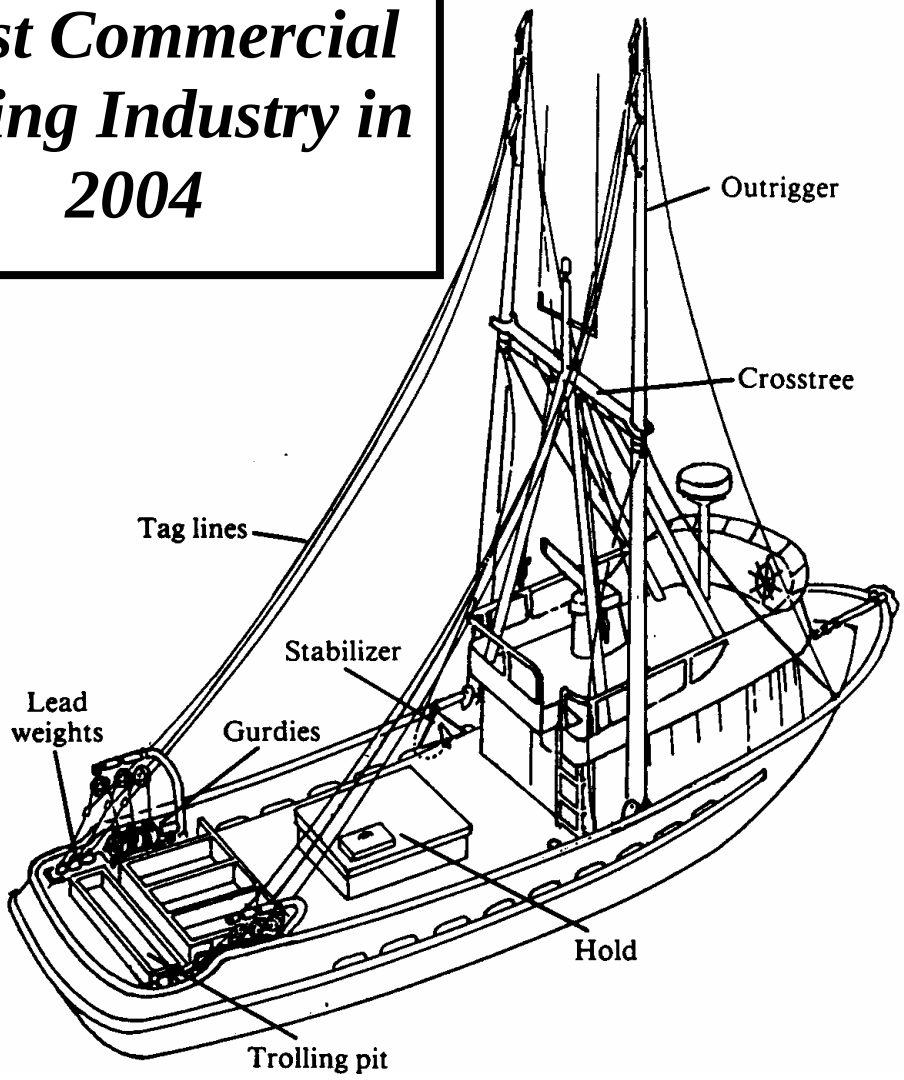
Review of the West Coast Commercial Fishing Industry in 2004



Pacific States Marine Fisheries Commission

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Review of the West Coast Commercial Fishing Industry in 2004

prepared by

The Research Group
Corvallis, Oregon

prepared for

Pacific States Marine Fisheries Commission
Portland, Oregon

September 2006

PREFACE

This study was sponsored by the Pacific States Marine Fisheries Commission (PSMFC). Dave Colpo, PSMFC directed the project and was very helpful guiding tasks to successful completion. The study was funded with a grant from the National Marine Fisheries Service (NMFS), Northwest Regional Office. Steve Freese was the NMFS funding administrator who did double duty in providing understanding and insight on the issues facing the U.S. West Coast fishing industry. The study consultant was The Research Group, Corvallis, Oregon. Shannon Davis and Hans Radtke were the principal authors. The authors were greatly assisted by Kari Olsen at The Research Group.

This study purpose is to prepare a report for lay readers interested in fishery management. The report is to have the same level and extent for Washington and California fishery descriptions that are in a serial publication describing Oregon commercial fisheries. (The Oregon report is written by this study's authors and the citation is in this report's bibliography section.) All three states would then have parallel descriptions in a single report. This study also provides updated information in a report published in February 2000 by the PSMFC. (Again, this study's author wrote the PSMFC report and the citation is contained in this report's bibliography section.) This new report liberally borrows excerpts from both the Oregon and previous PSMFC reports as applicable to new fisheries' situations.

Fish landing data is garnered from the Pacific Coast Fisheries Information Network database maintained by the PSMFC and the fish ticket and permit databases maintained by the states. Will Daspit at the PSMFC, Lee Hoines at the Washington Department of Fish and Wildlife (WDFW), John Seabourne at Oregon Department of Fish and Wildlife (ODFW), and Gerry Kobylinski at the California Department of Fish and Game (CDFG) assisted in providing the data.

This report was reviewed in draft form to provide candid and critical comments. This feedback helped make the findings of this report as sound as possible and ensures the report meets standards for objectivity, evidence, and responsiveness to the study charges. Although reviewers provided many useful comments and suggestions, they were not asked to endorse study findings and recommendations. This independent examination task was done in accordance with accustomed procedures and review comments were carefully considered.

The authors' interpretations and conclusions should prove valuable for this study's purpose. However, no absolute assurances can be given that the described results will be realized. Government legislation and policies, market circumstances, and other situations will affect the basis of assumptions in unpredictable ways and will lead to unanticipated changes. The information should not be used for investment or operational decision making. The authors and study sponsor do not assume any liability for the information and shall not be responsible for any direct, indirect, special, incidental, or consequential damages in connection with the use of the information.

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LIST OF ACRONYMS AND ABBREVIATIONS

AKFIN	Alaska Fisheries Information Network
CDFG	California Department of Fish and Game
CFEC	Alaska Commercial Fishing Entry Commission
COMES	Coastal Oregon Marine Experiment Station
CPS	coastal pelagic fisheries
DLCD	Oregon Department of Land Conservation and Development
EEZ	exclusive economic zone
EFP	exempted fishing permit
FAO	Food and Agriculture Organization of the United Nations
FCMA	Fishery Conservation and Management Act
FEAM	Fisheries Economic Assessment Model
FMA	Fishermen's Marketing Association
FMP	fishery management plan
HMS	highly migratory species
IMPLAN®	IMpact Analysis for PLANning
IPQ	individual processor quota
IQ	individual quota
ITQ	individual transferable quota
LE	limited entry
MSA	Magnuson-Stevens Act
MFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	maximum sustainable yield
mt	metric tons
NEV	net economic value
NMFS	National Marine Fisheries Service, now called NOAA Fisheries
NOAA	National Oceanic and Atmospheric Administration
OA	open access
OCN	Oregon Coastal Natural stocks
OCZMA	Oregon Coastal Zone Management Association
ODFW	Oregon Department of Fish and Wildlife
OSU	Oregon State University
OY	optimum yield
PacFIN	Pacific Coast Fisheries Information Network
PC	perturbation cycle

PDO	Pacific decadal oscillation
PFMC or Council	Pacific Fishery Management Council
PSMFC	Pacific States Marine Fisheries Commission
RCA	resource conservation area
REI	regional economic impacts
SFA	Sustainable Fisheries Act
SST	sea surface temperature
U.S.	United States
VMS	vessel monitoring system
WCSPA	West Coast Seafood Processors Association
WDFW	Washington Department of Fish and Wildlife

EXECUTIVE SUMMARY

Project Purpose

The project purpose is to prepare a report that has the save level and extent of an Oregon commercial fisheries economic description publication for Washington and California commercial fisheries. The Oregon serial publication is sponsored by the Oregon Department of Fish and Wildlife. The publication is an annual review of the commercial fishing industry and is issued as soon as possible after the previous year's landing data becomes available. It contains an outlook of fisheries in the upcoming year and provides brief descriptions of important issues about industry structure and fishery management. The National Marine Fisheries Service (NOAA Fisheries) is sponsoring the expanded report to cover Washington and California commercial fisheries through a grant administered by the Pacific States Marine Fisheries Commission (PSMFC).

Fishery descriptions include mention of management regimes in which they operate. The management regimes are from both federal and state regulations. In some cases, such as for pink shrimp management, interstate agreements outside of federal purview and management plans are included in discussions. While the data and its analysis as well as management regime descriptions may prove useful for fishery managers and others interested in the U.S. West Coast commercial fishing industry, the project's purpose was not to explain potential responses by the harvesting and processing sectors to changes in fisheries management, species abundances, seafood market conditions, or other factors that affect the earnings potential for businesses dependent on the fishing industry. The description are simply observations about trends leading up to Year 2004 with more detailed explanations about fisheries status in Year 2004.

Data Sources

Several landings and fisheries permit data sources were used to describe industry trends (see Table ES.1). The landing and permit compilations were summarized by species/gear groups

Table ES.1
Data Sources

Fishery	Data Source	Status
Washington, Oregon, and California onshore fisheries	PSMFC PacFIN Program	Vessel specific landing information
Alaska onshore fisheries	CFEC and anecdotal	Summary landings by species and gear, and vessel specific lists
U.S. West Coast and Alaska offshore fisheries	PSMFC AKFIN Program and NMFS Blend File	Vessel specific landing information
Other Pacific Ocean waters	Anecdotal	Expert estimate

Notes: 1. CFEC - Alaska Commercial Fisheries Entry Commission
PSMFC - Pacific States Marine Fisheries Commission
NMFS - National Marine Fisheries Service
AKFIN - Alaska Fisheries Information Network
PacFIN - Pacific Fisheries Information Network
USCG - U.S. Coast Guard

through Year 2004. The groupings were developed to reflect traditional fisheries definitions used in management plans or to reflect summary descriptions typically found in other briefing type reports. Example groupings would be the wetfish fishery in California or the tribal salmon Puget Sound net fishery in Washington. Where fisheries transcend state boundaries, the species/gear mapping was kept intact (such as the groundfish LE trawl and fixed gear category). This approach resulted in each state having a unique set of fishery groups. The major groupings by state are shown in Table ES.2.

Distant Water Fisheries

Distant water fisheries are discussed in general and data and economic effect descriptions are offered when the information exists from other studies. The distant water fisheries components are: (1) revenue returned to West Coast economies through vessels that make West Coast

Table ES.2
Major Fishery Groups by States

Washington	Oregon	California	West Coast
Salmons	Salmons	Salmons	Groundfish
Coastal ocean troll and in-river net	Columbia River tribal net	Lobsters and prawns	Pacific whiting
Puget Sound net	Columbia River non-tribal net	Dungeness crab	Salmon
Dungeness crab	Dungeness crab	Pink shrimp	Crab/lobster
Coastal	Pink shrimp	Pacific sardine	Shrimp
Puget Sound	Albacore tuna	Market squid	Pelagic
Pink shrimp	Groundfish	Other pelagics	Highly migratory
Albacore tuna	LE trawl and fixed gear	Tunas	Halibut
Groundfish	Open access	Groundfish	Sea urchins
Coastal LE trawl and fixed gear	Pacific whiting on-shore	LE trawl and fixed gear	Other
Coastal open access	Other coastal and Columbia River	Open access	West Coast at-sea
Puget Sound all gear	Aquaculture (shellfish)	Pacific whiting	Distant water, incl. Alaska
Pacific whiting onshore		Sharks and swordfish	
Other coastal		Sea urchin	
Other Puget Sound		Sea cucumbers	
Aquaculture (shellfish and salmon)		Other coastal	
		Aquaculture (shellfish)	

Notes:
1. Many of Washington's fisheries have tribal and non-tribal allocations, so descriptions are itemized for these two sectors where applicable.
2. Washington salmons coastal, in-river, non-Indian fishery includes Grays Harbor, Willapa Bay, and Lower Columbia River. There are many Washington salmons in-river treaty fisheries, including Columbia River above Bonneville Dam, that have itemized descriptions within major groupings.
3. Ocean groundfish are segmented for federal limited entry and open access permit status. Open access fisheries descriptions includes groundfish bycatch when target fisheries were for non-groundfish like salmon and pink shrimp.
4. Other coastal and other Puget Sound includes wild shellfish as well as finfish.
5. Aquaculture is sometimes included in states' fish ticket systems (for example, Washington oysters) and sometimes is not included (for example, California abalone). Other data sources were used to give as complete a picture as possible for this category.
6. Klamath River treaty harvests are not accounted in value and volume tables, but the fishery is mentioned in narrative descriptions.

landings and also landings in Alaska, southern Pacific Ocean, or elsewhere; (2) revenue returned by vessel owners, captains, or crewmen whose vessels hail from ports elsewhere on the West Coast, but don't harvest and deliver in the West Coast fishery; and (3) Alaska fishery permits owned by companies or individuals with addresses in West Coast states that may be leased by other vessel owners. There are also economic impacts created in regional economies along the West Coast from two other components that are not included in any project analysis: (4) vessels and processors who buy from provisioning, repair, and services businesses, but whose owners, captains, and workers live elsewhere; and (5) West Coast residents that work as crewmen, skippers, and at processors in Alaska whose vessels and businesses are not registered in Washington, Oregon, or California. All of these components' effects are generally associated with the West Coast fishing industry, but require significant investigations that are beyond the scope of this project to determine estimates. The economic contribution from distant water fisheries to West Coast economies was already estimated for Oregon, therefore specific calculations are included for that state. Only general data descriptions are made for Washington and California.

