

Santa Cruz Harbor Commercial Fishing Community Profile

California Fishing Communities Project



July 2008



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California Sea Grant Extension Program

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Cover photo of Santa Cruz Harbor by Melissa M. Stevens

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EXECUTIVE SUMMARY

National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires that fishery managers consider the importance of fishery resources to fishing communities, to provide for their sustained participation and to minimize adverse economic impacts on them, consistent with conservation objectives. Information on how specific fisheries and harbors operate, as well as how they are connected (i.e., their interdependence) is essential to meeting this mandate.

This profile of the Santa Cruz Harbor commercial fishing community provides information to address National Standard 8 and complements work being conducted by social scientists at NOAA's Northwest and Alaska Fisheries Science Centers (and others) by updating fisheries data and bringing fine-scale detail to individual harbor profiles.¹ It is part of a larger California Fishing Communities Project (FCP [conducted in collaboration with NOAA Fisheries economist Cindy Thomson]), the goal of which is to characterize individual ports and describe how regulatory, economic and environmental changes influence the commercial fishing communities of each singly, by region and for the state.

Located in Central California, Santa Cruz Harbor (SCH) is an important refuge and place of business for both resident and nonresident West Coast commercial fishery participants. Established in 1964, its current infrastructure and physical characteristics support small-scale fishing vessels (smaller than 60 feet in length) and lower volume, higher value fisheries, such as chinook (king) salmon, Dungeness crab and albacore tuna. It has been described as a "pink fish" port, one largely dependent on salmon for both its commercial and recreational fisheries. However, other fisheries such as the groundfish trawl, hook-and-line and trap fisheries have also supported local fishing operations and the harbor.

The harbor is a key socio-cultural feature of the Santa Cruz community and is important to the local economy. Revenue generated from commercial fisheries and a range of other uses contributes substantially to the tax base of the city and county of Santa Cruz, as well as the local transit district. The Santa Cruz Port District, which manages the harbor and its facilities, depends solely on user fees to support its operations. In return, the Port District provides an array of services and infrastructure that serve commercial fishermen and other harbor users. The Port District's largest expense is maintenance dredging of the harbor channel. Shoaling of the harbor entrance continues to be an issue for commercial fishing operations and places a financial strain on the Port District.

Much of the harbor's commercial fishing infrastructure (buildings, services and businesses) was developed in the mid-1980s and early 1990s. At that time there were approximately 100 to 115 resident commercial fishing vessels (and skippers) at SCH. Since then, there have been relatively few changes in infrastructure and the number of buyers. However, the number of resident commercial vessels has declined to about 40 vessels, 12 of which are considered full-time. A considerable number of transient (nonresident) vessels—about 85 in 2005—utilize the harbor to off-load, re-provision or avoid dangerous weather. One resident receiver and a handful of nonresident receivers buy product directly from fishermen each year; about 15 fishermen also market some of their own catch. Very little processing occurs on site, although it does occur elsewhere

¹ See the NOAA Northwest Fisheries Science Center's community profile work at: <http://www.nwfsc.noaa.gov/research/divisions/sd/communityprofiles/index.cfm>

within the city and county. Approximately 20 businesses within one mile of the harbor and more elsewhere in Santa Cruz County provide goods and services that support commercial fishing.

A combination of regulatory, economic and environmental factors has influenced West Coast fisheries over the last 25 years. Overall, recent fishing activity at the port (landings, ex-vessel value and number of boats) has been reduced by about half compared to the longer (25-year) term. Study participants emphasized increased fishery regulations as the primary factor affecting their businesses. Time and area closures, trip limits and quotas have led skippers to adapt by shifting effort to other fisheries or relying more on their mobility to access fisheries along the coast. In addition, regulations have affected market opportunities, in some cases limiting fishermen's ability to secure consistent markets and good prices for their catch. Fish receivers indicated that increased regulations have limited the amount of local product coming across the docks, leading some to increase their dependence on other domestic or imported seafood products. Economic viability and quality of life, SCH commercial fishing community members report, have been reduced over time due to regulatory constraints, increased operating costs, limited availability of fish (particularly salmon) and uncertainty about future restrictions. They are concerned about the impacts of these factors, in turn, on the well-being and viability of the harbor, support businesses, the local fishing community and those of the larger Monterey Bay area.

ACRONYMS

CDFG	– California Department of Fish and Game
CPS	– Coastal Pelagic Species
EEZ	– Exclusive Economic Zone
FCP	– Fishing Communities Project
FMP	– Fishery Management Plan
HMS	– Highly Migratory Species
MLMA	– Marine Life Management Act
MSA	– Magnuson-Stevens Fishery Conservation and Management Act
MSY	– Maximum Sustainable Yield
NMFS	– National Marine Fisheries Service
NOAA	– National Oceanic and Atmospheric Administration
OY	– Optimum Yield
PacFIN	– Pacific Fisheries Information Network
PFMC	– Pacific Fishery Management Council
PSMFC	– Pacific States Marine Fisheries Commission
RAP	– Rapid Assessment Process
SFA	– Sustainable Fisheries Act

INTRODUCTION

Commercial fisheries have a long and rich socio-cultural and economic history in the state of California. An abundance of marine life thriving in diverse coastal habitats has provided much to harvest, initially for native peoples and later attracting immigrants from diverse places and cultures (Lydon 1985; Mangelsdorf 1986; Lydon 1997). Fisheries have provided both sustenance and a coastal livelihood to many generations of Californians. Some of the species that have defined California's commercial fishing heritage over the last 200 years are abalone, salmon, sardine, tunas, groundfish (such as halibut and rockfish), Dungeness crab and market squid.

Today more than 20 commercially active fishing ports and many more small landing sites along the California coast contribute upward of \$150 million to the state economy each year (DBW 2002). These fishing ports and the communities they represent have experienced a great deal of change in recent years. For example, between 1996 and 2005, the ex-vessel value of California fisheries has declined from \$214 million to \$108 million and the number of active commercial vessels has declined from 3,108 to 1,786.² These changes—along with increasing regulations and operating costs (particularly fuel), aging infrastructure and high uncertainty regarding the nature of future fishery regulations—present serious challenges to the resilience of California fishing communities and effective management of marine resources.

Santa Cruz Harbor (SCH) is part of a network of commercial fishing ports that play a vital role in supporting commercial fisheries in the Central Coast region and beyond. There are three ports within Monterey Bay (Moss Landing, Monterey and Santa Cruz) and another four (Avila, Morro Bay, Princeton/Half Moon Bay and San Francisco) within 100 miles (Figure 1). Each of these ports has a unique identity and fills a niche in the region's and the state's fisheries system. Given the proximity of Santa Cruz Harbor to other ports and the extensive geographic range of many local fisheries, fishermen utilize not just their home port, but also others within and beyond the region. Shoreside receivers and distributors also operate among a network of ports. Buyers may have permanent receiving stations at one or more ports, but may also send trucks to other ports closer to the fishing grounds to receive the catch, then truck it to processing or cold-storage facilities, or to wholesalers or retailers elsewhere. Some buyers do not have receiving stations, but travel to one or more ports to receive the catch. Still others are fishermen who sell their catch directly to the public or process it before selling it to another business or consumers. Because fishing operations are complex, dynamic and influenced by variability and change over space and time, it is important to understand the human dimension of fisheries locally, regionally and coastwide.

² Pacific States Marine Fisheries Commission (PSMFC) PacFIN data, <http://www.psmfc.org/pacfin/data.html>



Figure 1. Major Central California fishing ports. (Credit: R Rizzo, NOAA Fisheries)

The Fishing Communities Project (FCP) was initiated in 2005 to fulfill a need for community-specific information on how fishery regulations (and other factors) influence fisheries and fishing communities over time. An understanding of how specific fisheries and harbors operate, as well as how they are connected (i.e., their interdependence), can provide fishery managers with information needed to predict regulatory impacts on communities, as required by National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA):³

Conservation and management measures shall, consistent with the conservation requirements of the Act, take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities (PL104-297 Sec. 301(a)(8)).

The MSA defines a fishing community as “a community that is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators and crew and U.S. fish processors that are based in such a community” [50CFR 600.345(b)(3)]. A

³ The 1996 SFA added National Standards 8, 9 and 10 to address fishing communities, fishing vessel safety and bycatch, respectively.

fishing community also includes the people, businesses and facilities that provide goods and services that support fishing activities. These include gear and equipment sales and service; vessel haul-out, repair and maintenance; electronic, refrigeration and hydraulic services; fuel, ice and bait; launch ramps, unloading docks and hoists; processing, cold storage and trucking (for the catch), dry storage (for equipment) and amenities such as bathrooms (showers), laundry and groceries. In addition to private businesses, fishermen depend upon harbor services and infrastructure to conduct many aspects of their operation. For example, they need dock space, fresh water and electricity to berth their boats. Together, these types of businesses provide the infrastructure that is essential to the effective operation of fisheries and harbors.

Fishing communities develop specialized networks that are unique to place and change over time as fishery and larger social, cultural and economic conditions change. Fishermen and businesses (along with their families) immigrate to or emigrate from the community, changing the demand for support businesses, goods and services, as well as the volume and value of catch coming across the docks. Other types of communities (e.g., occupational communities, communities of interest) are also appropriate for describing the social and economic organization of fisheries.

To provide and/or support this infrastructure—much of which serves other harbor users as well—most ports rely on revenue from user fees (e.g., slip rental) and business rental income. If fishing activity lessens, so does demand for supplies and services. If there is no substitute for the loss of revenue (and especially if there is no warning), businesses and the harbor community itself experience economic stress, which in turn has consequences for the larger community and the region.

This document provides a profile of the Santa Cruz Harbor (SCH) commercial fishing community, including background on relevant California fisheries and their management; a brief history of Santa Cruz fisheries and the harbor; a detailed description of present-day fishery operations, activities and associated infrastructure; and discussion of some of the key regulatory, economic and environmental factors that interact with and affect the local commercial fishing community.

The information presented is based on archival and field research conducted in 2007.⁴ Fieldwork conducted between February and May 2007 included observation, informal and formal interviews and two small group meetings at SCH. These activities engaged 15 local fishermen, four fish buyers, the owners of two fishery-support businesses and the port director. Field data were analyzed together with fishery landings data from the PacFIN database and other secondary sources to better interpret patterns, variability and change within and across local fisheries and the community over time. Although not necessarily representative of the population of SCH fishery participants, those who took part in small group sessions for this project (n = 12) ranged in age from 39 to 83 years (mean = 60 years), had an average of 31 years of fishing or industry experience and had fished out of Santa Cruz for 26 years on average (range = 10–40 years).

Background on California Fisheries and Their Management⁵

California fisheries have been managed since the mid-1800s, when the state Fish and Game Commission—the first wildlife management agency in the nation—was

⁴ For more detailed methodological information, see Appendix B.

⁵ For more detailed information on individual fisheries, see Appendix A.

established in the state constitution. In 1953, the federal Submerged Lands Act authorized state control over the use of marine resources in waters within three miles of shore. Twenty-three years later, in an effort to “Americanize” U.S. fisheries, the federal government passed the 1976 Magnuson Fishery Conservation and Management Act (later re-named the Magnuson-Stevens Act (MSA)), which designated the nation’s Fishery Conservation Zone from 3–200 nautical miles from the coast. It also established eight regional fishery management councils and required the development of fishery management plans (FMPs) to manage commercially and recreationally important fisheries occurring in federal waters and in some cases, state waters.

