade 1995:161). Twenty years later, Hunn discusses a change in ethnobiology in regard to nature, away from D’Andrade’s “mind-centered” cognitive anthropology and towards an engagement-centered approach. He argues, “Knowledge of the world derives from an engagement with the world outside the mind” (Hunn 2014:147). Citing Anderson and Milton, Hunn posits that it is truly through “loving nature” that one is moved to conserve nature (Hunn 2014:148), although he recognizes that “love” may not be the most apropos word. What he means by it is “an intensely emotional engagement with nature” (Hunn 2014:148).

The argument in its simplest form is Hunn’s equation whereby knowledge produces love and love (or an intensely emotional engagement) in turn produces action, particularly action for the conservation of biodiversity (Hunn 2014:149). As Hunn points out, this equation is not scientifically testable with “controlled double-blind experimental studies” (Hunn 2014:148) but that evidence does suggest that “in our contemporary urban milieu those most supportive of biodiversity conservation are those who have invested in learning to appreciate that biodiversity in great detail” (Hunn 2014:149). Yet regarding this contemporary urban milieu, which is hugely important to my hypothesis, is Hunn’s contention that, “What many urbanities have lost--insulated as many of us are from direct personal experience of nature--is this intense emotional engagement, which is replaced by ignorance, indifference, annoyance, romantic delusion, or abstract analysis” (Hunn 2014:148). Herein lies the gap. The question of how to motivate shark conservation
among contemporary urbanites must be addressed through an interdisciplinary approach between anthropology and conservation biology.

Anderson argues that “saving the environment requires four things,” with the first requirement being that “people must actually care about the environment.” The second is that people must want to learn about the state of the environment. (He contends that most people are far more interested in learning about celebrities than anything to do with science.) The third is that people must “learn to be tolerant of others and to value biodiversity.” The fourth requirement is a realization and understanding that humanity has one planet that we share and how it is managed affects everyone (Anderson 2014:18-19). Therefore the overall goal of this study is for the results to demonstrate whether there is a way to motivate people to care for sharks and whether this emotion can then motivate people to action in shark conservation.

Sharks’ numbers are rapidly declining due to being slaughtered by shark-finning practices in which their fins are sliced off and their still-alive bodies are thrown back into the ocean to rot. Additionally, their numbers are declining due to being caught by commercial fishermen as bycatch, which happens when animals that are not the target fish get caught in the fishing process and are thrown back in the ocean and typically die of wounds sustained. Sharks are keystone species in the ocean. A keystone species is one that has a relatively low biomass yet plays an important role in structuring the interrelated food webs of which it is a part (Libralato et al. 2006:153). According to biologist Ken Hinman, “By removing so many of the sea’s keystone predators, we are weakening an entire tier at the top of the food chain. This may have dire biological consequences throughout the ecosystem, far beyond the social, economic and moral costs
of depleted fisheries” (1998). Most biologists agree that, without these apex predators, biodiversity will be adversely impacted. Scientific data suggests that these predators are quickly disappearing from the oceans. Baum et al. “estimate that all recorded shark species . . . have declined by more than 50% in the past 8 to 15 years” (Baum et al. 2003:389). The authors discuss the value of marine reserves in helping to reinvigorate population numbers. However, they need to be placed in areas that do not adversely impact the biodiversity of the proposed reserve area.

Worm et al. argue that there is strong correlation between biodiversity and trophic level productivity within the ocean ecosystem food web. Additionally, global fisheries are headed straight to collapse if fishing behavior does not change. Their models of long-term trends “project the global collapse of all taxa currently fished” and these taxa will be commercially extinct by the year 2048 (Worm et al. 2006:790). “Without exception, fishing is the main activity threatening oceanic pelagic sharks and rays” (Dulvy et al. 2008:466). This extreme biodiversity loss will assure that humans will incur the ecosystem service costs associated with their absence in the top trophic levels.

Research about fishery collapses and the implications thereof is not the province of biologists alone. Acheson and Wilson weigh in with chaos theory in fish populations and propose a parametric approach by examining traditional fishing societies ethnographies. They argue that the blame for overfishing practices can be laid on the politicians, the scientists, and the fisheries. Acheson and Wilson argue that overexploitation of fish and fishing above the Maximum Sustainable Yield (MSY) is a problem of what Hardin (1968) calls the tragedy of the commons. The central idea of the tragedy of the commons is the hypothesis that when spaces are public and shared, a
tragedy ensues when the area is overexploited. Overexploitation results because costs are not personal, they are deleterious, and everyone instead shares them. Essentially, “freedom in a commons brings ruin to all” (Hardin 1968:1244). Anderson questions why people ignore these environmental cautions and asserts that Hardin’s tragedy of the commons “is actually an emergent phenomenon of unregulated social action” (Anderson 2014:50). Though Hardin argues the tragedy is due to shared spaces, Anderson argues the tragedy occurs “because powerful interests exert top-down control” (Anderson 2010:66). These are driving forces in major fishing fleets and their power will only be lessened if consumers exercise their willingness to make environmentally responsible consumer decisions.

By using LEK, I began to piece fragments of cultural meaning together so that those pieces could supplement the experimental sciences, like conservation biology. This is important in relation to the aforementioned paper in the journal Conservation Biology by Muter et al. Of the 300 articles evaluated by Muter’s team in the newspapers from both Australia and the U.S. from 2000-2010, the topic was that of shark attacks in over 150 of them, whereas shark conservation was the topic of only 32 articles (Muter et al. 2013:190). There was a difference in the way sharks were portrayed in the U.S. as opposed to Australia. The U.S. delivered messages via scientists, whereas Australia used politicians to deliver messages. Additionally, the U.S. had a much stronger focus on sharks as entertainment than Australia. What the evidence strongly suggests is that the media is portraying sharks as extremely harmful to humans. The media “emphasized negative effects of sharks (for example, human injuries or deaths, closed beaches)” (Muter et al. 2013:190) in over half of the articles even though shark attack numbers are
extremely low per capita. Perhaps most importantly, shark attacks on humans are reported more than any other human-animal encounter and even make global headline news, “This means the world is watching how local people respond to shark-related events” (Muter et al. 2013:194). If individuals are only hearing stories about sharks from television, movies, and the news (and I will point out in the analysis chapter that most of my nonsurfer informants reported this), the media may be the reason non-surfers and those people not enthusiastic about water sports are irrationally afraid of sharks.

In Ecologies of the Heart (1996), Anderson argues that the inability to sacrifice immediately for long-term benefits is to blame for environmental negligence. He cites the reason for this negligence as a combination of emotional decision-making and a lack of hard facts relating to future ills. The loss of sharks reduces ocean trophic levels, the result of which is uncertain and, as Anderson posits, without the tangible evidence of exactly what will happen, humans fall prey to the “problem of uncertainty.” (Anderson 1996:7). More recently, Anderson contends, “Much of the problem is due to a failure to convince the vast mass of humanity that the environmental situation is serious and needs attention. Even more serious is a failure of uniting people to act” (Anderson 2014:15).

Therefore, this interdisciplinary approach to biodiversity conservation is essential. Loving nature is not enough on its own, “It has to be combined with doing something to save and protect nature” (Anderson 2010:203). Milton contends that there is a cultural feature to humans’ relationship to the environment and as such she argues, “Anthropology’s contribution to environmental discourse depends on environmental issues being seen as cultural in character” (Milton 1999:13). There must be an integration of the biological data with the cultural data to create a complete picture in
order to motivate conservation action because as Anderson so poignantly stresses, “These [environmental degradation] realizations are not currently affecting behavior enough to save resources” (Anderson 2014:16). This is the chief reason for an interdisciplinary approach in my research: to supplement the biological data on shark overfishing with an educational strategy to motivate people to practice active shark conservation.
Chapter 4: Data and Results

As mentioned, one of my primary methods of data collection was through a personal face-to-face survey of beachgoers and surfers using convenience and snowball sampling. I found that general-public beachgoers were difficult to survey because they did not want to take the time out of their day. Surfers, on the other hand, were all more than happy to volunteer their time. There are most likely outside factors that contribute to these differences in attitude, but since I did not inquire why, I cannot authoritatively attempt to explain them.

Many of my surveys were conducted in the Santa Monica Pier (SMP) area of Southern California. I picked it because it is one of the most visited tourist meccas in the state of California, attracting tourists from around the world. SMP is the actual western end of the iconic Route 66 and attracts what is commonly estimated at four million visitors annually (www.healthebay.org). It also attracts individuals from each end of the socioeconomic scale and everyone in between. The surrounding beaches attract all types of beachgoers who commonly use the pier for the restrooms, showers, and dining facilities. In addition to those in the SMP area, some individuals were surveyed in Encinitas and Oxnard, California.

One of the uses of the survey was to establish a difference between those who are surfers and those who are not, and separating surfers out from nonsurfers proved important to the analysis of the data. Survey results are discussed under the main survey headings: Demographic Information, Knowledge, Feelings, Consumer Information and Habits, with General Information last.
**Demographic Information**

The surfers I interviewed were mostly men, while females comprised the majority of the nonsurfers who consented to participate in my survey. Of the surfers, 64% were between the ages of 35-45, while 27% were in the 25-34 category, and one was in the 18-24 category. There was no one older than 44. The age range of nonsurfers was split between all the age groups: 17% were 18-24 years old, 34% were 25-34, 24% were 35-44, 3% were 45-54, 7% were 55-64 and 14% were 65+. All surfers surveyed had at least some college education: 64% of them had at least a 4-year degree, and a few had a master’s degree or equivalent. Nonsurfers were spread across the board: 24% had either a high school diploma or GED, while 31% had some college, 7% had a 2-year degree, 24% had a 4-year degree, 10% a master’s, and 3% a Ph.D.

**Knowledge**

Knowledge was used to test what people know scientifically about sharks. As Anderson contends, people have far more interest in nonscientific topics than scientific ones, and this is a worrisome trend that is pervading the world. He argues that people must start desiring to learn about science, especially environmental science, in order to save our planet from human over-exploitation and ultimate destruction (Anderson 2014:18).

When asked whether sharks are mammals, 72% of nonsurfers answered “false” and 24% answered “true.” Since the correct answer is that sharks are fish, the majority of respondents were correct. Surfers however, were split about evenly. Only 45% answered correctly with “false,” while the majority (55%) answered incorrectly with “true.” In the next two questions surfers fared much better. To “All shark species are dangerous to
humans” and “All shark species are capable of being man-eaters,” all of the surfers answered correctly with “false.” 86% of nonsurfers answered correctly with “false” for “All shark species are dangerous to humans,” while 10% answered “true” and 3% were neutral. When I stated, “All shark species are capable of being man-eaters,” 79% answered correctly with “false,” while 14% answered “true” and 7% were neutral. The majority of respondents knew that not all shark species grow to at least three feet; 82% of surfers answered “false,” as did 72% of nonsurfers.

To the statement “One-quarter of all shark species are currently endangered,” there was little difference between surfers and nonsurfers. In total 63% of all respondents answered correctly—and indeed it is true (Dulvy et al. 2014). 27% were neutral and 10% answered false, including one male surfer who said confidently, “Just the whale shark is endangered. And a guy caught one in China.” To the question, “Sharks play an important role in the balance of the ocean ecosystems,” 100% of surfers answered “true” and 90% of nonsurfers also answered “true.”

Surfers and nonsurfers were again nearly identical in response to “Humans eat shark meat and shark fin soup because it’s a healthy super food.” In total 28% answered “true,” 58% answered “false,” and 15% were neutral. The answer is false. Shark meat is full of high levels of elemental mercury (Hg) in addition to high levels of toxic monomethylmercury (MMHg), which can be extremely hazardous to humans (Nalluri et al. 2014). Four respondents answered that they thought shark meat was a super food, and all listed they had either eaten shark meat, shark fin soup, or both. During the survey a female nonsurfer told me, “I worked at a seafood restaurant in San Diego in the 90s and we were encouraged to try all the fish on the menu. I have tried a bite of shark meat--it is
tough, grey, and gamey to eat. It is not tasty at all.” Interestingly, of the people I
surveyed, only 13% claimed to have eaten shark. When I interviewed a surfer from Santa
Monica (whom I refer to as Maverick since he is a military pilot who bears a strong
resemblance to the 1980s character in *Top Gun*), he said, “When I lived in Corpus Christi
[Texas], it was popular to eat shark. You could get it in the stores but it’s too tough!”

Statistically, sharks kill ten humans every year. When I asked the respondents to
guess the accurate number between 1, 10, 100, and 500, overall 55% answered correctly.
20% answered that they thought only one human is killed annually. 25% answered 100
humans killed, and no one answered 500. Humans, on the other hand, kill roughly 100
million sharks annually, which translates to about 270,000 a day. 100 million is the
official reported number but considered to be conservative by most scientists, like Dr.
Worm, who estimates the number to be closer to 250 million a year (Worm et al. 2013).

During the course of my work at the aquarium and with the surveys, I found that
people were shocked to find out how many sharks are killed each day by humans. At the
end of each survey, when each respondent had the chance to ask questions of his or her
own, nearly everyone wanted to know if he or she was correct with respect to the number
of sharks killed daily. In fact, only one respondent answered correctly. Since she was
the last person I surveyed, I had time to talk to her afterwards. I was interested to know if
she had guessed the answer or really believed it was the correct one. She replied, “I
guessed, but I saw something a while ago on how endangered they are because of shark
fin soup in Japan and how there aren’t laws.” Though she is mostly correct on this, most
of the slaughter of sharks for soup is carried out by China and not Japan. Just as she
guessed, the correct number is estimated at 270,000 a day. One respondent absolutely
would not believe the statistic and let me know that he did not think my information was correct. 58% of respondents answered that 2,700 sharks are killed a day while the next closest guess 27,000, chosen by 25%.

**Feelings**

Whereas the section of my survey devoted to knowledge is fairly objective, this section is highly subjective. Early on in my research, intriguing patterns began to emerge. Once all my data were collected, these patterns remained constant. 73% of surfers answered that sharks frightened them, but 55% clarified that only *large* sharks frightened them. 69% of nonsurfers claimed sharks frighten them, and 52% clarified that only large sharks frightened them. Perhaps most interesting, to the statement "Sharks frighten me," 17% of nonsurfers responded false (meaning sharks do *not* frighten them) and 14% had a neutral response. Yet to the statement “I am not frightened by sharks,” 88% of all respondents--surfers and nonsurfers alike--answered false. One person remarked, “I feel more fascinated towards sharks versus frightened.”