Tables ES.3 and ES.4 show vessels counts and permit earnings in Alaska onshore fisheries by Washington, Oregon, and California residents. In recent years, there have been around 400 vessels with ownership ties to Washington, Oregon, and California residences that made landings at U.S. West Coast ports and Alaska or other Pacific Ocean locations. There were about another 2,500 vessels with owner registration residency in West Coast states that fished in Alaska. Total onshore harvest revenue for Alaska permits held by residents of Washington, Oregon, and California was about $232 million in 2004. This is about 35 percent of all onshore harvest revenue. Oregon registered catcher vessels and Washington registered catcher vessels, catcher-processors, and motherships are very active in Alaska groundfish fisheries. The Gulf of Alaska and Bering Sea/Aleutian Island groundfish harvests were $625 million in 2004. About 89

Table ES.3
Vessel Counts for U.S. West Coast Fishing Fleet in 2004

Fishery	Washington	Oregon	California	Total
U.S. West Coast				
Onshore	1,151	1,306	2,082	4,111
Offshore	--	--	--	25
Motherships	--	--	--	4
Catcher-processors	--	--	--	6
Catcher vessels	--	--	--	15
Alaska	2,133	362	233	2,728
U.S. West Coast landings	194	30	9	233
Other	1,939	332	224	2,495
Other Pacific Ocean waters	74	55	79	148

Notes:
1. NA - not available.
2. Excludes vessel identifiers "ZZ.." and "NONE."
3. U.S. West Coast vessel counts among states are not unique vessels. The "total" counts for states are unique.
4. The inclusion criteria for Alaska registered vessel counts with landings at U.S. West Coast states is whether at least one landing was made at a U.S. West Coast port. This excludes vessels that may have a homeport in a U.S. West Coast state, but participate exclusively in offshore or distant water fisheries.

Table ES.4
Estimated Gross Earnings for Alaska Permit Holders by Onshore Fisheries and Residency in 2004

Fishery Group	Residents of Alaska	Residents of Washington	Residents of Oregon	Residents of California	WOC Subtotal	Residents of Other	Non-Alaska Subtotal	Total
All Fisheries Combined	422.6	422.6	71.3	20.7	514.7	52.9	567.5	990.1
Crab	40.1	92.2	11.4	0.6	104.2	9.7	113.9	154.0
Halibut	114.6	37.8	7.1	1.7	46.6	7.9	54.5	169.1
Herring	11.2	2.4	0.0	0.0	2.4	0.4	2.8	14.0
Other Finfish	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other Groundfish	48.9	196.9	42.8	10.7	250.5	5.2	255.7	304.7
Other shellfish	7.2	2.5	0.4	0.3	3.2	1.5	4.6	11.9
Sablefish	37.0	29.7	1.8	1.4	32.9	4.3	37.2	74.2
Salmon	163.5	61.1	7.8	5.9	74.8	16.7	91.5	255.0
Unknown Permit Landings	0.0	0.0	0.0	0.0	0.0	7.2	7.2	7.2

Notes:
1. Earnings are in millions of 2004 dollars.
2. Fisheries may not sum to "all fisheries combined" due to proxy earnings being used where fisheries are confidential. Proxy earnings are assigned to some permit codes where reveal is precluded due to confidentiality rules. The assigned earnings are based on the average earnings per permit for combined permit areas or combined permit residencies.
3. Fishery group definitions are different than U.S. West Coast onshore landed fisheries.
4. Some offshore fisheries earnings are not included in the tabulations.

percent of those earnings are from vessels not registered in Alaska. About 55 percent of the groundfish harvests are caught by catcher-processors or delivered to motherships and the rest to shoreside processors. The West Coast at-sea fishery harvest is estimated to be about $9.5 million in 2004 using onshore price assumptions. Similar distant water harvest values are not estimated for other than Alaska fisheries and the West Coast at-sea fishery for this project.

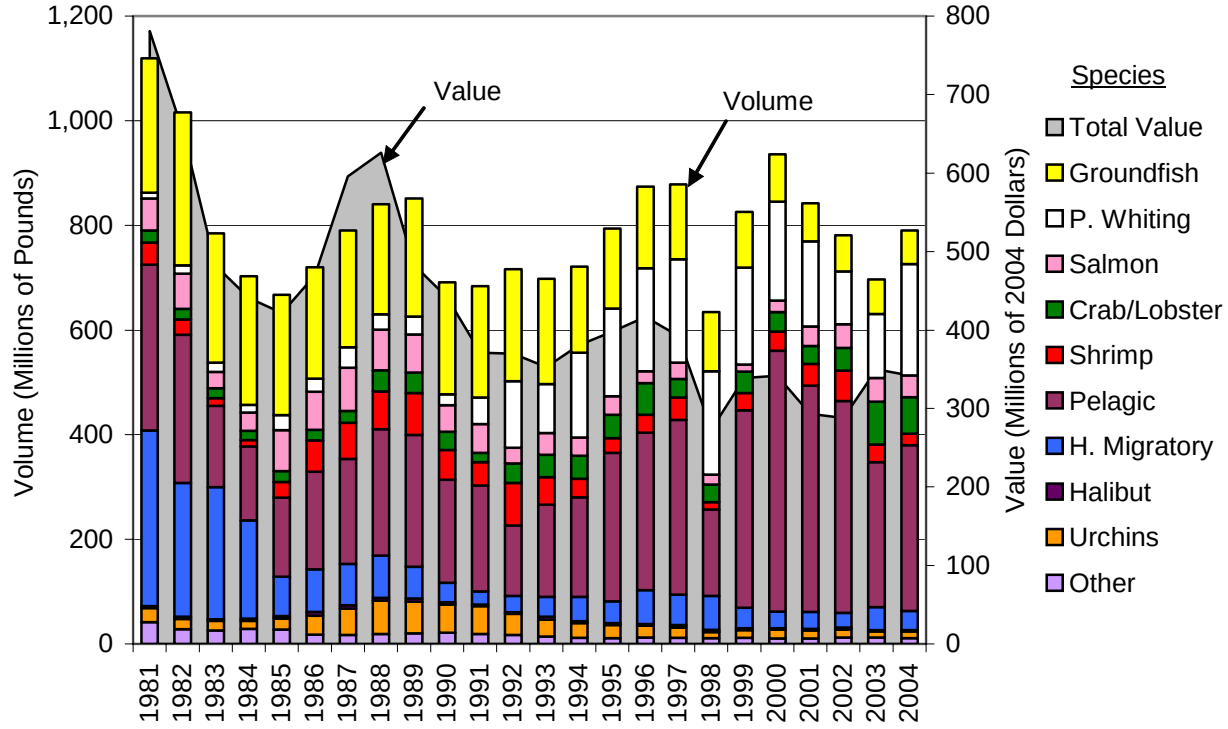
Onshore Landing Trends

Landed Volume

Historically, the U.S. West Coast ocean fishing fleet shifted from salmon and tuna toward groundfish, shrimp, and crab (Figure ES.1). In the late 1980's, groundfish landings stabilized and shrimp landings increased. In the late 1990's and early 2000's, Dungeness crab landings increased. Landings and prices (except for shrimp) were such that 1987 and 1988, then 2003 and 2004, were banner years. Because of declining resource availability or species cyclical abundance lows, the value of landings in most U.S. West Coast ports is expected to decrease in the near future unless prices dramatically rise.

With the development of the groundfish fishery and the heydays in the southern California tuna fishery, historical landings in terms of volume increased to 1.1 billion pounds in 1981. These landings decreased during the low years of adverse oceanic conditions in 1984 and 1985 and again in the early 1990's. The volume of landings increased when Pacific whiting was brought onshore to be processed into "surimi" starting in the middle 1990's. Because of the influence of Pacific whiting prices, total landings have changed generally from high value-low volume to low value-high volume species.

Figure ES.1
U.S. West Coast Onshore Landed Value and Volume by Species Groups in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.

Landed Value

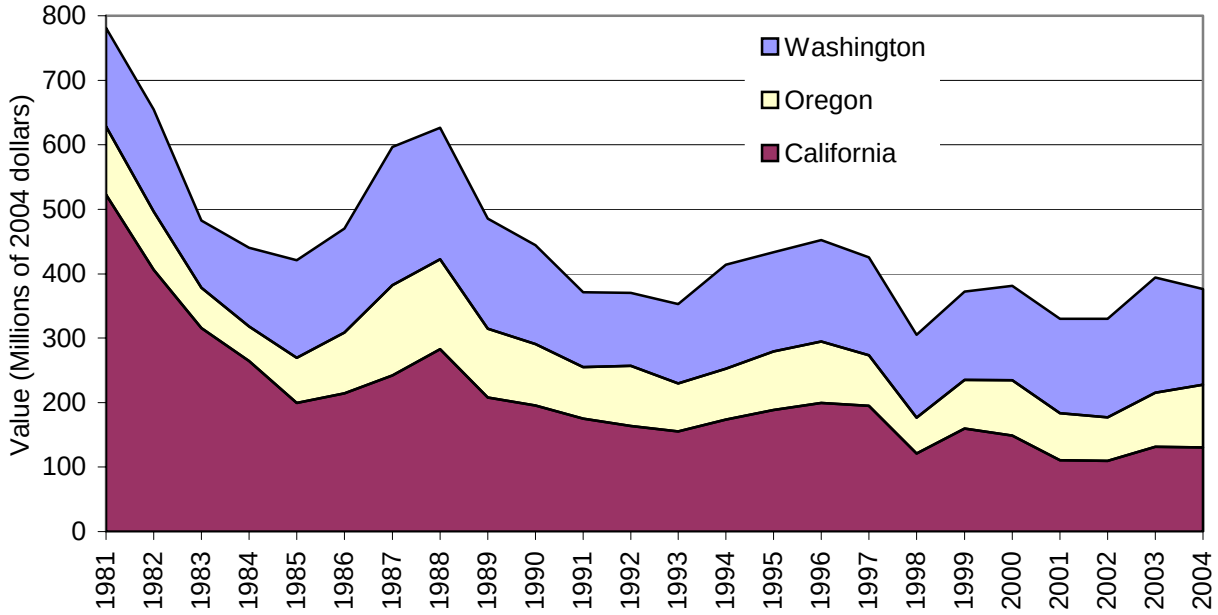
The value of landings (in inflation adjusted, real terms) peaked by 1981 at $781 million when high levels of landings in tuna, groundfish, crab, and salmon combined with strong prices for almost all species. In 2004 real terms, the ex-vessel value of all landed fish declined to an average of $431 million in 1984 and 1985, then increased to $626 million in 1988. The value has stabilized overall to around $325 million in the last five years. There were higher years of landing values in 1996 and again in 2000 due to increased prices and higher landings of certain species other than salmon. Increased salmon prices buoyed the ex-vessel value for this fishery in 2004.

The landings by states have been traditionally highest for California (Figure ES.2). However, that share has decreased significantly since highly migratory species (HMS) like tunas have moved to an offshore fishery. Oregon's share increased due to relatively recent developed fisheries for Pacific whiting.

Vessel Profiles

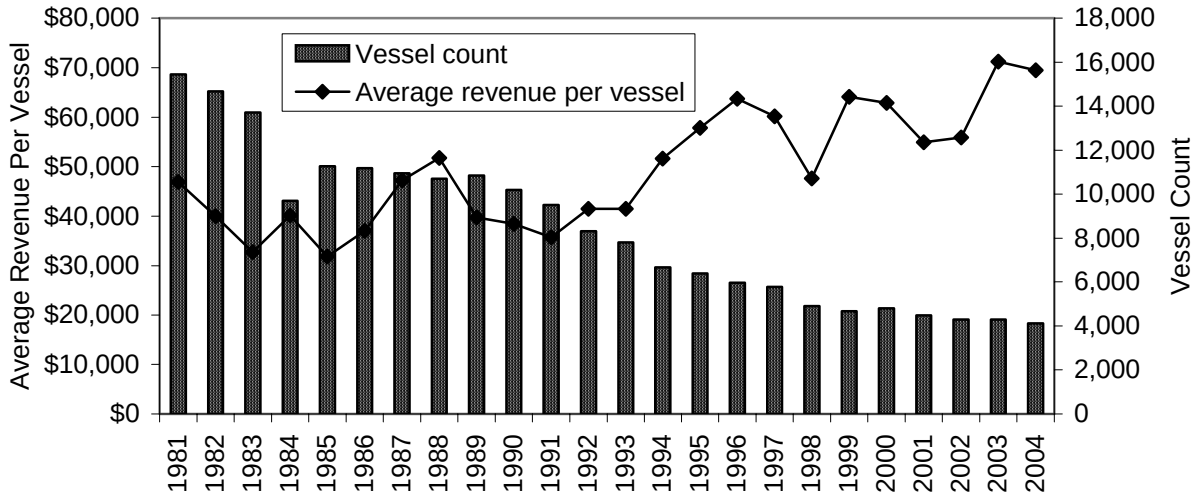
The aggregate number of vessels landing at U.S. West Coast ports has decreased almost 67 percent since 1981 (Figure ES.3). There was a large drop in the count of vessels delivering in

Figure ES.2
U.S. West Coast Onshore Landed Value by States in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.

