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## Capstone Papers

### Title

Follow Your Fish: Traceability Case Studies of American Caught Seafood

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**FOLLOW YOUR FISH**  
***Traceability Case Studies of American Caught Seafood***

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## **Abstract**

The United States is home to some of the most sustainably-managed fisheries in the world, but a surprisingly small number of Americans eat seafood that originated in U.S. waters. An average of 90% of the seafood consumed by Americans is imported. At the same time, the U.S. has become the sixth largest supplier of seafood in the world. The goal of this project is to reveal the supply chains of domestic species in order to better understand why more of our domestic seafood isn't kept at home. Using an ocean-to-table model, we traced three species of iconic American-caught seafood that have particularly interesting supply chains: American lobster (*Homarus americanus*), California market squid (*Doryteuthis opalescens*), and California spiny lobster (*Panulirus interruptus*). By compiling available landing and export data for these fisheries, and by interviewing individuals involved in each step of the supply chain, we increased the transparency of these three seafood supply chains and help reconnect consumers with their seafood. We found that most of the locally-caught CA market squid is exported abroad, but a small portion comes back to the U.S. for local consumption after being processed in China. Both lobster species are exported overseas. Exports to China continue to increase because they are highly coveted by an increasing middle class.

## **Keywords**

1. Local Seafood
2. Traceability
3. Lobster
4. Squid
5. Supply chain
6. Fisheries

## INTRODUCTION

The United States is home to some of the most sustainably-managed fisheries in the world, but a surprisingly small number of Americans eat seafood that originated in U.S. waters. In 2014, U.S. commercial fishermen landed 9.5 billion pounds of seafood valued at \$5.4 billion. Yet this same year, the U.S. exported \$5.3 billion worth of seafood (USDA 2015). The U.S. has become the sixth largest supplier of seafood in the world (USDA 2015). Why, then, is an average of 90% of the seafood consumed in the U.S. imported from overseas (NOAA 2016)? An increasing amount of seafood that is originally landed in the U.S. travels far and wide before reaching the dinner plate (Greenberg 2015). Consumers need more information about where our local seafood is going and why it isn't staying in the United States.

Using an ocean to table model, we traced U.S.-caught seafood in an effort to increase the transparency of our seafood supply chains and provide consumers with the facts they need to make informed choices when purchasing seafood.

As consumers, we have grown more and more disconnected with our food to the point where we tend to associate food with grocery stores, not farmers or fishermen (USFRA 2011). We are also creatures of habit: we go to the market and buy the almost the same items every time because we know what we like and it's easier to buy things we already feel comfortable with. That is particularly true of seafood. That's why seafood items like shrimp, salmon, and tuna haven't left the top 10 list of most consumed species in more than a decade (NFI 2015).

Since at least 2005, roughly 55% of seafood consumed in the U.S. has come from 3 species: shrimp, salmon and canned tuna (NFI 2015). Further, as much as 90% of the seafood consumed in the U.S. is imported from overseas (NOAA 2016), while an increasing amount of U.S.-landed seafood is exported. In FY 2014, the U.S. exported \$5.3 billion worth of seafood, making it the sixth largest supplier of seafood in the world (USDA 2015).

While nearly 80% of Americans who consume seafood regularly believe that it is "important" or "very important" to purchase seafood that was caught sustainably, only 14% are "very confident" that the sustainable label they see is actually accurate (Barclay 2013). Part of this hesitation could be due to the fact that sustainable seafood guides and ecolabels can be difficult to decipher. Even if you have all the guides in front of you, it can be difficult to make a decision because key pieces of information are often missing. Additionally, there isn't yet a consistent tracing or labeling system for domestic or imported seafood that is easily accessible by consumers. Food safety laws and strict import and export regulations mean there is some way to track all of the food entering the U.S., but that information isn't

always public and is often maintained by many different organizations. Additionally, seafood that is originally landed in the U.S. and shipped abroad for processing, only to be shipped back to the States for consumption can still have a “local” label.

For example, salmon landed in Alaska may be labeled as “local” or “Product of the USA” at a grocery store or fish market, leading the consumer to believe she is making an informed choice. However, the consumer is missing a few key pieces of information, like how that salmon indeed was caught and landed in Alaska, but then it was shipped across the Pacific, deboned in facilities in China, and shipped back here as a ready-to-eat fillet (Guilford 2014).

To complicate this issue even more, sustainable seafood is not clearly defined concept. The very definition is that of a moving target based on ecological, regulatory, social, and economic dynamics (e.g., Costanza 1997). Most of us also have different definitions of sustainability based on our values, beliefs, and the information available to us (Talley and Batnitzky 2013). This can make it incredibly difficult to choose sustainable options when ordering at restaurants or shopping at markets. Even armed with sustainable seafood pocket guides and apps, consumers are still missing key pieces of information. Consumers need more information about every aspect of their seafood, not just the biology and life history of the species, the fishing gear used to catch it, and the regulations involved in the process, but also an awareness of what happens after it is caught. Once consumers have all the facts, they will be able to make their own informed decisions based on their own views of sustainability.

The goal of *Follow Your Fish* is to begin to increase the transparency of our seafood supply chains and to help reconnect people with their seafood. We used an ocean to plate model to trace the supply chains of three iconic U.S.-caught species: California market squid (*Doryteuthis opalescens*), California spiny lobster (*Panulirus interruptus*), and American lobster (*Homarus americanus*). We established a model that can be applied to other commercially caught species in the future.

## **OBJECTIVES AND METHODS**

Our first objective was to define and describe the pathways of these three focal species. This involved collecting information on the amounts, value, and form (e.g., live, whole, filleted, frozen, etc) of the products landed and sold by fishermen and other members of the supply chain. We also collected previously published national import and export statistics for each species. To fill in any gaps and to get a more complete picture of what happens behind the scenes, we conducted interviews with individuals involved in each step of the

seafood supply chain. The stories we collected served to help connect consumers with the people behind their food.

Our second objective was to raise consumer awareness about sustainable seafood, local food, and the complexities of seafood supply chains. In order to help bridge the gap between consumers and their seafood, we designed a user-friendly website and social media accounts to reach a wide variety of audiences. We wrote casual blog posts for each step of the supply chain in order to break it down and designed maps and infographics to display the data in a visually appealing way.

## **CASE STUDIES**

### **California Market Squid, *Doryteuthis (Loligo) opalescens***

The Fishery:

California market squid (*Doryteuthis opalescens*) fishery dates back to at least the 1860s (Pomeroy 2006). It began with Chinese immigrants who caught small amounts using hand nets and torches, dried it in the sun, and sent it to China for consumption. It has played a big role in California's history, growing to the point where Monterey Bay was once called the squid capital of the world (Hale 2016). There are currently two major market squid fishery areas in California: northern and southern. The northern fishery is located primarily in Monterey Bay. The southern fishery has a larger range, spanning the coast from Point Conception to southern La Jolla, including the Channel Islands. This fishery has been one of the most lucrative fisheries in the state with much product still being shipped overseas.

The California Department of Fish and Wildlife (CDFW) and the Pacific Fishery Management Council (PFMC) have jurisdiction over the market squid fishery. CDFW is in charge of implementing the Market Squid Fishery Management Plan (MSFMP), which is used to regulate and manage *D. opalescens* and has been in effect since 2005 (MSFMP 2005). This plan provides a framework for the long-term conservation and sustainability of the resource, while allowing for flexibility regarding environmental and socioeconomic changes (MSFMP 2005). This is particularly important since market squid are very sensitive to changing environmental conditions and since it has been a lucrative fishery in the recent past. The current MSFMP has a seasonal catch limit of 118,000 short tons. It requires monitoring programs, weekend closures, and gear regulations (MSFMP 2005).

The market squid fishery is a restricted access fishery, which means permits are required. In 2013, there were 75 vessel permits (though only 67 vessels made any commercial landings), 34 light boat permits, and 44 brail (scoop net) permits. The majority of landings (90%) came from just 43 vessels (MSFMP 2005).

As terminal spawners, market squid reproduce once at the end of their 10-month lifecycle, from April to October in the northern range, and from October to April or May in the southern range. They are fished during this spawning season, making fishing a year-round opportunity (until the limit is reached). During spawning, the squid congregate in large schools, typically over sandy bottoms, which make them an easy target for the purse seines, which is the most common gear type used in the commercial market squid fishery (MSFMP 2005). The purse seiner works at night with a smaller vessel called a light boat, which uses lights to attract squid to the vessel so that the purse seiner can encircle the squid in the net (MSFMP 2005).

#### Supply Chain:

Squid fishermen will catch squid hundreds of tons at a time. In 2014, U.S. market squid fishermen landed about 229 million pounds of market squid. Since squid don't have much of a shelf life (two or three days at the most), the easiest and most economical solution is to offload the squid to a processor who can freeze the squid in bulk. Occasionally, they will buy back small portions of the frozen squid to sell domestically, but most of it is out of their hands right away (Haworth 2016).

There are only a handful of processing plants in California that deal with market squid. The places that do are typically ones that process all of the different wetfish (anchovies, squid, sardines, and mackerel) (Pomeroy 2002). In the U.S., the process is simple. Market squid are frozen directly with just ice -- no other products are added. They are frozen most commonly in 10 kilo blocks and packaged for further shipping (Gonzales 2016).

Frozen market squid is shipped most often to processing facilities in China and Europe. From 2010 to 2015, the United States exported an average of about 26 million pounds (worth more than \$77 million) of *D. opalescens* every year (CFS 2016). To simplify the case study, we focused only on market squid that goes to China, which is an average of about 18 million pounds (67% of all exports) (CFS 2016). The journey across the Pacific can take up two weeks (Alibaba 2016), but once the squid is frozen it can stay that way for a long time without losing quality.

There are more than 7,000 processing plants in China, most of which work on primary processing (IBISWorld 2015). This is the level that includes cleaning and tubing squid.



Market squid processing is relatively simple, since it doesn't involve de-boning, like salmon or other finfish. The squid is unfrozen from the blocks in which it was packed. Then, the head and guts are separated from the body and everything gets cleaned. It's then cut depending on the specifications of the next buyer. In most cases, the tube is cut into perfectly formed steaks or rings, ready for breading and frying. The tentacles are packaged separately and everything is refrozen before it continues its journey.

China exports much of the seafood it processed to Japan, the United States, and Hong Kong (AAFC 2014). A small portion of California market squid gets shipped directly back to California where it is sold as a product of the US and often labeled as "local seafood," even though it has traveled more than 12,000 miles. The portion that gets shipped back to the United States is small, though. Between 2010 and 2015, the United States imported an average of about 370,000 pounds (worth nearly \$450,000) every year, only about 1.4% of what was exported that same year (CFS 2016).