82% of surfers answered true to “I care about sharks,” with the exception of one respondent answering false and one neutral. 100% of surfers answered true to the two questions “I think sharks are important” and “I think shark conservation is important.” However, nonsurfers do not hold nearly as positive a view. Only 45% of nonsurfers stated that they care about sharks with 24% answering false and 31% remaining neutral on the topic. Both “I think sharks are important” and “I think shark conservation is important” also received 7% false answers and 10% neutral answers.
Consumer Information and Habits

88% of all respondents, with the exception of five nonsurfers, claim to have been raised or now live within 50 miles of the ocean. However, one of those exceptions made it clear that she had lived in Los Angeles for 31 years. 82% of surfers surveyed supported the ban on plastic bags, and 18% did not. In contrast, 45% of nonsurfers support the ban with 24% not supporting it and 31% neutral. Plastic bags and plastic fragments make their way into the ocean and are extremely harmful to sea life that mistake the plastic for food. Once ingested, sharks can suffocate on the plastic and die, or the chemicals from the plastic can leach into tissue, causing physiological and reproductive damage. The chemicals can then be harmful to humans that ingest shark meat (Carson 2013). Two individuals answered that they do not support the ban on plastic bags, yet both say they eat fish weekly and both have eaten shark meat. These sorts of results lead me to believe that there are people who do not understand that they can end up ingesting these harmful chemicals from the plastics they themselves throw away.

General Information

Nonsurfers in the study overwhelmingly avoided entering the ocean. Despite most of them having been reared within 50 miles of the ocean (or now living there), 66% said they enter the ocean once a year, and 17% said they never go in it. 10% claim to enter the ocean monthly, and 7% said they had only ever entered the ocean once. Of those nonsurfers who do go in the ocean, one stated, “I think about sharks/predators before I enter the ocean. It doesn’t prevent me from going in though.” Another said, “Anyone would be afraid of sharks, but would I not go into the ocean because of it, no!”
wouldn’t want to lose my arm and their eyes are scary-straight black, yuck!” Surfers generally, on the other hand, were split fairly equally among daily (36%), weekly (27%), and monthly (27%) ocean-swimming excursions.

Of all those surveyed, only 10% of respondents claim never to have seen the movie Jaws. As for Shark Week viewers, 73% of surfers claimed to watch it, while the number of nonsurfers was split equally with 48% who watch it and 53% who do not. One nonsurfer remarked, “Sharks frighten me because of the movie Jaws and all of the horror stories told during Shark Week, but I wouldn’t want to harm a shark.” Thus, my data confirms what Owen contends:

Shark knowledge derives from aquariums, television documentaries, feature films and YouTube clips, media stories and reportage and of course books, the covers of which all too often feature the gaping mouth of a great white shark—surely the most overused and misleading animal image of all time. But it is that very overuse that is so informative about us. [Owen 2009:xi]

All of the questions on the survey except for one have a fixed number of responses and the respondent must select one. (I avoided providing a response of the “Other: specify:_____” sort in order to lock in a set of mutually exclusive responses to these questions that would allow analysis using a simple consideration of the popularity of each answer based on its percentage). The percentages found are posted to templates of the questionnaire in the Appendix.

There is one question, however, that was intentionally open-ended. It was stated as follows: “Give me the first 3 words you think of when I say the word ‘shark.’” The language was intentional: “Give me” was intended to make the respondent answer quickly. A respondent would automatically produce responses in the order in which they came into his or her mind. The order of responses was then available to be taken into
account in the analysis of the data. In fact, a test called Smith’s Salience Index does this very thing. The formula for Smith’s Salience Index is (Smith and Borgatti 1998:208):

\[ S_j = \frac{\sum_{i=1}^{N} L_i - R_{ij} + 1}{N} \]

where:

- \( S_j \) = the Salience Index for response \( j \), where \( j \) varies from 1 to the number of responses (inclusive).
- \( F_j \) = number of respondents who mentioned response \( j \) anywhere in their list.
- \( L_i \) = length of respondent \( i \)’s list. In this study \( L_i = 3 \) for all \( i \), and \( i \) varies from 1 to the number of respondents.
- \( R_{ij} \) = rank given to response \( j \) by respondent \( i \). For example, if some respondent \( i \) gave a particular response \( j \) second in his or her list of three responses, \( R_{ij} \) would be assigned the number 2.
- \( N \) = total number of respondents.

Until indices like Smith’s were developed, researchers were left to interpret open-ended questions using only frequency of responses, and while that remains a valid thing to consider, building on Romney and D’Andrade (1964), Smith’s test provides a statistical method to view more than that. Romney and D’Andrade’s early work on “free recall” or “freely recalled list” identifies that both the frequency and order in the free-list response together provide the greatest measure of “saliency” (Romney and D’Andrade 1964:155). Smith calls his measurement salience (Smith et al. 1995: 206), and he defines it to be a combination of frequency of response and what I term prominence of response. I use prominence to refer to the rank of a particular response in a respondent’s list. My respondents’ lists were limited to exactly three responses (although Smith’s formula allows for each respondent to have a list of arbitrary length), so in my case, prominence
refers to whether a response was first, second, or third in a respondent’s list. Thus, Smith’s S truly is a measure of salience, because, as shown, it takes both prominence and frequency of a response into account, and I illustrate exactly what this all means with actual data from my study below.

First, however, let us see exactly how Smith’s formula works to combine these things into a single index. First, the expression \( L_i - R_j + 1 \) establishes the rank of a response in a particular respondent’s list, as described above. This expression reverses the magnitude of the rank. In other words, if a respondent put a particular response first in his or her list, which would give it a rank of 1 (Smith and Borgatti 1998:209), then this expression would assign it a value of 3—giving it numerically the highest value it could have in a list with three members. Then, by dividing that quantity by the list length, the “weight” of the response is normalized across lists of different length. (In my study, of course, the lists all had a length of 3, but this calculation has to take place in any case.) The net result at this point in the calculation is that the more prominent a response is (equivalently, the higher its rank in a list), the higher a value the expression will have—normalized, however, so that if lists are of different length, the results can nevertheless be compared with results developed from other lists. Finally, the sum of the individual normalized results from each list are divided by the number \( N \) of respondents, which normalizes the sum \( \sum \) of the responses from all lists for a particular response to the results obtained from the same type of calculation for other responses so that the end result (Smith’s S Index) for all responses can be compared. This final division is what creates a measure of frequency. For example, if there were, say, 29 respondents in a particular sample group, and for one response, 17 respondents chose it, then the result of
the calculation on those 17 responses would be divided by 29. That could be expected to produce a greater value for Smith’s S than one based on a set of only 5 responses, because the result of the calculation on those 5 responses would also be divided by 29. The result of all of this is that Smith’s S is automatically reduced for each respondent who did not put the response in question into his or her list. Thus, Smith’s S is sensitive to both the prominence of an answer (where it ranks in all the lists that contain it) and frequency (the number of lists that contain it versus the total number of lists, which is the same as the number of respondents), and the combined effect of both of these characteristics is called salience (devised from personal interview of Allen Palmer with author, February 13, 2015).

We can now consider the actual data obtained from the surveys. A total of 11 surfers and 29 nonsurfers were interviewed. The results for surfers are:
<table>
<thead>
<tr>
<th>Domain Rank</th>
<th>Item Name</th>
<th>Freq</th>
<th>Resp %</th>
<th>Avg L-Rank</th>
<th>Smith’s S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>teeth</td>
<td>4</td>
<td>36.4%</td>
<td>1.50</td>
<td>0.303</td>
</tr>
<tr>
<td>2</td>
<td>beautiful</td>
<td>2</td>
<td>18.2%</td>
<td>2.50</td>
<td>0.500</td>
</tr>
<tr>
<td>4</td>
<td>jaws</td>
<td>2</td>
<td>18.2%</td>
<td>2.00</td>
<td>0.121</td>
</tr>
<tr>
<td>3</td>
<td>mysterious</td>
<td>2</td>
<td>18.2%</td>
<td>2.50</td>
<td>0.091</td>
</tr>
<tr>
<td>4</td>
<td>big</td>
<td>1</td>
<td>9.1%</td>
<td>1.00</td>
<td>0.091</td>
</tr>
<tr>
<td>5</td>
<td>blood</td>
<td>1</td>
<td>9.1%</td>
<td>1.00</td>
<td>0.091</td>
</tr>
<tr>
<td>6</td>
<td>hazards</td>
<td>1</td>
<td>9.1%</td>
<td>1.00</td>
<td>0.091</td>
</tr>
<tr>
<td>7</td>
<td>help</td>
<td>1</td>
<td>9.1%</td>
<td>1.00</td>
<td>0.091</td>
</tr>
<tr>
<td>8</td>
<td>fin</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>9</td>
<td>limb-missing</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>10</td>
<td>Montana del Oro</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>11</td>
<td>pray</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>12</td>
<td>predator</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>13</td>
<td>prehistoric</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>14</td>
<td>running</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>15</td>
<td>shitt</td>
<td>1</td>
<td>9.1%</td>
<td>2.00</td>
<td>0.061</td>
</tr>
<tr>
<td>16</td>
<td>great-white</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>17</td>
<td>lifeguard</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>18</td>
<td>Morro Bay</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>19</td>
<td>shark-week</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>20</td>
<td>unpredictable</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>21</td>
<td>water</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>22</td>
<td>fear</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>23</td>
<td>Morro Bay</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>24</td>
<td>shark-week</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>25</td>
<td>unpredictable</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
<tr>
<td>26</td>
<td>water</td>
<td>1</td>
<td>9.1%</td>
<td>3.00</td>
<td>0.030</td>
</tr>
</tbody>
</table>

FIGURE 4.1 Table of Response Data for Surfers

The columns are defined as follows:

**Domain Rank**: This is the rank of the item across all respondents. Its order depends on its frequency (below). As is the case with the tabulation of most free-list domains, there are a number of responses that only occurred to one person, so their frequency is one in each case. However, some may have higher salience scores than others, so a second-
level sort is conducted to cause responses with the same frequency to be grouped by salience. If there are duplicates at this point (which there are), then they are left that way.

Item Name: This is a transcription of the terms the respondents put on their surveys, and it has obvious special characteristics that have to be taken into account, as Borgatti points out (Borgatti 1996). Different respondents are likely to have slightly different ways of expressing the same response, and these can simply be reflected in the tabulations under a single form of the responses selected by the researcher. In some cases, though, ambiguity exists. For example, some respondents reflected the loss of a limb with an expression like “leg bitten off.” So to this respondent, did that mean “leg bitten off” or “sharks put me off” or “I think of sharks and it makes me feel ‘off’ as in ‘off my rocker’ or ‘out of sorts’”—or something else? In these cases, I chose to leave the response as a separate response.

Frequency: This is the total number of respondents who used the response in question.

Respondent Percentage: This is the frequency of the response in question reflected as a percentage of the total number of respondents.

Average List Rank (L-Rank): This is the average rank for the response in question across all respondents who chose it. Smith and Borgatti clarify that L-Rank = 1 corresponds to an item being the first item in a respondent’s list, that is, the first item that occurred to a respondent (Smith and Borgatti 1998:209).

Smith’s S: This is Smith’s Salience Index. What it indicates and how it is calculated has been discussed above. The table below, however, can provide further clarification about what is meant by prominence. If we look at all the items with a frequency of 1, they will all have a respondent percentage of 9.1% (that is, 1/11), but the value of Smith’s S varies
between 0.030 and 0.091. This happens because each of those several items with a frequency of 1 could have an L-Rank of 1, 2, or 3, and those with an L-Rank of 1 will have the highest Smith’s S (0.091), while those with an L-Rank of 3 will have the lowest (0.030).

The results for nonsurfers are:
<table>
<thead>
<tr>
<th>Domain Rank</th>
<th>Item Name</th>
<th>Freq</th>
<th>Resp %</th>
<th>Avg L Rank</th>
<th>Smith's S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>teeth</td>
<td>9</td>
<td>31.0%</td>
<td>1.889</td>
<td>0.218</td>
</tr>
<tr>
<td>2</td>
<td>ocean</td>
<td>8</td>
<td>27.6%</td>
<td>1.500</td>
<td>0.425</td>
</tr>
<tr>
<td>3</td>
<td>jaws</td>
<td>7</td>
<td>24.1%</td>
<td>1.571</td>
<td>0.195</td>
</tr>
<tr>
<td>4</td>
<td>bite</td>
<td>4</td>
<td>13.8%</td>
<td>2.000</td>
<td>0.126</td>
</tr>
<tr>
<td>5</td>
<td>great-white</td>
<td>4</td>
<td>13.8%</td>
<td>1.750</td>
<td>0.023</td>
</tr>
<tr>
<td>6</td>
<td>scary</td>
<td>4</td>
<td>13.8%</td>
<td>1.000</td>
<td>0.138</td>
</tr>
<tr>
<td>7</td>
<td>blood</td>
<td>3</td>
<td>10.3%</td>
<td>2.667</td>
<td>0.046</td>
</tr>
<tr>
<td>8</td>
<td>fish</td>
<td>3</td>
<td>10.3%</td>
<td>2.333</td>
<td>0.057</td>
</tr>
<tr>
<td>9</td>
<td>swimming</td>
<td>2</td>
<td>6.9%</td>
<td>3.000</td>
<td>0.034</td>
</tr>
<tr>
<td>10</td>
<td>water</td>
<td>2</td>
<td>6.9%</td>
<td>2.500</td>
<td>0.034</td>
</tr>
<tr>
<td>11</td>
<td>beach</td>
<td>2</td>
<td>6.9%</td>
<td>2.000</td>
<td>0.046</td>
</tr>
<tr>
<td>12</td>
<td>fin</td>
<td>2</td>
<td>6.9%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>13</td>
<td>animal</td>
<td>1</td>
<td>3.4%</td>
<td>3.000</td>
<td>0.011</td>
</tr>
<tr>
<td>14</td>
<td>fear</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>15</td>
<td>fierce</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>16</td>
<td>limb-missing</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>17</td>
<td>misunderstood</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>18</td>
<td>mouth</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>19</td>
<td>movies</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>20</td>
<td>shark-week</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>21</td>
<td>smooth</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>22</td>
<td>stay-away</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.034</td>
</tr>
<tr>
<td>23</td>
<td>big</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>24</td>
<td>boneless</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>25</td>
<td>cartilage</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>26</td>
<td>death</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>27</td>
<td>predator</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.023</td>
</tr>
<tr>
<td>28</td>
<td>Hawaii</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>29</td>
<td>killer-whale</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>30</td>
<td>large</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>31</td>
<td>leave</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>32</td>
<td>liver</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>33</td>
<td>maneaters</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>34</td>
<td>mysterious</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>35</td>
<td>off</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>36</td>
<td>open</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>37</td>
<td>run</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>38</td>
<td>shipwreck</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>39</td>
<td>skin</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
<tr>
<td>40</td>
<td>snout</td>
<td>1</td>
<td>3.4%</td>
<td>1.000</td>
<td>0.011</td>
</tr>
</tbody>
</table>