The 1970s saw significant growth in California’s commercial fisheries (Figure 2). Factors influencing this growth included: 1) passage of the MSA and other legislation, which excluded foreign vessels from U.S. fishing grounds, 2) technological advances in fishing gear and methods (e.g., nylon nets and line, onboard refrigeration, sonar to more efficiently find fish) and, 3) low-interest government loans and other incentives to develop fishing capacity. At the time it was relatively easy to enter fisheries, seafood prices were relatively high, start-up costs were moderate and regulations were few.

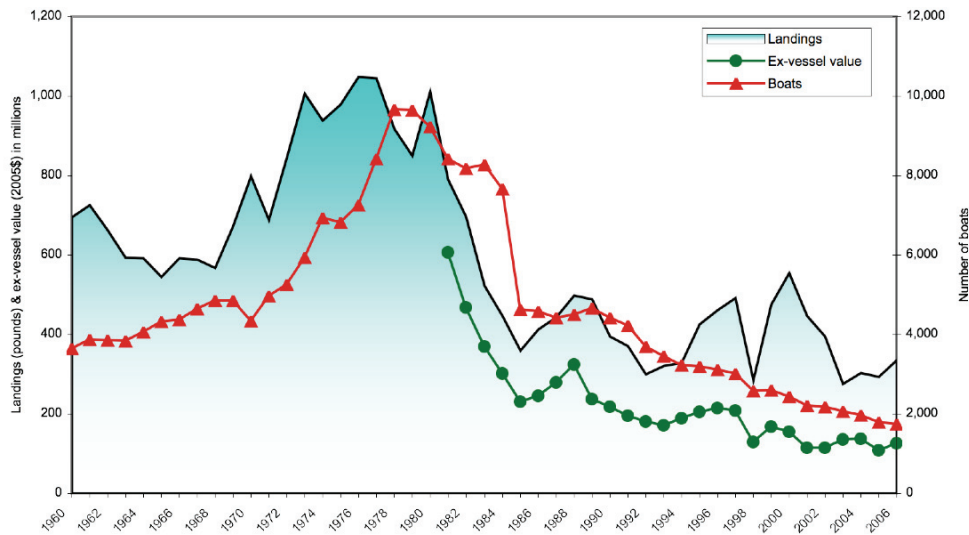


Figure 2. Total landings and number of boats for California commercial fisheries, 1960–2006. (Source: CDFG Fish Bulletins 1960–1980 and C. Thomson, PacFIN data 1981–2006) Notes: 2006 data are preliminary; secondary axis for boats.

By the early 1980s, however, growth in the fishing industry slowed as concern among federal and state managers and fishermen about overfishing mounted. Most California fisheries experienced considerable variability and change over the ensuing decade. Several fisheries (e.g., salmon, tuna and later, groundfish) contracted in response to regulatory and economic pressures. At the same time, the sardine fishery continued to rebuild (and was designated “rebuilt” by the state in 2000) and the squid fishery grew.

A number of federal and state regulatory events in the 1990s led to further changes in the state’s fisheries. In 1996, Congress re-authorized the MSA (known also as the Sustainable Fisheries Act (SFA), PL 104-297), adding National Standards to reduce bycatch, limit the negative impacts of management on fishing communities and promote

safety at sea. In addition, the SFA included mandates to protect “essential fish habitat” and identify and rebuild “overfished” species. In 1998, the California legislature passed the Marine Life Management Act (MLMA). Similar to the MSA, the MLMA required the development of Fishery Management Plans (FMPs) and other measures, including the conservation (through management) of whole ecosystems (including human elements) through the use of sound science and stakeholder involvement in the implementation of FMPs (Weber and Heneman 2000). It also delegated commercial fishery management authority from the Legislature to the Fish and Game Commission. Until then, the state’s commercial fisheries had been managed primarily through legislative directives to the California Department of Fish and Game (CDFG), while recreational fisheries were managed by the Commission.

Fishery activity (landings, number of boats and revenue) in California over the past 50 years reflects periods of expansion and contraction influenced largely by technology, regulations and the dynamics of resource availability, fishing effort and market conditions (Figure 2). With the influx of more vessels beginning in the early 1970s, total landings peaked again in 1977 and the early 1980s, but declined sharply thereafter for a number of reasons, most notably the relocation of Southern California tuna canneries offshore to American Samoa and the implementation of limited entry on the salmon fishery in 1983. Other factors have influenced overall fishing activity, including, for example, the 1997–1998 El Niño. This environmental event led to a dramatic drop in landings for the state’s largest fishery, California market squid. Despite declines in other major fisheries, such as groundfish and salmon, total reported landings have increased in the early part of this century. This is largely due to an increase in the landings for market squid and Dungeness crab.

By the late 1990s and into 2000, stock assessment scientists determined that some commercially important stocks were overfished, particularly rockfishes (*Sebastes* spp.). To comply with rebuilding policy, state and federal fishing regulations became extremely restrictive. For example, in 1999–2000, the West Coast commercial groundfish fishery, a large and important fishery in terms of the number of boats and the volume and value landed, was sharply limited to rebuild overfished stocks of rockfish. Fishermen shifted their effort to other fisheries, supplemented their income with other types of work, or left the industry altogether. This, and other more recent restrictions (such as the significantly reduced 2006 season and a complete salmon closure in 2008), have had pronounced impacts not just on fishermen, but also on the fishing communities and shoreside businesses that support them.

SANTA CRUZ COMMERCIAL FISHING COMMUNITY HISTORY

The Santa Cruz Small Craft Harbor (SCH), located in Central California, was built in the early 1960s to serve small-scale commercial and recreational users.⁶ Its present day commercial fisheries, infrastructure and associated community described here are the product of a long fishing history that pre-dates the establishment of the harbor and has been further shaped by a dynamic and complex set of regulatory, economic and environmental factors.

The first commercial fishermen on record in Santa Cruz County were Chinese immigrants who established a small camp near New Brighton beach in the 1850s. Lack of rail transportation, however, limited their ability to bring large volumes of fish to market. By the 1880s, a rail line to San Francisco had been established (via Watsonville) and another immigrant group, the Genovese Italians of Riva Trigoso, became the dominant participants in the burgeoning Santa Cruz commercial fishing industry. During this time, Santa Cruz was largely focused on the lime and timber industries, but as timber resources and demand for natural lime diminished, fishing became more important. By the early 1900s there were almost 100 boats daily unloading their catch of rockfish, sea bass, salmon, flatfish (halibut and sole) and albacore tuna (Lehman 2000).

The municipal pier (the present day Santa Cruz Wharf), built by the city in 1914 to replace the ailing railroad wharf, quickly became the hub for commercial fisheries. Fishery participants raised and lowered their boats to the water with davits (hoists), processed and sold their catch and generally used the wharf as their offices and community space. Throughout the 1920s and 1930s, the height of the sardine-canning boom in Monterey, fishing was very prosperous throughout the bay. However, World War II dramatically changed the lives of the region's Italian and Japanese fishing families and its fisheries as well. In 1942, Executive Order 9066 prohibited U.S. citizens of Italian and Japanese ancestry from entering coastal areas. Many families were forced to move inland and their boats were lost or confiscated by the government. Hundreds of men were sent to internment camps or overseas to fight in the war. Many fishing families left the area or stopped fishing altogether. The prosperity experienced by Santa Cruz's fishing community never fully recovered.

In the late 1930s, a U.S. Army Corps of Engineers survey of coastal areas determined Santa Cruz to be a good location for a harbor. In a 1950 general election, the Santa Cruz Port District was established to provide for and manage harbor facilities. Additional feasibility research was conducted by the Corps and presented to Congress in 1958; legislation followed for the purpose of creating a navigable harbor and place of refuge for small boats (Cotton and Associates 1980). Federal funds and local property taxes supported the design and construction of the harbor, which opened in 1964 with 360 berths. Demand for berths was high, so an upper harbor was constructed, opening in 1973 with 560 additional berths. As recreational and commercial fishing activity around the harbor grew, fishing activity at the wharf slowed. When the davits were removed from the wharf in the late 1960s, the harbor became the new focal point for commercial fisheries in Santa Cruz (Figure 3).

⁶ Although beyond the scope of this profile, it is important to also understand recreational fisheries and other sectors of the harbor community and the connections among them.

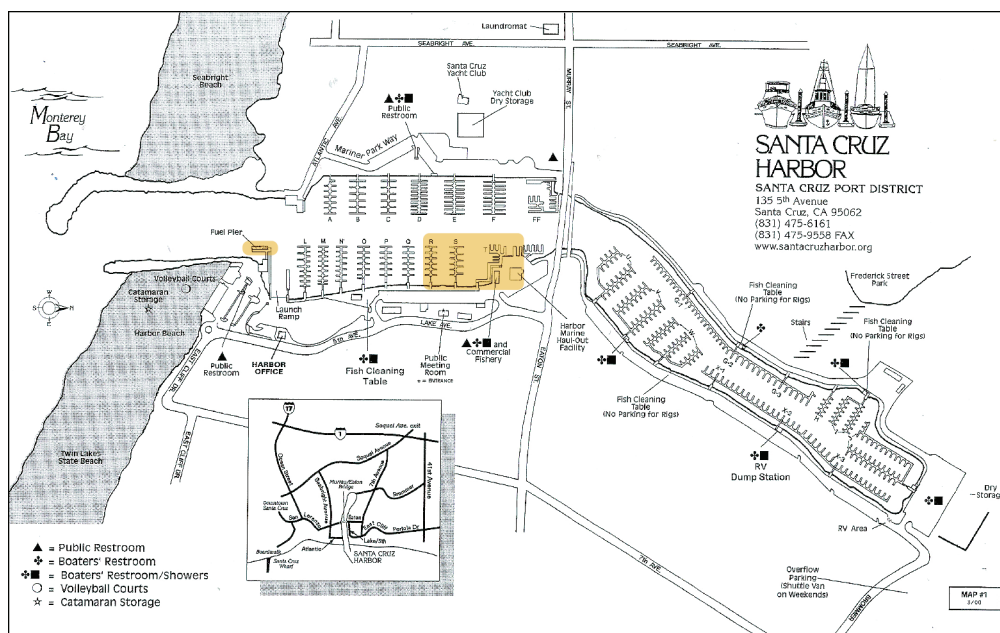


Figure 3. Map of Santa Cruz Harbor with primary commercial fishing activity and infrastructure highlighted (in orange). (Credit: Santa Cruz Port District)

As the fishing industry expanded statewide through the 1970s, so too did the commercial fishing community at SCH. In 1979, there were approximately 115 commercial fishing vessels berthed in the harbor and the Port District made plans to improve facilities to better support the local fishing industry (Cotton and Associates 1980). In 1984, the Port District began to develop these facilities, which included a fish offloading pier and buying station, cold storage and an ice plant. In the 1990s, two additional economic development grants supported the development of a restaurant above the fish offloading site and additional berthing space. The goal of this development was not to encourage higher volume operations, but to sustain existing commercial fishing and an increasingly diverse set of activities in the harbor.⁷ The last two decades of fishing activity have been variable, due to availability of and access to fishery resources, market changes and the presence or absence of specific receiving businesses. Generally speaking, SCH has retained its fishery infrastructure along with a sustained, but more modest, level of fishing activity compared to the “boom years” of the late 1980s and early 1990s.