Figure ES.3
U.S. West Coast Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2004



Notes: 1. Revenues adjusted to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes vessels with identifier codes "NONE" or "ZZ…," which are generally attributable to deliveries made in tribal fisheries.
3. Average revenue per vessel is for onshore landings; distant water fisheries revenue and aquaculture revenue are not included.

the adverse oceanic conditions years of 1984 and the early 1990's. There were strategic buyout programs for vessels participating in the salmon fisheries in the 1990's and groundfish fishery in 2003. Vessel counts continued to drop until the late 1990's and have remained somewhat stable since then.

Revenues are not evenly distributed among vessels (Table ES.5). In 2004, 69 percent of the vessels landed 14 percent of the total ex-vessel value of U.S. West Coast onshore revenue. The average per vessel revenues for the other 31 percent that land 86 percent of the value is $191,632, while the average for the rest of the fleet is $13,958. This characteristic is not unique to 2004; the distribution has been about the same following the adverse oceanic conditions years of 1983 and 1984. Prior to those years, landings were spread somewhat more evenly among vessel revenue categories.

Table ES.5
Vessel Revenue Frequency Distribution in 2004

Category	Vessel Counts		Average Vessel Length	Revenue Category	Average Per Vessel Revenue
<$500	288	7%	27'	0.02%	$238
$500 - $4,999.99	743	18%	28'	1%	$2,296
$5,000 - $49,999.99	1,796	44%	33'	13%	$20,983
$50,000+	1,284	31%	49'	86%	$191,632
Total	4,111	100%	36'	100%	$69,452

Notes:
1. Revenue excludes offshore and distant water fisheries sources.
2. Excludes vessel identification codes "NONE" and "ZZ..."
3. Length mean excludes vessels with missing or an assigned zero length. Where a vessel has more than one assigned length, the smallest non-zero assignment is used.

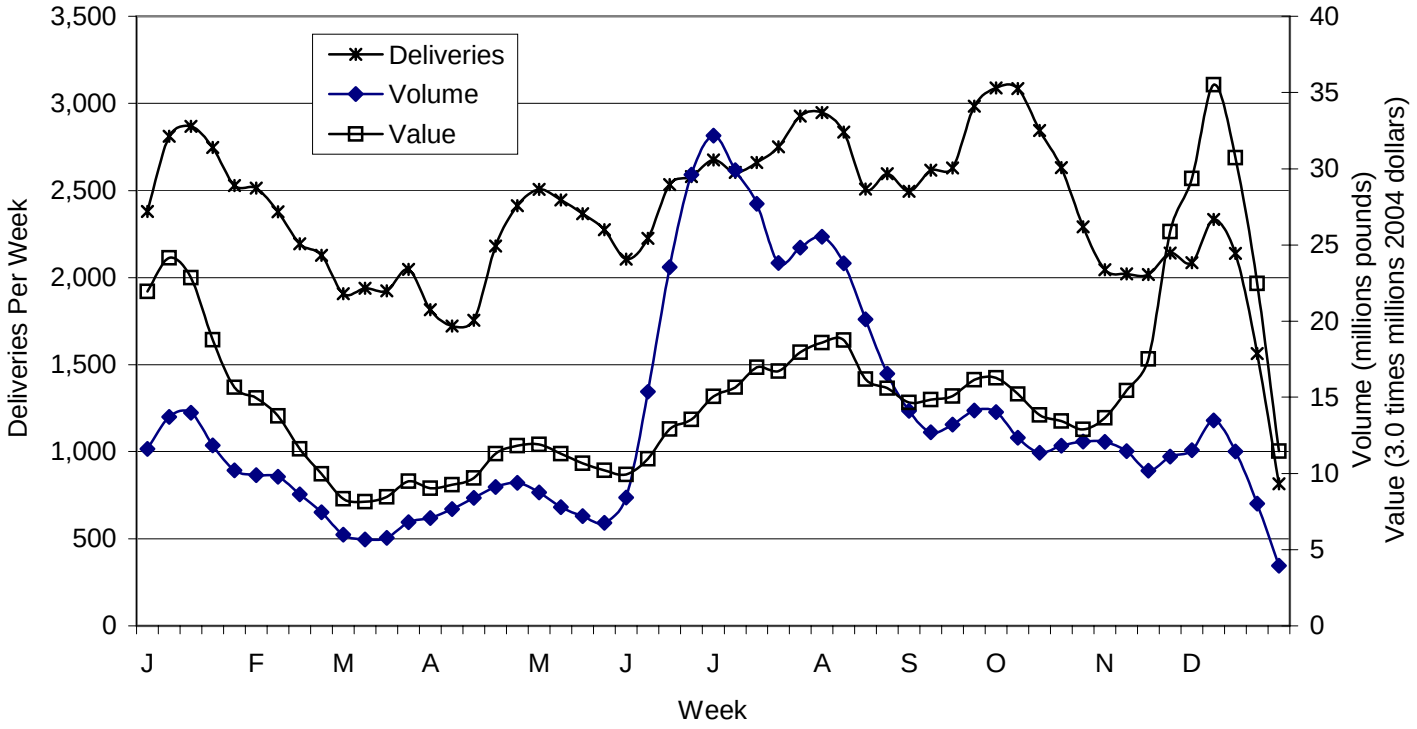
Recent trends show there is port-by-port variation for vessel count and revenue changes. The most active vessels remaining are centralized at "hub" harbors. These vessels roam where fisheries are occurring. For example, several southern California vessels that harvest in the wetfish fishery also travel to Astoria for the sardine fishery. Most of the Astoria sardine fishery is prosecuted from vessels hailing from ports in northern Puget Sound. Some Oregon homeported vessels participate in the Washington coastal Dungeness crab fishery after tribal quotas are caught, and so on.

Many fisheries are regulated by vessel entry as well as managed for conservation purposes. The federal government has administered a limited entry program for the groundfish fishery since 1994. There are other federal limited entry permit programs, such as for coastal pelagic species started in 2003. Several other fisheries or allocation sectors within fisheries have control dates established, but federal limited entry programs have not been initiated. States also have limited entry programs for several fisheries. The fisheries include such species as nearshore groundfish, ocean troll salmon, pink shrimp, Columbia River gillnet salmon, ocean Dungeness crab, ocean scallop, sea urchin, abalone, and others. Limited entry programs are one method to control effort and keep a fishery economically viable to participants.

There is a seasonal pattern to U.S. West Coast fisheries (Figure ES.4). However, not every active vessel participates in all fisheries in this cycle. Different species are available at different times of the year, and general fishing, processing, and marketing patterns have developed over time. It is more appropriate to view the fishing year as a pattern of activities rather than in terms of individual species seasons. Individual species, when viewed in isolation, may not appear important, but these often affect the harvesting, processing, and marketing of other species and the fishing industry as a whole. Fishing vessels as well as crew members move from one fishery to another, depending on seasons and alternatives available.

Offshore and Alaska fisheries are important for the total fish harvesting/processing industries in coastal communities. During the year, some crew members and fishing vessels will travel to Alaska to fish for salmon, halibut, sablefish, shellfish, and groundfish.

Figure ES.4
Onshore Deliveries, Volume, and Value by Week During Three Year Average of 2002 Through 2004



Notes:
1. Values adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Deliveries per week are fish ticket counts. Fish tickets issued for sales by vessels to the public are excluded, since they do not correspond to a harvest trip. This will slightly undercount the estimate of total coastwide deliveries. This will be offset by situations where a vessel delivers to more than one processor following a trip.
3. Data is adjusted using a three week moving average over a three year period to remove weather events that alter delivery schedules. However, dramatic weather and harvest management changes within the three year period will influence depictions.

Processor Profiles

U.S. West Coast fish purchases by processors, dealers, and individual consumers buying directly from vessels totaled 803.7 million pounds with an ex-vessel value of $376.3 million in 2004 (Table ES.6). The volume landed is slightly more than one third in California, but the value landed is highest (40 percent) in Washington. Data sources only show where the purchase occurs; not all landings are processed at their geographical location of deliveries. Purchased fish are transported to processors in other locations and there is cross hauling of species between processor facilities.

Table ES.6
Volume and Value of Fish Landings by State in 2004

	Processor/ Buyer	Landed Volume		Ex-Vessel Value	
Area	Count	Amount	Percent	Amount	Percent
Washington	367	207.4	26%	$148.7	40%
Oregon	228	294.1	37%	$97.4	26%
California	620	302.1	38%	$130.3	35%
Total	1,215	803.7	100%	$376.3	100%

Notes: Volume is in millions of pounds and value is ex-vessel value in millions of 2004 dollars.

There were 1,215 unique names of processors or buyers in 2004. These companies include operators of processing plants, buyers that may do little more than hold the fish prior to their shipment to a primary or secondary processor, and consumers buying directly from vessels. A relatively small number of processors and buyers handle most of the deliveries in the U.S. West Coast.

Finding categories of processors is analogous to determining a vessel classification scheme. Processors making the higher volume purchases are a generalized category for using many species and manufacturing many product forms. The rules adopted for a classification scheme adopted the threshold purchase levels as shown in the first column on Table ES.7. The ex-vessel values by purchased species for these categories are shown in the other columns.

Fish Processing Facilities

A modern processing facility is an expensive investment. It would be expected that a medium sized plant handling crab and shrimp, and having groundfish fillet lines would cost a minimum of $10 million. This includes site development, structures, processing equipment, and cold storage facilities. It does not include specialty product manufacturing equipment such as for surimi, does not include land acquisition costs, and does not include startup and working capital. Investors are faced with a very competitive setting and many uncertainties on species availability and market situations. Due to the high risk, substantial equity participation is required: 25 percent should be considered a minimum level. Borrowing terms on equipment generally have short periods, like five years. Given the expected high debt servicing, plants must operate year around and at full capacity. Financial feasibility is drastically affected by whether processed

Table ES.7
Processor Purchases by Species Group and Purchase Size Categories in 2004

U.S. West Coast Onshore

Purchase Size	Ground-fish		Pacific Whiting		Salmon		Crab/ Lobster		Shrimp		Pelagic		Highly Migratory		Halibut		Sea Urchins		Other		Total Onshore		Processor Count
<=$10K	107	6%	0	0%	495	29%	476	27%	80	5%	44	3%	227	13%	38	2%	14	1%	251	14%	1,731	100%	597
	0%		0%		1%		0%		1%		0%		1%		0%		0%		1%		1%		
<=$100K	896	7%	0	0%	3,161	24%	4,143	32%	1,224	9%	421	3%	1,285	10%	163	1%	69	1%	1,772	13%	13,135	100%	360
	2%		0%		7%		3%		10%		1%		4%		2%		1%		6%		4%		
<=$1,000K	4,130	6%	382	1%	17,602	25%	22,294	32%	2,558	4%	4,373	6%	3,906	6%	804	1%	5,156	7%	8,441	12%	69,645	100%	192
	10%		5%		36%		19%		21%		14%		12%		10%		67%		28%		20%		
<=$5,000K	10,339	10%	1,507	1%	13,283	12%	26,981	25%	1,910	2%	25,547	24%	4,388	4%	3,326	3%	2,483	2%	18,551	17%	108,316	100%	49
	25%		19%		27%		22%		15%		79%		13%		40%		32%		62%		32%		
>$5,000K	26,697	18%	5,850	4%	13,904	9%	66,301	44%	6,594	4%	1,972	1%	23,445	16%	3,981	3%	2	0%	749	1%	149,496	100%	17
	63%		76%		29%		55%		53%		6%		71%		48%		0%		3%		44%		
Total revenue	42,169	12%	7,739	2%	48,444	14%	120,195	35%	12,368	4%	32,356	9%	33,251	10%	8,313	2%	7,724	2%	29,764	9%	342,322	100%	1,215
	100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		
Processor count	377		24		524		529		160		145		321		107		58		499		1,215		

Notes: 1. Revenue is ex-vessel value in thousands of 2004 dollars. Percents are column \ row total revenue shares.

2. Processor counts across species group categories are not unique but the column total is for unique vessels.

Source: PacFIN March 2005 extraction.

products can be immediately brokered to market or they are kept in inventory. Cold storage must be -20 degrees for most products and operating costs for power are high.

Part of the challenge of full utilization of processor capacity is to maintain and develop the infrastructure (utilities, docks and unloading facilities, cold storage, navigation channels, and product shipping ground and air transportation routes) required for processing. The greatest concern is whether water and byproduct use will overwhelm existing infrastructure. Increased demands for potable water from growth and fixed supply sources will probably increase water costs as an overall share of production costs in the future. Seafood processors would benefit from water conservation measures, as well as improved controls for waste utilization and disposal methods. With industry participation, seafood processing wastes can be put to further use by existing plants.

Processing of fish products includes a variety of functions. For some products, primary processing involves icing fish and selling the product directly to consumers. Other harvests are iced or frozen and hauled to a central location to be portioned or canned. The mass canning function, such as for albacore tuna, has moved almost entirely overseas. Other products are cooked and picked for local sale or shipment to fresh and frozen markets. There is a recent trend for Dungeness crab to be sectioned and shipped frozen to China. The meat is then picked and returned to the U.S. in either canned or frozen form. Groundfish are usually filleted. The primary product for fillets ranges from 25 to 33 percent of the round weight for skin-off. The processing of the residue (carcasses) is therefore an important component in the total value of the product (either oil or fish meal).

It is important to know the flow of seafood products from harvester to consumer in order to determine economic effects. Such general descriptions may be used to estimate the value added, or which may be attained, from alternative modes of seafood processing. Some processing firms also include distributing and wholesaling as their function. Seafood retailing includes a considerable margin because of the labor intensiveness and fragile nature of seafood.