FIGURE 4.2 Table of Response Data for Nonsurfers
At this point, we can consider some of the significant differences between the two tables of responses, which will allow us to develop a concept of a “meta-shark” for each of the two groups. However, to make an assertion about the meta-shark archetype for each group it would be apropos first to discuss what I mean by the term. Hearkening back to schema theory, it may be useful to think of what you know about something as a 100-color crayon box. In order to keep the brain from running at unsustainable full speed, it automatically invokes built-in knowledge defaults to fill in the gaps for you. In this scenario, then, let each crayon represent one thing you know about sharks. If you watched *Jaws* as a child, you might think that sharks are large, scary predators and killing-machines—usually great white man-eaters with sharp teeth that bite people, and this produces a lot of blood in the ocean. Let all these thoughts represent ten crayons in your box of 100. What your brain does then, based on these first ten crayons of information, is to fill in the remaining 90 thoughts represented by the remaining crayons to create a clear picture in your mind of a shark. This is very useful in keeping your brain from overheating, and it can sometimes save your life by quickly creating an image you need to survive, but it proves problematic from a perspective of shark conservation: if your brain by this time has conjured up an image of a shark as a man-eating predator (because 90 of the 100 crayons used to produce it represent preconceived notions), you are not likely to be motivated to conserve sharks.

When examining the table of responses for the nonsurfers, it seems as though their meta-shark is a scary, sharp-tooth-filled great white similar to the shark in *Jaws*. In fact, I would go so far as to say that their meta-shark *is* the shark in *Jaws*. Yet, in the case of surfers, their crayon box is filled with a slightly different narrative. Based on the
words they free-listed, they may have also seen *Jaws* as children and therefore share a common narrative in the beginning. Perhaps sharks have sharp teeth that produce blood in the water, and great whites inspire fear, but they are also mysterious, magnificent, beautiful, and misunderstood perfect predators. The “ten crayons” representing these positive thoughts enable your brain to create a whole different narrative by filling in the remaining 90 crayons with a representation of an animal that to you is perhaps worthy of conservation.

What is important is that these archetypes we create are shifting, fluctuating, and changing as we learn new information. Your brain can either replace the old information, or it can supplement the old information to create a clearer picture. For example, when I was growing up, my meta-shark was the shark in *Jaws* because that was the only representation of sharks in my life experience to that point. Once I began to watch scientific television shows about sharks, or some pseudo-scientific television shows, such as those on *Shark Week*, my meta-shark began to change. Nevertheless, I still believed all sharks to be dangerous to people. It was only once I began to docent at the aquarium that my meta-shark really began to transform into something in stark contrast to the shark in *Jaws*. This is also a personal characteristic I noticed in aquarium patrons.

Aquarium patrons would enter with a meta-shark archetype resembling *Jaws*, and after only a little education on sharks, their understanding changed. Consequently, their meta-shark changed. I observed this many times in conversation with patrons. One useful example happened when a mother and young son were standing at the shark tank and the boy started to place his hand under the water. Before I could let him know that the aquarium does not permit that for the safety of the sharks, his mother yanked his hand
out and slapped it. She then went on to lecture him about how dangerous sharks are to people and how they could bite his hand right off. As I have previously explained, that is completely untrue. The sharks in our aquarium are not capable of biting hands off. In fact, we usually clarified that if they bit someone, it would feel at most like a cat scratch. Once I explained this to the mother and imparted some other education about sharks (like how their numbers are dwindling and that they are being exploited), she understood things quite differently. In response to many of the pieces of information I gave her she repeated multiple times, “Oh my, I didn’t know that!” This example is useful because it happened many times over the course of my fieldwork. In sharing my meta-shark analysis with folklorist Jay Mechling, he pointed me towards his similar research on alligators in America where he posits:

Americans have a sense of “alligatorness,” a reservoir of ideas they use to interpret their real and mass-mediated encounters with alligators. There is no “real” alligator for most Americans, only a “symbolic alligator” that is the product of the humans; interpretation of the meeting of an alligator and the humans’ ideas of alligatorness. [Mechling 1987:76]

To further explore the meta-shark archetype for each group, we can also develop some differences in the way the two groups view sharks (and what is important about sharks to them) by grouping the responses. While the choice of groups is necessarily arbitrary, because no two investigators would probably have the same choice of groups, it is probably safe to assume that multiple investigators would have similar choices of groups, based on the fact that they would share a significant amount of domain knowledge in the field of sharks and humans.
Surfer responses group as follows:

<table>
<thead>
<tr>
<th>Descriptions:</th>
<th>Attributes:</th>
<th>“Attack”:</th>
<th>Fear:</th>
<th>Places:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mysterious (2)</td>
<td>Teeth (4)</td>
<td>Blood</td>
<td>People Running</td>
<td>Hazards</td>
</tr>
<tr>
<td>Beautiful (2)</td>
<td>Jaws (2)</td>
<td>Missing Limbs</td>
<td>Fear</td>
<td>Montana de Oro</td>
</tr>
<tr>
<td>Magnificent</td>
<td>Sharp Teeth</td>
<td>Miscellaneous: Fear</td>
<td>Scared</td>
<td>Morro Bay</td>
</tr>
<tr>
<td>Perfect Predator</td>
<td>Great White</td>
<td>Prehistoric</td>
<td>Help!</td>
<td>Water</td>
</tr>
<tr>
<td>Misunderstood</td>
<td>Fin</td>
<td>Shark Week</td>
<td>Shiit!</td>
<td></td>
</tr>
<tr>
<td>Star Struck</td>
<td>Big</td>
<td>Unpredictable</td>
<td>Pray</td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 4.3 Table of Grouped Free-List Responses for Surfers

Non surfer responses group as follows.

<table>
<thead>
<tr>
<th>Description:</th>
<th>Attributes:</th>
<th>“Attack”:</th>
<th>Fear:</th>
<th>Exclamations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Killer Whale</td>
<td>Teeth (9)</td>
<td>Bite (4)</td>
<td>Scary (4)</td>
<td>Stay Away</td>
</tr>
<tr>
<td>Great White (4)</td>
<td>Jaws (7)</td>
<td>Blood (3)</td>
<td>Predator (1)</td>
<td>Don’t go in the water</td>
</tr>
<tr>
<td>Great</td>
<td>Fish (3)</td>
<td>Gore</td>
<td>Fear</td>
<td>Leave</td>
</tr>
<tr>
<td>White</td>
<td>Fin (2)</td>
<td>Death</td>
<td>Maneaters</td>
<td>Run!</td>
</tr>
<tr>
<td>Fierce Animal</td>
<td>Liver</td>
<td>Dying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boneless Animal</td>
<td>Limb-Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big</td>
<td>Mouth</td>
<td>Beach (2)</td>
<td>Movies</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>Snout</td>
<td>Water</td>
<td>[Shark]-Week</td>
<td></td>
</tr>
<tr>
<td>Mysterious</td>
<td>Skin</td>
<td>Swimming(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cartilage</td>
<td></td>
<td>Shipwreck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smooth</td>
<td></td>
<td>Hawaii</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 4.4 Table of Grouped Free-List Responses for Nonsurfers

It is possible to develop a corollary to Smith’s Salience Index for use in indexing groups. I call this the Roll-Up Category Salience Index$^2$ and define it with a new formula as follows:

$$[C_j] = \sum_{i=1}^{F_j} \left( \frac{L_i - R_{ij} + 1}{N} \right)$$

$^2$ Equation, explication, tables, and analysis for Roll-Up Category Salience Index developed by Prof. Allen D. Palmer, Ph.D. on the basis of Smith’s S.
\[ C_j \] = the Category Salience Index for category \( j \), where \( j \) varies from 1 to the number of categories (inclusive).

\( F_{j^*} \) = number of lists in which a response in category \( j \) was found. In this respect, the present formula differs from Smith’s in that a particular respondent might put two or three responses from a category into his or her list, which would generate two line items contributing to this figure. That represents an anomaly when normalizing the indices, because the basic formula expects a respondent to be represented only once in this figure. However, \( F_{j^*} \) can be used in this formula as a fairly good approximation of the normalization effect \( F_j \) has in the regular formula in the case of short lists (and mine have only three places in them), since this reduces the chances of responses from the category occurring in a single list.

\( L_i \) = length of respondent \( i \)’s list. In this study \( L_i = 3 \) for all \( i \), and \( i \) varies from 1 to the number of response lines.

\( R_{ij} \) = rank given to response in category \( j \) by respondent \( i \)

\( N \) = total number of respondents. In this formula, the number of responses can exceed \( N \) since multiple members of a category can be on a single list. However, the error introduced is minimal if the number of separate lists does not exceed \( N \) by much.
The category roll-up results for surfers are:

<table>
<thead>
<tr>
<th>Domain Rank</th>
<th>Category Name</th>
<th>Freq</th>
<th>Avg L-Rank</th>
<th>Category S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attributes</td>
<td>9</td>
<td>1.778</td>
<td>0.606</td>
</tr>
<tr>
<td>2</td>
<td>Description</td>
<td>8</td>
<td>1.875</td>
<td>0.515</td>
</tr>
<tr>
<td>3</td>
<td>Fear</td>
<td>7</td>
<td>2.000</td>
<td>0.424</td>
</tr>
<tr>
<td>4</td>
<td>Place</td>
<td>4</td>
<td>2.250</td>
<td>0.212</td>
</tr>
<tr>
<td>5</td>
<td>Miscellaneous</td>
<td>3</td>
<td>2.667</td>
<td>0.121</td>
</tr>
<tr>
<td>6</td>
<td>Attack</td>
<td>2</td>
<td>1.500</td>
<td>0.083</td>
</tr>
<tr>
<td>7</td>
<td>Exclamations</td>
<td>0</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

FIGURE 4.5 Table of Category Roll-up Results for Surfers

The category roll-up results for nonsurfers are:

<table>
<thead>
<tr>
<th>Domain Rank</th>
<th>Category Name</th>
<th>Freq</th>
<th>Avg L-Rank</th>
<th>Category S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attributes</td>
<td>31</td>
<td>2.065</td>
<td>0.690</td>
</tr>
<tr>
<td>2</td>
<td>Place</td>
<td>17</td>
<td>2.118</td>
<td>0.368</td>
</tr>
<tr>
<td>3</td>
<td>Attack</td>
<td>14</td>
<td>2.071</td>
<td>0.310</td>
</tr>
<tr>
<td>4</td>
<td>Description</td>
<td>10</td>
<td>2.200</td>
<td>0.207</td>
</tr>
<tr>
<td>5</td>
<td>Fear</td>
<td>9</td>
<td>1.444</td>
<td>0.264</td>
</tr>
<tr>
<td>6</td>
<td>Exclamations</td>
<td>3</td>
<td>2.333</td>
<td>0.057</td>
</tr>
<tr>
<td>7</td>
<td>Miscellaneous</td>
<td>3</td>
<td>1.000</td>
<td>0.103</td>
</tr>
</tbody>
</table>

FIGURE 4.6 Table of Category Roll-up Results for Nonsurfers

To create the data for the roll-up process, the charts are used with a table of the basic data written out one line per response. The response name and L-rank are given. Then all the response names are changed to the names of the groups into which they roll up, and the whole table is then resorted by group name so that further calculations to implement the requirements of the Roll-Up Index formula can be carried out just as they were for the basic Smith’s S Index.

The category roll-ups illustrate one of the same behaviors that Smith’s S exhibits (Smith and Borgatti 1998): Category S appears to be rather closely correlated with
frequency. It is easy to see this in the two roll-up tables. *Frequency* is in the third column and Average L-Rank (our measure of *prominence*) is in the fourth. These are mathematically combined by the formula to form a measure of *salience*, which occupies the fifth column. Heuristically, this would seem to make sense: the things people thought of *most often* would also seem to be the things people tended to think of *first*—or at least early in their lists. One can see that in the case of surfers, with only a few exceptions, categories with a higher frequency also have a higher prominence, and hence, a higher salience. Curiously for nonsurfers, the categories with the higher frequencies have medium prominence, and hence, the salience is lower. In both cases, however, *salience follows frequency to a great extent* (Personal Communication, Prof. Allen Palmer, February 15, 2015).

The categories also make it somewhat easier to see what aspects of sharks and shark lore are significant to each group, and this way of viewing the data complements the development of group meta-shark definitions from elementary responses as discussed earlier. The *attributes* of sharks are clearly the thoughts that come first to the minds of both groups when asked to “give me three words” about sharks. After that, surfers concentrate on *descriptions* of sharks, while nonsurfers tend to think of *places* where they are found. The next most important category to surfers is *fear*, and to nonsurfers is *attack*. These two concepts are obviously closely related, but there is a subtle difference: Surfers may *fear* sharks in the wild, but that does not necessarily lead to thoughts of *attack*, whereas nonsurfers glom onto *attack* immediately; *their fear is welded to thoughts of attack*, and for them, the possibility of escape is probably not something entering their minds. Since surfers are at home in the water, it may be possible that they may fear a
shark but imagine themselves better able to avoid an attack than nonsurfers, many of whom (as the survey data has shown) rarely if ever go in the water. There is probably no scientific way to reach that conclusion, but it is nevertheless an interesting possibility.