THE SANTA CRUZ COMMERCIAL FISHING COMMUNITY

Commercial Fishing Operations

The primary fisheries at Santa Cruz currently include chinook or king salmon (*Oncorhynchus tshawytscha*), Dungeness crab (*Cancer magister*), albacore tuna (*Thunnus alungunas*) and groundfish (various species). Fast-moving pelagic species such as salmon and albacore are caught using troll (hook-and-line) gear. Crab are caught with pots; and groundfish, which were formerly caught mostly with bottom trawl gear, are now

⁷ B. Foss, Santa Cruz Port Director, pers. comm., May 16, 2007 and January 17, 2008.

primarily caught using hook-and-line. Bottom dwelling sablefish are caught with line gear or baited traps. Most of these fisheries are seasonal as a function of resource availability—affected by climate, weather and other factors—and regulations that define when, where and how each fishery is allowed to operate (Figure 4).⁸

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
Salmon												
Albacore												
Groundfish ⁹												
Dung Crab												

Figure 4. Seasonality of major commercial fisheries at Santa Cruz Harbor, given regulations; the salmon fishery was closed in 2008.

As is common in fisheries, fishing operations that land at SCH vary greatly in their level of activity. Of the approximately 40 resident operators (i.e., skippers), about a dozen (or 30%) are full-time. Full-time skippers depend on fishing for their livelihood and fish year-round, as resource availability, weather and regulations permit. Twenty-eight resident, part-time skippers focus primarily on salmon during the summer season and depend on other sources of income in addition to fishing. In addition to resident vessels, a number of transient vessels use the harbor each year.¹⁰

Fishing operations may be categorized as day-boats or trip-boats. Whereas most day-boats are resident at SCH, the trip-boats include a mix of residents and nonresidents. Most resident full-timers are also trip-boat operators who combine salmon and albacore trolling in the summer months with sablefish and/or rockfish hook-and-line or pot gear fishing, and in a few cases crab pot fishing, during the rest of the year. Trip-boats venture out for two days to several weeks to follow the fish—especially salmon and albacore. If the fish and a willing buyer are nearby, they deliver their catch at SCH. Otherwise, they deliver to ports nearer the fishing grounds (that vary by year), ranging as far north as Oregon and even into Washington. Day-boats, which are often smaller vessels and not equipped for long-distance trips, leave port early in the morning to fish nearby, primarily for salmon and groundfish, then return to SCH the same day to unload their catch.

Santa Cruz Harbor Seafood Receiving, Processing and Marketing

Fish receiving and processing capacity at SCH consists of one resident buyer and a number of other local buyers, including some who sub-lease space from the resident buyer for small-scale processing for local markets. In addition, a processor/wholesaler/distributor of locally caught seafood is located near the harbor in downtown Santa Cruz. In 2005, at least 12 of the 38 entities that received fish at Santa Cruz, including fishermen who sold their own and in some cases others’ catch, were based in the Santa Cruz area. The other buyers—including a few fishermen who market their own catch—are based as far north as Bellingham, WA and as far south as San Diego.

⁸ For further information on individual fisheries, see Appendix A.

⁹ The groundfish fishery is open year-round but subject to bi-monthly cumulative trip limits and seasonal closures for some species.

¹⁰ Roughly 5,000 to 5,600 visitor-nights are spent each year by boaters; approximately 10–20% of those are commercial fishing vessels (B. Foss, pers. comm., February 12, 2008).

Most of the catch landed at Santa Cruz undergoes little if any processing, due to: a) the local availability of species that consumers prefer in relatively unprocessed form, b) fishermen’s emphasis on those higher value species, c) the harbor’s small size and limited receiving capacity and, d) the limited local processing capacity. The catch is landed fresh or frozen at sea, and is sold to consumers whole or as filets or steaks, or live (especially crab). SCH fishermen sell their catch to a fish buyer (resident or nonresident), to restaurants and grocers in the region or, with additional permits, directly to consumers through off-the-boat sales, farmer’s markets and other means (Figure 5).

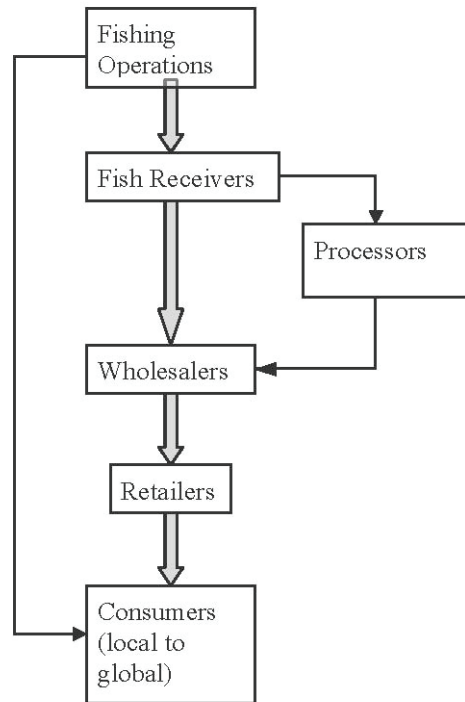


Figure 5. Pathways of seafood landed at Santa Cruz Harbor.

Port Infrastructure and Support Businesses

SCH’s commercial fishery participants (fishermen and fish buyers) depend on infrastructure, including specifically outfitted buildings, equipment and goods and services provided by the Port District and other local fishery-support businesses (Table 1). More than 60 businesses at or near the harbor provide goods and services that support commercial fishing, recreational fishing, recreation, tourism and other uses. Of these businesses, about 20 directly support commercial fishery participants. Although specific needs vary by fishery, the fishery-support businesses most commonly used by commercial fishermen at the harbor include marine supply, bait-and-tackle shops and electronics services. They also use hydraulics services, a marine surveyor, restaurants, grocery stores and laundromats located in town.

Table 1. Santa Cruz Harbor user groups, infrastructure and services, as of June 2007.¹¹

User groups	Harbor-owned infrastructure	Harbor services	Resident business types
Commercial fishing	Docks/slips (935 wet, 275 dry)	Bilge pump-out station	Fish buyer (1)
Commercial charters (for fishing and other purposes)	Launch ramp	Oil recycling station	Electronics services (1)
	Parking	Bathrooms/shower	Marine supplies (2)
Recreational fishing (charter, private boat and shore-based)	Fuel dock	Dredging/maintenance of harbor channel	Bait/tackle shops (2)
	Offloading facility	Visitor berthing	Restaurants (5)
Pleasure boats (sail and motor)	- Hoists (3)	Fuel, water, ice	Boat yard (1)
	- Ice (~15 ton/day, wet and dry)	Dock power	Canvas shop (1)
	- Receiving/processing	Waste disposal and recycling	Sign maker (1)
Community residents	- Cold storage	RV park	Boat broker (2)
		Dry storage	Kayak shop (1)
Tourists			Dive shop (1)
			Commercial divers (4)

The Port District provides many services (e.g., maintenance dredging) and owns the physical infrastructure at the harbor, including a receiving station (for offloading), a fuel dock, 935 berths (for recreational and commercial vessels), a five-lane launch ramp, dry storage and bilge, sewage and oil pump-out facilities.¹² In 1986, the Port District purchased its own dredge to keep the harbor entrance and channel open and to improve access to berths and other harbor facilities. The fuel dock is operated by a local sport fishing and marine supply shop. The receiving station is operated by the resident fish buyer and includes three hoists, an ice machine and a 2,000-square foot processing and packing building with cold-storage capacity. Access by large refrigeration trucks is somewhat limited by the steep, narrow driveway between the street and the offloading/receiving area.

Fishing Organizations

In the 1960s, the Santa Cruz Commercial Fishermen’s Marketing Association (SCCFMA) was formed to represent local commercial fishing interests. The organization initially functioned under the bylaws of the larger Pacific Coast Federation of Fishermen’s Associations and was funded by a \$0.06 per pound self-imposed landing tax. Its main goals were to lobby on behalf of the SCH commercial fishing sector and to have a unified voice in dealing with the Santa Cruz Port District Commission. Although it has struggled financially at times due to fluctuating membership (often related to the ups and downs in fisheries and the ebb and flow of management issues), the SCCFMA has remained a unifying voice for the community. The SCCFMA currently has more than 60 members, including more than 50 fishermen, two buyers and fishery-support business operators.¹³

¹¹ Does not include off-site, local businesses.

¹² The harbor has no moorings. Berth sizes range from 20 to 60 feet. See <http://www.santacruzharbor.org/education/rates.pdf> for further information on services and rates.

¹³ M. Stiller, President, SCCFMA, pers. comm., June 27, 2007.

COMMERCIAL FISHERY ACTIVITY AT SANTA CRUZ HARBOR

Fishing activity at SCH has varied considerably over the last 25 years (1981–2005), ranging from a low of 280,000 pounds in 1983 to more than 4.6 million pounds in 1990. The ex-vessel value of landings has ranged between about \$5.1 million in 1988 (2005 dollars, Figure 6) and just under \$600,000 in 2001. The number of boats with landings at the port has also ranged widely, from 374 in 1989, to 94 in 2002. A small number of fishing operations account for a majority of the landed value of fish at SCH. In 2005, for example, 12 fishing operations—about 10% of those that landed at SCH—accounted for about half of the ex-vessel value of commercial fishery landings at the port. Thirty vessels accounted for 75%, and 72 vessels accounted for 95%, of the ex-vessel value of commercial fishery landings at the port. In recent years (2001–2005), there has been markedly less activity—about 50% less on all three measures, and somewhat less variability from year to year compared to the long term. However, both landings and ex-vessel value increased slightly from 2003 through 2005.

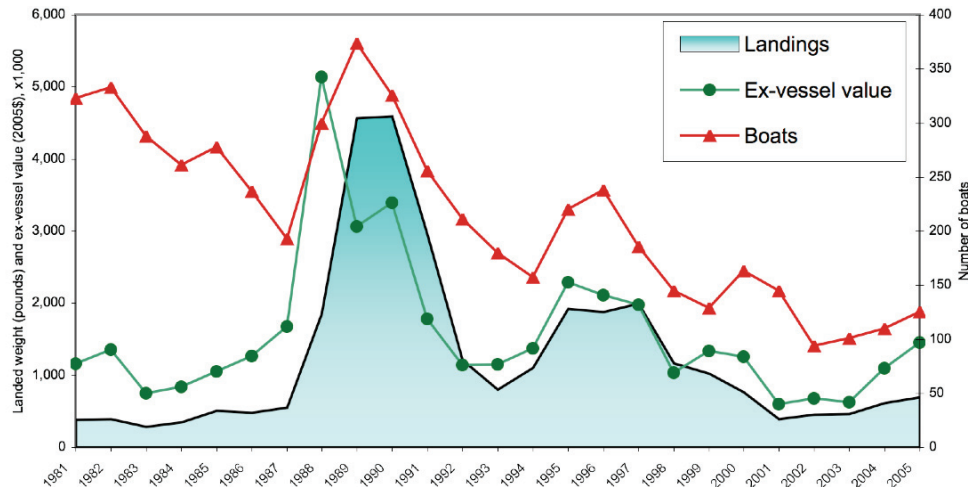


Figure 6. Number of boats, weight and ex-vessel value of commercial fishery landings at Santa Cruz, 1981–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries)

Although the average number of buyers over the long term (1981–2005) is nearly the same as the average for the recent five-year period (about 35 and 34, respectively), the number of buyers that received commercial fishery landings at Santa Cruz has varied considerably over time, both within and among fisheries. Of the 37 buyers that received seafood at SCH in 2005, most are individuals selling their own catch. Three buyers accounted for more than 60%, five accounted for more than 75%, and 13 accounted for 95% of the landed value of the catch.