The major components of processing are also important to making economic contribution estimates. Raw product flows, labor inputs, and transportation to central plants need to be included. Following product manufacturing and distribution flows allows an explanation of why low value products that are intensively processed may have an ex-vessel to income impact multiplier of seven to 10, while a high value, minimally processed product such as troll Chinook will have a multiplier of two.

The estimated ex-processor value from processing the U.S. West Coast onshore landings in 1996 was estimated to be about double the ex-vessel value of the landings. Using the same relationship between ex-vessel price and ex-processor price, the 2004 ex-processor sales, including non-edible products such as fish meal, are estimated to be $752.6 million.

Seafood Processing Trends

Processing is being centralized to occur at plants in only a few regional commercial fisheries centers. The expense for equipment and refrigeration to meet new quality standards balanced

against business risk makes it unlikely this trend will change. For example, only processors making purchases over $1 million accepted deliveries for pink shrimp and Pacific whiting in 2004. Smaller processors specialize in products, but processors making purchases of over $1 million are year-around operations with product forms from all species harvested in Oregon fisheries.

There is a growing number of harvesters selling whole, dressed (cleaned and gutted) salmon, crab, and tuna directly to the consumer from vessels. This direct marketing concept is not without controversy, since participating vessels would be in competition with the local retail markets for customers. Harvesters can receive about double the price from what is received when delivering to processors. While the direct sale price appears to be an attractive return, there are costs (advertising, packaging, spoilage, etc.) and legal risks for this type of sale. In addition, there can be lost fishing effort while the vessel is used as a base for sales.

The above are two examples of six major trends taking place in the fish processing industry. Tracing back to the early 1990's, the six trends are:

(1) Infrastructure issues;
(2) Decreased seafood product wholesale prices;
(3) Major expansion of the onshore Pacific whiting fishery;
(4) Centralization of general processing plants in limited locations a few consolidated companies;
(5) Vertical integration into distribution and harvesting operations; and,
(6) Return of small processors to offering particular products in niche markets.

The following is a more detailed explanation of each trend.

(1) Infrastructure Issues. Part of the challenge of full utilization will also be to develop the infrastructure (utilities, docks and unloading facilities, cold storage, navigation channels, and product shipping ground and air transportation routes) required for processing. Seafood processing requires significant water usage and generates large amounts of byproducts. Shrimp requires the greatest amount of water, while groundfish water demand varies widely, depending on the product being produced. Fillets require much higher water usage than processing for headed-gutted products. Surimi requires around two gallons of water for every pound of surimi. Surimi is high in water use because of the repetitive washings the mince must undergo. Surimi processing for the offshore allocation (about half of total harvest) takes place on factory ships where desalinated water is used.

Wastewater discharges by onshore processing plants are generally done to the waterway where they are located. This is allowed in U.S. West Coast states as long as adequate mixing occurs in the waterway. Wastewater discharged to municipal sewer systems is very costly to plants because they are charged on strength and volume. Some processors in U.S. West Coast states use pretreatment methods prior to discharge to municipal systems to recover useful byproducts and meet local regulations for wastewater acceptance.

Most of the shells from shrimp, crab and urchins are composted, which encompasses both the careful biological breakdown through a process of oxygenating and heating or simply applying the byproducts to a field to decompose without the benefit of aeration. The cost of disposal of shrimp, crab, and urchin shells varies between processors; some farmers and reducing plants will pick up the byproducts, while other processors need to deliver their materials to a receiving facility. Shell disposal is generally a barter arrangement where the processor is able to dispose of the material and farmers are able to fertilize their fields at minimal cost to either party.

There are valid concerns for whether water and byproduct use will overwhelm existing infrastructure. Increased demands for potable water from growth and fixed supply sources will probably increase water costs as an overall share of production costs in the future. Seafood processors would benefit from water conservation measures, as well as improved controls for waste utilization and disposal methods. With industry participation, seafood processing wastes can be put to further use by existing plants. Creative options for waste disposal exist, but additional research and product development need to make sure these options are cost effective. Further study of the composition of seafood wastes may show that they are a benefit rather than a hindrance for improved utilization of marine resources.

(2) Prices. Since the late 1980's, ocean troll caught Chinook salmon real prices, largely because of the expansion of the farmed salmon industry, dropped to below $1.50 per landed pound in the early 2000's. There was a price increase to $1.75 in 2003 and a jump in prices to $3.00 per pound in 2004. Despite these price increases, they still are not equal to inflation adjusted prices in the 1970's and 1980's of $4.00 to $5.00 per pound. Pink shrimp prices have also decreased from around $0.70 per pound in the middle 1990's to about $0.25 per pound in 2003 with an increase to $0.39 in 2004. While these longer trend price decreases have eliminated valuable product lines and in some cases led to the demise of some processors, the effects mostly are the earnings power of harvesters. Processors will continue to purchase salmon and shrimp as long as their margins are covered. Vessels sometimes will continue to harvest at losses in order to protect their investment and permits. To remain in business, operation losses for both harvesters and processors in single fisheries will have to be covered by other fisheries.

(3) Onshore Pacific Whiting Fishery. At the present time, three surimi plants along the West Coast have the capacity to process up to 20 million pounds per week. Except for a couple of years in the early 2000's, an average 150 million pounds of whiting has been delivered onshore annually. The surimi product form's prices are subject to the Alaska pollock surimi market and downturns in the Japanese market have lowered prices in recent years. As a consequence, more whiting is being directed to the developing fillet and H/G market.

(4) Owner Consolidation and Plant Centralization. There have been dramatic changes in processor business ownership and where fish processing occurs. Ownerships are being

consolidated to a few major companies and landings are being hauled to general processing plants at a few locations along the central West Coast.

Ownership consolidation has typically been accomplished by purchasing seafood buying or seafood processing facilities that are in financial difficulties. At times, this has meant only buying the name of the distressed company. Other times it has involved purchasing working capital and inventory from ongoing businesses. Processing employment was then moved out of smaller ports and replaced by buying stations. Most of the other landings go to specialty buyers or are landed in one port to be hauled to regional processing plants in another location.

(5) Vertical Integration. Vertical integration has been witnessed for both harvesters and processors. Harvesters are participating in direct marketing of their landings to consumers, and large processing companies have acquired vessel ownership positions. Major processing companies are becoming more involved in distribution as its capacity to fill large orders grows.

(6) Specialized Products for Niche Markets. There is a trend is for some small processors to return to particular product and species specialization. Salmon, live groundfish, albacore tuna, and Dungeness crab are species used in these markets. There is a minimum amount of investment needed to set up a buying station and ship products to consumer markets. A number of small ports are studying how they can assist in this marketing technique.

The process of ownership consolidation has resulted in only a few general fish processing plants left operating. Even though fish are landed in one area, they are hauled to a facility in another region for processing. The smaller competing fish buyers specialize in products for which they have established niche markets. This leaves harvesters with very limited markets in any geographic area.

The relationship between harvesters and processors that results in a harvester "having a market" is largely determined by the relative bargaining power of the two sectors. A case-in-point to discuss this harvester-processor relationship is the U.S. West Coast groundfish fishery. The fishery is managed under a license limitation system with equal trip limits for all vessels. Under the status quo:

- Processor ownership consolidation has been increasing.
- There has been a large oversupply of vessels relative to harvest levels.
- There is an information asymmetry as processors know the end value of fishery resources and harvesters do not.

If governing fishery regulations change, the relative bargaining power of harvesters and processors will also change.

New management techniques for assigning access privileges to vessels and processor shares to companies will be controversial for those directly involved. It will be argued that individual transferable quotas (ITQ's) have unequal distributional impacts. Processor concerns are that

harvester-only ITQ's will increase the bargaining power of harvesters. Harvesters argue that ITQ's will allow them to seek better markets and therefore increase economic contribution generated for the dependent coastal communities. Individual processor quotas (IPQ's) may have the potential effect for continuation and possible acceleration of consolidation and centralization. If this would occur, it would reduce market opportunities for harvesters and impact the influence that communities have in keeping or attracting fleets and processing facilities.

Seafood Marketing Issues

A powerful configuration of domestic and global forces has reshaped the way the U.S. seafood processing industry perceives its role and its opportunities. These forces include the globalization of trade, the rise in aquaculture production, the concern of product safety, and the continued growth in product demand. These forces have compelled the industry to re-evaluate traditional production, distribution and marketing strategies. The industry today needs to develop market driven, rather than merely supply-side strategies. Projections are that the U.S. consumer will continue for less red meat consumption, continued increasing poultry consumption, and a fairly steady but increasing per capita consumption of fresh and frozen finfish and shellfish seafood.

There have been some tremendous changes in the U.S. seafood market as a result of the introduction of convenience value added products. The most notable is the growth of the surimi market. Surimi is used in all types of pasta dishes, soups, seafood salads, and sushi. In addition to surimi products, portion control of fresh and frozen products is becoming more prevalent. The aquaculture factor, especially salmon and catfish, is leading the way in the development of these products.

All of the fisheries along the central U.S. West Coast have a number of substitutes for products in the regional food distribution. Most supermarkets and restaurants do not rely on local supplies to stock their shelves or prepare menus, although some retail or restaurant patrons may place a premium on knowing the product they are purchasing is locally caught. Locally caught products are often replaced with close substitutes obtained from elsewhere in the global supply chain. Some fisheries, such as Columbia River spring Chinook, early caught Dungeness crab, and certain rockfish, are considered to be of high quality and are valued in fresh markets. Generally, however, there are similar products from South America, Mexico, Canada or Alaska to substitute for West Coast production.

Parent Group Ownership

There are numerous processing and fish buyers licenses in all three states. The major processor groups can be categorized by estimated ex-processor sales in four classifications: largest (greater than $10 million), medium ($5 million to $10 million), small ($1 million to $5 million), or very small (less than $1 million). The largest classification is composed of 11 companies (parent groups) and processed 50 percent of the fish by volume and 49 percent of the total fish by value in 2004 (Table ES.8). These processors average about $15 million in landed value and about $30 million in ex-processor value annually. Some may be identified as individual or business groups. Several groups have significant amounts of landings in more than one area. Table ES.9 lists the

Table ES.8
Ranking of U.S. West Coast Processor Groups in 2004

	Count	Percent of Volume	Percent of Value	Average Annual Ex-Vessel Value	Annual Estimated Ex-Processor Sales
Largest	11	50.4%	49.2%	$15.3 million	> $10 million
Medium	15	27.8%	15.5%	$3.5 million	$5 million to $10 million
Small	78	15.9%	22.6%	$1.0 million	$1 million to $5 million
Very small	221	4.9%	10.5%	$161,886	$100,000 to $1 million
All others	847	1.0%	2.3%	NA	NA
Total	1,172				

Table ES.9
Largest Processing Groups on the West Coast With Purchases in 2004

Processor Name
Arrowac Fisheries (W)
Bornstein Seafoods (W)(O)
Caito Fisheries (C)
California Shellfish Co. (O)(C)
Carvalho (O)(C)
Delmar Seafoods (C)
Jessie's Ilwaco Fish Co. (W)
Pacific Choice Seafood (A)(W)(O)(C)
Quinault Tribal Enterprises (W)
Starvin Marvin (O)
WF Alber (C)

Notes: 1. Identified are processing and/or buying plants in West Coast states and Alaska. Some of these processors may also have minor (less than $500 thousand in ex-vessel value) purchases in other states. The letters following the parent company identify the states where purchases are made:
(A) Alaska
(W) Washington
(O) Oregon
(C) California

top 11 processing groups with the larger total amount of landings (by value) on the West Coast. The medium sized processor category processes 29 percent of the landed volume and 16 percent of the landed value. This group averages about $3.6 million in purchases per year. The large and medium processors purchase 79 percent of the landed volume and 65 percent of the landed value along the U.S. West Coast. The other smaller processors purchase an additional 22 percent of the total volume. The rest are either individual vessels that also act as dealers and other very small buyers found along the U.S. West Coast.

Of the 11 largest processor groups on the U.S. West Coast in 2004, the three largest seafood processors purchased 60 percent of the groundfish landed in the three states. Pacific whiting purchases are even more concentrated, with 98 percent by value purchased by three companies. For other species groups, the concentration percentage decreases. Because of the dominance of the Pacific Group in Oregon ports, the Oregon seafood processing sector ownership is most

concentrated of the states. In Washington and California, most of the marine products are landed close to the metropolitan centers of Seattle, San Francisco, and Los Angeles. This allows for smaller buyer/processors who process and sell their products to "niche" markets in the area. The important difference in Oregon processor plant capacities from Washington and California is Pacific whiting surimi production at plants in Astoria and Newport and the expanding sardine packing/freezing facilities in the lower Columbia River area. These are generally considered "commodity" products destined for out of area or overseas markets.

While many processing plants are located in many locations along the U.S. West Coast, only some of these processing plants serve to hold inventories and distribute products in the U.S. and to the rest of the world. U.S. West Coast seafood production and distribution is primarily to serve the closest major regional markets. The San Francisco and Los Angeles market areas dominate the absorption of seafood products. Strong markets for some groundfish have also developed in Japan. This includes products from sablefish, Pacific whiting, and relatively modest amounts of salmon and shrimp. Most of the Pacific whiting processing capability being developed by U.S. West Coast firms is for surimi production. Surimi markets are mostly in Japan and Korea. Some domestic and European markets for Pacific whiting headed and gutted, fillet and other product forms are also developing. Most other groundfish and Pacific whiting headed and gutted markets were mostly in the U.S. These markets for groundfish were evenly divided between the U.S. northwest, California, and the rest of the U.S.