There were instances in the free listing where participants listed words that were clearly influenced by the movie *Jaws*, yet they had never seen it; clearly, they knew of it by reputation. In total 25% of all respondents used the word “Jaws” in the free-listing section. *Jaws* Director, Steven Spielberg, once reminisced, “I just remember seeing a large block of pages that said ‘Jaws’ on it and I didn’t know what that meant. Was it about a dentist? Because ‘Jaws’ was not in the national consciousness at the time, it was just a word, it was kind of an unusual word” (Spielberg 1995). It has been almost forty years since Benchley coined the term “Jaws” to refer to a shark. Today, the term has become completely synonymous with sharks. Never again will someone look at the title and assume the movie is about a dentist.

I looked at the frequency of free-listed words for a cultural consensus that perhaps a certain characteristic of sharks is shared by all or most people. In regard to this, most people seemed to relate the word “shark” immediately to large predators, mainly a Great White “man-eater.” Even though the vast majority of sharks are small and usually harmless to people, this concept seemed to be absent in the free lists. One important distinction that came through in the free-listed words was that nonsurfers’ responses were clearly influenced by external factors such as pop culture portrayals of sharks by the media and in movies, such as *Jaws* and *Sharknado*. The nonsurfers produced words such as scary, blood, teeth, and missing limbs. One individual, who admitted to entering the ocean at most once every year, and did not herself know anyone who had ever had an
experience with a shark, simply listed her three words in this order: Leg, -Bitten, -Off. By contrast, surfers’ words were only marginally influenced by the media and instead included words such as magnificent, beautiful, mysterious, and misunderstood. This is a noteworthy distinction, because it seems to show that habitual interaction with the ocean as a surfer has an effect on how people feel about sharks.

Every person surveyed and interviewed easily free-listed three words about sharks and each one conveyed strong feelings towards or opinions about sharks. One nonsurfer claimed, “I am in constant fear of sharks in ankle deep water. I had a fear of sharks coming through my bathtub drain and swimming pool drain as a child because of the movie *Jaws*. I am still reeling in that fear--silly me!” 52% of nonsurfers stated that the only stories they knew about sharks came from television, movies, and the news. 41% did not know of any stories about sharks at all, and 7% possessed actual stories about real sharks. One of these individuals stated, “I have a friend who was bitten by a shark” and this person showed me a picture of his friend in a hospital bed with a large chunk of his thigh missing. The other individual told a story about how she and her fiancé were snorkeling in Hawaii and thought they saw the shadow of a shark beneath them and they started panicking until they realized it was a dolphin. However, since the majority of those surveyed had no personal experience with or stories about sharks, these ideas about sharks and feelings towards them are not constructed through personal interaction; these data show they have been culturally constructed through the media. Moreover, they suggest that people equate the term “shark” with the movie *Jaws* and a large man-eating species as is portrayed in that movie.
Chapter 5: You’re Gonna Need a Bigger Boat

It has been my observation that people have an abnormal fear of sharks largely because of the blockbuster movie *Jaws*. In 1973, Peter Benchley wrote a best-selling book titled *Jaws: A Novel*. The book was such a success that Universal Pictures turned it into a movie released in July of 1975. It was an instant hit and became the first summer blockbuster movie ever. “*Jaws* changed the [movie] business forever” (Shone 2004:35).

There are a few points worth mentioning about *Jaws*. The movie did a great deal of damage to shark population numbers at the time that have continued to this day. Large sharks reach maturation late in life and have few young; therefore, once population numbers are negatively impacted, recovery is a difficult endeavor for them. As Patrick Nason remarks, “By framing the shark as a worthy and formidable opponent to the good, the peaceful, and the innocent, the film reified the theme of man-versus-nature and encouraged shark fishing tournaments, shark culls, and a general loathing of the unknowing animal to all that saw it” (Nason 2012:60).

Additionally, what specifically adds to the terror factor of *Jaws* is that, for the first half of the movie, the shark is never seen and is represented only by music. In fact, the shark is only shown for about one minute total throughout the film. This is important because what we know of shark attacks by survivors and eyewitnesses is that the shark usually remains unseen until the unexpected bite. In the documentary, *The Making of Steven Spielberg’s ‘Jaws,*’ the movie’s composer John Williams explains:

This idea of characterizing the shark musically…It’s an unstoppable “dunum-dunum.”...It’s the combination of the visual, the shark, combined with the notes. That combination of sound and image forming a memory which can then be referred back to, as you do with an audience that now hears it and the little child will scream in terror because of the association that’s been created.
In some ways this may be a contributing factor as to why people are so terrified of a shark that they never see when they are in the ocean. This psychological fear that the shark is always lurking underneath them is pervasive.

The cultural fear of sharks is not something that suddenly occurred with the release of *Jaws*. Benchley once remarked, “For years after the movie version of *Jaws* exploded into the public consciousness, I was asked why I thought it had such an impact. I had no answer beyond the obvious: People have always been terrified of sharks, of deep water, and of all the unknown, and this story touched all those nerves” (Benchley 2000). However, as the Stop Shark Finning website argues, “*Jaws* did intensify the hype, repeating the same simple message over and over: sharks are dangerous, sharks attack humans, sharks are killers” (www.stopsharkfinning.net).

While examining the politics of human-shark incidents in Australia, Christopher Neff of the University of Sydney asserts that shark attacks “command a disproportionate amount of psychological space in the minds of the public.” Even the colloquial term “shark attack” that we employ in most human-shark interactions is problematic. In reality, sharks rarely “attack” humans. Instead, sharks use their jaws for exploratory bites as a way to feel what is, and what is not food. Very unfortunately, humans usually lose limbs or bleed out as a result of these exploratory bites. Thus, most researchers concerned with sharks prefer the term “shark bite” in place of the misleading and anxiety-causing “shark attack.”

David Owen aptly points out:

The relationship between shark and human is a complex one. Make-believe and reality are intertwined as comedy competes with horror, popular entertainment feeds off gruesome tragedy. Like a skull and crossbones, a triangular fin in water is
a profoundly evocative symbol. Yet very few of those fins ever 'attack' people. [Owen 2009:1]

*Jaws* and its pop culture influence have never left the public consciousness since its debut, and the movie still plays on television and at outdoor summer movie screenings across the country. Its movie blockbuster status has diffused the irrational fear of sharks and the negative stereotypes, not just nationally, but internationally as well. Yet even before *Jaws*, sharks have been found in various representations throughout history. There exists pottery dated to 725 BC, found on Ischia, an island in the Tyrrhenian Sea near Naples, that depicts a shark eating a sailor after his ship sank (Owen 2009:51). However, the term “shark” does not surface until British Captain Hawkins coins it in the sixteenth century. Hawkins placed a large shark on display for all to see in London at a tavern on Fleet Street. He needed a term to call the fish to excite and draw people in and lore tells that he decided upon the term “Shark” (Owen 2009:57). Perhaps the most popular portrayal is the painting *Watson and the Shark* from 1778. It was painted by John Singleton Copley and inspired by Brooke Watson of London, who was known for telling the tale of how he lost his leg to a shark in Havana Harbor (Southgate 2004:2290).

*Jaws* kicked off the genre of shark movies. Today shark movies are more popular than ever. In the summer of 2013, the movie *Sharknado* premiered on the SyFy channel and became an instant cult classic. The plot is that Los Angeles experiences a freak hurricane storm complete with tornados that are filled with sharks. It begins with a shark being finned and then moves to show a Chinese businessman eating shark fin soup on a ship in the Pacific Ocean. A freak storm creeps up that brings sharks flying through the air devouring everyone on the ship. The sharks do not eat the people in the water; instead they fly onto the ship and devour them on dry decks. As the story progresses, Los
Angeles is completely flooded and becomes full of lakes and flowing rivers. The sharks fill all the waterways, including people’s flooded houses. Nearly all the main characters in the movie are eaten at some point or another. The movie ends epically with the main character being devoured whole by a giant shark, but, in true heroic form, he cuts his way out of its belly with the chain saw he just happens to have and saves everyone.

It is unclear if the movie is purposely farcical or if that was a happy accident due to the short filming schedule, bad acting, and absurd premise. However, this low budget, made-for-television movie was a complete success. In an unprecedented move, the movie played on the big screen at over 200 Regal movie theaters in the country at midnight on August 2, 2013 (The Hollywood Reporter). While Sharknado was a poorly made low-budget film, it was so popular that a sequel was filmed with a host of famous award-winning actors, and a third movie is currently in pre-production with even more topnotch actors appearing in it. The second movie takes place in New York City. The third takes place in Washington D.C. and Orlando Florida. The second and third installments of the series are purposely humorous, outlandish, satirical, and campy.

Additionally, the SyFy Channel is releasing a new shark movie every couple of months. One such movie is Mega Shark versus Crocosaurus. As the title suggests, there is a huge Mega Shark fighting a giant animal that is a cross between a giant crocodile and a dinosaur. The US military finds itself in the middle of the destruction and fights to kill both animals. Like Sharknado, it also has bad acting, a low budget, and an absurd premise. However, unlike Sharknado it feels like it takes itself too seriously. Whereas Sharknado is so awful it’s funny, this movie is just awful.

After one survey I spoke at length with a nonsurfer female and she proclaimed:
I’m horrified! You don’t even know! I just saw [the movie] *Unbroken* and a guy like leans over the boat and a shark leaps up. Scary as shit! I was like, Ah! I feel like it’s an unrealistic fear I’ve had since a child.

I asked her why she has had this fear since childhood and she answered:

The New England Aquarium had a shark in a tank in the center and it scared the crap out of me. Maybe I was like eight and I thought the tank was gonna break and it was gonna eat me! [Also] I’ve seen lots of shark movies, *Deep Blue Sea*, *Jaws*, and *Open Water*. As scary as they are, I’m a little fascinated, but not enough to come close to one. I’ve had nightmares about jumping in a pool and sharks are in there. Of course in a lake and stuff all those movies make you think it could happen. Like *Sharknado*. That was so stupid, so unrealistic, but the parts where it overflows and you’re trapped in a garage, that’s’ freaky! But I’m legitimately scared of sharks so I wonder if it could happen, like could a shark tornado do that? Also I just watched the new *Jurassic Park* trailer and they’re dangling a great white in front of a dinosaur and it was eaten and I felt bad for the shark.

This informant was intriguing because she inserted herself into a movie. When speaking about *Sharknado*, she uses, “You’re trapped in a garage,” not “they’re trapped in a garage.” Also, she legitimately wonders whether a tornado could pick up large, man-eating sharks out of the ocean and drop them on people. This is about as fantastical a story as it gets, but the fear and uncertainty is real to her.

In the movie *Sharknado*, the sharks are not stipulated as killer sharks; they are just the “normal” sharks one finds in the ocean. However, the film then clearly pushes the idea that all sharks are large, man-eaters. Further in the movie, the sharks are dropped into a pool full of people, playing on the irrational fear that many children have of sharks eating them in a freshwater pool. There are many negative remarks made throughout *Sharknado* such as, “We shouldn’t be afraid of sharks, they are the ones that should be afraid of us,” “I hope that storm kills them all,” “I hate sharks! I’m from Wyoming!” and “I really hate sharks!” There is also a line in which one character exclaims, “That’s a
tiger shark” and she is asked, “How do you know that?” to which her response is, “Shark Week.”

In the movie, *Mega Shark versus Crocosaurus* many negative terms are used to discuss the shark in the film. The characters exclaim, “We are on a hunt to kill a shark,” “I can help you kill this beast,” and “Kill this creature.” Just as in *Sharknado*, the shark sounds like a lion roaring. This phenomenon is also in the movie *Jaws*. When the shark is killed at the end, it makes the sound of a dinosaur (the sound a dinosaur makes according to Steven Spielberg). The construction of this mindless, man-eating meta-shark is clearly powerful and pervades media portrayals of sharks.

What is clear from my own data, and most likely your own life experiences, is that most people—while they have quite probably seen more than one shark movie or at least are familiar with the folklore they engender--have never had any sort of interaction with sharks in the wild. A few have seen or touched them at aquariums and some people have heard stories from others who say they have seen them while surfing, but almost no one has had their own experience. Therefore, when I discuss the cultural construction of sharks that perpetuates an irrational fear of sharks, I refer to the way in which the media constructs individual knowledge about and feelings towards sharks.

Sharks and allusions to the movie *Jaws* are found in many different places. According to Dr. William Keegan in an article about Caribbean Archaeology for the Natural History Museum of Florida, the first documented shark attack in the Americas happened sometime between CE 789 and 1033. Keegan explains that in the 1980s archaeologist Dr. Peter Siegel conducted excavations on Puerto Rico’s north coast at a pre-Columbian site known as Maisabel for his Ph.D. dissertation *Ideology, Power, and
Social Complexity in Prehistoric Puerto Rico. Though there are no records and no witnesses of the attack, Dr. Keegan contends after carefully reviewing Dr. Siegel’s research, that a 29-year-old male in burial number 17 at the site was fatally attacked by a tiger shark more than 1,000 years ago. The evidence for this, Dr. Keegan argues, is found in the abnormal features of the cut marks on the “lateral and posterior surface of humeral shaft” and “The striations associated with the cuts made it likely that the culprit was a tiger shark” (Keegan 2008:29).

Dr. Keegan received his Ph.D. in Anthropology from UCLA in 1985 and is the chairman and curator of Anthropology, Department of Natural History, Florida Museum of Natural History. He fancifully tries to recreate the events of that day and jokingly includes that “There was no soundtrack music to raise the alarm” (Keegan 2008:25) and ends with “Just when you thought it was safe to go back in the water” (Keegan 2008:30), the official tag line for the movie *Jaws II*. What I find remarkable about this is that here we see that even in an archaeology paper about a prehistoric shark attack, allusions to the movie *Jaws* are made.