Activity Within and Among Fisheries

Salmon troll and groundfish (using various gears) have been the core fisheries at SCH, together accounting for an average of 70% of the ex-vessel value of landings per year over the long term (1981–2005; Figure 7a). Salmon has retained its strong role at SCH in terms of landings, ex-vessel value, boats and buyers in the recent term (2001–2005), in contrast to groundfish—although the groundfish fisheries combined still account for a considerable part of SCH fishery activity (Figure 7b). In some years, other fisheries have accounted for a substantial portion of the pounds and ex-vessel value of landings at SCH. For example, from 1989 through 1991, CPS finfish and squid together accounted for between 65% and 69% of pounds landed and between 13% and 15% of ex-vessel value. (These data are not shown in Figure 7b to ensure confidentiality.)

Between 2001 and 2005, commercial salmon landings accounted for an average of 35% of total landings (in pounds) and almost half (49%) of ex-vessel revenues at the port (Table 2). Of the 125 boats that landed fish at the harbor in 2005, 104 (83%) landed salmon (Figure 7c). The salmon troll fishery has consistently had more buyers compared to other fisheries, averaging about 22 buyers over the long term and about 24 over the more recent five-year period. (Many of these are fishermen handling their own and perhaps others' catch.)

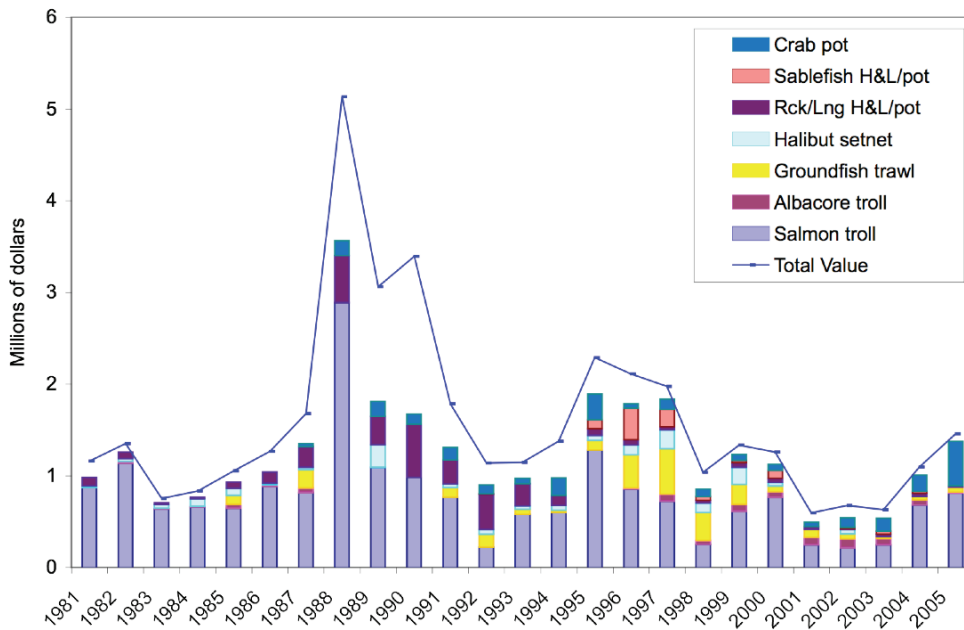


Figure 7a. Ex-vessel value (2005\$) of landings at Santa Cruz Harbor for selected fisheries and overall, 1981–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries) Note: Data for some fisheries are not reported to ensure confidentiality and/or because they are landed infrequently at SCH.

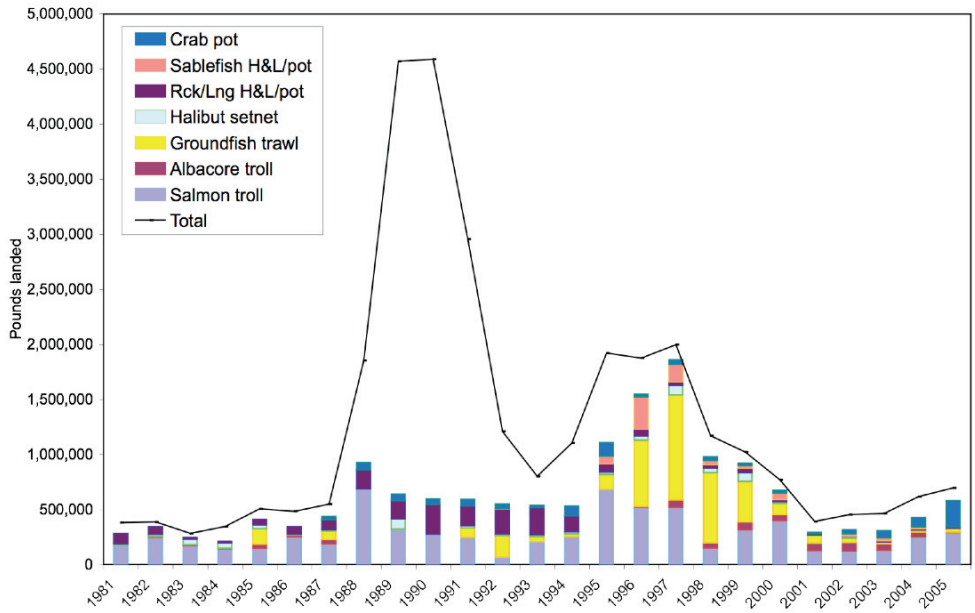


Figure 7b. Pounds landed at Santa Cruz Harbor for selected fisheries and overall, 1981–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries) Note: Data for some fisheries are not reported to ensure confidentiality and/or because they are landed infrequently at SCH.

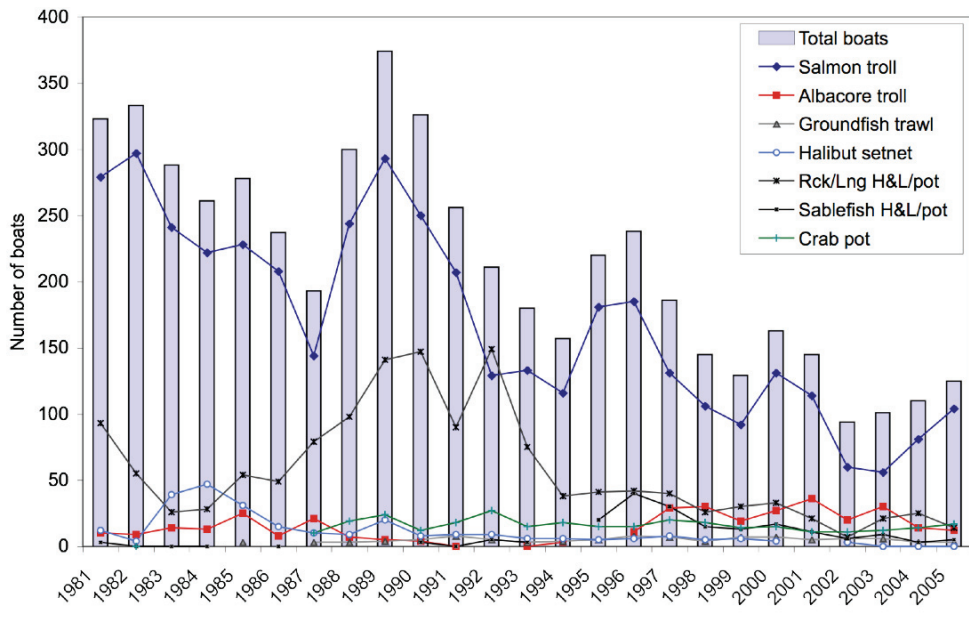


Figure 7c. Number of boats with landings at Santa Cruz Harbor for selected fisheries and overall, 1981–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries)

Table 2. Mean annual landings, ex-vessel value and number of boats for selected fisheries and overall at Santa Cruz Harbor, 1981–2005 and 2001–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries)

Fishery	1981–2005				2001–2005			
	Pounds landed	Ex-vessel value	Boats	Buyers	Pounds landed	Ex-vessel value	Boats	Buyers
Salmon troll	275,121	\$777,894	169	22	182,037	\$439,458	83	24
Groundfish trawl	208,469	143,193	5	3	34,455	50,774	5	6
Rockfish/lingcod H&L/pot	84,273	137,956	57	10	9,973	22,720	18	9
Crab pot	56,559	127,473	15	8	88,908	190,166	13	8
Albacore troll	34,737	40,219	15	6	53,281	62,355	22	10
Overall	1,255,337	1,582,947	215	35	524,023	890,274	115	34

Groundfish fisheries have also played an important but variable role at SCH. Over the 25-year period (i.e., 1981–2005), groundfish trawl landings accounted for an average of 12% of SCH landings per year and as much as 54% (in 1998), but averaged about 7% of landings and ex-vessel value for 2001–2005. No more than 6% of the boats that landed at SCH in a given year had groundfish trawl landings. Sablefish and rockfish hook-and-line and pot gear fisheries have had a small but important presence for some fishermen and buyers and at times, for the harbor as a whole. For example, in 1992, 71% of the boats that landed at SCH had landings in the rockfish hook-and-line fishery.

Figure 7a also illustrates the contribution of selected fisheries to the overall ex-vessel value from 1981 through 2005. Salmon accounted for the plurality of value for 22 of the 25 years in the time series (5-year mean = 46%, 25-year mean = 51%). Through the early 1980s, salmon accounted for more than 70% of the landed value at SCH. Groundfish, reflecting trawl, hook-and-line and gillnet fisheries for those species combined, has ranked second in value for the port over the 25-year period, first in two years (1992 and 1998) and tied for first with salmon one year (1997) (5-year mean = 11%, 25-year mean = 19%). Groundfish landings accounted for an increasing proportion of the landed value at SCH relative to salmon in the late 1980s and into the 1990s. As the groundfish fishery was increasingly restricted, especially starting in the late 1990s, its share of landed value at SCH declined.

The Dungeness crab pot and albacore troll fisheries also have been increasingly important in recent years, accounting for 27 to 28% of the ex-vessel value and 12 to 15% of the landings (by weight) for 2001–2005. On average, between 10% and 14% of boats per year landed crab (caught using pot gear) or albacore (caught using troll gear). Dungeness crab pot (5-year mean = 19%, 25-year mean = 7%) and albacore troll (5-year mean = 9%, 25-year mean = 3%) landings have accounted for a larger proportion of the landed value at SCH in recent years.