Many of the people we spoke with expressed their annoyance with the fact that they can't get locally-caught California market squid that's never left the United States. In order to address that issue and keep more market squid in the U.S., a few things would have to change.

Most importantly, the cost of squid would increase. Almost all of our squid is processed overseas because the U.S. no longer has the capacity to process it. But even if we were capable of processing thousands of pounds of market squid at a time, we would still probably export it to China because the cost of labor is much cheaper. In order to keep more California market squid in California, we would have to establish the industry to do so. That would involve running processing facilities and paying American laborers to process squid, which would dramatically increase the price, at least to start.

### **California Spiny lobster, *Panulirus interruptus***

The Fishery:

California Spiny lobster is endemic to the West Coast of North America. The population extends from Monterey Bay, California to Manzanillo, Mexico (Neilson 2011), with the majority of the population found between Point Conception, California (in Santa Barbara County) and Magdalena Bay in Baja California, Mexico. Within this region, both California and Mexico have a commercial spiny lobster fishery, which are fished and managed separately (Neilson 2011).

The California commercial fishery has existed since at least 1872 when spiny lobster was first shipped from Santa Barbara to San Francisco (Neilson 2011). From this point on, demand for California spiny lobster skyrocketed as commercial lobster fisheries spread throughout the entire southern California coastline. As a result, lobster populations began to decline, and by as early as 1894, fishing seasons had been established by local ordinances for most of the southern California coast. By 1901 the State implemented a closed season very similar to what exists today (Neilson 2011). Despite the season closures, demand for California spiny lobster was increasing beyond what the fishery could provide. California fishermen began to look for new fishing grounds and by 1916, spiny lobster fisheries in Baja California, Mexico had been fully established. These Baja fisheries were extremely productive. California fishermen working in Baja were catching 2-3 times more than their counterparts fishing in California. This continued until 1952 when the Mexican government closed the Baja fishery to foreign fishermen. (Neilson 2011) The California spiny lobster commercial fishery currently extends from Point Conception, south to the US/Mexico border. The fishery is managed by the state of California through the California Department of Fish and Wildlife.

The California spiny lobster fishery is fairly small in terms of landings, yet valuable. In 2014 California commercial fishermen landed over 951 thousand pounds of spiny lobster. However, despite landing less than a million pounds, it was valued at over 18 million dollars, making it the 47th most valuable fishery in the United States in 2014 (out of 485 fisheries) and one of the most valuable in the state of California (NOAA CFS). Demand for California spiny lobster is extremely high and prices reflect that. In the 2014 season, the average boat price was around \$19 per pound (NOAA CFS).

#### Supply Chain:

The California spiny lobster supply chain starts with the lobster fishermen. In order to harvest lobsters in California the commercial fishermen must have a California Commercial Fishing License as well as a Lobster Operator Permit (CSLFMP 2016). They must also follow regulations set by the state. Spiny lobsters are caught in wire-mesh baited traps and serviced with boats during a season that opens the first Wednesday of October and closes the first Wednesday after the 15th of March the following year (CSLFMP 2016). The majority of lobsters are harvested in the first half of this season.

Nearly all of the California commercial lobster fishermen then sell their lobsters to lobster buyers. The buyers are often middlemen between the fishermen and seafood exporters. Most buyer's meet the fishermen at the docks and pay the fishermen by the pound, a price set by the market. The price goes up as the season progresses and landings decrease. In the 2015-2016 season prices ranged from \$16 per pound to \$25 per pound (Case 2016). While

at the docks, some buyers will also sell the fishermen bait for their traps. Buyers can be independent businesses or can work directly for large seafood exporting companies. Regardless, the majority of the buyers sell the live lobsters to these seafood export companies, many of which are located in the Los Angeles area. A small fraction of the buyers will also sell a very small portion of their lobsters locally.

Some buyers can also be regional seafood wholesalers. One example is Catalina Offshore Products in San Diego, California, which is both a wholesaler and retailer. They sell about five percent of the spiny lobster they buy to US restaurants or direct to customers through their retail market. These restaurants tend to be high end, white tablecloth type places. The rest, about 95 percent, is also sold to the large seafood export companies in the Los Angeles area (Rudy and Gomes 2016).

The seafood export companies are a type of wholesaler that specialize in shipping seafood abroad. We were not able to clearly define what happens at the seafood exporters because the exporters we attempted to talk to were not willing to participate. In addition to this, California Department of Fish and Wildlife does not collect export data on the California spiny lobster and the NOAA Commercial Fishery Statistics data does not separate exports of *Panulirus interruptus* from other *Panulirus* species (Buck 2016). This is an important gap within the supply chain that is worth noting. In order for this fishery to be truly traceable, information on where the lobsters go after they are sold to the exporters should be available.

Due to this gap, we have to speculate about what happens next based on conversations with other members of the California spiny lobster industry. Based on these conversations with fishermen, wholesalers, buyers, managers, and others involved in the industry, we believe that 95-99 percent of all California spiny lobsters caught in the U.S. are sent to the Chinese market. The majority are shipped live, though some may be frozen. Because exporters are shipping a live product, it is important that the lobster get there as soon as possible; therefore, they are flown on airplanes instead of being shipped on cargo ships like market squid. It is believed that all the lobsters sent to China remain there and do not get shipped back to the United States. Once the lobsters land in China, Chinese companies pay large import taxes to bring the lobsters into the country (Food Export USA). The Chinese wholesalers then distribute the lobster to retail and restaurant markets.

Live exports of seafood to mainland China are subject to a number of barriers, including large import taxes. Therefore, it is not uncommon for lobsters to be first sent to third party countries such as Hong Kong, Taiwan, and Vietnam before being delivered in China (ERA 2015). The Chinese market refers to exports to China as well as to these third party countries.

A growing middle class in China has increased demand for lobster from the United States (Blank 2015). In general, the Chinese value live U.S. seafood. Lobsters are particularly valued because they are seen as a symbol of status and luck. The spiny lobsters are viewed as lucky because of their red color and similarity in appearance to a dragon, both of which are important in Chinese culture. Because of this, spiny lobsters are popular items to serve at big celebrations such as weddings and holidays such as Chinese New Year.

The huge demand for lobster in China has almost monopolized the market and that means if U.S. consumers want to eat more spiny lobster locally in California, they need to compete with the Chinese consumers. In order to compete, U.S. consumers need to be willing to pay the high prices that Chinese consumers are paying.

More than twenty years ago, California spiny lobster was sold predominantly throughout southern California, according to locals involved in the industry. Lobsters were brought in live by local fishermen and went straight to the local processing companies where the lobsters were immediately cooked and distributed to local restaurants. This began to change in the mid-90s when demand for live lobsters from Japan and Taiwan caused companies to explore shipping live lobsters to Asia. At this point the shipping technologies were still new and it was risky to ship live lobsters all the way across the pacific. However, this new demand increased prices and fishermen were making more than they ever had. At the end of the 1990's and early 2000s, demand from Japan dropped off and prices dropped with it. However, China quickly stepped in. The demand for lobster in China had outgrown the Australian rock lobster fishery and they were looking for new sources of lobster. China became the main importer of California spiny lobster and prices began to rise and have continued to rise ever since (Law 2016).

### **American Lobster, *Homarus americanus***

The Fishery:

When English settlers arrived in America in the 1600's, lobsters were said to be so plentiful that they would wash up on beaches and could be collected by walking along the shores at low tide. Lobster was seen as the food of the poor and early colonists served them to prisoners, indentured servants, and even pigs. As tastes evolved, lobster began to gain popularity in the mid-19th century (Corson 2004). In the 1840's Maine established its first Commercial Lobster Fishery (Maine Lobster 2015). At first the lobster was canned for easy transport. However, by the late 1800's lobster was no longer a poor man's food but was seen as a luxury item. Tourist that had summered in New England acquired a taste for lobster and wanted to be able to eat it in their home cities. Expensive restaurants in major

cities like New York City starting serving fresh Maine lobster. Demand increased and populations declined.

To address this decline, the state of Maine established its first lobster conservation measure by banning the sale of egg bearing females in 1872. Two years later a minimum size limit was established to attempt to protect the species and combat overfishing (Lemieux 2015). By 1950 populations began to steadily increase and the last few years have produced record catches (Maine Lobster 2015).

In 2014, for example, about 148 million pounds of American lobster were landed (worth over \$567 million), making the American lobster fishery the most valuable fishery in the U.S. (NOAA CFS). The fishery extends from the U.S. - Canada border down to Cape Hatteras, North Carolina. However, over 94 percent of the total lobster catch is landed within the Gulf of Maine (ASMFC 2015).

The fishery is managed collaboratively between the states and the National Oceanic and Atmospheric Administration (NOAA) under a Fishery Management Plan (FMP) created by the Atlantic States Marine Fisheries Commission (ASMFC) (GARFO). States are also allowed to establish their own stricter regulations within state waters. The ASMFC divides the American lobster into three separate biological stocks. There is a Gulf of Maine stock, Georges Bank stock, and a Southern New England Stock (everything south of Cape Cod, Massachusetts). Every five years, NOAA assesses each of these stocks separately to determine if they are overfished or experiencing overfishing. Currently, Gulf of Maine and Georges Bank stocks are at target levels and the Southern New England stock is below the target level. None of the stocks are experiencing overfishing (GARFO). Additionally, the ASMFC divides the coast up into 7 Lobster Conservation Management Areas (LCMAs). Each LCMA has its own set of regulations allowing the commission to address each area individually (ASMFC).

The American lobster fishery does not have a closed season (with the exception of a few places) and lobster can be caught year round. However, landings of lobster are highly seasonal due to their natural growth and migration patterns. Lobsters shed their shell (molt) to grow. When a lobster is young it will molt multiple times a year. However, as they get older, their molt cycle slows down. A legal size lobster will molt 1-2 times a year (Glenn 2015). In the winter through early spring when waters are cold, lobsters tend to move offshore to deeper waters where the temperatures are actually warmer than the shallow waters. However, in the late spring and early summer waters begin to warm closer to shore and lobster migrate back to the shallow waters. In these warm summer months, many smaller lobsters molt into legal sized lobsters (Lawrence 2016). During this time, lobsters are also more easily caught by lobstermen because the shallower waters are more

accessible and the summer weather tends to be calmer and more pleasant, making fishing conditions are safer for the lobstermen. Many lobsters caught during this time tend to have molted recently and therefore have a softer shell. Referred to as soft shells, new shells, or shedders, these lobsters are known by locals to be sweet, tender and delicious. However, on average they have 25% less meat in them than lobsters that haven't recently molted (hard shells). They are also more delicate and therefore do not travel easily (Taylor Lobster). As a result, soft-shelled lobsters are sold for less money than hard-shelled lobsters.