There is certainly something real to fear in sharks. However, we blow that fear out of proportion, and I agree with stopsharkfinning.net, which argues “We have been brainwashed about sharks. We’ve been fed an incredibly skewed narrative that focuses on isolated and extreme examples of human-shark interaction…it leads to a prejudice against all sharks. It turns people into sharkists,” and they define a “sharkist” as a “person with an irrational fear of sharks” (stopsharkfinning.net). The questions are then, why are there so many “sharkists?” and who had a share in creating this widespread narrative?
Charles Darwin refers to a shark in his journal as a “monster” and, after seeing a shark killed by a poisonous puffer fish, he ponders, “Who would ever have imagined that a little soft fish could have destroyed the great and savage shark?” (Owen 2009:69). This label of sharks as savage survives. In fact, in 1970 Philippe and Jacques Cousteau wrote a book titled The Shark: Splendid Savage of the Sea. Darwin, Cousteau, and countless stars of bad, made-for-TV shark movies incessantly use these derogatory terms. Jacques Cousteau has even (wrongly) argued, “Every species of shark, even the most inoffensive, is automatically a formidable source of potential danger” (J. Cousteau 1970:236). People have been conditioned to vilify sharks, and even Winston Churchill is famous for once saying, “The British government is entirely opposed to sharks” (MacCormick 1998:ix). These are powerful creations about sharks by powerful men. Therefore, an in-depth examination of “Truth” and power in cultural constructions, and who is telling these stories about sharks is necessary.

‘Truth’ and Power to Create

Sharks cannot tell stories about themselves. Instead, shark lore exists at the mercy of those who tell stories on their behalf. The questions that should be asked then are, who tells the stories? Is it those people in positions of power? Stories constitute identity. Who is telling the stories about sharks? Are economic power differentials involved? Milton argues that, in order to add a voice to environmental discourse, anthropology must take an interdisciplinary approach to answer these questions. “Environmental protection depends on the relationship between their understanding of power, the way they allocate responsibility . . . the way they think about time and the extent to which they envisage and plan for the future” (Milton 1996:224). Just as
Foucault cautioned, power and knowledge tend to travel hand in hand. People should always pay attention to who is doing the constructing and what sort of power dynamics are involved.

Western culture created the image of sharks as dangerous, ominous, savage monsters that outnumber “us,” and therefore, we must kill “them” if we are to survive. These perpetuated notions that the True Nature of sharks is to be mindless, human killers have given justification for the destruction of that of which we are afraid. There is a power differential involved here. We are practicing ritualized domination over a predator that we fear. This represents a way of exercising our power by stripping them of theirs. As Owen argues, “Modern western culture has shown itself capable of being absorbed by the threatening otherness of sharks” (Owen 2009:270), and as we exert our power, shark population numbers dwindle.

Cultural constructions of truth are explicitly linked to systems of power. Usually Truth is enacted by those who have power onto those who do not. According to Foucault, “‘Truth’ is linked in a circular relation with systems of power which produce and sustain it, and to effects of power which it induces and which extends it. [It is] a ‘regime’ of truth” (Foucault 1984:74). Thus, cultural construction is a fiction of sorts. This fiction is either created by the people in the culture themselves, by a separate group, or by a small but powerful group. Or, as Foucauldian discourse is quick to point out, it is not always the majority who represent the powerful. Instead it is a “powerful minority” who has the ability to create truth for the majority (Fillingham 1993:7). Creation is power and power dynamics are complex.
What is evident through an examination of the power to create is that, clearly, there is a problem with the creation of truths. “The problem is not changing people’s consciousness – or what’s in their heads – but the political, economic, institutional regime of the production of truth” (Foucault 1984:74), which Foucault urges for “detaching the power of truth from the forms of hegemony, social, economic, and cultural, within which it operates at the present time” (Foucault 1984:75). Foucault understands that there is no universal “Truth,” only that which man creates. Since truth is a construct, then we must pinpoint who is creating it and detach that truth from the power that creates and maintains it. Only then can people be free of the hegemonic dominion that can oppress and dictate behaviors and understanding, in this case the vilification of sharks. As Feinberg et al. question, “How might we write about politics and power at the level of animal others when the author’s own ontological position is essentially authoritative” (Feinberg et al. 2013:4)?

“Othering” the Shark

The exclusive study of humanity yields only internal insights: patterns of significance and meaning among our species alone. While the concept of the animal has long offered the ultimate Other against which to define the boundaries of the human, this binary is just one of the many ways humans and animals shape one another’s existences and experiences of the world. [Feinberg et al. 2013:1]

There is a tendency with humans to “overemphasize charismatic megafauna” (Anderson 1996:9) instead of choosing to conserve the animals that are most important for the well-being of humanity. Charismatic megafauna are those animals that possess the charisma to capture the imagination of the public and are effective at “directing public attention toward conservation and preservation of the natural environment” (Barney et al. 2005:41). Unfortunately, as Ducarme et al. address, sharks are a “non-charismatic
species” (Ducarme et al. 2013:5), and Dobson goes so far as to say they “possess negative charisma” (Dobson 2008:51). In discussing photojournalist representations of charismatic megafauna, Dijana Gaćeša contends these photographs are, “meant to evoke the Westerner’s feelings of protection, care and sympathy for the animals, which should further result in a specific campaign of political activism and financial generosity” (Gaćeša 2008:550). Most photographic representations of sharks are of a great white’s gaping mouth full of sharp teeth emerging out of the water towards the camera. This is a difficulty that shark conservationists must figure out how to remedy.

In an interesting examination of zoo spectatorship, Malamud calls attention to Steve Baker’s investigation into “Manipulative and inauthentic appropriations of animals’ integrity that inhere in the semiotics of cultural representation” (Malamud 2007:232). This cultural representation of animals seems to be aimed at youth just as “zoos, realistic animal toys, and the widespread commercial diffusion of animal imagery all begin as animals started to be withdrawn from daily life” (Berger 2007:261). For the last century, “Children in the industrial world are surrounded by animal imagery: toys, cartoons, pictures, decorations of every sort. No other source of imagery can begin to compare with that of animals” (Berger 2007:259). If one were to examine the types of stuffed animals children find most popular, the first that should come to mind is teddy bears. In fact, as children, most of us were surrounded with sweet, lovable, soft teddy bears. What is this really a representation of? Bears are dangerous, like all predators in the wild. They can be unpredictable, and bears are something a child should probably be taught to keep a safe distance from. Instead, children are taught that bears are cuddly and you should sleep with them because they keep you safe and sound. Moreover, there are
popular anthropomorphic representations of bears. There is Yogi the Bear who lives in Jellystone National Forest frolicking and picnicking all day. Then, of course, there is Smokey the Bear who once taught children, “Only you can prevent forest fires!” and now has generalized that to “Only you can prevent wildfires!” Most adorably, there are the “cute” Care Bears. These animals are a heavenly force for all that is good in the world (since they live in the clouds, not the forest). In fact, “Today anthropomorphic animals are everywhere we look” (Sax 2007:276).

Fetishization

In the twenty-first century, sharks are quickly emerging as objects of fetishization. Sharks have been appropriated as objects of fetishization by differing demographics. At one end of the spectrum, teenage boys proudly wear shirts with a picture of the visceral white shark’s mouth gaping open. It is as though the boys are appropriating the white shark’s power to make a statement about their own ferocity. This consistent white shark imagery provides a wealth of insight into Western culture and its proclivity to appropriate the very thing it has “Othered.” At the opposite end of the spectrum, the large, white shark has been turned into a “cute” object for little children. A great example of this is the new popular baby stroller. The top of the stroller is made to resemble a great white’s gaping mouth full of teeth, and this is where you set the child. You place a baby right into the mouth of a great white shark.
Perhaps this is to “protect” the vulnerable child from the dangerous shark. However, it says more about the parent than the child at that age. It may be that they are exercising their power over this great predator, stripping it of power by making it a “cute” object for a child. These various appropriations and fetishizations make one thing clear, “[Sharks’] murderous power, their ancient lineage, their aloofness--all these attributes have given them a place within human culture where they are simultaneously worshipped and loathed. It's an unenviable position, one that is helping propel their rapid decline” (Eilperin 2011:xii).
Surfer Interview Analysis

Surfing began in Hawaii, but when the Western Christian missionaries came to Hawaii in the nineteenth century, surfing was quickly condemned. They felt it had pagan-like qualities and it was replaced with Christianity and Christian activities (Taylor 2010:106). The entire sport was almost completely stomped out until Jack London himself learned to surf. He was then inspired to write an article in 1907 about an Irish Hawaiian surfer named George Freeth (Taylor 2010:106). From there on out, surfing slowly made a comeback in the twentieth century, starting in Hawaii and diffusing out to California and Australia. Now people across the entire globe enjoy and compete in the sport.

I conducted participant observation and interviews on the beach in Encinitas, California and interviewed surfers from Santa Monica and Oxnard, California. I utilized the pertinent methodology of semi-structured in-depth interviews through snowball sampling. Each interview took roughly 60 minutes to complete, though this did vary depending on the interviewee.

Fear

While I was doing fieldwork in Encinitas, I was staying with a surfer I will refer to as Utah. When I first interviewed Utah he was taking a break from surfing. I then asked him if he thought about sharks while surfing and he replied:

Yes. I guess you’ll see something and you’ll wonder, is that a shark? Lots of time that happens in the evening cause in the evening you’ll get a lot more shadows in the water and that’ll freak you out, cause you want to be ready in case it happens. You know, put the board in its mouth rather than your leg, or kick it or hit it.

Then I probed, “Do you often think about what would happen?” and he answered, “Oh yeah, I usually think about what would happen if it happened to someone else, me going
to the rescue. I mean I’m not really scared of them. I mean, I’m scared of them, but not like that.” This comment was so interesting. That he would say he is not really scared of sharks, but then take it back immediately and acknowledge, “I mean, I’m scared of them.” As I probed deeper as to what he meant by this he explained, “I think about what would happen to someone else. I’d jam over to them, throw them on my board, paddle in as fast as I could. Most likely use my leash to tie off anything that’s gonna be bleeding, like usually an artery cause their leg is probably gonna be pretty mangled. It usually is.” He went into such depth about his plans that I asked him, “Have you ever seen anyone get attacked?” and his answer was no.

In my research, none of the surfers personally knew of anyone who had been bitten by a shark. Many of them had never seen a shark in the water. Yet every single one of them thought about sharks every time they entered the ocean. Utah put so much thought into it that he had created this entire scenario in his head and yet had never had any experience with a shark outside of seeing them on television or in the movies. One surfer wanted to take my survey but did not have much time to speak after. He did state, “I’ve heard stories about close encounters but never an attack. I work through the fear every time I get in the water. I won’t let it dictate my life and the enjoyment I get from the ocean.” When I asked Maverick whether he thought about sharks while surfing he answered, “I try not to think about it. I know they’re out there but I try not to worry about them because if you do, you can’t enjoy it. You can’t enjoy anything if you’re worried about something.” When I asked one of the surfers I interviewed from Oxnard (whom I refer to as Miami), “Do you have any stories about sharks?” he said, “Just seeing them and scaring the crap out of me. It gets me out of the water!”
Another surfer I interviewed is a military pilot who surfs and is also a fisherman. He had so many stories to tell that, at one point, he asked me if he was boring me to death and whether he should stop. He mostly had fishing stories to tell and for this reason I refer to him as The Fisherman. In response to whether he feared sharks while surfing he said:

Sometimes I think about sharks when surfing. I try not to think about it much. Some place like Hazards I think about it all the time because it’s their [the sharks’] area. Hazards at Montaña de Oro Beach has slick, black scary water paddling out to it. It’s a reef break with sea lions everywhere. After the day of surfing out there, I saw a dead sea lion washed up with a bite taken out. Proved that I don’t want to go out there again!

He also told me a story that was told to him:

Two hundred and fifty miles southwest of Cabo a buddy worked on a boat. He jumped in the water with yellow fin tuna. He wanted the guys on the boat to scoop the bait on him in the water to see the tuna feeding frenzy around him and it worked. But then they all bolted and the guys are like, “Dude, get out of the water now!” They started pulling him out of the water and a tiger shark came up out of the water with his mouth open and was just about to eat him!

During the survey in response to “sharks frighten me,” Bodhi said “yes” and then said, “Fight or flight fersure!” After the interview, Bodhi went back out in the ocean and about thirty minutes later he came back to where I was sitting with a pretty serious looking cut on his knee from surfing. He jokingly referred to it as “shark bait” since it was bleeding quite a bit. This use of shark humor was most likely for my benefit, but it is interesting that he made that joke. Utah made what he thought was a joke as well when he said in response to the question if he knew anyone who had had any interaction with a shark, “A guy was eaten alive at Solano Beach. A veterinarian ironically enough.”

Though this is a particularly morose sentiment, there is irony there somewhere.
Not long after my niece and I initially arrived at the beach in Encinitas, a female lifeguard in a bright red, one-piece bathing suit took off from the tower behind us towards the ocean at a dead run. Who or what she was running to was unknown to us sand-sitting beachgoers. No one was yelling or screaming for “help” that we could see. I looked around and noticed there was a group of beachgoers watching in wonder as to where she was going and who needed help. In the end, she was out of our line of sight beyond the wave breaks. About five minutes later, she came running back once again to regain her place of lookout at the lifeguard station behind me. All of this reminded me that the ocean is inherently dangerous. It looks fun and appealing, but a family trip to the beach is not just, as they say, “a day at the beach.” It comes with certain fundamental dangers. While all of this aforementioned commotion was taking place, my 18-year-old niece was out in the water learning to surf for the first time. When I previously told her to please be careful before she went out towards the water, she mouthed back to me “shut up.” I am rather sure what she really meant to say was that I was being too over-protective, and she did not think it was as dangerous in the waves as I did.