Economic Contribution

Economic contribution estimates are measured by the increment of personal income received by households due to the fishing industry. The estimates include wages and proprietary income made by crewmen and captains during harvesting and workers at processing plants. It includes income earned by people working at suppliers for fishing industry businesses. It also includes the respending of wages throughout the economy, therefore is inclusive of the "multiplier effect" of the industry.

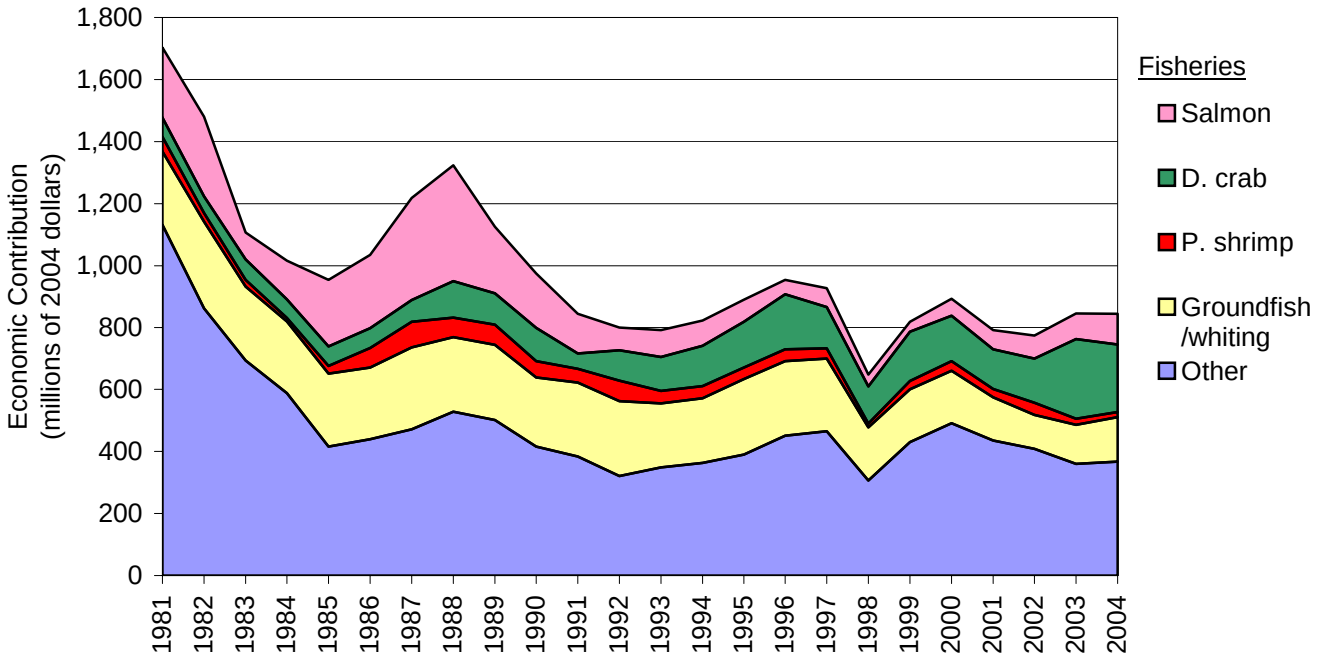
Overall, the fishing industry generated about $845 million in total personal income from onshore landings in 2004 (Figure ES.5). The highest economic contributor in any state was the species group Dungeness crab in California, which was also the highest within Washington and within Oregon (Table ES.10). Shellfish aquaculture added another $88 million (Figure ES.6). Another $95 million of personal income was generated in the Oregon economy by the distant water fleet making landings to at-sea processors and onshore processors in Alaska, other West Coast states, southern Pacific Ocean, and elsewhere (Table ES.11).

Fishery level observations are:

- Economic contributions from salmon fisheries were up in 2004. It is more than triple what was seen during the late 1990's. The increase was partly due to higher landings and partly due to a price increase.

- Dungeness crab economic contribution was $219 million in 2004. This was nearly as much as Year 2003's record $258 million.

Figure ES.5
U.S. West Coast Economic Contributions From Onshore Landings in 1981 to 2004



Notes: 1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish and salmon aquaculture are not included.
3. Distant water fisheries economic contribution is not included.

- Pink shrimp decreased to $17 million in 2004. This is down from $40 million generated in 2002.

- Groundfish and Pacific whiting landings contributed $244 million in personal income to the economy in 1995, but this decreased to $109 million in 2002. Because of high sablefish landings, higher quotas for Pacific whiting, and better prices for some species, the total economic contribution increased to around $143 million in 2004.

- Fisheries other than the before mentioned salmon, crab, shrimp, and groundfish species groups also have measurable economic contributions. For example, sardines alone contributed about $104 million in 2004. Market squid in California contributed $68 million in 2004. Albacore tuna contributed another $56 million in 2004, mostly in Washington and Oregon. (Albacore tuna is $33 million for Washington and $17 million for Oregon. The California tuna group includes other tunas for a total of $8 million, of which $6 million is albacore.)

The commercial fishing industry is an important business segment to many communities along the U.S. West Coast. There are certain segments of the industry that are experiencing severe

Table ES.10
Economic Contributions From Onshore Landings by Selected Species Groups and State in 2004

Species Group	Washington	Oregon	California	Total
Groundfish	$27.0	$32.1	$31.8	$90.9
Pacific whiting	$20.6	$31.2		$51.8
Salmon	$46.9	$21.2	$30.7	$98.9
Dungeness crab	$54.4	$79.5	$85.3	$219.2
Lobster and prawn			$13.6	$13.6
Pink shrimp	$4.9	$9.9	$1.9	$16.8
Sardine	$11.1	$52.4	$40.6	$104.1
Market squid			$68.4	$68.4
Other pelagic			$22.9	$22.9
Albacore tuna	$32.6	$17.1	$8.0	$57.6
Shark and swordfish			$10.2	$10.2
Sea urchin			$13.2	$13.2
Sea cucumber			$1.5	$1.5
Shellfish aquaculture	$57.1	$7.7	$22.8	$87.7
Other	$57.5	$3.7	$14.9	$76.1
Total	$312.2	$254.9	$365.7	$932.8

Notes: 1. Economic contribution is in millions of dollars.
2. Pacific whiting is included in groundfish for California. Some pelagic fisheries are only calculated for California.
3. Other tunas are included in albacore tuna for California.

reductions in harvests. However, overall the fishing industry in 2004 generated higher than average economic contributions going back to 1990. The increases came mainly from increased prices from troll salmon, higher Dungeness crab landings, newly developed northern component of a sardine fishery, abundant stocks of Pacific whiting, and higher opportunities for certain coastal pelagic stocks. The 2004 economic contribution represents less than one percent of the U.S. West Coast's earned income, but is as high as seven percent for all earned income in coastal communities along coastal Oregon and northern California. At $30,000 income per year, the industry segment for onshore landings represents about 28,000 annual full time equivalent jobs.

Current Issues

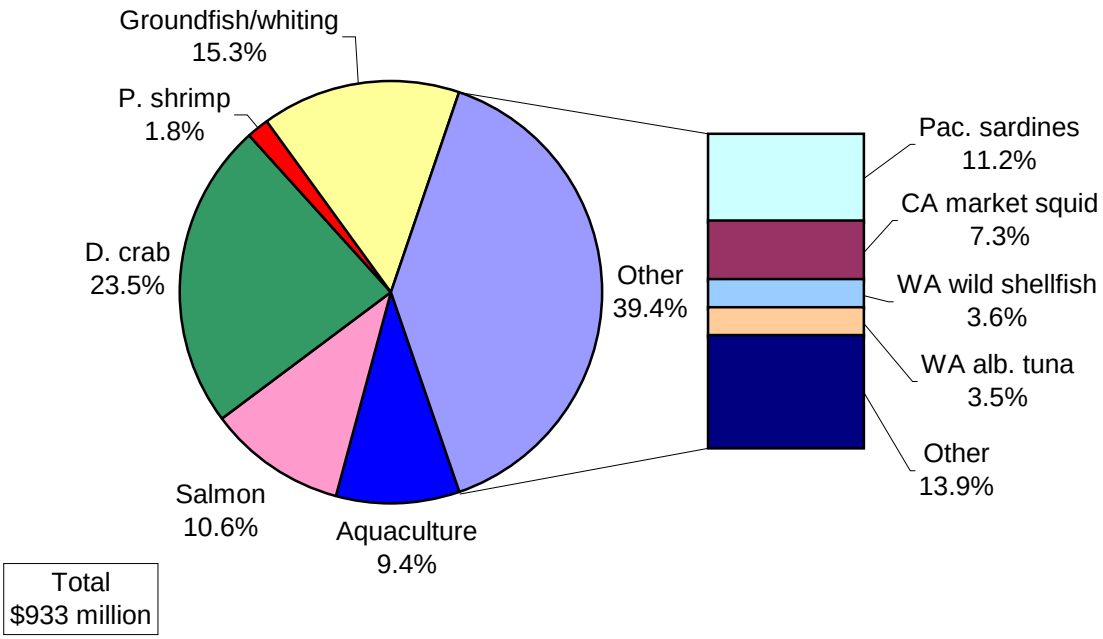
Some current issues affecting the future of the commercial fishing industry are:

- Abundances depend on favorable ocean conditions through vertical mixing and lateral currents which are not completely predictable;

- Pressure to set aside areas for no-take marine protection areas for research and to preserve their intrinsic values;

- Social policies for allocations among user groups (commercial, recreational, and tribal fishermen) and communities;

Figure ES.6
U.S. West Coast Economic Contributions by Species Group and Shellfish Aquaculture in 2004



Aquaculture economic contributions by species (millions of dollars):	
Pacific oysters	45.4
Manila clams	18.1
Geoduck	5.7
Blue or bay mussel	4.2
Abalone	11.6
Other oysters, clams, mussels	2.7
Total	87.7

Notes:
1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Salmon aquaculture is not included.
3. Distant water fisheries economic contribution is not included.

Table ES.11
Distant Water Fisheries Economic Contributions to U.S. West Coast Economies in 2004

	U.S. West Coast At-Sea	Alaska	Other	Total
Washington	--	--	--	--
Oregon	--	--	--	$95.4
California	--	--	--	--
Total	--	--	--	--

Notes: 1. Economic contributions are from vessel derived effects and do not include returns from such sources as processor workers or crew working on vessels registered to owners in non-West Coast states; and, out-of-area registered vessels only using repair and provisioning services from U.S. West Coast businesses.
2. Individual states' other category includes effects of that state's home-port vessels returning revenue to out-of-state ports.

- Judicial decisions on habitat protection and incidental take issues brought to the forefront by conservation organizations, like protection of sea birds and mammals either impacted by fishing techniques or dependent on protein from the same fish species now exploited;

- Compacts and international treaties, such as recently completed negotiations with Canada for allocation of Pacific whiting between the two nations that will lower the U.S. share; and the Multilateral High Level Conferences on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific which may result in new country allocations of HMS like albacore tuna;

- Better understanding in the science of ecosystem interactions and improved stock assessments that may cause fishery management agencies to reduce exploitation rates, control fishing gear, reduce trip limits, or have further restrictions in time/area closures;

- Not being able to reach harvest quotas on species in healthy stock status due to fishing techniques that have unavoidable mortalities on species in a depleted stock status where species occupy the same space at the same time;

- Stock building programs calculated using variables with large uncertainties; rebuilding programs will take many years for depleted species to return to sustaining harvest levels because of life cycle characteristics of these fish;

- For the most part, there are not underutilized species in which harvesters can move, but new fisheries may develop around some minor opportunities for filling niche markets;

- Looming issues for the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MFCMA) and the use of groundfish fishery ITQ's and IPQ's for vessels, processors, and cooperatives.

In consideration of the before mentioned landing trends and in light of the above mentioned current issues, it is a prudent assessment that commercial harvesting of marine resources is not a growth industry. Goals for the industry would be to extract more value from the fishery resources that are available.

Raising resource value has several challenges. There will be continuing price pressures on seafood products from substitute aquaculture products. Consumer concerns about quality (freshness, inclusions of toxics, etc.) will affect seafood product demands. Considerations about health and wholesomeness of natural coldwater fish could be a marketing advantage to the industry. The fall-out from lower values will be disruptive to a fleet where profitability already suffers due to, among other influences, excess capacity. Modernization of vessels for better handling capabilities and initial onboard processing, modernization of processing plants that will improve seafood products, and assistance through commodity commissions and other entities for developing marketing strategies that will gain market power for U.S. West Coast seafood products could help the industry raise value at all levels of seafood production.

I. INTRODUCTION

A. Project Scope

The fishing fleet making landings at ports in the states of Washington, Oregon, and California has changed in recent years. The fleet has had to adjust to new fish resource levels, fishery management regulations, and harvest selling opportunities. Vessels have had to switch to other than their primary fisheries, and many times several different fisheries, to sustain revenue levels. Many vessel owners have simply elected to quit commercial fishing. Seafood processors have had to adapt to a global marketplace. There has been unprecedented ownership consolidation and processing operations have been centralized to a few locations. These vessel and processor sectors' changes have economically impacted not only fishing industry participants, but also coastal communities where the fleet and processors are located. This project is to describe the trends and characteristics of the U.S. West Coast fishing industry to show the changes.