### Supply Chain:

The American lobster supply chain is complex. As with the California lobster fishery, the American Lobster supply chain starts with the fishermen. The fishermen must have a commercial lobster permit to harvest lobsters and follow regulations set by both the ASMFC and state's own additional regulations. The fishermen play a very large role in the conservation and management measures put in place to ensure a sustainable fishery.

The American lobster is caught primarily using traps made of wire mesh. The traps are baited and have openings that allow all lobsters to enter and smaller lobsters to exit. They are set at depths of 15 to 1000 feet and attached to a rope with a buoy that marks the trap at the surface (FishWatch). Traps are serviced by lobstermen using boats that are specifically designed to haul traps.

Lobsters are caught by thousands of independent lobstermen who have a choice of whom they will sell to. They have the option of marketing their own lobsters and selling directly to consumers or restaurants. However, most lobstermen are busy fishing and do not have time for marketing their own catch. What typically happens is they sell to a Live Lobster Dealer (LLD). The dealer could be a dockside buying station or wharf, co-op, or wholesaler.

Buying Stations and Wharfs are for-profit businesses with waterfront access. They buy lobsters from the lobstermen at boat price and then mark the price up a bit before selling to the next stop (often wholesalers). They also sell bait and fuel or other gear to the lobstermen in addition to buying from them. Buying stations make it easy for the lobstermen to unload their catch and refill on bait and fuel on the way home. The buying stations benefit by pooling the catch, which allows them to sell larger quantities to wholesalers for a slightly higher price.

Co-ops are non-profits owned and operated by the lobstermen. The members share the expenses and profits. Co-op members always sell to the Co-op for a previously determined price. A Co-op manager then markets the lobsters for the members to various buyers. Co-

ops vertically integrate the fishermen into the supply chain, allowing them to have more control of where and for what price their lobster is sold. Because Co-ops have the benefit of pooling their landings, they can lock in with larger dealers by guaranteeing larger sums of lobster for competitive prices. Other benefits include purchasing supplies in bulk and waterfront access (which can be very expensive). At the end of the year, the Co-op must have zero profit, so if there is any leftover money, it is split between all members as a bonus, which is generally based on how much lobster they brought in individually. This makes up for the fact that the initial Co-op price may be lower than other buying stations.

Lobstermen not involved in a Co-op might sell exclusively to one dealer, or they might change whom they sell to, based on who is offering the best price (changing can be looked upon negatively in some areas). Price fluctuates constantly throughout a season however the average boat price in 2014 was \$3.83 per pound (CFS Landings). Depending on the season and the dealer to whom they sell, harvesters will receive one set price per pound for their whole catch (referred to as a run), or their catch will be graded and they will receive different prices for soft shells vs. hard shells, as well as for different sizes. The grading that determines the price the lobstermen get is different and less thorough than the grading for wholesalers that focus on shipping lobsters.

A wholesaler is a broad term in the lobster world. Wholesalers act as intermediaries to buy and sell lobsters in large quantities. Wholesalers typically do not sell directly to consumers, but instead sell to other wholesalers, retailers and restaurants through various distribution channels. (However, in the lobster industry, some wholesalers also are retailers.)

Wholesalers can be focused on local distribution, domestic/national distribution, international distribution, or some combination of all of them. There is a lot of exchange of lobsters between wholesalers. For example, a smaller wholesaler, focused on local distribution, might sell to local restaurants and fish markets as well as to a larger wholesaler, who will then distribute the lobsters across the country or even over to other wholesalers in Asia. Who wholesalers sell to depends on the size and scope of their business and what orders they need to fill.

Once at the wholesaler, the lobsters are graded based on shell quality and size before being redistributed. Shell quality is based on how hard the shell is and there are specially trained workers whose job it is to grade the lobsters. Once graded, lobsters are sold either to a live market or to processors. Different shell qualities and sizes are worth different amounts of money. Grades for shell quality running from highest to lowest are: Hard, Superfirm, A, B, C, and Processing.

The softest shelled lobsters become processing lobsters. They are sent first to the primary processor where they are cooked or frozen raw in a variety of forms such as picked meat,

whole lobsters, or lobster tails. They are then distributed to restaurants and retail markets domestically and internationally or sent to value added processing plants that will turn the lobster into products such as lobster ravioli or lobster bisque. Once in its final form, distributors will sell processed lobster to the retail and restaurant markets as well.

Lobsters sold through the live market are distributed differently based on the grade. While all grades can be distributed locally not all grades can be distributed internationally. The further the destination, the higher the shell quality needs to be. For example, lobsters destined for Asia must be a Hard or Superfirm while lobsters destined for Europe can be an A grade. Typically, B and C grade lobsters are reserved for domestic distribution.

Lobsters in the live market will be sold between wholesalers both domestically and internationally until they reach a location where they will be distributed to chain and independent restaurants, other members of the food service industry such as caterers, chain supermarkets, and independent retailers before eventually reaching the end consumer.

In 2014, the U.S. landed about 148 million pounds of American lobster (NOAA CFS). The U.S. also exported around 114 million pounds and imported over 98 million pounds (CFS Trade). That means that about 132 million pounds were distributed throughout the United State and the rest was sent abroad.

The majority of our trade is done with Canada. The relationship the United States has with Canada is complicated. They are competitors and also partners. Of the 114 million pounds that the U.S. exported in 2014, over half (about 69 million pounds) were exported to Canada (CFS Trade). Canada also sent the U.S. over 98 million pounds of lobster (CFS Trade). The lobsters from Canada are the same species as the lobsters from the U.S. Why then are we trading lobster back and forth?

The difference lies in the seasonality of the fisheries. While you can lobster year round in the U.S., the majority of our lobster is landed in the summer and fall when lobsters have moved inshore to molt. As a result, there is an influx of soft shelled lobsters in the summer produced by the U.S. In Canada they manage their fishery in zones that open and close at different points during the year (GOC). However, the majority of their catch happens during the cold winter months. This leads to an influx of hard shell lobsters produced by Canada in the winter.

Despite this seasonality, demand for lobster tends to remain high throughout the year. In order for businesses to provide their customers with enough lobster year round, U.S. companies buy hard shelled lobster from Canada in the winter to ship abroad and Canadian



companies buy soft shelled lobster from the U.S. in the summer, mostly to process, hold, and use locally during tourist season.

The U.S. and Canada then compete with each other to sell the live and processed lobsters that they produce. Landings are so high that it would be difficult to sell all lobster landed domestically. Therefore, they both compete to sell their lobster to international markets.

The US exports large numbers of lobsters to Europe and Asia. Traditionally, European countries such as Italy, Spain, and France have always imported large quantities of American lobster and continue to do so today. In 2011, Italy alone imported over 9 million pounds of lobster (CFS Trade). When you combine exports to the entire European Union, they are the second largest market behind only Canada. Historically Japan was also a significant importer of American lobster, rivaling even Canada in 1989. However, exports to Japan peaked in 1995 and have steadily declined since then (CFS Trade). In recent years, demand for American lobster elsewhere in Asia has grown. This is especially true of the Chinese market, which like with the California lobster, includes China, Taiwan, Hong Kong, and Vietnam. Beginning around 2009, exports to the Chinese market have grown steadily and are closing the gap on the European market (CFS Trade). This increased demand has been extremely important for lobstermen and many lobster businesses. Lobstermen have been catching record landings in the last few years. With all that extra lobster on the market, prices can drop and did. However, increased demand from the Chinese market absorbed some of landings increase and lessened the drop in prices.

Our experience talking with wholesalers who export lobster within the American lobster industry was vastly different than the exporters from the California lobster industry. The American lobster wholesalers were all more than willing to share what they do, who they buy from, and who they sell to. In addition to this, most had advanced computer systems that allowed them to trace all the lobsters they bought and sold. Exports are also collected and reported by the National Oceanic and Atmospheric Administration. Despite the fishery being much larger than the California fishery, traceability was much higher within the American lobster fishery.

## **Conclusion / discussion**

These three case studies clearly demonstrate just how complex and different seafood supply chains can be. When combined with the ever-changing definition of the word “sustainable,” this creates a system that can be difficult to navigate as a consumer.

The definition of “sustainable seafood” should be a moving target and we believe that consumers should be able to decide what aspects of sustainability matter most to them.

That's why we decided to approach this topic from a storytelling perspective. While most existing sustainable seafood guides rely solely on facts and data of specific fish or fisheries, many studies suggest that, unfortunately, facts and data don't really matter to people who have already made up their minds.

When it comes to seafood, however, we hope most people have not already made up their minds. And we hope that reading about the people behind their food will help them connect with the process and figure out what aspects of sustainability matter most to them.

For example, by learning that the local calamari someone ordered at an ocean-side restaurant in Southern California most likely traveled more than 12,000 miles from the time it was caught to the time it ended up on the dinner table, she might reconsider whether or not local automatically means seafood is sustainable.

Conversely, when a person living on the West Coast typically avoids buying American lobster because it seems unnecessary to buy an East Coast species while enjoying a view of the Pacific Ocean, he might change his mind after he learns how ubiquitous American lobsters are and that California is actually one of its closer destinations.

By providing consumers with a complete picture of their seafood and telling them stories about the people behind their food, we hope to help them reconnect with the process and create their own definition of the word "sustainable."

## **Resources**

All of the stories will be published online on [FollowYourFish.com](http://FollowYourFish.com).

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## **Appendix I: California Market Squid Blogs**

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## Introducing California Market Squid

### Fast Facts

- **Common name:** California Market Squid
- **Scientific name:** *Doryteuthis (Loligo) opalescens*
- **Size:** 3mm at hatching to 152mm (6 inches) full grown
- **Lifespan:** 6-10 months

### Introduction

There are about [750 recognized species of squid](#). Today (and for the next several weeks), we'll be focusing on just one: *Doryteuthis opalescens*. Commonly called the California market squid, this species is found in the Eastern Pacific Ocean, ranging from southeastern Alaska to Baja California, Mexico. In the United States, they are the most abundant off the coast of Monterey Bay, CA.