The Southern California Coast does not have many human-shark incidents. The average person is far more likely to be injured by a surfboard or to drown. Even so, surfers always pass on useful stories of resident sharks in certain areas. A couple of the surfers told the same story about surfing at Point Mugu when a great white was in the water feeding on a dead whale. As Bodhi told it:

I’ve been kicked out of the water for sharks off Point Mugu Navy Base. Some whales had died, the Navy was towing a whale in, and a great white was munchin’ it. A scientist guy came out and said “Everyone get out!” and no one listened. I’ve heard stories about how deep it is at Point Mugu. So the great whites are there in the shadows.
When I asked Utah if he had heard any stories about sharks, he said, “Juveniles [great whites], they may bite and could do some damage. They say they see them all the time at Will Rogers, I think, and Topanga. Malibu Surfrider too, but they’re always juveniles.” Additionally, the Fisherman told me he knew about “A couple juvenile great whites in Trussles. People say they have been seeing them.” He also said, “Moonstones Beach in Cambria, they have a big female white shark that the locals have a name for, well, as of like a year ago anyway.” When I asked Bodhi if he had any shark stories he said, “I saw a tiger shark in Hawaii chillin’ by a dock thing--it’s just known for chillin’ there.”

Likewise, one of the survey respondents stated, “I have heard generally ‘loose’ stories about sharks circling paddle boarders in the San Diego area.” Clearly, stories and information about sharks in known locations is being passed on. This may be for safety or just because it is a story they feel is “cool” to tell (like an urban legend), but either way, the information is being effectively transmitted.

According to Dr. Stephen P. Leatherman, “Only one person on average is killed annually in the United States by sharks, which pales in comparison to the 100+ people who drown and tens of thousands of swimmers who struggle in the deadly rip currents each year. Clearly rips are the real killers. Yet most people do not even think about rip currents” (Leatherman 2003). Dr. Leatherman is definitely correct, based on the data I collected. For example, as soon as one interview with a female surfer I interviewed in Encinitas (Cindy) was over, she quickly got back to surfing. I realized that while I was interviewing her, I had missed what happened behind me at the lifeguard station. When she took off to hit the waves, I noticed a truck had showed up at the lifeguard station to render aid to a boy who appeared to be a teenager. The female lifeguard had him
standing straight up while her hands kept his head completely straight. The truck had come with a gurney, on which they carefully secured him after immobilizing his neck with a brace. It was probably a surfing accident, and the paramedics lifted the boy into the truck and drove away.

**Respect and Awe**

When I initially started to interview Cindy on the beach, she answered “false” to sharks frighten me,” and then clarified, “Frighten is a bad word.” When I further asked her about sharks she said, “Sharks are more in control of the situation than I am. I have respect [for them], like an awe. It’s a humbling experience, surfing. We’re in their space and at their mercy. Makes you feel small.” This reference to respect hearkens back to Anderson’s idea that it is a sense that “we are all in this together . . . and, because of that have to act decently towards one another” (Anderson 2014:77). These surfers are aware that they share the waves with sharks and other sea life. In fact, they are acutely aware that the ocean is not the humans’ natural environment, but it is the sharks’. During one of our conversations Utah remarked:

I remember a few years back there was a big male white off of our coast. I remember seeing pictures from a helicopter of just how close he was to Zuma (or another) Beach. It was a bit off-putting, but the ocean is his home not mine! If he strolled into my living room, I would have a problem with that. Since I am a visitor to his home, I try and be respectful.

One female surfer from Encinitas (whom I refer to as Freebird) told me, “I think I saw [a shark] at Manhattan Beach swimming in the water. It was not a dolphin fin!” So I asked her if she was afraid of sharks and she replied, “It’s their home, but I belong here too. I respect them more. Know as much as you can and you’ll have good shark karma.” I thought this was a very interesting statement: she was aware that she is sharing the ocean
with sharks, but she feels that they need to share with her too because she belongs in the water as well.

I asked Freebird, “How do you feel about shark attack survivors who devote their lives to conserving sharks?” She said, “I think it’s awesome. You are a part of something bigger than yourself.” She went on to say that she works doing “surf therapy” and explained, “I teach people to work through anxiety, stress, and fear through surfing. It’s self-healing and community healing.” To the same question Cindy replied, “It seems like a healthy coping mechanism. They realize they aren’t a victim.”

At his request for the interview, I met with Maverick at a restaurant overlooking the ocean and Santa Monica Pier. He said it was his favorite spot to sit and watch the waves and it was clear the water seemed special to him. When I asked him the prompt question on how he felt about shark attack survivors who devote their lives to conserving sharks, he sat and thought for a moment and answered, “It’s part of the respect you have for the animals. Knowing what you know after you’ve been attacked. When you come face to face with something and you develop a newfound respect.” He ended with saying “Needless to say I’m not a big fan of sharks, I respect them.” I never used the word “respect” once in conversing with him, yet he used it three times in just four sentences.

Two surfers had interesting things to say about sharks. They each had more than just a healthy respect for sharks and desired to experience a shark in different ways. I asked Utah if he had ever seen any sharks before and he replied:

I’ve never even really seen a big shark before, there’s always when you think you see a fin, but it’s not. I want to see a big shark! They’re perfection through the water. I think if I saw a great white I’d be star struck: there it is! Like seeing a lion in Africa, like whoa! But it’s like a jungle, there’re things in there [the ocean] that can bite you in two.
Utah desperately wants to see a big shark but he does not want to be bitten by the shark. Then I interviewed Miami, another military pilot, on a Naval base in Ventura California. He told me that he thinks about sharks while surfing. When I asked him to elaborate, he responded:

Surfing alone you see sea life and you’re near [a shark’s] normal food. Especially in cloudy sandy water, I know they don’t want to bite me, but they might. So that bothers me. I also came from Florida, tons of people are bit there. But they’re little sharks. I think I’d like to get a little bite, cause that would be a cool story, but a big bite here [Oxnard CA.] and you’d go missing or missing a limb. Like, I don’t think lightning will strike me, but car driving, I could crash.

This response is full of interesting thoughts. He is aware that, as a human, he is not a shark’s preferred meal and he is aware of the cloudy water conditions that sharks often feed in. This demonstrates a high level of awareness about shark behavior. He also likens the odds of being bitten by a shark to that of being struck by lightning, when, in fact, one has far better odds of being struck by lightning. Whereas the odds of being a victim of a shark attack are 1 in 300 million, being struck by lightning is 1 in 3 million (Harvard Public Health Review). Miami also claims to want to get a “little bite” from a shark. Miami’s desire to be bitten is so intriguing. It is as though through the bite he can absorb some of the shark’s power, and perhaps by absorbing this power, he may be afforded some protection against other larger sharks.

Spirituality

Every surfer I interviewed stated that surfing is religious or spiritual. This seems to be a constant, just as Taylor affirms: no matter where someone surfs or what his or her culture is, surfing is considered spiritual by a majority of surfers (Taylor 2010). I define spirituality the same way Leslie Kerby does: “a process of fulfilling this need for understanding of the meaning of existence which is part of the human condition” (Kerby
Accordingly, in relation to this argument that humans are far more motivated to conserve nature when they are actively engaged with nature, a discussion of the spirituality of surfing is apropos. Thus, surfing as active engagement with nature creates a respect for nature. “Loving nature, insofar as it applies to religious feeling or actions, would clearly be in the ‘spiritual’ rather than ‘religious’ realm. For saving nature, love is essential, and so is structured ethical practice— in short, we must use spirituality and religion, and of course science too, to save the world” (Anderson 2014:76).

Surfing induces a core unitary experience. David Hufford defines a core experience as an experience that is shared by humans and must follow a certain criterion. First, it must be shared cross-culturally, thus existing outside of the individual’s culture and prior beliefs. It must also have a “stable perceptual pattern” (Hufford 1995:28). This experience must also in some way refer to spirits or the supernatural. Therefore, I categorize surfing as a core experience because the experience that surfers have evokes supernatural feelings of spirituality and religion. Surfers have an enchanted worldview in which they feel connected to and in harmony with nature, and when they surf, they enter into a relationship with the ocean, the sea creatures, and the spiritual power that oversees it all. This is clear in the words they chose to use to explain how they feel while surfing.

During our interview as the sun was setting, Maverick gazed out to the waves and said, “I can zone out and forget and just think about the moment. There’s too much going on. Surfing lets me detach.” The individuals I interviewed often said that surfing makes them feel like they are part of something bigger than themselves.

The relationship surfers have with sea life is reminiscent of Taylor’s assertion: “For many surfers, interspecies encounters are more important to surfing spirituality than
experiences with fast and dangerous waves, even constituting [a] kind of Naturalistic Animism” (Taylor 2010:122). Freebird answered that, to her, surfing is spiritual and religious, and she went on to elaborate, “Surfing is magical too. Dolphins will come and play with you. It’s mind blowing!” Maverick stated, “I don’t do organized religion, but [surfing] is my religion. There’s nothing like it. It’s just you, a board, and nature with waves and scenery.”

The correlation has been made in the past that surfing is considered spiritual because it’s a high-risk sport (Agrell 2004). This connection between high-risk behaviors and spirituality was made by Malinowski and his ethnography on deep-sea fishing in the Trobriand Islands (Malinowski 2002). Gmelch even famously wrote about the superstitions and rituals among baseball players in high-risk positions, such as hitting and pitching (Gmelch 1971). It may be that the biological and neurological nature of high-risk sports creates a euphoric state of altered consciousness promoting a sort of Zen-like spirituality, which I believe is comparable to a type of nature worship. Taylor argues, “There is a mysterious magic in surfing that can only be apprehended directly through the experience” (Taylor 2010:104). Miami thoughtfully said, “[While surfing] you don’t worry about daily troubles. Maybe it’s like sitting in the forest for a while if you don’t surf.” Cindy explained, “When I’m out by myself surfing, it’s really meditative. The surf is constantly teaching you lessons and putting you in your place.” One surfer I interviewed, who was more of a shark fisherman than a surfer, agreed that “Yes, definitely, surfing is spiritual. [It’s] becoming one with nature, like in the woods, or fly-fishing for me.” It would seem that only by entering the ocean, paddling beyond the break, and riding the waves can you understand the spiritual nature of surfing. This
experience then evokes a special sense of respect for the ocean, the waves, and sea life in the people who practice it.

**Are we Taught to Fear Sharks?**

Frake posited, “For ethnography to be successful it must be able to get inside the mind of the observed informant” (Frake 1962:55). I strove to practice this during my fieldwork at the aquarium. The main room has a puppet stage with various stuffed marine animals and puppets. While I was cleaning a tank near the puppet stage, one little girl ran over, grabbed the great white shark puppet, and exclaimed, “I'm an evil shark!” This observation and many more like it, along with the biological data on shark population numbers I have already provided, supports Milton’s argument that humans do not naturally live in harmony with their environment. She argues that to believe otherwise is to believe a falsehood. She acknowledges that such a point of view paints a rather pessimistic picture of our future and our ability to act sustainably (Milton 1996:224). This, of course, is in contrast to Wilson’s self-proclaimed optimistic biophilia hypothesis, in which he argues humans have a genetic predisposition to love nature and “to the degree that we come to understand other organisms, we will place greater value on them” (Wilson 1984:2). However, I believe the answer is somewhere between optimism and pessimism, and with the appropriate educational strategies, we may be able to provide a much brighter future for shark populations—and in consequence of that--for humanity.

The vast majority of visitors with whom I came into contact at the aquarium believed that all sharks are dangerous to humans. It has been argued that fearing predators, such as sharks, may have some usefulness in an evolutionary sense. Kellert suggests, “Fear of injury or even violent death in nature will continue to be an integral
part of the human repertoire of responses to the natural world, and realistic tension with threat and danger in nature is part of the challenge of survival” (Kellert 1993:58). Ulrich calls this innate fear of nature “biophobia” and argues that early humans needed to develop phobias for aspects of nature that were dangerous, such as “snakes, spiders, and heights” (Ulrich 1993:76). As for contemporary urbanites who no longer need to have these deep-rooted phobias, he posits, “Fear/avoidance responses might nonetheless persist because they are represented in the gene pool” (Ulrich 1993:76). Likewise Wilson maintains that fear of these predators is a genetic predisposition that requires “very little negative reinforcement” (Wilson 1993:33).

The vast majority of visitors with whom I came into contact at the aquarium believed that all sharks are dangerous to humans. One visitor was so interested in seeing the sharks up close that her chewing gum fell right out of her mouth and into the shark tank. Fearing for the sharks’ safety, in case one tried to swallow it, I reached my hand in the tank of four sharks and retrieved the gum. This shocked the visitors around the tank. Some gasped, some stared at me with their mouths wide open, and what seemed to be most clear was that each of them thought that the sharks were dangerous and that I had just done something truly brave or truly reckless. One visitor asked me if I was afraid a shark would bite me. This question warranted the speech I had become extremely used to giving by now: I told them that these species of sharks are relatively harmless because they are not aggressive and have very small needle-like teeth that do about as much damage as a house cat would if it bit you. I let them know that of the over 400 species of sharks that exist, most sharks are either small or harmless or both. Like nearly every patron I had contact with before them, this was the first time they had heard these facts
about sharks. This was the first time they were told that not all sharks are dangerous and something to be feared. This is important because throughout the course of my 100 volunteer hours, patrons were consistently shocked to hear that there exist harmless and nonaggressive sharks.

On a Wednesday afternoon, an aquarium visitor brought his two young daughters in. While he was showing one daughter a tank in which people can touch animals, his other daughter ran over to the shark tank and threw her entire face in the water to get a good look at the sharks underneath. It happened so quickly that I hardly had time to process what was happening before a nearby woman pulled the girl’s head out of the water. The woman was terrified the sharks were going to bite the little girl. The girl’s father quickly came over and lectured the little girl about how dangerous her actions were and that the sharks are dangerous to little girls and that she should never do that again. However, the sedentary sharks in my tank barely opened even one eye to see what all the excitement was about. Then, as soon as the father turned his back, the little girl threw her face back into the shark tank’s water. At the time I was not sure of the girl’s age but, since this visitor was a famous actor, I was able to find out his daughter was five years old. This little girl had no fear of these sharks whatsoever. Since this was an isolated incident, without further data I cannot use this to support any claims I might want to make that the intense fear of sharks is more culturally conditioned than innately wired within us. However, it is an interesting example of the way a child might initially perceive sharks prior to any cultural conditioning.
Chapter 6: Discussion and Conclusion

Fisheries have been wiped out around the world, but no one seems to learn. Overfishing is worse than ever. [Anderson 2014:16]

A Case Study: The Day All the Sharks Died

In the book *Shark Trouble*, Peter Benchley tells the story of a small seaside village with a thriving lobster fishing industry, that is, until the day a Chinese shark-finning ship spent two days off their coastline. The fishermen thought, “The sea and all its living things seemed infinite, indestructible, eternal” (Benchley 2002:116). But the ocean is not indestructible. There is a delicate balance at work. This seaside village found this out the way “thousands of thousands of towns and villages all over the world” had before, “When the people in the village awoke on the morning of the third day, the ship was gone. Everything seemed okay; nothing looked different. There was no way anyone could know that, over the past two days, their village had been murdered” (Benchley 2002:116-117). This may seem like an exaggeration, but it is not. Cultures change and evolve; they are rarely, if ever, static.