B. Project Limitations

The project draws upon existing information sources about landings and permits. Past relevant studies are also referenced when applicable. The data and its analysis may prove useful for fishery managers and others interested in the U.S. West Coast commercial fishing industry, however, the project's purpose was not to explain responses by the harvesting and processing sectors to fisheries management decisions, species abundances, seafood market conditions, or other factors that affect the earnings potential for businesses dependent on the fishing industry. Also, some species stock status is described but is not explained in terms of how fishing pressure might be altered to take advantage of or avoid stocks. Finally, comprehensive detailed landing information is only available since 1981. This period is inadequate from a biological perspective to show how the fishing fleet may change due to stock recoveries from management decisions, or due to cyclical variations in stock abundances. No prescriptions or recommendations are offered to influence the trends witnessed during the analysis period, to develop fisheries, help in fisheries' recoveries, or increase value of fisheries.

The project required economic modeling development. There were many assumptions that had to be made to determine vessel and processors revenue and expenditure characteristics, and it is important to consider how these assumptions propagate through the analysis. Trends are described in terms of aggregate landing history where it might have been just as revealing to show a longitudinal perspective of fleet and processor groups. A review of fishery entry and exit over a recent five year period was completed to better understand how cross-sectional data would be applicable for describing fleet characteristics. Study resources prevented a more thorough longitudinal analysis of categories. The vessel and processor groupings were determined using species and gear combinations and geographic source of revenue. Other criteria, such as cost functions, vessel and processor size characteristics, ownership considerations, past fishery participation factors, etc. may also have been revealing for determining groups, but data availability precluded this criterion's use in any grouping methodology.

C. Sources of Information

1. Vessels

A description of the U.S. West Coast commercial fishing fleet and processors must consider more than just deliveries made to U.S. West Coast ports. Vessels with homeports in U.S. West Coast states may travel to other waters in the Pacific Ocean for fishing opportunities and make landings at those locations. Residents of Washington, Oregon, and California own permits and moor vessels in Alaska. Residents in these states also travel to work as vessel crew and processor workers and send paychecks back home. Revenue returned to the U.S. West Coast in the form of expenditures made to support the harvesting and processing sectors and in the form of wages and profits is a modeling exercise. There is no single source of information for all of the fisheries in which the U.S. West Coast fishing industry draws revenue. Four different sources, including anecdotal information, were used to track revenues for this project (Table I.1).

Table I.1
Data Sources

Fishery	Data Source	Status
Washington, Oregon, and California onshore fisheries	PSMFC PacFIN Program	Vessel specific landing information
Alaska onshore fisheries	CFEC and anecdotal	Summary landings by species and gear, and vessel specific lists
U.S. West Coast and Alaska offshore fisheries	PSMFC AKFIN Program and NMFS Blend File	Vessel specific landing information
Other Pacific Ocean waters	Anecdotal	Expert estimate

Notes: 1. CFEC - Alaska Commercial Fisheries Entry Commission
PSMFC - Pacific States Marine Fisheries Commission
NMFS - National Marine Fisheries Service
AKFIN - Alaska Fisheries Information Network
PacFIN - Pacific Fisheries Information Network
USCG - U.S. Coast Guard
Source: Study.

The U.S. West Coast onshore landing information is from fish ticket programs administered by states. A fish ticket is issued by a purchaser to a vessel selling its catch to a processor or buyer. The fish ticket information for the U.S. West Coast is compiled by the states and copies of data sets are sent to the Pacific States Marine Fisheries Commission (PSMFC), Pacific Fisheries Information Network (PacFIN) Program. The PacFIN Program constructs a database using common units of measurement. Vessel and processor specific landing information is available to qualified researchers executing confidentiality agreements. Project analysis results from this information source are summarized in this report to remove visibility of any one vessel or processor's revenues.

Alaska onshore landings are compiled by the Alaska Commercial Fishing Entry Commission (CFEC). Downloads of this database are not available to other than fishery managers, however the CFEC does provide summary revenue tables annually by gear and species groupings for

vessels with owners who have addresses in the U.S. West Coast states. Vessel specific information is available from CFEC vessel permit and registration files, including the owners address. The average revenues by gear and species were imputed to U.S. West Coast states vessels based on whether the vessel had permits for the respective Alaska fisheries. There are instances where Alaska fishery permits are held by owners from U.S. West Coast states but leased to vessels owned by others, i.e. the U.S. West Coast states owners received lease revenues but not revenues from landings. In these instances, this report's analysis imputed revenues just as if the owner received the lease revenues from landings. This will accurately reflect earnings returned to U.S. West Coast states, but cause an overcount of vessels that actually fished in Alaska.

Offshore landings in Alaska and the U.S. West Coast are compiled in the PSMFC Alaska Fisheries Information Network (AKFIN) Program and Blend File. These information sources show deliveries made to motherships and harvests done by catcher-processors in Alaska and the U.S. West Coast. The National Marine Fisheries Service (NMFS) provided summary revenue information for vessels with owners from U.S. West Coast states. The same procedures used for imputing Alaska onshore revenues were used for offshore revenues. Other information sources included anecdotal information from vessel associations and others about vessels participating in other distant water fisheries. For example, such information included estimated revenues and vessel lists for the tuna fisheries in the southern Pacific Ocean. The other information sources also included information about vessels with owners from U.S. West Coast states, but with corporate addresses in other states.

A separate analysis was done for vessels holding federal permits for the groundfish limited entry program administered by NMFS. Many states along the U.S. West Coast also require permits in order to fish and land certain species. For example, a vessel moratorium permit system for salmon has existed in U.S. West Coast states since 1980.

There are data limitations with landing information being associated with a vessel, and determining vessel attribute information, such as length and tonnage. Vessels are required to be registered and hold valid permits for most of the fisheries in which the U.S. West Coast fleet participates. However, the vessel registration number is not always the same in the various fisheries jurisdictions and the U.S. Coast Guard requires only vessels over five tons displacement to be documented. Moreover, a vessel can be re-documented with the same or new name. Vessels harvesting in treaty fisheries are not required to be identified. For these reasons, tracking individual vessels for mobility between fisheries was not exact.

Treaty fishery landings were particularly vexing for tracking vessel revenues. While fish tickets must be issued for landings within treaty fishery allocations, it is not required that individual vessels be identified. The PacFIN Program uses a routine to assign a sequential code to non-identified vessels. It is "ZZ" followed by a number. There are also some fish tickets that erroneously omit vessel plate number and are also assigned a ZZ code. There are other landings not associated with a vessel, such as imports across state boundaries and illegal catches. In these cases, a vessel identification code of "NONE" is assigned.

Vessel attribute information is supplied by states to the PacFIN Program. Certain vessel attribute information, such as length, is included for state licensing. PacFIN routines can retrieve vessel attributes from both the state supplied information and from USCG documentation information. Since it is not necessary to document vessels less than five tons, the USCG data is only relevant for larger vessels.

Various analysis tables in this report refer to an extraction of data from PacFIN. This is not important information for the reader, but is useful for future comparative analysis purposes. PacFIN downloads vary somewhat as information from states is constantly being benchmarked using adjustments in methodologies and error reduction routines (NMFS 1997, MRAG 2005). Most of the PacFIN data was downloaded as annual vessel summary information from query table "sum_ftl_vsums_leoa." This removed visibility of trip specific information, such as vessel trip number, trip duration, trip catch, seasonal occurrences of trips, etc.

There is some limitation in trend data used for describing the history of landings by the U.S. West Coast fishing fleet. Trend information since 1981 was available for onshore landings in Washington, Oregon, and California, however the only 1996 data for distant water fisheries was cross-sectional from a previous study (The Research Group February 2000) and from new information developed for this study in 2004. In the case of the federal limited entry program for groundfish, the program has only been in existence since 1994. Only the years 1994 through 2004 were available for this fishery's descriptions.

2. Processors

Processor information was also developed mostly using landing information from the PacFIN. Personal communication with owners and processor associations was used to sort out how licensed processor and buyer names are related to parent companies. Public record information related to private processor business formation, land ownership and leases, wastewater discharger permits, and the like were also reviewed.

There are data limitations with landing information being associated with a processor or buyer. The limitations are due to the limited information included on a fish ticket and the complexity of the types of businesses that issue fish tickets. States submit the fish ticket data sets to PacFIN with processor identification codes along with a separate file that translates the codes to names and other registration information about a processor or buyer. Sometimes the codes do not have an entry in the translation file whereby a PacFIN Program routine assigns a non-identified processor or buyer. Analysis that includes associating processor or buyer purchases with individual vessels also has problems.

Ownership of processing plants changes frequently, therefore analysis based on ownership information collected at a point in time may not be applicable over a longer period of time. The results presented in this project should be considered an approximation for the period of the descriptive analysis. Further, exact name matches will tend to miss matches between licenses held by the same firm when the firm's name differs between the license records due to typographical errors or data entry choices (e.g. entering "&" or "and"). It is also likely that not all instances of cross ownership were detected between firms with different names. For these

reasons, the actual number of processors/buyers is likely to be lower and the concentration of processing/buying activities greater than represented in this analysis.

D. Fishery Management Context

West Coast commercial fishery management is accomplished through a complex and overlapping set of federal and state regulations authorized under state compacts and statutes, international treaties, Indian treaties, and case law. It is outside of the scope of this descriptive report to detail the governance history and readers interested in this topic are encouraged to review individual fishery management plans. Reader guidance would be to start with overarching programs such as described by NMFS in the Groundfish Essential Fish Habitat (December 2005) and Groundfish Bycatch Mitigation (September 2004) that will reference other federal and state management plans and cross-cutting mandates. These two programs' environmental impact statements can be found on the Pacific Fishery Management Council (PFMC) website.

The most important federal action affecting fishery management was the passage of the Fishery Conservation and Management Act (FCMA) in 1976. The FCMA changed fishery management dramatically by extending U.S. jurisdiction into a 200 mile ocean buffer around coastal mainlands. The buffer is called the exclusive economic zone (EEZ). The FCMA is also known as the Magnuson-Stevens Act (MSA). There were several amendments made to the MSA over the years, including amendments passed inn 1990 and 1992. There were major amendments made by the Sustainable Fisheries Act (SFA) of 1996. SFA amendments included numerous provisions requiring science, management and conservation action by the NMFS (now called NOAA Fisheries). The SFA also renamed the MSA to be the Magnuson-Stevens Fishery Conservation and Management Act (MFCMA). The SFA authorized the MFCMA as amended through Year 1999. There are House, Senate, and Administration versions of reauthorization bills and proposals being considered by the 109th Congress. Hearings were held in the spring of 2006 and the 109th Congress may pass the Act's reauthorization in 2006.

E. Definition of Species and Gear Groups

The PacFIN system contained 237 different species codes and 37 different gear codes through 2004. To reduce the number of codes to a reasonable number for analysis purposes, mapping to groups was done. The mapping was mostly influenced by existing management regimes that combine species dependent upon similar habitat and are harvested using common gears. Some analysis required more detailed subgrouping within major groupings. Appendix C contains the mapping scheme using the notation Summary Level 1 for major groups and Summary Level 2 for subgroups. Single variable (such as species) analysis was revealing about fleet and processor characteristics, but it was necessary to use multi-variable (such as species, gears, and vessel attributes) analysis to explain unique groupings of vessels and processor businesses.

The fishery groups were developed to reflect traditional fisheries definitions used in management plan summary descriptions or other briefing type reports, for example the wetfish fishery in California or the tribal salmon Puget Sound net fishery in Washington. Where fisheries transcend state boundaries, the species/gear mapping was kept intact (such as the LE trawl and

fixed gear category). The categorization means each state has a unique set of fishery groups. The major groupings by state are in Table I.2.

F. Definition of the Fishing Fleet and Processors

1. Vessels

There are many vessels listed in the sources of information used in this project that have ties to Washington, Oregon, and California. The vessel's homeport may not necessarily be in these states and the vessel may not make deliveries to these states' ports. Also there are fishing permit owners, and crew, skippers, and processor workers with residency in these states that don't own vessels. Vessel accounting information in this report when possible distinguishes whether a vessel is a U.S. West Coast fishery participant or a participant solely in offshore or distant water

Table I.2
Major Fishery Groups by States

Washington	Oregon	California	West Coast
Salmons	Salmons	Salmons	Groundfish
Coastal ocean troll and in-river net	Columbia River tribal net	Lobsters and prawns	Pacific whiting
Puget Sound net	Columbia River non-tribal net	Dungeness crab	Salmon
Dungeness crab	Dungeness crab	Pink shrimp	Crab/lobster
Coastal	Pink shrimp	Pacific sardine	Shrimp
Puget Sound	Albacore tuna	Market squid	Pelagic
Pink shrimp	Groundfish	Other pelagics	Highly migratory
Albacore tuna	LE trawl and fixed gear	Tunas	Halibut
Groundfish	Open access	Groundfish	Sea urchins
Coastal LE trawl and fixed gear	Pacific whiting on-shore	LE trawl and fixed gear	Other
Coastal open access	Other coastal and Columbia River	Open access	West Coast at-sea
Puget Sound all gear	Aquaculture (shellfish)	Pacific whiting	Distant water, incl. Alaska
Pacific whiting onshore		Sharks and swordfish	
Other coastal		Sea urchin	
Other Puget Sound		Sea cucumbers	
Aquaculture (shellfish and salmon)		Other coastal	
		Aquaculture (shellfish)	

Notes:
1. Many of Washington's fisheries have tribal and non-tribal allocations, so descriptions are itemized for these two sectors where applicable.
2. Washington salmons coastal, in-river, non-Indian fishery includes Grays Harbor, Willapa Bay, and Lower Columbia River. There are many Washington salmons in-river treaty fisheries, including Columbia River above Bonneville Dam, that have itemized descriptions within major groupings.
3. Ocean groundfish are segmented for federal limited entry and open access permit status. Open access fisheries descriptions includes groundfish bycatch when target fisheries were for non-groundfish like salmon and pink shrimp.
4. Other coastal and other Puget Sound includes wild shellfish as well as finfish.
5. Aquaculture is sometimes included in states' fish ticket systems (for example, Washington oysters) and sometimes is not included (for example, California abalone). Other data sources were used to give as complete a picture as possible for this category.
6. Klamath River treaty harvests are not accounted in value and volume tables, but the fishery is discussed in narrative descriptions.

fisheries. It was decided that the U.S. West Coast fleet would be defined by those vessels that make at least one onshore landing in Washington, Oregon, or California. Otherwise, vessel, permit, or worker derived revenue is put into another classification. The project defined U.S. West Coast fleet vessel counts are shown in Table I.3.