### Characteristics

Just like all other types of squid, the market squid has well-developed eyes, a strong beak, two fins, eight arms, and two longer tentacles that are used for feeding. Their bodies have an iridescent color that's often described as milky white and purple, but it looks different under different environmental conditions. They also have an ink sac that is used as a form of defense: the squid releases ink, which confuses the predator, giving the squid time to escape.

### Life history

Market squid are fast growing animals that live only about nine months. They are terminal spawners, meaning they reproduce only at the end of their life cycle. During spawning, the squid congregate in large schools, typically over sandy bottoms. Females are capable of producing about 20 egg capsules, which contain about 200 eggs each, and are attached to the seafloor. The eggs take weeks to months (22 to 90 days) to hatch, depending on environmental conditions.

In general, squid are very sensitive to changing ocean conditions at all stages at all stages of life. This season, for example, fishermen are catching very few because the squid don't thrive in El Niño conditions. El Niño events occur when sea surface temperatures are significantly warmer than average for three or more months.

### Food Web

They eat krill, small fish and crustaceans, and other small squid. They're eaten by many fish, seabirds, and marine mammals.



## Introducing the Market Squid Fishery

### Fast Facts

- Seasonal catch limit: 118,000 short tons (107,048 metric tons)
- So far this year, there have been 540 short [tons landed](#) (6/3)

### Introduction

There are two major fishing areas in California: northern and southern. The northern fishery is located primarily in Monterey Bay. The southern fishery has a larger range, spanning the coast from Point Conception to southern La Jolla, including the Channel Islands.

### Fishing Season

Fishermen target adult market squid during the spawning season. Since squid are terminal spawners ([link to background post](#)), this means they are only caught at the end of their natural lifecycle. Spawning events occur from April to October in the northern range, and from October to April or May in the southern range, making fishing a year-round opportunity (until the quota is reached).

### Rules and Regulations

The [California Department of Fish and Wildlife](#) (CDFW) and the [Pacific Fishery Management Council](#) (PFMC) have jurisdiction over the market squid fishery. A [Market Squid Fishery Management Plan](#) (MSFMP) is used to regulate and manage *D. opalescens*, which CDFW is in charge of implementing. It has been in effect [since 2005](#). This plan provides a framework for the long-term conservation and sustainability of squid as a species and as a resource. It also allows for flexibility regarding environmental and socioeconomic changes, which is particularly important since market squid are so sensitive to changing environmental conditions and since it has been a lucrative fishery in the recent past.

Fishing is prohibited over the weekends, from Friday at noon through noon Sunday. This closure was established to give squid an uninterrupted period of spawning - a good idea, except the squid probably don't know it's the weekend!

The most recent MSFMP (2014) has a seasonal catch limit of 107,048 metric tons or 118,000 short tons. It requires monitoring programs, weekend closures, and gear regulations.

The market squid fishery is a restricted access fishery, which means permits are required. [In 2013](#), there were 75 vessel permits (though only 67 vessels made any commercial landings), 34 light boat permits, and 44 brail (or netted scoop, which are large dip nets) permits. The majority of landings (90%) came from just 43 vessels.

## **Gear Type**

Purse seines are the most common gear type used in the commercial market squid fishery. The purse seiner works with a smaller vessel called a light boat. Market squid are targeted at night when the light boat uses (you guess it!) lights that are known to attract squid to the vessel. These purse seines don't hang as low as other nets, so there is minimal damage done to the sea floor.

## **A very brief history**

The market squid fishery is over 150 years old. It started with Chinese immigrants who caught small amounts, dried it, and sent it to China. Instead of fancy light boats, they used torches to attract squid to the surface.

The earliest commercial fishery landed less than 1,000 tons per year from 1916 - 1923 in Monterey Bay.

## Step 1: The Fishermen

### INTERVIEW WITH DAVID HAWORTH, SAN DIEGO COMMERCIAL FISHERMAN

#### Fast Facts

- Market squid is one of the many species that commercial fishermen David Haworth's vessels catch.
- This season has been terrible for market squid (earlier in Northern California, and now in the southern region) due to the current El Niño conditions.

#### Meet the Fisherman

David Haworth is a second generation San Diego fisherman with 40 years of fishing experience. He owns four commercial fishing vessels that target tuna, lobster, swordfish, sardine, and squid. He is on the Pacific Fishery Management Council Advisory Body as a [Coastal Pelagic Species Advisory Subpanel](#) (CPSAS) member. He is also the Vice President of the [California Wetfish Producers Association](#).

#### Fishing for Market Squid

Squid fishing is typically done in the dark. The boats will head out after the sun has set and fish until it rises, depending on how much they catch. Squid fishermen use powerful lights to attract squid to the surface and then catch them in purse seines, which are large nets that close like a drawstring coin purse. You can see a video of it in action here [insert link]. After a night of fishing, they'll head to the closest processing facility to offload the squid where they usually get frozen immediately.

When Haworth and his crew starting fishing for market squid about 15 years ago, they caught a lot more squid year-round. There weren't enough boats to reach the quota (link to management article), "so we'd fish some sardines, some mackerel, some tuna, and just whenever the squid showed, up we'd catch 'em," Haworth explained in an interview. They also caught more because there just weren't that many boats. And, the boats that were there were smaller. Then things changed.

"The squid market got better so a lot of people got involved in it and they started bringing a lot of bigger boats down from Canada." Instead of fishing year-round and never reaching the quota, an increasing number of bigger boats mean that quota was reached after just four or five months.

Increased competition, combined with El Niño conditions, means Haworth's squid fishermen aren't catch much right now.

#### Selling Market Squid

After the squid is caught, Haworth and his crew sell the squid to a few different places. “It doesn’t have a shelf life,” Haworth explained, so they don’t sell much at the local Tuna Harbor Dockside Market. “After two or three days, it starts to turn red so we can’t keep it on ice.” And even though people are increasingly requesting local seafood, squid is still an intimidating one for many.

“So what we end up doing is taking it and selling it to a cannery or a processor that pumps it off [the vessel].” The processor then buys the fresh-caught squid at a set price per ton and freezes it, and it’s no longer Haworth’s problem.

This is the preferred method because it’s a lot easier to sell directly to a processor than try to manage tons of fresh squid on their own.

In a good year, “we’re catching a hundred tons at a time so it’s way easier for us.”

If there’s demand at the local markets, Haworth can buy it back after it’s frozen for a little bit more money per ton. So if you see squid at the market, it was most likely previously frozen. Luckily for consumers, squid doesn’t diminish in quality when it’s frozen and defrosted like many other of our favorite seafoods.

And squid is popular at the market. “We sell it every day,” said Haworth, “but not enough to pay the bills.”

### **The next step**

The next step takes place at processing plants where the squid is frozen and then shipped off to a number of different destinations. Some stays here in California and other places in the U.S., but a huge portion of it gets exported overseas. Our next post will explore this step. Stay tuned!

## Step 2: Processing in the United States

### INTERVIEW WITH MARY LOU GONZALES, SALES MANAGER AT [DEL MAR SEAFOODS](#)

#### Fast Facts

- Del Mar Seafoods catches, packages, freezes, and exports 80 million pounds of seafood annually, including anchovies, market squid, mackerel and sardines.
- They catch nearly a quarter of the entire California market squid limit.
- About half the squid that comes through gets shipped to destinations in China.

#### The Processing Plant

Del Mar Seafoods is a family run operation with more than 40 years of experience in the fishing and processing industries. They catch, package, freeze, and export 80 million pounds of seafood every year, including anchovies, sardines, mackerel, and market squid. I recently spoke to Mary Lou Gonzales, sales manager at Del Mar Seafoods, who told me a little more about what happens to market squid after it's caught.

Del Mar works with a total of 20 fishing vessels. Nine are owned by Del Mar Seafoods directly and the others are privately owned. After a night of fishing [[link to fishing post](#)], the vessels will head back to one of Del Mar Seafoods' several unloading locations, depending on where the boat was fishing. The squid is then offloaded into totes with water and ice, loaded into refrigerated trucks, and driven to one of two processing plants. One is located in Central California in Monterey Bay (Watsonville, to be specific), which is the corporate processing center. The other is located in Oxnard, CA, just north of Los Angeles. They are both used to process market squid.

"On any given day between both facilities, we can pack about 1,000 tons of fish daily." This gives them plenty of capacity during peak seasons.

#### Processing Market Squid in the U.S.

The process is very simple, Gonzales said. On a typical day during squid season, the squid will arrive at the facility around 7:00 or 8:00 in the morning and is processed with water and ice within hours. That's it. "Nothing else is added to the squid," she told me. It's then frozen whole round in various packaging styles. Whole round simply means that the squid is frozen whole -- head, tentacles, guts and everything intact.

It's typically packaged in 10 kilo boxes "and blast frozen in our public freezers."

Depending on demand, it can sit in the freezer for anywhere from a few days to several weeks. Luckily for the consumer, squid has a texture and consistency that doesn't change when it's frozen!

#### Where does it go?

“Del Mar Seafoods will catch about 30,000 tons of the California market squid limit” during a normal season, Gonzales explained. “Of those 30,000 tons, I would say at least half of that goes to China. We have many customers in China that use the squid for local domestic markets and for re-processing.”

The squid that isn’t shipped directly to China is split between other Asian and European markets. Gonzales said that Spain and Italy are two of the biggest markets there. Of the approximately 15,000 tons that get shipped to China, only a fraction ends up back in U.S. markets.

“Lately, we’ve been [importing] about 20 loads of cleaned squid per year, so that’s roughly 500 tons or less,” Gonzales said. The cleaned squid that gets shipped back to the U.S. is used for local distribution and is sold to local restaurants. The company has several trucks that deliver seafood (and squid, when it’s in season) to locations in Central and Southern California.

Though, “it’s a very small portion compared to what leaves and never comes back.”

**The next step:**

Find out how California market squid is shipped overseas! We’ll have that story next.

## Step 2.5: The Journey Overseas

### Fast Facts

- Most market squid is exported to China
- Shipping market squid from California to China takes about 14 days
- The one-way trip is more than 6,000 miles

### Why is much squid exported to China?

Shipping a product that's consumed in the U.S. to another country for processing may seem a little absurd, but there are several reasons it's done this way.

The first reason has to do with our preference for seafood that's already been cleaned and cut. When market squid is sold whole at markets, only people who are comfortable working with the whole animal (or the ones who are feeling adventurous) will buy it. Let's face it, cleaning squid can be intimidating to those who prefer easy fish fillets.