Preliminary 2006 landings data for SCH indicate that 93 vessels landed just under 300,000 pounds of commercially caught species, with an estimated ex-vessel value of about \$586,000, the lowest value in the 1981–2006 time series (the previous low was \$600,000 in 2001).¹⁴ Much of this change may be attributed to the 2006 salmon disaster, when the fishing season was cut to 98 days and trollers were limited to 75 fish per week. The most marked changes from the previous year were drops in salmon troll and crab pot

¹⁴ All 2006 landings data are preliminary.

activity and production, and a marked increase in albacore troll landings and value. Salmon troll landings and value were down 85% and 73%, respectively—although ex-vessel prices increased dramatically due to limited availability of and strong demand for wild-caught fish. Crab landings and value were down 61% and 55%, respectively. Meanwhile, albacore landings and ex-vessel value increased more than threefold, and halibut and rockfish landings and value were up 18% to 29%.

Overall, the catch was landed by 25% fewer vessels and 40% fewer trips were reported for landings at SCH in 2006 compared to 2005. The biggest change occurred in the salmon troll and groundfish trawl fisheries, with the number of trips down 65% and 69%, respectively, compared to 2005. The number of trips was down for most other fisheries, except for crab and halibut, which were up 3% and 29%, respectively, compared to 2005.¹⁵

Mobility

Mobility is a common and dynamic feature of West Coast fishing and receiving operations and is influenced not only by the location of and access to the fish, which varies intra- and inter-annually as a function of environmental and regulatory factors. It is also affected by access to receiving sites and infrastructure, and proximity to a customer base. Mobility is an important feature to consider in determining connections among port communities and how fisheries, fishery participants and fishing communities are affected by regulations and other sources of variability and change.

Mobility is evident among the vessels that deliver to SCH. For example, of the 125 vessels that delivered their catch to Santa Cruz in 2005, one-third were resident and two-thirds were nonresident. These vessels delivered to an average of three California ports that year. Forty-seven (38%) made all of their commercial landings at Monterey Bay area ports (Santa Cruz, Moss Landing and/or Monterey). About 26% (33) landed only at Santa Cruz and 23% (29) landed at only one other California port within the Central Coast region in addition to Santa Cruz. The remaining vessels delivered to between two and seven additional California ports that year. Some of these boats hail from or also deliver to ports in Oregon and Washington. Moreover, some of the skippers and crew associated with these operations also work on other fishing operations within California, elsewhere along the West Coast, and even farther away at times. Some resident Santa Cruz fishermen actually land more of their catch (in pounds and ex-vessel value) at ports other than Santa Cruz. For example, some land significant catches of albacore in northern Oregon because the fish and the receiving and processing infrastructure are located in that area. Figure 8 illustrates some of the common ranges among vessels that landed at SCH in 2005.

¹⁵ Although fishermen may catch more than one species on a fishing trip, trips as reported here are assigned to the species or fishery that accounted for the plurality of revenue for that trip.



Figure 8. The number of vessels (and trips) made between ports for all vessels that landed at least once at Santa Cruz Harbor in 2005. Some vessels and trips are omitted to insure confidentiality. (PacFIN data, Credit: C. Thomson and R. Rizzo)

The patterns among buyers at SCH suggest considerable mobility (within the state) as well. (These buyers include several individual fishermen who sell some of their own catch, as well as a number of entities whose primary activity is buying fish from fishermen.) The SCH buyers we spoke with reported that their range of potential receiving locations has widened in recent years. In 2005, of the 37 buyers that received fish at SCH, 42% (16) received fish at Santa Cruz alone, 16% (6) received at three other California ports and 11% (4) received at five ports in addition to SCH. Overall, 45% of SCH buyers relied on other ports for at least 50% of their California fish landing receipts. Many also rely on seafood imports from other states and countries to meet demands for consistent supply and to insure the viability of their business.

Connections Among Ports and Operations

SCH resident fishermen also rely on other ports to obtain goods and services and deliver their catch. Several fishermen go to Moss Landing to haul out, purchase equipment and supplies and access hydraulics maintenance and repair services. The more mobile local fishermen (trip-boat operators) obtain needed goods and services along California’s North Coast (e.g., Fort Bragg, Eureka and Crescent City) or at ports in Oregon, usually in conjunction with fishing in those areas.

In addition to the availability of goods and services, access to buyers is another important factor that influences where fishermen deliver their catch. Whereas some fishermen have standing agreements with buyers, others make arrangements while they are out fishing.¹⁶ Some buyers can readily receive catch directly or through other receivers at various ports, while others are more limited and may require that the boat deliver to them at a particular port (even if it is far from the fishing grounds). Many North Coast ports have substantial capacity for fish receiving and processing, which is important for Santa Cruz’s more mobile commercial fishermen.

SCH fishermen identified six key considerations in choosing to deliver or re-provision at a certain harbor: 1) maintaining quality of the catch, 2) access to a buyer offering a good price for the catch, 3) quick turn-around time (i.e., offload, re-provision and head out again), 4) cost of travel between ports and to and from the fishing grounds, 5) safety (as a refuge from severe weather and for entering and leaving the port) and, 6) the location of family members and other personal considerations. They noted the overall importance of having a network of ports along the coast that could be accessed when necessary.

KEY ISSUES AFFECTING LOCAL FISHERIES

SCH’s local fisheries and fishing community have experienced considerable social and economic variability and change over the past 25 years. Pinpointing the exact cause and effect of variability and change in fisheries is extremely difficult, as several factors may be operating at once and cause feedbacks within the system locally, regionally and coastwide. Nonetheless, local fishery participants and support business operators highlight key regulatory, economic and environmental events that have affected local fisheries and infrastructure (Table 3). Some of these are addressed below.

Table 3. Key factors identified by Santa Cruz fishery participants that affect their operations.		
Regulatory	Economic	Environmental
Shortened salmon seasons Salmon and groundfish area closures Halibut gillnet closure Groundfish trawl buyback	Increasing operating costs Stagnant/declining prices Quantity—price mismatch Loss of market share	Klamath River degradation Changing marine conditions Marine mammals Dangerous weather Harbor access

Regulations

The most significant factor affecting commercial operations at SCH has been regulatory action, which participants report has in turn affected other factors (except for some naturally induced changes in oceanographic conditions). As one fisherman noted:

Through the mid 1980s and early 1990s, the regulations were such that if you couldn’t catch salmon, you could go for rockcod or something else. There were more options and this supported infrastructure. The port now depends on salmon and crab. Diversity in any industry is key [and that’s getting] harder and harder [to maintain].

¹⁶ Agreements between skippers and buyers often provide more certainty for both parties in terms of the price paid, volume sold and security of markets.

Regulations affect individuals' decision-making and behavior on the water and shore including: which fisheries to participate in; how, where and when to fish and land catch; and whether or not to invest in maintenance. Regulations also affect the profitability and economic viability of individual operations and their material and social well-being. The outcomes are manifest in a number of ways, most apparently the distribution of fishing effort and landings within and across fisheries and ports.

The most frequently noted regulatory changes include reduced or closed areas or seasons in a number of fisheries—most recently salmon, the 2003 federal groundfish trawl buyback, the state closure of gillnet fisheries in 1994, and severely reduced quotas in the groundfish fishery overall, including the hook-and-line and pot gear fisheries. Local fishery participants described some of the consequences of these actions. For example, some highlighted the shift of effort into the crab fishery associated with the groundfish fishery's increasingly tight cumulative trip limits, the rockfish conservation areas and the trawl buyback, noting that this shift has increased competition on the fishing grounds.

Economics

As with any business, economic factors that affect profits—and economic viability—are of critical and ongoing concern to local fishery participants. For fishing operations, those include fixed costs such as the vessel, gear and equipment (e.g., for navigation, safety and maintaining the quality of the catch), slip fees, permit fees, insurance and general vessel maintenance. They also include variable (operating) costs such as fuel, ice and other provisions. Study participants noted that most, if not all, of their costs have risen, while ex-vessel prices for the catch are not keeping pace and in some cases are declining, relative to costs.

Although average annual ex-vessel prices have declined for most fisheries statewide, prices at Santa Cruz have been more variable over the long term (1981–2005; Figure 9). After dropping from the \$2 to \$3 range to \$0.67 per pound in 1989, Santa Cruz prices have increased at a moderate pace, though never to the levels of the early 1980s.¹⁷ The overall local trend has been driven by salmon troll prices, which continued to drop through 1997, due to competition with imported farm-raised salmon (PFMC and NMFS 2006). Salmon prices then began to increase, reaching about \$2.80 per pound in 2005. They reached \$5.16 per pound in 2006, when salmon landings dropped sharply due to the severely restricted season. This higher price notwithstanding, salmon revenues and overall revenues per boat for landings at Santa Cruz declined from 2005 to 2006. Average annual ex-vessel crab prices at Santa Cruz have ranged from a low of \$1.10 in 1987 to a high of \$3.70 in 2001, but declined 46% through 2005, due in part to market gluts that often occur during the first weeks of the season (Deweese *et al.* 2004).

¹⁷ Prices vary by port and within (as well as across) fisheries (e.g., whether it is primarily a high-price “live fish” fishery or a lower price “dead fish” fishery).

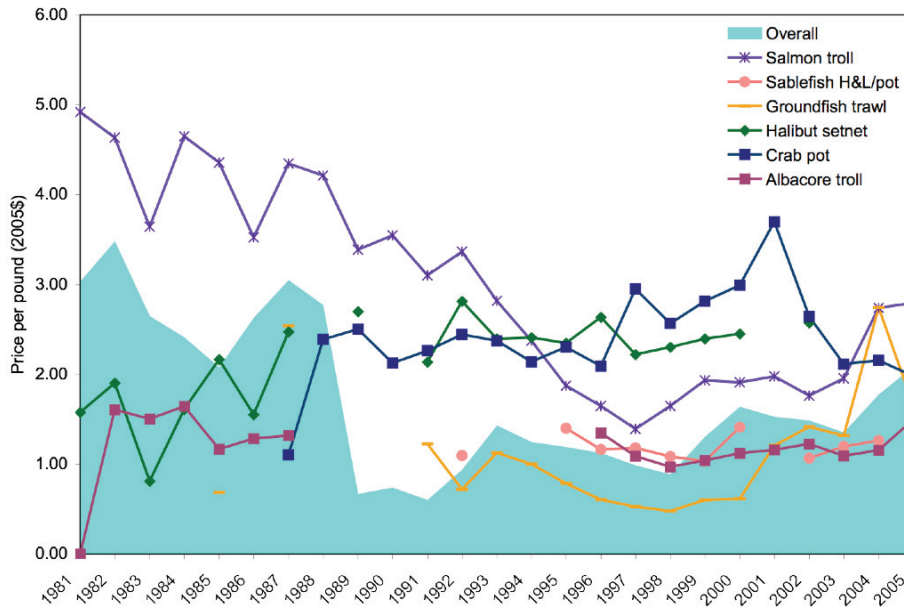


Figure 9. Average annual ex-vessel price per pound (2005\$) for selected Santa Cruz fisheries and overall, 1981–2005. (PacFIN data; Source: C. Thomson, NOAA Fisheries)

The recent rise in fuel prices has had major impacts on fishery participants’ operations. Whereas the price of vessel fuel in California was about \$1.30 per gallon (excluding taxes) in 2000, it nearly doubled to \$2.55 per gallon by 2006 (PSMFC 2007). In mid-2007, one fishery participant noted that he had just spent \$1,000 on about 300 gallons of fuel for his vessel, reflecting the local fuel price of more than \$3.00 per gallon (including taxes). As of May 2, 2008, the price for diesel fuel at SCH was \$4.82 per gallon. Local fishermen report that fuel price increases of the past three years in particular have led them to change their fishing patterns. For example, they do much less scouting for fish, rely more on information from fellow fishermen about where the fish are, and more carefully calculate the costs and benefits of traveling long distances to fish. Higher fuel prices have limited—and in some cases prohibited—traveling up the coast to fish. Fishermen also report cutting costs in other areas such as boat maintenance, hiring of crew, and home visits between fishing trips. These actions affect the safety of fishing operations and fishery participants’ overall quality of life. They also affect the amount and value of fish landed at the port and the demand for and use of local support businesses and infrastructure.