Anthropology has a long tradition of describing cultures as they are, almost as if suspended in time. Ethnography can provide us a snapshot of that culture at that moment in time. Benchley provides us with a snapshot of this thriving seaside village before the shark-finning ship shows up, but then he paints a very different picture of their livelihood afterwards. He creates a timeline of extreme and swift culture change. The shark-finning vessel lived up to its name. They captured all of the sharks along the coastline, thousands upon thousands of them. They cut their fins off and dumped their still alive but mutilated bodies back into the water to die slowly and rot. When the fishermen discovered what the ship had been up to and discovered all the mutilated bodies of thousands of sharks,
they were angry but assumed more sharks would come and repopulate the area. They assumed that nature would stay balanced. They were wrong. There were no more sharks up or down their coastline. There was no immediate change; it took a couple of weeks. The fishermen who made their living catching lobsters began to catch fewer lobsters and more octopi, an unfortunate situation they had never before faced. Within just two months the number of sea lions grew exponentially. Not only did the sea lions aggressively take over all the beaches, boats, and docks but their waste began to waft continuously through the air causing restaurants and local businesses to lose customers and shut down permanently.

The lobster catches were steadily declining, which caused fishermen to raise their prices to pay for their boats and house mortgages. The rise in prices caused vendors to buy from other fishermen, and this caused the fishermen to lose their boats and houses. Benchley asserts that, “Every one of these decisions and actions became a new stone dropped into the pond: ripples spread, affecting businesses and men and women and their families for miles and miles around. And always the question lingered: why?” (Benchley 2002:120). A local high school student finally discovered that the answer could be found in the food chain. As we should know, and as almost every person I interviewed seemed to understand, as a keystone species sharks are at the top of the food chain and they provide balance to the ecosystem. Sharks eat the octopi and sea lions, both populations of which would, can, and did explode without the top predators. The octopi eat lobsters. When their population exploded, they ate all the lobsters, leaving none for the fishermen. The high school student found further that because sharks reach
maturation late in life and so few young survive, “In all likelihood, the village would 
ever recover...the marine food chain had been altered forever” (Benchley 2002:122).

In 2000, six years before Peter Benchley’s death, he reflected on his part in the 
vilification of sharks in a National Geographic article. “I became convinced, too, that 
considering the knowledge accumulated about great whites in the past 25 years, I 
couldn’t possibly write Jaws today...not in good conscience anyway...back then, it was 
OK to demonize an animal, especially a shark, because man had done so since the 
beginning of time, and, besides, sharks appeared to be infinite in number.”

Today, thanks to Jaws and its influence on every generation since 1975, shark 
attacks seem to be in the forefront of peoples’ minds when they enter the ocean. Yet we 
still do enter the ocean, and for those close to coastlines, we do so on a fairly regular 
basis. One thing scientists do know today is that sharks are not infinite in number, and 
this is a fact of which the general public needs to be made aware. My research, 
especially at the aquarium, has shown that people still believe, as Benchley did 40 years 
ago, that there are more sharks in the ocean than can ever be fished. My participant 
observation has also shown me that once people become aware of this fallaæy, they are 
more inclined to support shark conservation. As previously mentioned, shark 
conservation can be achieved either through direct action, such as signing online petitions 
for shark reserves and bans on shark fishing, or by discontinuing to use plastic bags by 
bringing reusable shopping bags when shopping. Or people can implement shark 
conservation indirectly by sharing their newfound knowledge, donating money to 
organizations that actively engage in shark conservation, or by “adopting” aquarium 
sharks, which provides for the care and feeding of aquarium sharks.
Shark Attack Survivors for Shark Conservation

Milton believes that humans are more likely to desire to conserve nature and natural resources only if they have had positive childhood experiences with nature and in nature. Especially with respect to sharks, I do not agree with this viewpoint. Many shark attack survivors feel quite the opposite. In the article *Great White Deep Trouble* in the April 2000 issue of *National Geographic*, Peter Benchley recounts the story that the 1963 shark attack survivor, Rodney Fox, once told him:

“I looked down,” Rodney said when he told me the story years ago, “and saw that great big jaw rising at me through a cloud of my own blood, and I knew I was in trouble.” Trouble indeed. Only a series of amazingly lucky breaks—including the fact that the strands of his neoprene wet suit held his guts in--saved his life...[Rodney] devoted his life to the study and protection of great white sharks. (As David Doubilet puts it, “The shark bit Rodney and then inhabited him.”) He has never held a grudge against the shark that chewed him up (“He was only doing what sharks do”).

This is a story that holds true for many shark attack survivors. It is so common, in fact, that there are a number of shark attack survivors dedicated to shark conservation that have formed a group known as “Shark Attack Survivors for Shark Conservation.” The group’s cause is articulated on the home page of their website:

Despite terrifying attacks and grave injuries, the survivors recognize that these predators are in peril, a situation that puts the ocean and all its marine life at risk. Shark Attack Survivors for Shark Conservation. We work globally to establish pragmatic, science-based policies that protect our oceans, preserve our wildlands and promote the clean energy economy. [Pew Environment Group]

On their website, they also have an exemplar quote that reads, “If a group like us can see the value in saving sharks, shouldn’t everyone?” This quote is attributed to Debbie Salamone, an attack survivor and full-time shark conservation advocate. Debbie was a dancer who had her Achilles tendon severed in 2004. Mike Coots was swimming in Hawaii in 1997 when a tiger shark bit off one of his legs. He continues to surf the same
waters with a prosthetic leg and is now an active shark conservation activist with the organization. He worked to help pass Hawaii’s 2010 landmark ban on possession and sale of shark fins. The stories continue on the website. The shark attack survivors’ conservation group not only is concerned with shark conservation causes, these people are active advocates, and they recently traveled as a group to the United Nations to “urge countries to develop shark sanctuaries, conservation plans, and similar measures” (PEW website). They also traveled to Washington DC to try to persuade the US Congress to close loopholes in the nation’s shark-finning ban, which President Obama signed into law in 2011.

Conclusion

Somehow we must reclaim that essential basis for biodiversity conservation, the “love” of nature shared by those who live within its intimate embrace. [Hunn 2014:149]

Shark conservation is a global issue that requires immediate attention, but it is often overlooked because of humans’ persistent, irrational fear of sharks. Sharks are an integral part of our delicate ecosystem. Since sharks are a keystone species, they provide many important ecosystem services. Therefore, the loss of sharks will have an effect on our lives that we do not and cannot fully comprehend until that day is upon us. There are still questions that need to be answered about sharks through scientific observation and study. If sharks continue to be killed at the same rate as they currently are, they will not be around to study in the future.

What I expected to find, and what I did indeed find, is that most people relate the term “shark” to these perpetuated man-eating stereotypes. With respect to the research I conducted, I believe that it has shown that the film *Jaws* has made humans worldwide
more afraid of sharks than they would have been had the film never been made. This is a position that simply has to be reversed. Clearly, some effort must be made to educate the public, and additional research must be undertaken, because there is much that still remains to be learned and discovered about sharks, their importance to worldwide ecological balance, and the best techniques to use to promote their conservation. I have some recommendations to make below.

Sharks have gripped humans’ attention, and humans do not seem to be letting go. The data I collected shows that the general public, which has had only nominal interaction with the ocean and the animals contained within, have negative feelings towards sharks. Their free-listed words are overwhelmingly negative and correlate strongly to positions taken in the movie Jaws. However, surfers and those who habitually enter the ocean seem to have developed a respect for sharks. Therefore, I feel these data show that actual interaction with sharks or with their ecosystem may be the key to shark conservation.

Programs like Shark Week argue that, by teaching individuals about sharks, that knowledge will motivate them to conservation. Yet, the statistic of 100 million sharks killed annually seems to contradict this hypothesis. This argument would fit nicely into older models of cognitive anthropology in which the mind and its thoughts (watching Shark Week) would motivate action (active participation in shark conservation). However, the contrast between the two meta-shark archetypes I have displayed here are more in line with Hunn’s assertion, “Knowledge of the world derives from an engagement with the world outside the mind (Hunn 2014:147).

Through researching overfishing and communities such as those in Micronesia,
Maine, and the Solomon Islands that have been able to regulate effectively such exploitative practices in the past, Anderson found, “The communities involved people and provided rich emotional contexts that both motivate good behavior and developed strong levels of conscience and responsibility” (Anderson 2014:16). Like Anderson I believe education must be conducted outside of a traditional lecture-based paradigm of teaching and consist of a more participatory lesson.

Therefore, I recommend that for shark conservation educational programs to be effective, they must incorporate some sort of live shark interaction component. I am not advocating that sharks be poked, prodded, pet, or handled by the public. Instead, I propose that humans come face-to-snout, as it were, with these phenomenal animals. This can be through aquarium glass, shark tanks, shark cages, or snorkeling and scuba diving. My own observations at the aquarium are in line with Hunn’s assertion that it is through this personal engagement with the shark that action is motivated, and I agree with Anderson’s contention that education must be participatory. I believe the combination of actual interaction with sharks and the acknowledgment of individual misconceptions towards sharks can lead directly to inspiring active conservation. Additionally, the data collected can be used to educate and give individuals invaluable information about detrimental environmental impacts on shark populations through their own individual choices. This can give consumers the ability and desire to enact environmental policy change through legislation, their own decisions and demands such as discontinuing to eat shark meat and swordfish, and the use of reusable shopping bags instead of plastic.

This research contributes to the emerging dialogue on sharks and shark
conservation. The question of human-shark interactions and what humans know and feel about sharks is a question that is important, not just to myself or anthropology, but to a new generation of biologists and oceanographers who are committed to solving this global crisis of shark extinctions and exploitation.
WORKS CITED

Acheson, James M. and James A. Wilson

Agrell, Siri
The Province. A.12.

Anderson, E.N.

Anderson, E. N.

Baker, Paul T.

Barney, Erin C., Joel J. Mintzes, and Chiung-Fen Yen.

Baum, Julia K., Ransom A. Myers, Daniel G. Kehler, Boris Worm, Shelton J. Harley, and Penny A. Doherty

Beckman, Daniel

Benchley, Peter

Benchley, Peter

Berger, John

Berkes, Fikret, Johan Colding, and Carl Folke
Bernard, Russell H.  
2011 Research Methods in Anthropology: Qualitative and Quantitative Approaches. Plymouth, UK: Alta Mira Press.

Borgatti, Stephen P.  

Borgatti, Stephen P.  

Carson, Henry S.  

Cloud, John  
2008 Shark Frenzy in Solana Beach. Time.

Cousteau, Jacques-Yves and Philippe Cousteau  

Drew, Joshua A.  

D’Andrade, Roy G  

Dobson, John  

Ducarme, Frédéric, Gloria M. Luque, and Franck Courchamp  
2013 What are “Charismatic Species” for Conservation Biologists. BioSciences Master Reviews, Bd.

Dulvy, Nicholas K., Julia K. Baum, Shelley Clarke, Leonard JV Compagno, Enric Cortés, Andrés Domingo, Sonja Fordham, Sarah Fowler, Malcolm P. Francis, Claudine Gibson, Jimmy Martinez, John A. Musick, Alen Soldo, John D. Stevens, and Sarah Valenti  
Dulvy, Nicholas K., Sarah L Fowler, John A Musick, Rachel D Cavanagh, Peter M Kyne, Lucy R Harrison, John K Carlson, Lindsay NK Davidson, Sonja V Fordham, Malcolm P Francis, Caroline M Pollock, Colin A Simpfendorfer, George H Burgess, Kent E Carpenter, Leonard JV Compagno, David A Ebert, Claudine Gibson, Michelle R Heupel, Suzanne R Livingstone, Jonnell C Sanciangco, John D Stevens, Sarah Valenti, and William T White

Eilperin, Juliet

Feinberg, Rebecca, Patrick Nason, and Hamsini Sridharan

Ferrante, Anthony C. (Director)
2013 Sharknado [DVD]. Louisville CO: Gobal Asylum.

Fillingham, Lydia Alix

Foucault, Michel

Frake, Charles O.

Furedi, Frank
2007 The Only Thing we have to Fear is the “Culture of Fear” Itself. American Journal of Sociology 32:231-234.

Gaćeša, Dijana
2008 ECO-SAVAGES ARE CONQUERING THE WORLD (The Creation of Ecological Sensibility through the Construction of the “Other”). Teme-Časopis za Društvene Nauke 03: 541-556.

Gadgil, Madhav, Fikret Berkes, and Carl Folke

Gmelch, George
Hardin, Garrett

Harvard Public Health Review

Hinman, Ken

Hochschild, Arlie Russell

Hufford, David J.

Hunn, Eugene

Hunn, Eugene
2014 To Know them is to Love Them. Ethnobiology Letters 5:146-150.

Jacques, Peter J.

Keegan, William, and Lisabeth Carlson

Kellert, Stephen R

Kerby, Leslie

Kimmerer, Robin Wall
Kirch, Patrick V. 
2012 A Shark Going Inland is My Chief: The Island Civilization of Ancient Hawai‘i. Berkeley: University of California Press.

Latchford, Lauren

Leatherman, Stephen P.

Lewis, Hilary

Libertino, L., D. Ferraros, M. M. López Osornio, G. Hough

Libralato, Simone, Villy Christensen, and Daniel Pauly

Little, Paul E.

MacCormick, Alex

Malamud, Randy

Malinowski, Bronislaw

Mechling, Jay

Milton, Kay
Milton, Kay  

Moran, Emilio F. 