Additionally, American consumers tend to prefer larger, meatier squid, according to head of the California Wetfish Producers, D.B. Pleschner. [In a 2014 article for Fishing News](#), Pleschner explains that market squid are among the smallest squid species, making them less desirable local consumers.

Another reason is that there just aren't enough places to process squid in the U.S. This is due in part to the fact that seafood processing plants are built near the shore so the fish can be processed right where they are landed, which also happens to be right where people like to build houses and waterfront towns. Slowly but surely, the seafood production infrastructure in the United States has been phased out. The third and most important reason for the journey is that it is cheaper to process squid in China than it is in the United States.

According to Seattle-based Trident Seafoods, labor in China costs about [\\$0.20 per pound](#). It costs much more than that to process squid in the U.S., with estimates averaging about \$1.70 per pound. Considering that (on a good season) market squid is landed by the ton, this adds up to a lot of money. Even if we had the ability to process everything, it would still be more economically efficient to process it in China.

### The next step

After the market squid arrives at its destination, it's processed for consumption. We'll have the scoop on processing market squid next so stay tuned!

## Step 3: Processing in China

### Fast Facts:

- There are more than 7,000 processing plants in China that employ an estimated 400,000 people
- China imports about 60% of the world's squid, a number that is likely to grow
- The U.S. exported 26,589,864 kilos of market squid in 2015 valued at \$37,988,095, and much of it goes to China
- The same year, the U.S. imported 122,328 kilos of market squid valued \$246,848, and much of it comes from China

### Background on seafood in China

China ranks among the top seafood eating, processing, exporting, and importing countries in the world. The United States is one of its [biggest suppliers of seafood](#), exceeded only by Russia.

Imports of frozen seafood have increased steadily over the last five years, reaching approximately \$6.4 billion in 2015. They are expected to continue to grow by 2.5% a year over the next five years. Exports are also increasing, reaching \$10.1 billion last year and are expected to grow by 3.4% a year over the next five years. The increase of seafood passing through China is due in large part to its enormous capacity for processing seafood.

### The Chinese Seafood Processing Industry

There are more than [7,000 processing plants in China](#), primarily located in coastal regions for easy access to ships. This industry employs more than 400,000 people, many of whom are young women.

The frozen seafood processing industry totaled more than \$58 billion in 2015 and, according to [ACMR-IBISWorld](#) is expected to continue to grow over the next five years. This industry is concentrated in coastal provinces and regions where access to ships is easiest. Most companies involved in this industry “operate at the primary processing state,” which [includes processes like](#) deheading, gutting, and filleting finfish, shucking shellfish, and tubing squid. Some use secondary or integrated processing technology, but that isn't involved in market squid processing.

Market squid processing is relatively simple, since it doesn't involve de-boning, like salmon or other finfish. The squid is unfrozen from the 10 kilo (or similar) boxes it was packed in. Then, the head and guts are separated from the body and everything gets cleaned. It's then cut depending on the specifications of the next buyer. In most cases, the tube is cut into the rings (that eventually get deep-fried and turned into calamari), but sometimes it's frozen as whole steaks. The tentacles are often packaged separately and everything is refrozen before it continues its journey.



Many processing facilities in China have contracts with suppliers, which makes prices pretty stable. Del Mar Seafoods, for example, has a relationship with two processing facilities in China. They agree to send a certain amount of the product for processing and agree to buy a certain amount back.

### **The Next Step**

China exports much of the seafood it processed to Japan, the United State, and Hong Kong. A small portion of California market squid gets shipped directly back to California where it is sold as local seafood, even though it has traveled more than 12,000 miles. Learn more about that in the next post!

## Step 4: Back to the U.S.

### Fast Facts:

- The United States imports an average of about 370,000 pounds (worth nearly \$450,000) of California market squid every year
- That's less than 1% of what the U.S. exports
- Market squid processed in China doesn't necessarily have to have a "made in China" label

### Exports vs Imports

From 2010 to 2015, the United States exported an average of about 26 million pounds (worth more than \$77 million) of *D. opalescens* every year. During that same time period, the U.S. imported an average of about 370,000 pounds (worth nearly \$450,000) every year. That's an average of about one percent (1.4%) a year.

In 2015, we exported 58,277,701 pounds (\$37,988,095) of market squid and imported 269,122 pounds (\$246,848). That means we only imported less than one percent (0.46%) of the same squid that we exported that year.

### Labeling

Seafood that's processed in China isn't necessarily required to be labeled that way. [Country of Origin Labeling](#) laws require the product to be labeled with the country where the product was manufactured, produced, or grown. In order for the product to be labeled with the country where it was processed, a "substantial transformation" must take place there. A "substantial transformation" could be something like smoking, breading, or mixing with other ingredients. Since this isn't the case, market squid still gets a "product of the USA" label, leaving consumers unaware of the journey from boat to plate.

### Why doesn't that 1% stay here?

The biggest reason is that market squid has very little shelf life, so it has to be frozen pretty quickly and therefore isn't often sold fresh off the boat. Additionally, processing market squid isn't easy and it's much cheaper to do in China. There are several efforts underway to sell more market squid directly to consumers, but in most cases, it's still frozen at least once.

### Can you buy local California market squid in California?

Yes! But only sometimes. Find out more in the next post!

## Step 5: Eating California Market Squid in California

### INTERVIEW WITH MITCH CONNIFF OF [MITCH'S SEAFOOD](#) IN SAN DIEGO

#### Fast Facts:

- Mitch's Seafood serves 30-70 pounds of calamari a day
- They initially served only California-caught market squid, but have had to expand to any US-caught market squid since the California fishery dried up

#### Mitch's Seafood

Mitch's Seafood was established in 2008 by three fishing families in the San Diego Area. Located on San Diego's working waterfront, Mitch's Seafood provides consumers with fresh, local, sustainable seafood. I recently spoke with Mitch Conniff, who told me a little more about the challenges of serving local CA market squid.

When Mitch and his team started the restaurant, the goal was to use as many local San Diego and California products as possible. "So of course, one of the first things we wanted to get was squid," he said. But it wasn't that easy.

#### Serving California Market Squid

Mitch's Seafood has struggled with sourcing squid since day one. Though squid was abundant in California when they started up about eight years ago, it still wasn't easy to get squid that had never left the U.S.

Even though the team was willing to pay a premium for local squid, "it took probably two years to find [a processor]," Mitch said, but eventually they did. They started working with a processor in San Pedro and "were able to use it for about two and a half years."

"If we didn't really care where we sourced [our squid] from and just bought the cheapest stuff, it would probably be around \$3.00 per pound. The stuff we were buying was about \$5.50 per pound."

I asked Mitch if it was worth the higher price and he answered with a resounding "yes."

"Not only was the quality better, but what we're concerned with is traceability. Fish processing in China and Asia in general is rife with humanitarian issues...From a moral or ethical standpoint, I want to provide something that's processed in the United States."

Unfortunately, due to poor squid fishing lately, that processing facility has temporarily shut down, and Mitch's Seafood can no longer get any CA squid that was processed in the U.S.

"We stopped being able to get it about four months ago," he said.

In order to stick with the local and sustainable theme, they started purchasing market squid that comes from Oregon and Washington. Though, it's nearly impossible to know exactly where that squid was caught or if it is indeed 100% American.

### **Processing at home?**

In order to ensure that the product they're selling, Mitch's Seafood has considered the idea of processing the squid themselves. If only it were that easy...

"The processing of squid is a nightmare," Mitch explained. It's not as easy as just setting a person up at the sink and having them clean and cut each individual squid.

"We go through anywhere from 30 to 70 pounds of squid in a day, so to have someone processing that amount of squid is virtually impossible. And we'd have to hire a cleaning company to come in a clean up after."

In addition to being messy and slow, you also need to have a place to store the squid. Processing that much would take up a lot of freezer space. To meet all these needs, "you specifically have to be set up to process squid."

### **Processing it nearby?**

At one point, Mitch and his team were looking at getting a co-op of restaurants and seafood dealers together to purchase their own squid directly from local boats and process it themselves in a temporary facility. But it turns out that's not so easy, either.

"It would involve a lot," Mitch said. They would have to find a facility nearby that's already HACCP-certified - that's [Hazard Analysis Critical Control Point](#), a management system designed to address food security - and rent it. That would be a much simpler plan than building a facility from scratch, getting the HACCP certification, and running the facility full time, which would be much more expensive.

Though, building a place from scratch isn't out of the question.

"It's always possible, but when you start running the numbers you understand why it's so difficult to process here."

### **Ditching calamari altogether?**

If local California market squid is so hard to find, it might just be simpler to stop selling it. But that's not really an option.

"What it really comes down to, and why it's so difficult for restaurant owners, is there are certain things that people just demand. And they demand them at a certain price. You can't

be a seafood restaurant in San Diego or Southern California and not serve calamari. It's just part of the business."

Though, perhaps this is an area where we, as consumers, have the power.

"There's a discussion that the American public needs to be having with regards to sustainability. Everybody says they're concerned about the emptying of the oceans, traceability of fish, slave labor, and all those things, but when it comes down to it, they're not really willing to pay the price," Mitch said.

"In addition to the cost, the consumer needs to get used to the fact idea that you might not be able to have calamari every time you go into your favorite seafood restaurant. You definitely won't be able to always have salmon. They need to embrace the idea of seasonality."

For now, Mitch's seafood will continue to meet the demand for calamari and source American-caught squid, even if it's not from California. Hopefully, squid fishing will pick up again and they'll be able to reconsidered the idea of opening their own temporary local processing facility.

"Squid is already starting to show up pretty well this year so it looks like it might be back."

## **Appendix II: California Spiny Lobster Blogs**

### **Outline**

Pages 37-39:

- Meet the California Spiny Lobster (861 words)

Pages 40-43:

- The Fishery (1515 words)

Pages 44-46:

- Step 1: The Fishermen (1356 words)

Pages 47-49:

- Step 2: The Buyers (1049 words)

Pages 50-51:

- Step 3: The Exporters (571 words)

Page 52:

- Consumers: Demand for Lobsters in China (271 words)

Pages 53-54:

- Consumers: Mitch's Seafood (839 words)

Page 55:

- Side Story: A Bit of History (362 words)

## Meet the California Spiny Lobster

### Fast Facts:

- Common name: California Spiny Lobster
- Scientific name: *Panulirus interruptus*
- Average Size: 11.8 inches
- Lifespan: Difficult to determine. However, individuals have been known to live up to 50 years.