For purposes of describing the U.S. West Coast fishing fleet, it is problematic to lump vessels into classes that might be descriptive of common vessel traits. Most of the more active fishing vessels harvest in more than one species group and use more than one gear type. A vessel on December 1 may be equipped and fishing for something quite different than on June 1. Some vessels participate in only single fisheries and others will move into other fisheries only when prices and abundances appear lucrative. Insight on unique vessel types and fishing capability can be shown by analyzing a vessel's landings using species and gear combinations. Vessel expenditures, physical attributes, and homeport locations can also be variables that are important in classifying vessels.

Categorization of fishing vessels into groups that have similar fishing strategies and revenue/cost streams is dependent on available data and knowledge of the fishing industry. The vessel classifications in Table I.4 is a combination of statistical analysis of available data and information available in published data or from informal surveys. The classification scheme was the result of two previous projects. The first project (William Jensen Consulting 1998) provided a starting point for classification procedures used in the second project (The Research Group February 2000).

Table I.3
Vessel Counts for U.S. West Coast Fishing Fleet in 2004

Fishery	Washington	Oregon	California	Total
U.S. West Coast				
Onshore	1,151	1,306	2,082	4,111
Offshore	--	--	--	25
Motherships	--	--	--	4
Catcher-processors	--	--	--	6
Catcher vessels	--	--	--	15
Alaska	2,133	362	233	2,728
U.S. West Coast landings	194	30	9	233
Other	1,939	332	224	2,495
Other Pacific Ocean waters	74	55	79	148

Notes:
1. NA - not available.
2. Excludes vessel identifiers "ZZ.." and "NONE."
3. U.S. West Coast vessel counts among states are not unique vessels. The "total" counts for states are unique.
4. The inclusion criteria for Alaska registered vessel counts with landings at U.S. West Coast states is whether at least one landing was made at a U.S. West Coast port. This excludes vessels that may have a homeport in a U.S. West Coast state, but participate exclusively in offshore or distant water fisheries.

Source: PacFIN annual vessel summary March 2005 extraction and offshore November 2005 extraction, CFEC August 2005 extraction and AKFIN May 2006 extraction, and Wayne Heikkila, Western Fishing Boat Owners Association.

Table I.4
Vessel Classification Rules

Order	Vessel Category	Rule Description
1	Mothership/Catcher Processor	Identified by vessel documentation
2	Alaska Fisheries Vessel	Alaska revenue is greater than 50% of that vessel's total revenue
3	Pacific Whiting Onshore and Offshore Trawler	Pacific whiting PacFIN revenue plus U.S. West Coast offshore revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $100,000
4	Large Groundfish Trawler	groundfish (including sablefish, halibut, and California halibut) revenue from other than fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $100,000
5	Small Groundfish Trawler	groundfish (including sablefish, halibut, and California halibut) revenue from other than fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
6	Sablefish Fixed Gear	sablefish revenue from fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
7	Other Groundfish Fixed Gear	groundfish (including halibut and California halibut), other than sablefish, revenue from fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
8	Pelagic Netter	pelagic species revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
9	Migratory Netter	highly migratory species revenue from gear other than troll or line gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
10	Migratory Liner	highly migratory species revenue from troll or line gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
11	Shrimper	shrimp revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
12	Crabber	crab revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
13	Salmon Troller	salmon revenue from troll gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
14	Salmon Netter	salmon revenue from gill or purse seine gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
15	Other Netter	other species revenue from net gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
16	Lobster Vessel	lobster revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
17	Diver Vessel	revenue from sea urchins, geoduck, or other species by diver gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
18	Other > $15 Thousand	all other vessels not above who have total revenue greater than $15,000
19	Other <= $15 Thousand	all other vessels not above who have total revenue less than or equal to $15,000

Source: Study.

The first project's purpose was to develop a model to estimate contributions of the fishing industry to regional economies. The only information available was the "fish tickets" or landings. Economic information on vessel revenue and spending flows as well as primary processing products and costs was needed to estimate economic contribution of fish landings. While some cost information was available from literature, most of the information was gathered by informal surveys of individual fishery, processors, and associations. From these informal surveys several general observations emerged. These were:

- Vessel size and gear combinations are factors for skipper and owner decision making about when and where to go fishing. Other more important factors are the availability of resources and the management measures that allow access to fisheries.
- Even though there are very broad vessel groups that can be defined by total revenue, most fishermen are opportunists who will move from fishery to fishery within limits of perceived payback.
- Some specialization may develop for species using certain gear types. For example, the Seattle purse seiners will fish Puget Sound salmon, but may also go to California for the pelagic fisheries and then move to Alaska for the herring, salmon fisheries. The timing of fisheries influences many decisions of capital as well as human investments.
- Crew wages (including skipper) tend to average about 39 percent. This may change for the "derby" fisheries and also for the small boat owner/operated boats that require very little capital investment. Deciding which fisheries to pursue may include criteria for keeping experienced crew members retained by participating in fisheries of lower return to owners.
- Other decisions to define the vessels' classification depend on data availability. For example, distant water fisheries revenue is included because of the substantial amount of revenues that are returned from Alaska and U.S. West Coast offshore fisheries.

While cost and earnings background information was useful in the initial classification procedures, final rules are dependent only upon revenues revealed through the PacFIN, AKFIN, and other fish purchasing based systems.

The second project completed in 2000 for the PSMFC used a combination of a priori knowledge about fishery management, vessel fisheries participation, and statistical procedures to update the Fisheries Economic Assessment Model (FEAM) classifications. An important rule was adopted to use $15,000 as the dividing point for annual fishing revenue, with exceptions for salmon trollers and diver vessels. These vessels were selected using a minimum of $5,000 total revenue to be active within their respective vessel types. Otherwise most trollers as well as diving vessels would have been included in the "other" category. There also was a need to separate larger groundfish trawlers from small ground trawlers. These small trawlers were mostly California based halibut trawlers. Therefore, since analysis of the data showed two groupings, it was decided to have large trawlers put into categories of $100,000 or more.

The 33 percent specialization rule developed from analysis of the data. Without the 33 percent rule, too many boats would be classified as other. This is especially true for some groups such as shrimpers and sablefish fixed gear. For some groups the total amount of licenses permitted is close to those counted in this vessel classification; e.g. trawlers. This is not the case for other

categories such as salmon trollers. In Oregon alone, about 1,200 boats have salmon troll permits. From Washington to California only 367 boats land enough salmon (over $5,000) to be classified to be salmon trollers.

Several scenarios for number of classes, rule series order, and rule criteria were tested to best explain classification fit. It was necessary to itemize the revenue distribution within a species group for three specific species: sablefish, Pacific whiting, and lobster, and certain species harvested by dive gear. These species are either significant sources of revenue for some vessels and/or are managed separately from other complexes.

There is a separate harvest guideline for sablefish caught by trawl gear and fixed gear (pot and hook and line gear groups). Vessels that fish with fixed gear have different physical characteristics and participate in other fisheries differently than vessels that harvest sablefish with trawl gear. They are treated in a special category for further analysis.

Crab and lobster vessels use similar gear types, but the species are managed differently and harvests are geographically separated. California spiny lobster comprises about 15 percent of the crab/lobster species group. Landings are mostly at central and southern California ports while landings for Dungeness crab are in northern California, Oregon, and Washington.

Pacific whiting is also a case of groundfish that is harvested by vessels with special characteristics. These vessels can have expensive handling and processing equipment onboard that is not used on other trawlers. A portion of the vessels that land Pacific whiting deliver only to floating processors. The unique characteristics of vessels that harvest Pacific whiting require that they be treated in special analysis categories.

What is identified as "diving vessels" harvest species such as abalone, sea urchins, geoducks, etc. Some of these species were previously discussed as either a single-species group or lumped with the "other" species group.

Distant water fisheries provide a significant source of revenue for some vessels and definitions were needed to categorize the vessels that deliver in U.S. West Coast states, but whose revenue is mostly from elsewhere. If a vessel's distant water fisheries revenues were greater than 50 percent of its total revenues, then it is treated in a special category for vessel classification purposes.

The rules "explained" vessel classifications for about 55 percent of the fleet and 97 percent of the revenue in 1997 (Table I.5). Despite the scenario testing to make classes more general, two catch-all classifications were needed for vessels that didn't meet other rule criteria. The catch-all classifications were for vessels with total revenue greater than $15,000, representing one percent of the fleet, and vessels less than or equal to $15,000, representing 44 percent of the fleet. These vessels have either very low revenues or such a distributed revenue profile that it was not possible to treat them with any degree of specialization.

The complexity of the revenue distribution among species and gear groups and for other sources of revenue is shown in Table I.6. For vessels classified as groundfish trawlers (large and small),

Table I.5
Total Counts and Revenues by Vessel Classifications in 2003

Vessel Category	Total Category Revenue	Percent	Vessel Count	Percent	Average Revenue
1 Mothership/Catcher Processor	9,247	3%	4	0%	2,312
2 Alaska Fisheries Vessel	29,758	9%	161	4%	185
3 Pacific Whiting Onshore and Offshore Trawler	13,787	4%	23	1%	599
4 Large Groundfish Trawler	27,743	8%	121	3%	229
5 Small Groundfish Trawler	2,828	1%	52	1%	54
6 Sablefish Fixed Gear	11,349	3%	98	2%	116
7 Other Groundfish Fixed Gear	8,400	2%	112	3%	75
8 Pelagic Netter	35,237	10%	113	3%	312
9 Migratory Netter	8,730	3%	73	2%	120
10 Migratory Liner	26,270	8%	254	6%	103
11 Shrimper	11,058	3%	77	2%	144
12 Crabber	126,828	36%	772	18%	164
13 Salmon Troller	12,292	4%	395	9%	31
14 Salmon Netter	3,289	1%	224	5%	15
15 Other Netter	1,300	0%	30	1%	43
16 Lobster Vessel	4,663	1%	80	2%	58
17 Diver Vessel	8,427	2%	152	4%	55
18 Other > $15 Thousand	944	0%	14	0%	67
19 Other <= $15 Thousand	5,798	2%	1532	36%	4
Total	347,947	100%	4,287	100%	81

Notes:
1. Revenue is ex-vessel value in thousands of 2003 dollars.
2. U.S. West Coast onshore revenues exclude landings from vessels with identifier code "ZZ..." or "NONE."
3. Revenue includes U.S. West Coast onshore landings and revenue from offshore and distant water fisheries.

Source: PacFIN August 2004 extraction.

these vessels harvest 50 percent of all groundfish landings off U.S. West Coast ports in 2003. Groundfish revenues make up 74 percent of total revenues for large trawlers and 52 percent of revenues for the small trawlers. In addition, they land 13 percent of the shrimp and three percent of the Dungeness crab. While there are only 173 vessels in this category out of 4,287 making landings in U.S. West Coast states, they produce eight percent of all revenue. The highest category (when omitting the catch-all categories from tallies) is a crabber (32 percent), followed by a pelagic netter (nine percent). Alaska fisheries vessels land eight percent of all revenue, as do migratory netters and liners (eight percent). Shrimpers land three percent. Vessels specializing in salmon troll or gillnet gear are second from last.

Assigning vessels to a certain classification is rule order dependent, i.e. vessel classes are from a hierarchical structure. Study findings showed that the hierarchical approach does not significantly change if vessels were not removed from the pool for being previously classified in another category (The Research Group February 2000).