Environmental Conditions

Santa Cruz fishery participants also noted the role of environmental uncertainty, variability and change as they affect local fisheries and infrastructure. Environmental factors include weather, oceanographic and other biophysical conditions (such as freshwater inflows from coastal rivers) that affect the abundance, distribution and quality of fishery resources and fishermen’s ability to safely access and catch them. Participants highlighted the three major El Niño events of the past 25 years (1982–1983, 1991–1992, 1997–1998) and summarized their effects, noting that salmon and squid are locally abundant and accessible during La Niña and other cool-water periods, whereas albacore, other tunas, sea bass and halibut are much less abundant. When the water warms, the

latter species are more abundant, while salmon and squid become scarce. These patterns are also evident in the fishery landings data, which reflect shifts in landings among fisheries, ports and regions, correlated with these events. For example, in the past, salmon have been sufficiently abundant in the Monterey Bay area (i.e., within the home range of most Santa Cruz fishermen) during the season. As noted above, however, salmon were less abundant locally and somewhat more available in Northern California during the 2006 and 2007 seasons.

Dredging is another critical issue associated with environmental (and regulatory and economic) conditions at SCH. The harbor itself is somewhat shallow and because of its location in an area of high littoral transport (between 300,000 and 500,000 cubic yards per year from west to east) (USACE 1992); the Port District has faced ongoing challenges with respect to shoaling of the harbor mouth. Between 1964 and 1985, the Army Corps was contracted to provide yearly maintenance dredging. Concerned over delays, significant harbor closures and dangerous conditions, the Port District assumed responsibility for dredging in 1986 by purchasing its own dredge, the *Seabright*. In a study conducted in the early 1990s, Joseph (1992) determined that of all harbor users, commercial fishermen and charter boat owners are the most affected by the shoaling problem. Shoaling limits the number of hours they can fish (due to not being able to exit or re-enter the harbor, depending on tidal or other conditions) and thus their effectiveness and earning power (Joseph 1992). The current cost of maintaining the harbor channel and the dredge is approximately \$1.6 million annually.¹⁸

Complex Interactions Among Factors: The Salmon Fishery Example

All three types of factors—regulatory, economic and environmental—interact with one another within and across fisheries and ports. Examination of the SCH commercial salmon fishery illustrates these interactions and their influence on local fisheries and infrastructure.

SCH fishery participants most frequently discussed the influence of shortened salmon seasons on their fishing and harbor activities due to the need to restrict the harvest of Central Valley chinook to protect Klamath River chinook. The commercial fishing season for salmon was reduced from about 182 days in 2000 to 98 days in 2006 between Point Sur and the California-Oregon border (the area where salmon have historically been caught) (PFMC 2007a). (The season is shorter for significant portions of that region, especially as one moves north toward the Klamath Management Zone.) In addition, trollers were limited to 75 fish per week for most of the season, where the norm is 50 to 300 fish per day for active fishermen. During the more limited openings, the fish were not abundant in the southern range of the open area and catches were low. Environmental conditions (the scarcity of salmon in the Monterey Bay region) combined with strict fishery regulations, led to the lowest landings of the 26-year period (1981–2006) at SCH. One local buyer and a number of local fishermen said that although the lower volume drove up the price, total revenues did not match revenues generated during “normal” or higher-volume years when prices tend to be lower.

These conditions—extremely limited catch allowances and a shortened season combined with low availability of fish in the Monterey Bay area and sharply increasing fuel prices—presented an economic challenge to SCH fishing operations that depend on salmon for a large proportion of their revenue. Some full-time salmon fishermen and

¹⁸ <http://www.santacruzharbor.org/education/overview.html>.

buyers reported losing up to 90% of their salmon revenue in 2006. The PacFIN data indicate significant declines in the salmon fishery at SCH, with landings down 85%, ex-vessel revenues down 73%, and the number of trips down 65% in 2006 compared to 2005. Although these declines were less than those statewide (PFMC 2007a), they were still significant and of great concern to the harbor as well as fishery participants. The SCH Port Director estimated the economic impact of the potential salmon closure for the 2006 season (at the time under consideration by the PFMC) at 90 full-time job equivalents, with an estimated personal income loss (\$35,000/job) of \$3,146,500, affecting more than 60 fishing or marine-related businesses in the harbor, as well as the surrounding city and county area.¹⁹

CONCLUSION

The goals of this study were to describe the SCH commercial fishing community, its fisheries and infrastructure and discuss the primary regulatory, environmental and economic factors that have affected them over the last 25 years. SCH is a small-craft harbor, designed to meet the needs of smaller-scale fishing operations that primarily supply local and regional seafood markets and consumers with higher-value fresh and minimally processed product. Characterized as a “pink fish” port, its top fishery (by ex-vessel value) has been salmon, although historically groundfish and more recently albacore and crab, have played important roles for individual fishing operations and for the fishing community as a whole. After significant enhancements in the mid-1980s, local fishery support infrastructure has not changed dramatically over the past two decades. With the downsizing of the local and statewide fleets, however, the port has become somewhat less focused on commercial fisheries and more diversified to serve the broad range of SCH users.

Although fishing activity at Santa Cruz has varied somewhat over the long-term (1981–2005), average annual landings, ex-vessel revenue and number of boats more recently (2001–2005) have been about half of the long-term average. The most notable change to the SCH commercial fishing community over the long term is a decrease in the number of resident vessels, from around 100 in the 1990s to about 40 vessels in 2008.

These patterns reflect a number of challenges that face the SCH commercial fishing community such as increased operating costs and increasingly restrictive regulations. Fishermen generally are allowed fewer days to fish and less fish to catch compared to 10 and 20 years ago. The reduced level of fishing activity has led some local buyers to seek additional or alternative sources of fish to provide their customers and has lessened demand for local goods and services specific to commercial fishing.

Both fishermen and buyers have adapted to these challenges by spending less on maintenance, diversifying their operations to the extent regulations allow and/or using their mobility to follow the fish. Reduced maintenance (to cut costs) and longer periods at sea and away from home may increase the viability of these operations, but they also have social and economic costs (e.g., safety risks, stress) for individuals, families and the larger community. For many resident and nonresident fishermen alike, their landings and associated revenues are distributed across several ports along the California coast (and in some cases the greater West Coast). Some resident Santa Cruz fishermen actually land more of their catch (in pounds and ex-vessel value) at ports other than Santa Cruz. This

¹⁹ Letter from B. Foss to the PFMC, April 5, 2006.

dynamic is important to consider in assessing the socioeconomic impacts of management on ports and communities.

Current regulatory, economic and environmental conditions also suggest some uncertainty for the future. In addition to their practical concerns for continued economic viability, many SCH fishery participants are concerned that a way of life is beginning to disappear. They cite the attrition in the region's fishing fleets and attribute it to economic factors, frustration with regulations and the aging of local fishery participants. Some members of the SCH fishing community have a sense of loss for the marine heritage, tradition and knowledge that they feel no longer has a place of respect in the greater community.

As this report goes to press, the 2008 salmon season has been declared a coastwide disaster, following record low returns of Sacramento River fall chinook. In the coming months, state and federal scientists and others will evaluate some 48 factors for their possible role in the fishery's striking coastwide decline. State and federal disaster declarations have resulted in the allocation of funds to help fishery participants, supporting businesses and communities adapt.

Despite the challenges faced by the SCH fishing community, the consumer appetite for seafood domestically and abroad continues to increase. Although frustration and disappointment with industry changes are prevalent, many fishery participants are optimistic that continued demand for seafood will positively influence the future of commercial fisheries in Santa Cruz, Monterey Bay and the state. Some are working to build greater public awareness of local seafood products from well-managed fisheries, which they hope will sustain and perhaps increase demand for the local product.

APPENDIX A. SELECTED CALIFORNIA FISHERIES AND THEIR MANAGEMENT

To understand the dynamic interplay among fishing communities, ports and support businesses over time requires an understanding of how certain fisheries operate and how they are managed by the state and the federal government. The following overview focuses on selected fisheries' importance (historically or currently) to the Central Coast region.

The Salmon Troll Fishery

The California commercial king salmon (*Oncorhynchus tshawytscha*) fishery operates primarily north of Point Conception (34° N latitude). To catch these relatively fast-swimming fish, fishermen use a method called trolling. This type of hook-and-line fishing involves heavily weighted fishing lines that are “trolled” behind a moving vessel. The lines are attached to outrigger poles that ensure separation and are controlled by small hydraulic winches or gurdies (Figure 10). Salmon troll operators may fish for part or all of a given salmon season and engage in other nonfishing activities during the rest of the year (part-timers), or they may fish for salmon exclusively or as part of a year-round set of fishing activities (e.g., albacore, crab, rockfish fishing), with little or no nonfishing work (full-timers). Depending on the nature of the individual operation, the location of the fish and the travel capability of the vessel, fishermen may be at sea from one to several days at a time.



Figure 10. California salmon troller. (Credit: P. Olin, California Sea Grant)

Salmon trollers market their fish in a variety of ways. They may sell it (gutted and iced) directly to the public at the dock or a farmer's market, or to an intermediary such as a fish receiver, restaurant, grocery or other retail outlet. The majority of the Central Coast catch is marketed fresh as filets or steaks and served in restaurants, primarily in California.

The salmon fishery's infrastructure requirements include physical facilities and goods and services needed by other, similarly mobile fisheries. Fuel and ice are essential inputs for fishing. Bait generally is not used by most salmon trollers to reduce costs and to limit the likelihood of pinniped interactions (Pomeroy 2002). Berthing or mooring is required, as are hoists for offloading the catch. The availability of buyers—and the buyers' ability to efficiently access and use harbors and other landing sites to receive the catch—are both necessary. For off-the-boat or other local sales, fish cutting and packaging facilities that meet state and federal health standards are required. Access to nearby hydraulics, electronics, pump-out and other vessel services are also critical. The proximity of these services to landing sites is especially important for the many salmon fishermen (and

buyers) who travel far from their home ports to follow the fish and the fishery openings throughout the season.

The commercial salmon fishery is managed by both federal and state agencies. The Pacific Fishery Management Council (PFMC) manages the salmon fishery in the Exclusive Economic Zone (e.g., EEZ), 3–200 miles offshore, guided by the federal Salmon Fishery Management Plan (FMP), adopted in 1977. The salmon FMP’s key features are an annual goal for the number of spawners of the major salmon stocks (“spawner escapement goals”) and allocation of the harvest among different groups of fishermen (commercial, recreational, tribal, various ports, ocean and inland (PFMC 2007b).

The California Department Fish and Game (CDFG) manages the commercial salmon fishery in state waters (0–3 miles from shore) under authority delegated by the California legislature. In 1983, the state implemented a limited-entry permit system. Initially, 5,964 salmon vessel permits were issued; by 2000 that number had dropped to 1,704 (Leet *et al.* 2001), and in 2007 to 1,332 permits. State regulations include area quotas, minimum size limits and gear restrictions that limit vessels to six fishing lines and require the use of barbless hooks.