### Physical Description:

The California spiny lobster is a large ten-legged crustacean. They are red to orange in color with spines covering their hard shell. Unlike the American lobster, spiny lobsters do not have claws. Instead they have two large antennae which extend out of their face. These antennae can be twice as long as their bodies and are covered in spines and small sensory hairs.

### Geographic Range:

This lobster ranges from Monterey Bay, California to Manzanillo, Mexico and has a small isolated population at the northwestern corner of the Gulf of California. The majority of the population can be found between Point Conception, California (in Santa Barbara County) and Magdalena Bay in Baja California, Mexico.

### Habitat:

California spiny lobster prefers to live in rocky reef habitats where it can hide in cracks and crevices. It is also found in kelp forests and surf grass beds as well as the occasional tidepool. It's depth ranges from very shallow waters to 240 feet or more.

A large portion of the California spiny lobster population makes annual offshore-nearshore migrations stimulated by changes in water temperature and winter storms. During the cold fall and winter months, most male and female lobsters are found offshore at depths of 50 feet or more. In late March, April, and May, the lobsters move into warmer nearshore waters less than 30 feet deep. These warmer nearshore temperatures shorten the development time for lobster eggs and also have a more plentiful food supply.

### Behavior:

During the day, California spiny lobsters typically hide in crevices and caves called "dens". They usually share these dens with other lobsters or other animals such as moray eels. At night, they leave their dens in search of food.

California spiny lobsters are omnivorous, meaning they will eat pretty much anything ranging from algae and dead animals to a wide variety of marine invertebrates such as snails, sea urchins, clams, and mussels. They may even resort to cannibalism and prey on injured or recently molted lobsters (lobsters that have shed their shells). Lobsters have hard mouthparts called mandibles that allow them to chip away at the hard shells of many of these invertebrates.

While out searching for food, they also have to be careful of predators, including California sheephead, cabezon, kelp bass, octopuses, California moray eels, horn sharks, leopard sharks, rockfish, and giant sea bass. (Yes, they share their dens with morays but can also be eaten by them depending on size.)

If a predator comes too close to their den you will often see them attempt to scare the predator off by waving their antennae or hitting the predator. If that doesn't work they can create a loud clicking/rasping noise by rubbing the base of their antennae against a file-like spot near their eyes. And if all these very intimidating tricks fail, then they will resort to fleeing by rapidly flexing their tails, propelling themselves quickly backwards and away from danger. In the unlucky chance that they are caught, they are also able to drop and later regrow their appendages in a last chance escape.

### **Reproduction and Growth:**

Spiny lobsters mate from November to May. During mating, the male attaches a putty-like sperm packet, called a spermatophore, to the bottom of the female's carapace between the last pair of legs. The female will carry this sperm packet around till she is ready to use it around May and June when she will use a small claw on her last pair of legs to scratch it open and fertilize her eggs before attaching them to the underside of her tail. She will carry the eggs for about 10 weeks. During this time, she is generally in shallower water less than 30 feet deep. The number of eggs can range between 50,000 and 800,000 eggs and depends on the size of the female. Larger females are able to produce and carry significantly more eggs than smaller lobsters.

Spiny lobster eggs hatch into tiny, transparent larvae with flattened bodies and spider-like legs. They are planktonic, drifting wherever the currents take them. They may drift up to 350 miles offshore, and are found from the surface to depths of over 400 feet.

California spiny lobsters must shed their shell to grow. This is known as 'molting'. Before a lobster molts, it forms a new soft shell under the old one. Once ready, the lobster will spilt the old shell between the carapace and tail and pull its entire body out from the old shell. The lobster then takes in water to expand the new soft shell and give it room to grow. It



takes a few days for the shell to harden, therefore during this time they are more vulnerable to predation and hide away in a den.

Both male and female lobsters generally reach sexual maturity in 5 or 6 years and reach legal size around 7 to 11 years. Mature male lobsters grow faster, live longer, and reach larger sizes than females.

## The Fishery

### Fast Facts:

- Managed by California Department of Fish and Wildlife
- Season: Early October- Mid March
- Trap based fishery

**Quick Summary of the Fishery:** In order to harvest lobsters in California the commercial fishermen must have a California Commercial Fishing License as well as a Lobster Operator Permit. They must also follow regulations set by the state. Spiny lobsters are caught in wire-mesh baited traps and serviced with boats during a season that opens the first Wednesday of October and closes the first Wednesday after the 15th of March every year. The majority of lobsters are harvested in the first half of this season.

### Introduction:

The California Spiny Lobster commercial fishery occurs along the coast of Southern California from Point Conception, south to the US-Mexican border (there is also a Mexican fishery). The fishery is managed by the state of California through the [California Department of Fish and Wildlife](#). Based on the most recent [Status of the Fishery Report](#) in 2011, the population is healthy and the fisheries are sustainable. There is a commercial fishery and recreational fishery. This article will focus only on the commercial fishery. The fishery is currently in the process of adopting a [Fishery Management Plan](#) (FMP), which may change some of the current regulations.

The fishery is fairly small, in terms of landings, yet valuable. In 2014 California commercial fishermen landed over 951 thousand pounds of spiny lobster. However, despite landing less than 1 million pounds, it was valued at over 18 million dollars, ranking it the 47th most valuable fishery in the United States in 2014 (out of 485) and one of the most valuable in the state of California. Demand for California spiny lobster is extremely high and prices reflect that. In the 2014 season, the average boat price was around \$19/lb.

### A bit of History:

The California commercial fishery has existed since at least 1872 when spiny lobster was first shipped from Santa Barbara to San Francisco. From this point on, demand for California spiny lobster skyrocketed as commercial lobster fisheries spread throughout the entire southern California coastline.

### Permits:

The California spiny lobster fishery is a limited entry fishery. Lobster fishermen must possess both a Commercial Fishing License and a Lobster Operator Permit in order to fish for lobster in California. Permits must be renewed every year. During the 2015-2016 season, the Commercial Fishing License for residents cost \$136.73 and the Lobster Operator Permit renewal fee cost \$377.25. Permits can be transferable or non-transferable. Non-transferable permits can only be used by the owner of the permit. Once that owner of a non-transferable permit stops fishing, the permit leaves the fishery with them. (You may not sell a non-transferable permit.) Transferable permits may be bought and sold on the open market. Prices vary, however it is not unusual to see a Lobster Operator Permit sell for over \$100,000. There are currently 147 transferable permits and 48 non-transferable permits within the fishery.

There are also Lobster Crewmember permits. These are “required for each person who accompanies and assists any lobster operator permit holder in the commercial take of spiny lobster and who does not qualify for a lobster operator permit. The lobster operator permit holder must be present whenever a lobster crewmember is taking, possessing, or transporting spiny lobster for commercial purposes.” During the [2015-2016 season](#) a Lobster Crewmember permit cost \$179.74.

#### **Gear Restrictions:**

A fisherman with a lobster operator’s permit may only take lobsters using traps. The traps are generally made from wire mesh and have restrictions such as mesh size, escape gap requirements, and self destruction requirements to prevent ghost fishing (when lost fishing gear continues to fish). The escape gap is a hole in the side of the trap that allows small sublegal lobsters to exit the trap. The traps also must be marked with buoys with the permit number clearly labeled. The traps must be serviced (hauled up and lobsters removed) every 4 days (96 hours).

**Size Restrictions:** One of the most important restrictions within the fishery is the minimum size requirement to keep a legal lobster. The size limit is set at 3¼ inches carapace length. Carapace length is measured in a straight line from the rear edge of the eye socket to the rear edge of the body shell with both points along the midline of the back. Each fisherman must carry a measuring device and measure each lobster caught immediately on removal from the trap. No lobsters with a carapace length smaller than 3¼ inches may be kept or sold. If caught, they must be quickly returned back to the ocean. This measure helps ensure sustainability in the fishery by allowing the lobsters to reproduce at least once before reaching legal size.

**Season Closures:** The California spiny lobster fishery opens the first Wednesday of October and closes the first Wednesday after the 15<sup>th</sup> of March. The majority of lobsters are caught during the first half of the season (80%). No lobster may be caught outside of this

time. The off-season is designed to protect the lobsters when females are carrying eggs.

**Incidental Catch:** Lobster traps do not always only catch lobster. Occasionally other species may also be caught in the trap. A lobster operator permit holder may keep Kellet's whelk, Octopus, and species of crab (except Dungeness crab). Every other species incidentally caught must be returned to the water immediately. Because of the nature of the trap fishery, almost all of the incidental catch is released alive and healthy resulting in very low post catch mortality.

**Additional Restrictions:** Some other commercial fishery restrictions include but are not limited to, area closures in all of the bays and harbors in Southern California, the east side of Catalina Island, and Santa Monica bay. In addition, traps are not allowed to be placed within 750 feet of piers and jetties. These closures create a separate area for recreational fishermen to fish and also are designed to ensure clear passage of other vessels into bays and harbors. There are also a series of no-take state marine reserves where fishing is not allowed.

Fishermen are required to keep a daily lobster fishing log. They are also required to remove their gear at the end of the season. Any lost gear, must be reported.

**Proposed Future Changes:** The 2016 Fishery Management Plan Draft is currently proposing a few changes to the fishery. If adopted, these changes would not take place until the 2017-2018 season. The biggest change would be the implementation of a trap limit within the fishery. There is currently no trap limit. The proposed rule would set the trap limit at 300 traps per permit. Permit holders would also have the option of purchasing a second permit for an additional 300 traps, resulting in a 600 trap maximum total. Along with a trap limit, the change would also require traps to be marked with a trap tag that would have a unique ID for each fisherman. The idea of the tags is to ensure accountability for lost traps to help prevent ghost fishing and to make sure that no one is fishing more than the 300 traps per permit.

Another proposed change would be changing the requirement of servicing the traps from every 4 days to every 7 days. This will allow for more flexibility for the fishermen to go out when conditions are safe and weather permits.

**Whale Entanglements:** The [issue of whale entanglement](#) in trap-based fisheries has gained a lot of publicity in recent years due to high numbers of whales being reported entangled in fishing traps. Whale entanglements are accidents where no one wins. It is harmful for the whale, which can die if not freed and costly for a fisherman who loses his expensive gear. No one is exactly certain about why there has been such an increase in entanglements. There are a number of theories for why this may be. Some theories include: whale population growth, more people on the water observing the entanglements, el Nino

and fluctuations in bait fish populations causing whales to come closer to shore in search of food, or more traps in the water. There is currently a collaborative effort between environmental NGOs, commercial lobster fishermen, and the National Marine Fisheries Service (NMFS) to help learn more about the issue to help prevent future entanglements. NMFS is holding classes for commercial fishermen to become first responders for entangled whales, since they are often the ones on the water spotting them first. Fishermen are being trained on how to respond to the entanglements, who to contact, and what sort of information to collect. In addition, when a whale is spotted with a buoy and line wrapped around it, spotters can call in the whale and report the permit number on the buoy to the California Department of Fish and Wildlife (CDFW). CDFW can then contact the permit owner and NMFS to connect them and allow them to share information that is needed to learn more about why the whale might have become entangled. It is a group effort with everyone working together to avoid future entanglements.