Muter, Bret A., Meredith L. Gore, Katie S. Gledhill, Christopher Lamont, and Charlie Huveneers  

Nalluri, Deepthi, Zofia Baumann, Debra L. Abercrombie, Demian D. Chapman, Chad R. Hammerschmidt, and Nicholas S. Fisher  

Nason, Patrick  

Neff, Christopher  

Orlove, Benjamin S.  

Orlove, Benjamin S., and Stephen B. Brush  

Owen, David  

Pew Environment Group.  

Ray, Christopher (Director)  
Rivas, Dre
2009 The 50 Greatest Movie Monologues.

Romney, A. Kimball and Roy Goodwin D’Andrade

Scoones, Ian

Sinyard, Ally
2013 Top 10 Best Monologues.

Shone, Tom

Smith, J. Jerome, Louanna Furbee, Kelly Maynard, Sarah Quick, and Larry Ross.

Smith, J. Jerome, and Stephen P. Borgatti
1997 Salience Counts and So Does Accuracy: Correcting and Updating a Measure for Free-List-Item Salience. Journal of Linguistic Anthropology 7: 208-209. The authors corrected an error that was causing lists that did not contain the response under current consideration to be counted. However, they (or their editors) appear to have erred in their rendering of their revised formula, which they give as:

$S = \left( \sum \frac{(L - R_j + 1)}{L} \right) / N$. It should be: $S = \left( \frac{\sum ((L - R_j + 1)/L)}{N} \right)$.

Southgate, M. Therese

Spielberg, Steven, dir.

Spielberg, Steven, dir.

Steward, Julian H. and Frank M. Setzler


Zuckerman, Catherine. 2015 Shark Fin Demand in Decline. National Geographic Magazine, Mar: [14].
## Appendix A

### Shark Survey: All Respondents

#### Demographic Information (circle one)

<table>
<thead>
<tr>
<th>Category</th>
<th>Female</th>
<th>Transgender</th>
<th>Male</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>58%</td>
<td>35-44%</td>
<td>45-54%</td>
<td>55-64%</td>
</tr>
<tr>
<td>Age</td>
<td>18-24 15%</td>
<td>35-44% 33%</td>
<td>45-54% 3%</td>
<td>55-64% 5%</td>
</tr>
<tr>
<td>Education</td>
<td>H.S./GED 18%</td>
<td>Some College 28%</td>
<td>2-yr Degree 8%</td>
<td>4-yr Degree 35%</td>
</tr>
</tbody>
</table>

#### General Information (circle one)

Give me the first 3 words you think of when I say the word “Shark”

<table>
<thead>
<tr>
<th>Question</th>
<th>YES – 35%</th>
<th>NO – 65%</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you or someone you know had an experience with a shark?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you surf?</td>
<td>YES – 28%</td>
<td>NO – 72%</td>
<td></td>
</tr>
<tr>
<td>Have you seen the movie JAWS?</td>
<td>YES – 90%</td>
<td>NO – 10%</td>
<td></td>
</tr>
<tr>
<td>Do you watch Shark Week on the Discovery Channel?</td>
<td>YES - 55%</td>
<td>NO - 45%</td>
<td>Unsure</td>
</tr>
<tr>
<td>How often do you enter the ocean?</td>
<td>Never 13%</td>
<td>Once 5%</td>
<td>Daily 10%</td>
</tr>
</tbody>
</table>

#### Knowledge

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharks are mammals</td>
<td>33%</td>
<td>65%</td>
<td>3%</td>
</tr>
<tr>
<td>All shark species are dangerous to humans</td>
<td>8%</td>
<td>90%</td>
<td>3%</td>
</tr>
<tr>
<td>All shark species are capable of being man-eaters</td>
<td>10%</td>
<td>85%</td>
<td>5%</td>
</tr>
<tr>
<td>All shark species grow to at least 3 feet long</td>
<td>20%</td>
<td>75%</td>
<td>5%</td>
</tr>
<tr>
<td>¼ of all shark species are currently endangered</td>
<td>63%</td>
<td>10%</td>
<td>27%</td>
</tr>
<tr>
<td>Sharks play an important role in the balance of the ocean ecosystems</td>
<td>93%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Humans eat shark meat and shark fin soup because it’s a healthy super food</td>
<td>28%</td>
<td>58%</td>
<td>15%</td>
</tr>
<tr>
<td>Sharks kill this estimated number of humans yearly (circle one)</td>
<td>1 20%</td>
<td>10 55%</td>
<td>100 25%</td>
</tr>
<tr>
<td>Humans kill this estimated number of sharks daily (circle one)</td>
<td>27 15%</td>
<td>2,700 58%</td>
<td>27,000 25%</td>
</tr>
</tbody>
</table>

#### Feelings

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharks frighten me</td>
<td>70%</td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>Only large shark species frighten me</td>
<td>52%</td>
<td>38%</td>
<td>10%</td>
</tr>
<tr>
<td>I am not frightened by sharks</td>
<td>13%</td>
<td>88%</td>
<td>0%</td>
</tr>
<tr>
<td>I care about sharks</td>
<td>55%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>I think sharks are important</td>
<td>88%</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>I think shark conservation is important</td>
<td>88%</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Consumer Information/Habits (circle answer/s)</strong></td>
<td>YES – 88%</td>
<td>NO – 12%</td>
<td>Neutral – 22%</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Were you raised or do you now live within 50 miles of the ocean</td>
<td>YES – 55%</td>
<td>NO – 23%</td>
<td>Neutral – 22%</td>
</tr>
<tr>
<td>I support the Los Angeles City ban on plastic bags</td>
<td>NEVER 15%</td>
<td>DAILY 35%</td>
<td>WEEKLY 35%</td>
</tr>
<tr>
<td>How often do you eat fish?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever eaten:</td>
<td>SHARK FIN SOUP 13%</td>
<td>SHARK MEAT 18%</td>
<td>SWORDFISH 55%</td>
</tr>
</tbody>
</table>
### Appendix B

**Shark Survey: Nonsurfers**

#### Demographic Information (circle one)

<table>
<thead>
<tr>
<th></th>
<th>Female 69%</th>
<th>Transgender</th>
<th>Male 31%</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18-24 17%</td>
<td>25-34 34%</td>
<td>35-44 24%</td>
<td>45-54 3%</td>
</tr>
<tr>
<td></td>
<td>55-64 7%</td>
<td>65+ 14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>H.S./GED 24%</td>
<td>Some College 31%</td>
<td>2-yr Degree 7%</td>
<td>4-yr Degree 24%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M.A. 10%</td>
<td>PhD 3%</td>
</tr>
</tbody>
</table>

#### General Information (circle one)

Give me the first 3 words you think of when I say the word “Shark”

Have you or someone you know had an experience with a shark?

<table>
<thead>
<tr>
<th></th>
<th>Yes – 24%</th>
<th>No – 76%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you surf?</td>
<td>Yes – 0%</td>
<td>No – 0%</td>
</tr>
<tr>
<td>Have you seen the movie JAWS?</td>
<td>Yes – 90%</td>
<td>No – 10%</td>
</tr>
<tr>
<td>Do you watch Shark Week on the Discovery Channel?</td>
<td>Yes - 48%</td>
<td>No - 52%</td>
</tr>
</tbody>
</table>

How often do you enter the ocean?

<table>
<thead>
<tr>
<th></th>
<th>Never 17%</th>
<th>Once 7%</th>
<th>Daily 0%</th>
<th>Weekly 0%</th>
<th>Monthly 10%</th>
<th>Yearly 66%</th>
</tr>
</thead>
</table>

#### Knowledge

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharks are mammals</td>
<td>24%</td>
<td>72%</td>
<td>3%</td>
</tr>
<tr>
<td>All shark species are dangerous to humans</td>
<td>10%</td>
<td>86%</td>
<td>3%</td>
</tr>
<tr>
<td>All shark species are capable of being man-eaters</td>
<td>14%</td>
<td>79%</td>
<td>7%</td>
</tr>
<tr>
<td>All shark species grow to at least 3 feet long</td>
<td>24%</td>
<td>72%</td>
<td>3%</td>
</tr>
<tr>
<td>¼ of all shark species are currently endangered</td>
<td>66%</td>
<td>7%</td>
<td>28%</td>
</tr>
<tr>
<td>Sharks play an important role in the balance of the ocean ecosystems</td>
<td>90%</td>
<td>3%</td>
<td>7%</td>
</tr>
<tr>
<td>Humans eat shark meat and shark fin soup because it’s a healthy super food</td>
<td>24%</td>
<td>59%</td>
<td>17%</td>
</tr>
<tr>
<td>Sharks kill this estimated number of humans yearly (circle one)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yearly Number</th>
<th>1</th>
<th>10</th>
<th>100</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>21%</td>
<td>52%</td>
<td>28%</td>
<td>0%</td>
</tr>
</tbody>
</table>

| Humans kill this estimated number of sharks daily (circle one)             |      |       |         |

<table>
<thead>
<tr>
<th>Daily Number</th>
<th>27</th>
<th>2,700</th>
<th>27,000</th>
<th>270,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>17%</td>
<td>52%</td>
<td>28%</td>
<td>3%</td>
</tr>
</tbody>
</table>

#### Feelings

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharks frighten me</td>
<td>69%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Only large shark species frighten me</td>
<td>52%</td>
<td>45%</td>
<td>3%</td>
</tr>
<tr>
<td>I am not frightened by sharks</td>
<td>10%</td>
<td>90%</td>
<td>0%</td>
</tr>
<tr>
<td>I care about sharks</td>
<td>45%</td>
<td>24%</td>
<td>31%</td>
</tr>
<tr>
<td>I think sharks are important</td>
<td>83%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>I think shark conservation is important</td>
<td>83%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Consumer Information/Habits (circle answer/s)</strong></td>
<td>YES – 83%</td>
<td>NO – 17%</td>
<td>Neutral – 31%</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Were you <strong>raised</strong> or do you <strong>now live</strong> within 50 miles of the ocean</td>
<td>YES – 83%</td>
<td>NO – 17%</td>
<td>Neutral – 31%</td>
</tr>
<tr>
<td>I support the Los Angeles City ban on plastic bags</td>
<td>YES – 45%</td>
<td>NO – 24%</td>
<td>Neutral – 31%</td>
</tr>
<tr>
<td>How often do you eat fish?</td>
<td>Never 21%</td>
<td>Daily 0%</td>
<td>Weekly 28%</td>
</tr>
<tr>
<td>Have you ever eaten:</td>
<td>Shark Fin Soup 10%</td>
<td>Shark Meat 10%</td>
<td>Swordfish 48%</td>
</tr>
</tbody>
</table>
## Appendix C

*Shark Survey: Surfers*

### Demographic Information (circle one)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female 27%</th>
<th>Transgender 64%</th>
<th>Male 73%</th>
<th>Other 0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-24 9%</td>
<td>25-34 27%</td>
<td>35-44 64%</td>
<td>45-54 0%</td>
</tr>
<tr>
<td></td>
<td>55-64 0%</td>
<td>65+ 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>H.S./GED 0%</td>
<td>Some College 18%</td>
<td>2-yr Degree 9%</td>
<td>4-yr Degree 64%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.A. 9%</td>
<td></td>
<td>PhD 0%</td>
</tr>
</tbody>
</table>

### General Information (circle one)

Give me the first 3 words you think of when I say the word “Shark.”

| Have you or someone you know had an experience with a shark? | YES – 64% | NO – 36% |
| Do you surf? | YES – 100% | NO – 0% |
| Have you seen the movie JAWS? | YES – 91% | NO – 9% |
| Do you watch Shark Week on the Discovery Channel? | YES - 73% | NO - 27% | Unsure |

### How often do you enter the ocean?

<table>
<thead>
<tr>
<th>Never 0%</th>
<th>Once 0%</th>
<th>Daily 36%</th>
<th>Weekly 27%</th>
<th>Monthly 27%</th>
<th>Yearly 9%</th>
</tr>
</thead>
</table>

### Knowledge

<table>
<thead>
<tr>
<th>Sharks are mammals</th>
<th>True 55%</th>
<th>False 45%</th>
<th>Neutral 0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All shark species are dangerous to humans</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>All shark species are capable of being man-eaters</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>All shark species grow to at least 3 feet long</td>
<td>9%</td>
<td>82%</td>
<td>9%</td>
</tr>
<tr>
<td>¼ of all shark species are currently endangered</td>
<td>55%</td>
<td>18%</td>
<td>27%</td>
</tr>
<tr>
<td>Sharks play an important role in the balance of the ocean ecosystems</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Humans eat shark meat and shark fin soup because it’s a healthy super food</td>
<td>36%</td>
<td>55%</td>
<td>9%</td>
</tr>
<tr>
<td>Sharks kill this estimated number of humans yearly (circle one)</td>
<td>1 18%</td>
<td>10 64%</td>
<td>100 18%</td>
</tr>
<tr>
<td>Humans kill this estimated number of sharks daily (circle one)</td>
<td>27 9%</td>
<td>2,700 73%</td>
<td>27,000 18%</td>
</tr>
</tbody>
</table>

### Feelings

<table>
<thead>
<tr>
<th>Sharks frighten me</th>
<th>True 73%</th>
<th>False 18%</th>
<th>Neutral 9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only large shark species frighten me</td>
<td>55%</td>
<td>18%</td>
<td>27%</td>
</tr>
<tr>
<td>I am not frightened by sharks</td>
<td>18%</td>
<td>82%</td>
<td>0%</td>
</tr>
<tr>
<td>I care about sharks</td>
<td>82%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>I think sharks are important</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I think shark conservation is important</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Consumer Information/Habits (circle answer/s)</td>
<td>YES – 100%</td>
<td>NO – 0%</td>
<td>Neutral – 0%</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>---------</td>
<td>--------------</td>
</tr>
<tr>
<td>Were you raised or do you now live within 50 miles of the ocean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I support the Los Angeles City ban on plastic bags</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you eat fish?</td>
<td>Never 0%</td>
<td>Daily 9%</td>
<td>Weekly 55%</td>
</tr>
<tr>
<td>Have you ever eaten:</td>
<td>Shark Fin Soup 18%</td>
<td>Shark Meat 36%</td>
<td>Swordfish 73%</td>
</tr>
</tbody>
</table>