The timing and spatial distribution of the fishery are governed by the migratory patterns of the fish along the coast and by regulations designed to protect threatened and endangered runs of salmon and ensure adequate escapement for reproduction. In recent years, the California salmon fishery has been open from May 1 through September 30, although not all areas are open throughout the same period each year. The number of fishing days per season is lowest in the northern part of the state and increases with movement south to the U.S.-Mexico border. Commercial troll-caught salmon landings reflect this variability, with most concentrated in the San Francisco and Monterey port areas.²⁰

Since 1994, concerns for Klamath River fall chinook salmon stocks have resulted in limited seasons for the commercial salmon troll fishery statewide. The Klamath River fish mix with other, healthier stocks targeted by the commercial salmon troll fishery. Although the presence of Klamath River stocks decreases with distance from the mouth of the river, their poor condition drives “weak stock management” that limits the salmon season along the coasts of California and part of Oregon.

In early 2006, expected poor returns of Klamath River fall chinook salmon led to the most restrictive coastwide season to date, with boats limited to 75 fish per week (normal estimate is 50 to 300 fish per day) and a significantly reduced season (PFMC 2007a). These especially stringent regulations decreased the number of vessels landing salmon, from 682 in 2005, to 476 in 2006—a 30% drop. Ex-vessel revenue also decreased by more than 65%, from \$12.8 million to \$5 million.

Following extremely low returns of Sacramento River fall Chinook salmon in 2007, the PFMC adopted the most restrictive measures in the history of West Coast salmon fishing,

²⁰ The San Francisco port area includes San Francisco, Sausalito, Oakland, Princeton (Half Moon Bay), Alameda, Berkeley, Richmond and other San Francisco Bay and San Mateo County ports. The Monterey port area includes Monterey, Moss Landing, Santa Cruz and other Santa Cruz and Monterey County ports.

closing the 2008 season for commercial and recreational fisheries off the coast of California and most of Oregon.

The Dungeness Crab Pot Fishery

Fishermen use pots or traps to catch Dungeness crab (*Cancer magister*) between Avila and Crescent City (and into Oregon), with effort and landings increasing along with resource availability from south to north (Leet *et al.* 2001). Some salmon trollers and “multi-purpose boats” target crab in the winter and spring, salmon and albacore in the summer and fall and perhaps rockfish and/or other groundfish species throughout the year as regulations allow. Some of these boats are equipped to range far from port, may be at sea for several weeks and also target other highly migratory species (e.g., swordfish).

Specific infrastructure needs for the Dungeness crab fishery include receivers and/or processors capable of purchasing and offloading their live product, hoists and dock space to load and unload equipment and gear (e.g., pots, live holds) and storage space for the off season. Although they do not require ice, they do require bait as well as fuel.

The Dungeness crab fishery occurs in state waters off Washington and Oregon as well as California. Each state has its own management measures, but coordinates with the others through the Pacific States Marine Fisheries Commission (PSMFC). California divides the fishery into two components: the Central California fishery (Avila to the Mendocino-Sonoma county line) and the northern California fishery (from that line to the Oregon border). Both fisheries are managed on the basis of the “3-S” principles: season, size and sex (Leet *et al.* 2001). The fishery is closed from late spring (Central California) or mid-summer (Northern California) through late fall and only male crabs that meet a 6.25-inch minimum size requirement may be landed (to protect the reproductive potential of the populations). In addition, traps are required to have two openings for under-sized crabs to escape and be destructible so that if the traps are lost, they can open, release trapped animals and not “ghost fish.”

According to CDFG, Dungeness crab populations have produced fairly stable long-term landings for more than 30 years, and even with fluctuations in recruitment, current fishery regulations appear to be effective in maintaining the population at productive levels. Although they consider the resource to be healthy, no formal fishery management plan or stock assessments have been produced for the West Coast population (CDFG 2007a).

Following growing concerns among crab fishery participants and state resource managers about excess harvesting capacity in the fishery, a moratorium on entry into the fishery was enacted in 1995. This restricted the number of vessels to about 600, but did not effectively limit the amount of fishing effort (e.g., number of traps, vessels size) (Deweese *et al.* 2004). Decreased opportunities in other fisheries and favorable market conditions for crab have created an “intense race to fish,” which “has led to glutted markets, increased densities of crab traps on the fishing grounds and fishing in dangerous conditions leading to loss of lives and vessels” (Deweese *et al.* 2004).

The Albacore Troll Fishery

The California troll fishery for albacore tuna (*Thunnus alalunga*), a highly migratory species (HMS), is one of the last open-access fisheries on the U.S. West Coast. The fishery occurs primarily during the summer and fall as the fish migrate through the northeastern Pacific Ocean off the West Coast. Most California albacore trollers are smaller boats (30- to 50-foot) that carry one or two crew in addition to the skipper, spend

one to three weeks at sea and target albacore in coastal waters (up to 20 miles or more from shore). Some of the larger multi-purpose boats (50- to 90-foot) mentioned above operate with three to five crew, spend one to two months at sea, and may fish tens to hundreds of miles offshore (Leet *et al.* 2001).

The albacore fishery's infrastructure needs are very similar to those of the salmon fishery. Albacore trollers jig for fish using lures; few use bait (WFOA 2007). While many operations now have blast or brine freezers, some require ice to maintain the quality of the catch. Because they often travel especially long distances and make longer trips than other California fisheries, fuel is a significant factor for their operations. Currently, receiving and processing infrastructure for albacore is limited, and is located primarily in Newport, Oregon and Ilwaco, Washington.

Although the North Pacific albacore population targeted by California fishermen is believed to be relatively healthy (Leet *et al.* 2001), some members of the fishing industry are concerned that reductions in other fisheries (e.g., groundfish) could push more people into, and thereby increase pressure on, HMS fisheries (PFMC 2007c). In 2004, the PFMC adopted the HMS FMP to establish a framework for addressing issues related to HMS. The following year a permit system was established and provisions for limited entry (to control excess capacity if it becomes a problem) were developed, although entry into the fishery was not limited as of this writing.

In addition to state and federal management, the albacore troll fishery is subject to the rules of the Inter-American Tropical Tuna Commission, which is responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels in the eastern Pacific Ocean. Recently, Congress also ratified U.S. membership on the Central and Western Pacific Fisheries Commission, established in 2004 to coordinate HMS fishery management in the eastern Pacific.²¹

The Groundfish Fishery

The West Coast groundfish fishery is perhaps the state's most diverse and complex fishery. Fishermen use "fixed gear" (hook-and-line, longline, trap) and "mobile gear" (mid-water or bottom trawl) to catch more than 92 species of rockfish, flatfish and roundfish that are part of the federal groundfish fishery complex. Fishing operations range from kayaks and small (12- to 16-foot) skiffs operated by one fisherman on day trips to 60- to 90-foot trawlers (or "dragger") that carry a crew of one to three in addition to the skipper and work at sea for a few days at a time.²² Historically, the catch was landed and sold whole or processed as filets and distributed fresh or frozen locally and beyond the region. In the late 1980s, however, the live fish fishery for rockfish emerged, with fishermen delivering live product, for a markedly higher price per pound, to restaurants and grocers, especially in the San Francisco Bay and Los Angeles areas.

Infrastructure needs vary widely within the groundfish fishery. Smaller fixed-gear operations, especially those that can be trailered to the beach as well as more structured launch sites, have relatively modest requirements. These smaller operations nonetheless require fuel, ice, engine and other mechanical services and gear and equipment vendors and repair, as do larger operations. These operations require buyers and for those that

²¹ See www.wcpfc.int/ for more information.

²² <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observersamplingplan.pdf>; does not include whiting fishery.

market their catch to restaurants and grocers, facilities to process and store the catch. Fishermen can and often do travel by land to most of those services. Larger groundfish operations require access to harbors and associated berthing, offloading and (especially for trap and trawl operations) gear loading and unloading facilities and ready access to fuel, ice and, for trap and longline fishermen, bait. These operations also require receivers and processors to handle their catch, although some engage in off-the-boat sales or other direct marketing—for which processing and cold-storage facilities are also required. In addition, these operations have more substantial maintenance needs, including vessel haul-out and repair facilities and electronics, hydraulic and mechanical services.

Groundfish are managed by state and federal authorities through a number of measures, including harvest guidelines, quotas, trip and landing limits, area restrictions, seasonal closures and gear restrictions. There are four management sectors: limited entry, open access, recreational and tribal. State regulation of the fishery began in 1953 with the passage of a law that banned trawling in state waters. Through the 1980s, California groundfish regulations increasingly limited the use of gill and trammel nets. In 1994, these gears were banned in most state waters (0–3 miles from shore) to limit interactions with seabirds and marine mammals. Soon afterward, state groundfish management limited the number of lines and hooks used by set, vertical and other hook-and-line fishermen. In 1998, finfish trap regulations were implemented that limited where, when and how many traps could be deployed per vessel.

Also in 1998, the Nearshore Fishery Management Act (FMA), within the landmark Marine Life Management Act, was passed. The Nearshore FMA established minimum sizes for several species of rockfish, cabezon (*Scorpaenichthys marmoratus*) and lingcod (*Ophiodon elongatus*), established a nearshore fishery permit, and required the CDFG to develop a Nearshore FMP. Adopted in 2002, the Nearshore FMP provides for the management of 19 nearshore species using a combination of restricted access (or limited entry), management by region and marine protected areas (CDFG 2002). In 2003, 215 nearshore fishery permits were purchased by fishermen in the north, north-central, south-central and south regions. In 2007, 185 nearshore fishery permits were purchased, with about 30 permits allocated to each of the two northerly regions and about 65 allocated to each of the two southerly regions (CDFG 2007b).

Federal groundfish fishery management began in earnest in 1982 with the implementation of the Groundfish FMP, following rapid expansion of the groundfish fishery throughout the West Coast. In 1994, the PFMC instituted a limited-entry program for the groundfish fishery. Trawl, trap and longline fishermen who had participated in the fishery could qualify for a limited-entry permit. The majority of the allowable catch was allocated to the limited-entry fishery, while a considerably smaller allocation was set aside for the open-access fishery. Since then, the fishery has been subject to increasingly strict limits on the take of many groundfish species, in response to evidence of stock depletions. Six species included in the Groundfish FMP are overfished (as of this writing, down from nine in 2000), as defined by the MSA.²³ Similar to the salmon fishery’s “weak stock” management strategy, increasingly stringent regulations to protect overfished groundfish stocks constrain the fishery for healthy groundfish species, as some of the overfished stocks are found on the same fishing grounds as the abundant stocks.

²³ A species is considered “overfished” when its biomass declines below 25% of the estimated unfished (virgin) biomass. “Overfishing” is defined as occurring in a fishery when the harvest rate exceeds the prescribed fishing mortality threshold.

In January 2000, the Secretary of Commerce declared the West Coast groundfish fishery a federal economic disaster, reflecting an economic downturn for many ports and fishing businesses. The ongoing contraction of many West Coast groundfish stocks has followed two decades of poor recruitment and production, during a period of rapid growth in fishing effort (Hilborn *et al.* 2002). MSA standards require that overfished species be rebuilt to levels associated with Maximum Sustainable Yield (MSY). The rebuilding plans specify rigid limits on allowable catch, including bycatch from all sources, for each overfished species in order to meet rebuilding goals.