## **Step 1: The Fishermen**

### **Interviews with John Law and David Haworth, San Diego Commercial Fishermen**

#### **Fast Facts:**

- California spiny lobster is caught using baited wire traps.
- In addition to lobster, many of the fishermen participate in other fisheries.

#### **Meet the Fishermen:**

**John Law** is a native San Diegian with 38 years of fishing experience. He owns two commercial fishing boats that target lobster, crab, and a variety of fishes (rockfish, sheephead, cabezon, halibut, ling cod, shark, white sea bass, and several others), predominantly using trap and hook and line methods. John has been fishing for CA spiny lobster since 1996 and has seen the industry change dramatically in that time.

**David Haworth** is a second generation San Diego fisherman with 40 years of fishing experience. He owns four commercial fishing vessels that target tuna, lobster, swordfish, sardine, and squid. He is on the Pacific Fishery Management Council Advisory Body as a Coastal Pelagic Species Advisory Subpanel (CPSAS) member. David and his son both fish for CA spiny lobster. You may recognize David, his son, and his son's dog, Luna, from the [news](#). Luna is a young german sheppard/ husky mix who was lost at sea while lobstering at San Clemente Island. Presumed dead, the family was relieved 5 weeks later she was found by the navy, safe and returned home.

#### **Fishing for California Spiny Lobster:**

A typical day spent lobster-fishing starts before sunrise for the average San Diego commercial lobster fisherman. John Law has been lobster fishing in San Diego since 1996. His day starts at the dock with fueling up the boat. Depending on the size of the vessel, this may need to be done before every trip. The next step is loading up boxes of bait and checking the boat to make sure everything is ready. John baits his traps with salmon heads that are bought in bulk from the Pacific Northwest.

While still at dock, the weather is checked and the day is choreographed based on conditions such as winds, currents, or potential storms. If the weather is bad, a captain may choose to go service his farther traps first and work his way back towards home. Once out in the open ocean, John reassesses the conditions and adjusts the plan if necessary.

The majority of boats have at least two people, one person driving the boat and pulling the traps and the crew member servicing the traps. However, John Law fishes alone, unless it is

the first week of the season when the workload is heavy enough to warrant an extra hand. He fishes 300 traps on a small 25-foot boat that he keeps in Mission Bay. John and other fishermen with coastal skiffs in the 18-27 foot range, typically fish pretty close to shore. (However, there are guys who fish in larger boats up to around 42 feet and they can chose to fish coastal or venture further offshore to the islands.) It takes John and his crew about 4-5 days to set all the traps when the season starts. Once set, he is required by law to service his traps at least every 96 hours however, if his traps are in shallower water, around 30 feet, he generally services them every 1-2 days.

To service the traps, John must position the boat to work against the elements (wind or currents) so that he doesn't drift over the buoy. He then uses his gaff (a long pole with a hook on the end) to grab the buoy that is attached to a line connected to his trap. Once hooked, he uses a winch to pull the trap up to the rail where it is quickly assessed then opened. Once opened, the catch is sorted and the lobsters are measured using a gauge to make sure they are of legal size (carapace length 3 ¼ inches). Small lobsters and other incidentally caught species are returned back into the ocean alive. Once the trap is emptied, the bait bag is reloaded, all the trap doors are closed, and the trap is returned back into the water. He then moves on to the next trap. How long he spends out for a day varies depending on factors such as weather and how full his traps are. Some days he will work late into the afternoon/evening, other days he is done by 1pm.

John is not only a lobster fisherman. John and about 50 percent of the other San Diegian lobster fishermen are considered multispecies/multipermit fishermen. They fish whatever is available throughout the year. "I don't lock myself in on one thing. I just follow the fish, follow the trend, and follow the dollars." This year was not a great year for local lobster fishermen, probably due to the weird conditions created by El Nino. Therefore, John decided to pull his traps early. He explained that he made the decision based on assessing risk vs. gain. According to John, he had virtually all his fishing equipment in the water and he hadn't lost any traps yet but he also wasn't catching enough to make it worth risking it. He decided to quit before he lost traps that he would have to spend money replacing them next season.

David Hayworth is another San Diego lobster fisherman. Even though it wasn't a great season, David and his son continued to stick the season out. Like John Law, David is also a multipermit fisherman. He owns four commercial fishing vessels that target tuna, lobster, swordfish, sardine, and squid. Unfortunately, this season has been pretty terrible for squid and the sardine fishery was closed down earlier this year resulting in David having to rely more on his other catches to support his boats and crew. "Typically lobster is a small part of what we catch but this year the squid was so slow, that I was actually using my lobster money to pay for my squid boat." David explained that the catch fluctuates every season

and by diversifying his catch, it allows him to adapt to those fluctuations. When his squid catch was good, it actually paid for his lobster boat and all his traps. With this squid season being so bad, the lobster money is helping cover slip fees (money that pays for dock space) and some other expenses, like crew wages, but not 100 percent. Lobster typically brings in much less money than squid and therefore his crew wages are down this year.

To make up for a bad season, David and his son have also expanded their lobstering grounds this season. Typically they lobster locally between Point Loma and La Jolla or between the Mexican border and La Jolla when they need to. However, when I talked to David at the end of January (past the peak of the season), lobster had become more scarce and David's son had just returned from his first trip to San Clemente Island. David and his son fish 600 traps and have a larger boat (around 45 feet long) allowing them to make those further excursions out to the San Clemente Island.

### **Selling California Spiny Lobster:**

David Hayworth typically sells his lobster to Catalina Offshore Products, a local San Diego seafood market. The lobsters are sold live and prices vary throughout the season. Prices are generally lower at the start of the season and go up as the season progresses. This season, prices started at about \$16/lb. and went up to about \$25/lb. David also occasionally sells his lobsters at Tuna Harbor Dockside Market, a local fisherman's market where the public can buy seafood direct from the fishermen. In the beginning of the season, he had lobsters at his stand. Later in the season, people were able to place advanced orders online and he would have them ready Saturday morning, at the market, for them to pick up.

John Law sells his lobsters to Live Deal, a local buyer based out of Oceanside. Live Deal comes down to San Diego to pick up John's lobsters at his dock in Mission Bay.

### **The Next Step:**

Stay tuned for our next article where we talk with Catalina Offshore Products and Live Deal.



## **Step 2: The Buyers**

### **Interviews with Rob Case from Live Deal and Dave Rudy and Tommy Gomes from Catalina Offshore Products**

#### **Fast Facts:**

- Almost all the lobsters are sold live
- The majority are sold to large seafood exporters in Los Angeles

#### **Meet the Buyers:**

**Live Deal** is a family run business out of Oceanside California that buys California spiny lobster from local fishermen and also sells bait. Rob Case, the owner, started the business in 1993 and continues to run it with the help of his wife and daughter. Rob is also a local urchin diver.

**Catalina Offshore Products** was started by Dave Rudie almost 40 years ago as a small urchin business. It is now one of the one of the region's premier seafood purveyors and one of the largest seafood import and export companies in California. In addition to uni (sea urchin), Catalina Offshore Products sells a wide variety of fresh, frozen, and sushi grade seafood mostly sourced from Southern California and Baja California. The business includes a processing facility, Seafood Education and Nutrition Center, and seafood market. I talked with Dave Rudie, the owner, and Tommy Gomes, the fishmonger.

#### **The Process:**

##### **Live Deal:**

October to March, Rob Case starts his day driving his truck outfitted with a large blue fish tank in the back, down to the docks to buy California spiny lobster direct from local fishermen, like John Law. Rob has 8-10 guys that he makes daily trips (during the season) to buy lobsters from. By being the middleman between the fishermen and the exporters, Rob allows the fishermen to focus on what they do best, fishing. He also sells the fishermen salmon heads and mackerel that they use as bait in their traps. The exchange is fairly quick. Lobsters are weighed and he offers them a price set by the market. In the beginning of the season the price starts fairly low and increase as the season goes on and catches are lower. This season the price went from \$16/lb to \$25/lb.

On opening day, Rob will buy as much as 5,000 pounds of lobster. As the season progresses, he continues to make his daily trips to the docks to meet the fishermen, however he may only return home with 1,000 pounds. While Rob makes his stops at the different docks his lobsters are kept comfortable in the large blue tank in the back. The tank is filled with seawater kept at a cool 50 degrees and aerated.

Once home in Oceanside, Rob sells his lobsters to big seafood exporters like SeaWin International. SeaWin sends a truck down to Oceanside to meet Rob and bring the lobsters back to their facilities in Los Angeles, California.

### **Catalina Offshore Products:**

Catalina Offshore Products buys their lobsters direct from 10-12 local fishermen like David Haworth. The fishermen bring their lobsters directly to Catalina Offshore Products where the lobsters are weighed and the fishermen are paid based on the current market price. Catalina Offshore Products then turns around and sells the lobsters to several groups of consumers.

The majority of their lobsters (they estimate about 95 percent) are sold to big seafood exporters like SeaWin International in Los Angeles. Those lobsters are sent abroad primarily to Chinese markets. This is not unusual. It is estimated that almost all (as much as 99 percent) of the lobster caught in California ends up in China. Catalina Offshore Products does not ship any lobsters direct to China because they say it is too risky and they don't want to have to deal with chasing money down in China. They do however, pack them and send them to the airport where a US based company such as SeaWin, pays them for their lobsters. The lobsters are shipped live and therefore have to be packed very carefully so that they when they arrive in China they are still alive. Prior to shipping, Catalina Offshore holds their lobsters in tanks with water around 50 degrees. This slows down the lobster's metabolisms and make them kind of groggy/sleepy. They are then packed into Styrofoam boxes filled with wood straw and lined up like sardines. The woodstraw catches on their legs, which causes them to hold still for their long journey. A piece of blank damp newspaper goes on top and gel ice is packed on top of that to keep them cool. The lid to the box is added and they are taped up and ready to be shipped to China.

The rest of the lobsters that Catalina Offshore Products sells (probably around 5 percent) stays in the United States. Some are sold directly to consumers or local restaurants through their seafood market. The rest are shipped domestically to restaurants. The restaurants tend to be high end 'white table cloth' places like the famous French Laundry in Napa Valley. In San Diego, it is places like the Marine Room, Oceanaire, and La Valencia.

Stay tuned for the next step...the exporters.

### **Side story from Dave and Tommy:**

**Why aren't more California restaurants or markets selling local California spiny lobster?**

The answer is simple. People can't afford it. Dave Rudie and Tommy Gomes of Catalina Offshore explained it to me. "It's the whole price thing. I mean a pound and a quarter lobster, standard legal size, is going to run you 50 plus dollars at a restaurant, or more. Typically, restaurants like to keep their food costs down to 25% so think about the lobster that's a 1 ¼ lbs. I paid the fishermen \$20/lb. I need to mark it up a little bit and add shipping. So say the restaurant buys it for \$25/lb. That's a \$30 lobster. If he [the restaurant] wants to do a standard restaurant markup, he has to sell it for over \$100. But who wants to pay \$100 for one lobster? Not many people. So they end up working at a lower margin. They sell it for \$50-60 and there are still not that many people who want to pay that much for dinner. Maybe people in some high-end places like the French Laundry and maybe in a few markets in San Francisco and New York. The fishermen are happy that they get higher prices but they really only have one market now and that's China."

[For more on restaurant markups](#)

### Step 3: The Exporters

#### Fast Facts:

- The majority of California spiny lobster is flown live to the Chinese market.

#### The Exporters

This was supposed to be an article about the large seafood exporting companies in the Los Angeles area. However, things didn't go as planned. I spent months trying to email and call these exporters to get them to tell me about what they do and where they send their lobsters. I was either told I needed to talk to someone who wasn't at the office at the time, or ignored. One person, supposedly the guy in charge of all lobster business, finally emailed me back with an incredibly vague response about how they are a wholesaler and his "guess with where the lobsters may go is other wholesalers, markets, restaurants and export". He then never responded again when I tried to press for more specifics. On top of this, the California Department of Fish and Wildlife does not collect export statistics for the California spiny lobster. This is a huge gap within the supply chain and our quest for traceability. In order for this fishery to be truly traceable, information on where the lobsters go after they are sold to the exporters should be made available. Don't worry, despite this, the story continues...

Due to this gap, I am left to speculate, based on conversations with other members of the California spiny lobster industry, about where the lobsters go. We know that in 2014 California fishermen landed about 951 thousand pounds of California spiny lobster. I believe that the majority of this, we are guessing between 95-99 percent is shipped abroad to the Chinese market. The majority are shipped live, though some may be frozen. Because they are shipping a live animal, it is important that it gets there as soon as possible therefore, the lobsters are flown on airplanes vs. going on cargo ships. Once the lobsters land in China, Chinese companies pay large import taxes to bring the lobsters into the country. Chinese wholesalers then distribute the lobster to retail and restaurant markets where it reaches the consumer.

Live exports of seafood to mainland China are subject to a number of barriers, including large import taxes. Therefore, it is not uncommon for lobsters to be first sent to third party countries before being delivered in China. The Chinese market refers to exports to China as well as to these third party countries such as Hong Kong, Taiwan, and Vietnam. There are rumors within the industry that lobsters sent to these third party countries are actually later smuggled into China to avoid the import taxes. In 2012 Chinese Customs even implemented anti-smuggling campaigns to try to address the issue.

We do not believe that any lobster gets shipped back to the United States like with the squid. In order for spiny lobster to get shipped back, there would have to be a market for it. If U.S. customers are not willing to pay the large price tags to buy California lobsters the first time, it is doubtful that they would then pay an even higher price for a lobster that has made a roundtrip journey across the Pacific. On top of this, two trips in a box across the Pacific is asking a lot for a lobster and survival rates would certainly decline.

Stay tuned for the next article where I talk about demand for spiny lobster in China.

## **Consumers: Demand for Lobster in China**

The Chinese value the freshness of live seafood and believe that seafood coming out of US waters is cleaner than that from China. In the case of the lobster, there is especially high demand for it because not only is it shipped live from the US but to an increasingly large middle class, it is seen as a status symbol to be able eat lobster. Furthermore, the Chinese believe that the lobster is considered lucky because of its red color and resemblance to a dragon. Because of this, it is often served at weddings or Chinese holidays such as Chinese New Year.

Demand for lobster in China started with the Australia lobster which looks very similar to the California spiny lobster. However, the Australia fishery was unable to keep up with the Chinese demand and by the end of the 90s/early 2000s the California lobster was being exported in large numbers to help meet Chinese demand. Demand has continued to increase and beginning around 2009 American lobster also began being exported to China in huge numbers.

The Chinese serve lobster differently than we do in the United States. While we typically steam the American lobster or grill the Californian lobster, the Chinese serve it in a much wider variety of dishes. The type of dish, flavors, and how it is served differs regionally. In some areas it is served chopped up and stir fried with spices and noodles. While in other areas it is the centerpiece of a dish and table, served whole both cooked or sashimi style (raw) and shared with family and friends.

## **Consumers: Mitch's Seafood**

If you have ever tried to find California spiny lobster on a restaurant menu, you know how difficult it is to find. With boat prices of \$16-25/lb (boat price is the price that the fishermen are paid for their catch), most restaurants aren't willing to sell the local lobster and the few that do are high-end, white tablecloth restaurants. However, Mitch's Seafood in Point Loma, San Diego has been offering California spiny lobster every season since they opened in 2008. Mitch's is a dockside casual seafood restaurant that specializes in fresh, local, and sustainable seafood. It was established by three families with deep roots in the Point Loma fishing scene and the majority of the seafood served is either caught by a family member or by other local fishermen they know.

When asked why they sell California spiny lobster, Mitch told me that it is part who they are. As a restaurant that focuses on serving local seafood, Mitch's thinks it is important to share with their customers one of San Diego's top delicacies. They are proud to serve it and they should be. Mitch, his brother, and his two business partners all commercially fish for lobsters (Mitch is a deckhand on his brother's boat). The majority of the lobster they sell, they caught. If you are lucky enough to be sitting on the deck of Mitch's Seafood you may even see them carrying the lobsters up from the boats into the restaurant. It doesn't get fresher than that. It is also one of the reasons they can afford to sell California spiny lobster. The restaurant buys the lobster direct from the fishermen allowing them to get it at boat prices, which are lower than what most restaurants pay when they buy through a wholesaler.

You can find California spiny lobster on Mitch's menu in a variety of options. A favorite is lobster split in half and grilled with garlic, lemon and lots of butter. You may also find other delicious options such as lobster tacos, lobster bisque, and lobster corndogs. Mitch's Seafood makes sure to not let anything go to waste. The shells are boiled to add flavor to the bisque and even the small bits of meat in the legs are utilized.

While Mitch's Seafood buys most of their lobster from themselves, they will also buy from other fishermen when some of their catch is undesirable to other buyers. An example of this would be when a lobster has more than one broken leg. Most buyers won't buy these damaged lobsters because they won't survive the long trip to China or they are undesirable to their Chinese customers. Mitch's helps the fishermen out by buying them up at a slightly reduced price and then offering lobster specials like \$5 lobster tacos or lobster corndogs.

While Mitch's Seafood makes it a point to serve California spiny lobster every season, they do struggle to keep it on the menu for the entire season (October-March). The boat price of the California lobster is set by the market. The market is dominated by China and the

demand for California spiny lobster in China is huge. This creates competition among buyers and increases prices. Most of the lobster in California is caught in the first half of the season, with a significant quantity caught between opening day and Thanksgiving. It is during this time, that supply is up and boat price is at its lowest. This is when Mitch's Seafood has lobster on the menu. After Thanksgiving, the supply goes down, prices rise, and it is no longer financially feasible to keep lobster on Mitch's menu. It is not that Mitch's is trying to make a great profit off selling the local lobster. A normal restaurant marks its food up around 300 % to cover the expenses of running the restaurant, any less and a restaurant could be losing money. When Mitch's sells local lobster they only mark it up 60-70%. Mitch says that they consider it more of a point of pride to provide local lobster to their customers rather than a lucrative business decision.

Many people in Southern California have no idea that a local lobster even exists here. While Mitch's Seafood has many "lobster regulars", who return each season to enjoy the local delicacy, sometimes his staff has to educate customers on why there are no claws on their lobsters or ensure them that they are in fact local. Mitch says that in an ideal world all of the California spiny lobster would be kept in the United States. However he doesn't blame anyone for selling their lobsters to big exporting companies. As someone who has grown up around fishing he recognizes that fishermen need to make a living and that it is not easy. He just wishes that instead of importing over 90 percent of the seafood that we eat here in the US, that consumers would start appreciating the quality seafood that comes out of our own local waters and supporting our local fishermen.



### **Side Story: A Bit of History**

#### **The history of the California spiny lobster industry in San Diego according to John Law (San Diego commercial fisherman)**

Over twenty years ago, the market in Southern California was not a live lobster market and most of the lobster stayed locally. Lobsters were brought in live by local fishermen and went straight to the local processing company. In San Diego, one of the major companies was Ghio's Seafood who was also owner of the of Anthony's Fish Grotto, a local restaurant chain. Between Ghio's and a few other local processors, they bought all of the lobster from the local fishermen. "You walked in and everything went onto the scale and then straight into a big cooker, then into the chiller." After processing, the lobster was distributed to the local seafood restaurants such as Anthony's. According to John, "nothing was live, and nothing was exported." Prices were also significantly lower than they are now. Fishermen were getting less than \$5/lb for their lobsters, making a lobster dinner much more affordable for the average consumer.

Then, according to John, the boom in the Japanese economy happened and that started the exportation of live California lobster to Japan and Taiwan. With this increased demand, fishermen also started making more money. He believes this happened around 1996/1997, right around when John entered the fishery. "The price really ran up and went to \$7/lb. Everyone was ecstatic." As the season progressed, the price continued to increase, first to \$8/lb then \$10/lb.

Then around 1998/1999 the Japanese economy 'tanked.' "We [the fishermen] really suffered, because we had extremely poor production and no price." However, after that, China got involved and things rebounded pretty quickly. China became the main importer of California Spiny lobster and prices went up and continued to progress from around \$13/lb to more than \$20/lb. This is pretty much where we are today. According to John, right now what's happened is that domestic use of spiny lobster has become virtually zero or just a specialty item and the tanks that used to hold spiny lobster now hold American lobster and dungenous crab. The rest is sent directly to China.