In summer 2002, new stock assessment results led the PFMC to develop a system of depth-based area closures—along with continuing trip limits—to manage groundfish starting in 2003. Rockfish Conservation Areas were created off Washington, Oregon and California to minimize opportunities for vessels to incidentally take overfished rockfish by eliminating fishing where and when those overfished species are likely to co-occur with healthy stocks of groundfish. Based on fishery observer and landings data, in-season adjustments are made throughout the fishing season. Fishermen must keep up to date with all rule changes—challenging given the complex and dynamic nature of the fishery.

In 2003, the federal West Coast limited-entry groundfish trawl buyback was implemented to reduce capacity in the fishery. Coastwide, 91 vessels and permits, about a third of them based in California, were removed from the fishery. More recently, privately funded groundfish trawl buybacks have further removed some capacity from the fishery. The groundfish fishery is much smaller than it was in the 1980s and 1990s, and rebuilding of some stocks has occurred. For example, lingcod, declared overfished in 1999 and subjected to a rebuilding plan in 2003, was declared rebuilt in 2005.

The Coastal Pelagic Species and California Market Squid Fisheries

The coastal pelagic species (CPS) fishery focuses on four species: northern anchovy, jack and Pacific mackerel and Pacific sardine. Together these species are traditionally known as “wetfish” because they were packed “wet” (or raw) in cans, then cooked (Leet *et al.* 1992). The fishery for California market squid is closely related to the CPS fishery in several ways, with many vessels, skippers and crew participating in both fisheries, using similar gear and fishing practices.

Fishing for wetfish commonly entails the use of purse seine gear and a drum or a power block to help retrieve the net and a fish pump to transfer the catch from the net to the hold. Crew sizes average four to five fishermen (excluding the skipper) for both the squid and wetfish fisheries (Pomeroy *et al.* 2002). Most fishing occurs at night and targets schools of CPS finfish or spawning aggregations of squid. Seiners typically make two to four sets a night of several tons each, either to reach a buyer-imposed limit or to fill the boat if no limit is in effect. When fishing for squid, seiners are usually assisted by smaller “light boats” that are equipped with high intensity lights (limited to 30,000 watts per vessel) to locate and/or attract the animals to the surface. After a night’s fishing, the vessel returns to port to deliver the catch to receivers. Most receiving stations consist of a dock facility with a shore-based pump that is used to transfer the fish from the vessel’s hold to a weighing bin with a scale. Once the fish is weighed, it is transferred to totes, which dockside laborers pack with ice. The loaded totes are then transferred by forklift to a truck for transport to the processing plant.

The wetfish and squid fisheries have substantial infrastructure needs. As with many other coastal California fisheries, wetfish and squid operations require access to harbors and

associated berthing, offloading, gear loading and unloading facilities (e.g., to change out anchovy nets for sardine nets), marine fuel service, and vessel, equipment and gear maintenance and repair services and facilities. These operations need buyers with hydraulic fish pump stations. Substantial dock space is required for pumping wetfish and squid from the boats, de-watering it and packing it into totes and loading the totes into refrigerated trucks for transport to processing facilities. Although bait and ice are not required for wetfish and squid fishing operations, receivers require ice for packing the offloaded catch into totes. Because the wetfish and squid fisheries are based on markets for block frozen or processed product, cold-storage and processing facilities within trucking distance of the harbor are needed as well.

Except for World War II, when the federal government managed the wetfish fishery to maximize production, the state of California had primary management authority for the sardine, mackerel and squid fisheries until 1998 (Pomeroy *et al.* 2002). Since the 1960s, state regulation has included quotas on sardine, mackerel and anchovy. In 1970 and 1974, respectively, moratoria were placed on the mackerel and sardine fisheries. When the mackerel moratorium was lifted in 1977, the fishery was managed under a quota, with portions allocated to the state's northern (north of San Simeon to the Oregon border) and southern regions (south of San Simeon to the U.S.-Mexico border). The directed fishery for sardine was re-opened in 1986 under a similar quota system. The state also managed the anchovy fishery through the mid-1970s, when it became subject to federal management under the Northern Anchovy FMP.

Over time, squid fishing has been regulated by the state with legislative measures that restrict the use of lights to attract squid, limit days or times when fishing is allowed and, for several years, prohibited the use of purse seines in Monterey Bay. The rapid growth of the squid fishery in the 1990s prompted increased management. In 1997, the California legislature passed SB 364, which instituted a \$2,500 permit for catcher vessels and light boats and a three-year moratorium on entry into the fishery, and mandated a study (funded by permit fees) of the resource and the fishery for the development of a squid FMP. The California Fish and Game Commission adopted interim regulations to address ongoing and new management issues and adopted the Market Squid FMP in late 2004. A limited-entry (or restricted-access) program was adopted by the Fish and Game Commission in 2004. As of 2007, there were 74 transferable and 11 nontransferable squid vessel permits, and 57 transferable and three nontransferable squid light boat permits in California (CDFG 2007b).

In 1998, Amendment 8 to the federal Northern Anchovy FMP assigned sardine, jack and Pacific mackerel and squid to the same management unit as anchovy and renamed the plan the Coastal Pelagic Species (CPS) FMP. Under the CPS FMP, sardine and Pacific mackerel are "actively managed" by the PFMC and subject to annual harvest limits based on annual biomass estimates. Anchovy, jack mackerel and squid are "monitored" species not subject to federal harvest limits, but potentially to other forms of federal and state management. In 1999, the PFMC adopted a limited-entry program for the CPS finfish fishery south of Point Arena, California, effective January 1, 2000. As of this writing, there were 77 CPS permittees. In 2000, the sardine fishery was declared recovered. Given wetfish species' sensitivity to changing environmental conditions, the PFMC uses an environmentally driven harvest control rule to achieve optimum yield in the fishery. The harvest control rule monitors average sea surface temperature to detect changes in climate known as regime shifts or the Pacific Decadal Oscillation (Mantua *et al.* 1997).

APPENDIX B. PROJECT METHODOLOGY

To gain an initial understanding of specific port communities and their commercial fisheries, we conducted port and regional literature searches and analyzed fishery landings data for 1981 through 2006,²⁴ including landings, ex-vessel revenue, and number of boats by fishery type. We then conducted meetings with local fishery participants with experience and knowledge to describe their fishing community and interpret changes in local fisheries and infrastructure. The project was guided by the Rapid Assessment Process (RAP) methodology as described by Beebe (2001). RAP consists of obtaining community members' perspectives through semi-structured interviews and group meetings, observation of the system (the harbor and/or the larger region) and triangulation of data using multiple sources to validate information. Utilizing a team approach and an iterative process, we integrated fishermen's knowledge with archival data to describe harbor commercial fishing community function and change over the last 27 years.

The archival data used here stem from commercial fish landings receipts from over four million fishing trips that occurred between 1981 and 2006. NOAA Southwest Fisheries Science Center economist Cindy Thomson reconfigured these data into 34 distinct fishery types, based on species and gear type. This dataset enables in-depth analysis of fishing and receiving activity by year and by fishery and at varying geographic scales (including port, region, state and coastwide). The comprehensiveness and flexibility of these data make them well suited to provide baseline commercial fishery information needed for ecosystem-based fisheries management.

Informed by outputs of that archival work, our field research was guided by three themes or topics: 1) describing the harbor from a community perspective (fishery emphasis, presence/absence of support businesses, critical infrastructure), 2) the relationship between the harbor and its fisheries, *and* between that harbor and other harbors elsewhere within and beyond the region (assessing connections and networks), 3) how environmental, regulatory and economic factors have influenced local fisheries and infrastructure (sources and impacts of change).

Study participants were identified using a snowball method, whereby key informants (those with particular knowledge and experience of the port and its commercial fisheries) suggested other community members who might likewise be able to provide their knowledge and insight to address the research topics. Study participants variously took part in individual or group meetings, which were guided by a set of open-ended questions related to each theme. Conversations at each meeting were recorded by a dedicated note-taker and a team debriefing immediately followed each event. Meeting notes were finalized and reviewed for accuracy, then analyzed for content related to the project themes and objectives, and compared with landings and other data for further interpretation.

The resulting port profiles are intended to summarize both historical and current fishing activity, characterize the commercial fishing community and the harbor from a fishing community perspective, and discuss the impacts of regulatory actions and other factors on the socio-economic dynamics of each port and its fishing community.

²⁴ Data for 2006 are presented in some places, but are preliminary.

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GLOSSARY²⁵

Fish Buyer – A person or business that is licensed by the state to purchase fish directly for commercial purposes from a commercial fisherman, also referred to as a **fish receiver**. In the PacFIN landings data used in this report, fish buyers or receivers include those individuals and businesses that purchase fish from fishermen, *and* fishermen who sell their catch directly to the public off the boat or by other means.

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Ex-vessel Value – The value of the catch based on the price paid to fishermen when they deliver it to the first shoreside buyer; also referred to as “landed value.” Ex-vessel value does not account for the value added by processing, wholesaling, or retailing the seafood products.

Fisherman – A person (man or woman, captain or crew) involved in the capture of finfish or shellfish.

Fishery – All of the activities involved in catching fish (including shellfish).

Fishery Participant – A person who owns, operates or works in a fish business (fishing, buying, processing, etc.) or who fishes for sport or subsistence.

Fishery-Support Business – A business that provides goods and services needed for the safe and effective operation of fishing, receiving and processing businesses.

Fishing Community – A community that is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs. Includes fishing vessel owners, fishing families, operators, crew, recreational fishers, fish processors, gear suppliers and others in the community who depend on fishing.

Fishing Operation – A business involved in fishing that includes the fishing vessel and its gear, the skipper and crew.

Fish Processor – A person or business that modifies seafood (e.g., filleting, freezing, drying, smoking, canning, packaging, value-added) and sells the resulting products to businesses other than the ultimate consumer.

Groundfish – Fish living on or near the sea bottom. The federal West Coast Groundfish Fishery Management Plan includes more than 92 species of rockfish, finfish, roundfish, sharks and skates and selected other species.

Harvest – The total number or poundage of fish caught from an area and kept over a period of time.

²⁵ See <http://www.pcouncil.org/pfmcfacts.html> for additional terms and definitions.

Harvest Guideline – A numerical harvest level that is a general objective, but not a quota. Attainment of a harvest guideline does not require a management response, but it does prompt review of the fishery.

Infrastructure – The physical buildings, other structures and equipment and associated businesses that operate them, necessary to the safe and effective conduct of an activity such as fishing.

Magnuson-Stevens Fishery Conservation and Management Act (MSA) – The federal law that created the regional councils and is the federal government’s basis for fisheries management in the Exclusive Economic Zone. Also known as the Magnuson Act.

Maximum Sustainable Yield (MSY) – The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

Optimum Yield (OY) – The amount of fish that provides the greatest overall benefit to the nation on the basis of MSY, as reduced by relevant economic, social and ecological factors; provides for the rebuilding of any overfished fishery to a level consistent with producing the MSY.

Overfishing – As defined by the MSA in 1996, the rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the MSY on a continuing basis.

Skipper – The captain of a vessel, although not necessarily the owner.

Sustainable Fisheries Act (SFA) – The Act passed in 1996 that reauthorized and amended the MSA.