Table I.6
Sources of Revenue by Vessel Classifications in 2003

Vessel Category	U.S. West Coast Onshore																						U.S. West				
	Ground-fish		Pacific Whiting		Salmon		Crab/ Lobster		Shrimp		Coastal Pelagic		Highly Migratory		Halibut		Sea Urchins		Other		Total Onshore		Alaska Onshore		Alaska Offshore		Coast Offshore		Other Offshore		Total	
1 Mothership/Catcher	922	10%	0	0%											100	1%			0	0%	1,022	11%	737	8%	7,489	81%					9,247	100%
Processor	2%		0%												1%				0%		0%		2%		94%						2%	
2 Alaska Fisheries Vessel	626	2%	124	0%	1,130	4%	3,978	13%	106	0%	745	2%	312	1%	634	2%	31	0%	18	0%	7,705	25%	23,139	75%	81	0%			75	0%	31,000	100%
	1%		2%		3%		3%		1%		2%		1%		9%		0%		0%		2%		65%		1%				2%		8%	
3 Pacific Whiting Onshore	1,161	8%	3,611	25%	3	0%	1,090	8%	117	1%	18	0%	51	0%	1	0%			8	0%	6,061	43%	2,982	21%	426	3%	4,755	33%			14,223	100%
and Offshore Trawler	3%		65%		0%		1%		1%		0%		0%		0%				0%		2%		8%		5%		100%				4%	
4 Large Groundfish	20,364	74%	241	1%	0	0%	3,972	14%	1,527	6%	7	0%	471	2%	34	0%			667	2%	27,283	99%	158	1%					50	0%	27,491	100%
Trawler	46%		4%		0%		3%		12%		0%		1%		0%				3%		8%		0%						1%		7%	
5 Small Groundfish	1,573	52%	0	0%	5	0%	227	8%	87	3%	0	0%	60	2%					1,051	35%	3,003	100%									3,003	100%
Trawler	4%		0%		0%		0%		1%		0%		0%						4%		1%										1%	
6 Sablefish Fixed Gear	6,339	56%	3	0%	494	4%	2,979	26%	0	0%	6	0%	131	1%	632	6%	1	0%	40	0%	10,626	94%	652	6%					25	0%	11,303	100%
	14%		0%		2%		2%		0%		0%		0%		9%		0%		0%		3%		2%						1%		3%	
7 Other Groundfish	2,703	33%	0	0%	188	2%	782	10%	45	1%	0	0%	160	2%	2,604	32%	18	0%	318	4%	6,818	83%	1,369	17%					25	0%	8,212	100%
Fixed Gear	6%		0%		1%		1%		0%		0%		0%		37%		0%		1%		2%		4%						1%		2%	
8 Pelagic Netter	13	0%	0	0%	85	0%	214	1%			31,995	96%	32	0%					21	0%	32,360	97%	836	2%					300	1%	33,497	100%
	0%		0%		0%		0%				96%		0%						0%		10%		2%						7%		9%	
9 Migratory Netter	101	2%			66	2%	100	2%	29	1%	8	0%	2,996	72%	6	0%	0	0%	424	10%	3,730	89%	53	1%					400	10%	4,183	100%
	0%				0%		0%		0%		0%		9%		0%		0%		2%		1%		0%						9%		1%	
10 Migratory Liner	61	0%			1,205	4%	2,048	7%	223	1%	24	0%	22,064	77%	21	0%	6	0%	59	0%	25,711	89%							3,100	11%	28,811	100%
	0%				4%		2%		2%		0%		66%		0%		0%		0%		8%								69%		7%	
11 Shrimper	161	1%	0	0%	6	0%	3,126	28%	7,235	66%	1	0%	141	1%	34	0%			233	2%	10,937	99%	108	1%							11,045	100%
	0%		0%		0%		2%		57%		0%		0%		0%				1%		3%		0%								3%	
12 Crabber	5,407	4%	1,133	1%	7,184	6%	97,517	78%	2,385	2%	143	0%	4,312	3%	1,198	1%	24	0%	128	0%	119,431	95%	5,340	4%					525	0%	125,296	100%
	12%		20%		22%		74%		19%		0%		13%		17%		0%		0%		36%		15%						12%		32%	
13 Salmon Troller	206	2%			10,802	85%	817	6%	5	0%	61	0%	348	3%	96	1%			20	0%	12,356	98%	260	2%					25	0%	12,640	100%
	0%				33%		1%		0%		0%		1%		1%				0%		4%		1%						1%		3%	
14 Salmon Netter	4	0%			2,925	89%	3	0%			6	0%	0	0%					349	11%	3,287	100%									3,287	100%
	0%				9%		0%				0%		0%						1%		1%										1%	
15 Other Netter	16	1%			10	1%	115	8%			1	0%	51	4%			119	9%	1,011	74%	1,323	96%	48	4%							1,371	100%
	0%				0%		0%				0%		0%				2%		4%		0%		0%								0%	
16 Lobster Vessel	101	2%					4,010	89%	39	1%	12	0%	30	1%			34	1%	263	6%	4,488	100%									4,488	100%
	0%						3%		0%		0%		0%				0%		1%		1%										1%	
17 Diver Vessel	71	1%			0	0%	23	0%	0	0%	0	0%	33	0%			6,915	91%	582	8%	7,624	100%									7,624	100%
	0%				0%		0%		0%		0%		0%				95%		2%		2%										2%	
18 Other > $15 Thousand	66	8%			153	18%	116	14%	51	6%	5	1%	42	5%					372	43%	805	94%	53	6%							857	100%
	0%				0%		0%		0%		0%		0%						1%		0%		0%								0%	
19 Other <= $15 Thousand	1,587	15%			2,774	27%	2,321	22%	241	2%	422	4%	783	8%	23	0%	61	1%	2,159	21%	10,372	100%									10,372	100%
	4%				8%		2%		2%		1%		2%		0%		1%		8%		3%										3%	
20 Unidentified	3,212	8%	426	1%	5,758	14%	9,214	22%	496	1%	0	0%	1,575	4%	1,581	4%	39	0%	18,727	46%	41,027	100%									41,027	100%
	7%		8%		18%		7%		4%		0%		5%		23%		1%		71%		12%										11%	
Total revenue	44,696	11%	5,538	1%	32,788	8%	132,652	34%	12,586	3%	33,455	9%	33,593	9%	6,964	2%	7,248	2%	26,449	7%	335,970	86%	35,734	9%	7,995	2%	4,755	1%	4,525	1%	388,978	100%
	100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%	

Notes: 1. Volume is in thousands of round pounds. Value is in thousands using nominal dollars. Price in cents using nominal dollars. Percents are from column \ row totals.
2. Distant water fisheries revenue estimated using model results from The Research Group (February 2000).

Source: PacFIN March 2004 extraction.

2. Processors

The U.S. West Coast fishing industry is also made up of businesses and industries that process and distribute finfish and shellfish products and the businesses and industries that furnish supplies and services to them. While some smaller fishing, processing, and marketing firms may deal with a single species or species group, the majority of the U.S. West Coast seafood production comes from firms involved in a variety of species and products. This industry is diverse and complex, and many of the businesses along the U.S. West Coast are also involved in Alaska and foreign fisheries as well. A seafood processor was included in the analysis if at least one purchase from a harvester was made at a U.S. West Coast port. There are other businesses that produce secondary seafood products (such as breaded products) and use raw products from non-U.S. West Coast landings that are not included in project investigations.

G. Definition of Economic Value

There are many economic method and measurement terms used in this report. Revenue generated when harvesters receive money for delivering their catch to processors, restaurants, direct sales to the public, and other types of buyers is referenced in this report as harvest revenue, landing value, or ex-vessel value. When processors sell their products to wholesalers, it is called ex-processor value. Ex-vessel prices are reported per "round" pound equivalents. Round pounds are either the actual weight of fish when purchased by the buyer or processor, or the weight corrected by an adjustment factor in the case that the fish was dressed (gutted, gilled, and headed) when sold to the buyer or processor. All ex-vessel revenues and prices have been adjusted to real dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis. When ex-vessel or ex-processor prices and revenues/sales are discussed, they are in 2004 dollars, unless specifically defined otherwise.

One of the study's overall goals is to evaluate the economic contributions from ocean harvesting and primary processing to communities and the nation. Economic value can generally be described in one of two ways: net economic value (NEV) and regional economic impacts (REI). NEV attempts to measure the net benefits received by those that fish and the value people place on the resource, whether or not they intend to actually use the resource in a fishing experience. REI considers how many people participate in fishing and how much they spend while fishing. The spending introduces money into economies, which finds its way to household income from wages, proprietor's incomes, rents, interest and dividends. Only REI measurements are used in this report. A detailed description of the difference between NEV and REI measurements is provided in Appendix A.

REI estimates are made using measurements for household personal income and full-time job equivalents. The economic model that generated the measurements was developed for a previous project and applied to Year 2004 using new landing volumes and market conditions (Davis 2003). The previous project resulted in the development of the PFMC Year 2000 economic model, which is derived from the FEAM.[1] The model provides species/gear specific

1. The Fishery Economic Assessment Model (FEAM) was developed for the West Coast Fisheries Development Foundation by Hans Radtke and William Jensen in 1986. The FEAM is based on economic response coefficients generated from the IMPLAN input-output model. IMPLAN models are available for each county

(per round pound harvested) marginal economic factors for the harvest and processing sectors. In order to apply the factors from years prior to this benchmark year and following years, it was necessary to adjust the factors to new ex-vessel pricing and sometimes adjust recovery rates for certain product forms. What may have been a predominant product form in the late 1990's may have shifted to something else having different yield in 2004.

H. Definition of Climatic Conditions

References are made in this report to adverse ocean conditions that have affected fish resource productivity. This is a science discipline not yet fully understood on an ecosystem basis. Correlations with numbers of adult salmon returning to spawning streams and hatchery release sites have received considerable study. Oceanic conditions appear to strongly influence survival of out-migrating salmon species as indicated by the Pacific Decadal Oscillation (PDO) index (Mantau 1997). Important changes in Northeast Pacific marine ecosystems have been correlated with the PDO (Francis et al. 1998). For example, warm PDO phases have favored high salmon production in Alaska and low salmon production off the west coast of California, Oregon, and Washington states (Figure I.1). Conversely, cool PDO eras have favored low salmon production in Alaska and relatively high salmon production for California, Oregon, and Washington (Hare 1996, Hare et al. 1999). More recently, Peterson et al. (August 2006) has looked at other indicators to predict ocean salmon survival. These include measures of upwelling, water temperature and salinity, plankton composition, and presence of forage fish and predators among other elements.

I. Definition of Overfished

Overfished is defined in the SFA of 1996, which added and refined the MSA of 1976, to be when a stock reaches a depleted status. The SFA also has a definition for stocks in a precautionary status. The PFMC has adopted proxies for the depleted status condition to be when the stock's spawning biomass declines to less than 25 percent of unfished biomass. The PFMC uses 40 percent of unfished biomass for precautionary status condition. This means that the PFMC adopts management actions aimed to maintain abundance of each stock at or above approximately 40 percent of its virgin biomass. The MFCMA and National Standard Guidelines refer to the depleted status threshold as the minimum stock size threshold. A rebuilding plan that specifies how total fishing-related mortality is constrained to achieve a maximum sustainable yield (MSY) abundance level within the legally allowed time is required by the MSA when a stock is declared depleted.

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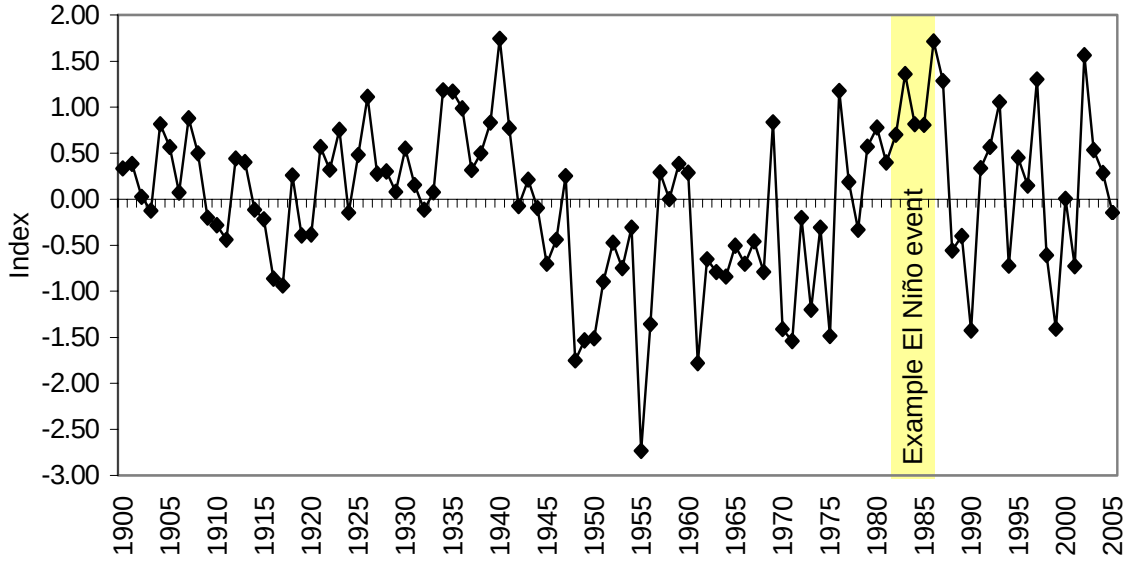
and state in the U.S. The models are distributed by MIG, Inc., 1725 Tower Drive West, Suite 140, Stillwater, MN 55082.

Figure I.1
PDO Index Annual October to March Average in 1900 to 2005



Notes: 1. Updated standardized values for the Pacific Decadal Oscillation (PDO) index, derived as the leading perturbation cycle (PC) of monthly sea surface temperature (SST) anomalies in the North Pacific Ocean, poleward of 20 degrees north latitude.
2. Each year's index is the average of the monthly indices from October of that year to March of the following year.
3. The shading on the figure shows one example El Niño event.

Source: University of Washington, http://jisao.washington.edu/pdo/PDO.latest.

II. HARVEST TRENDS

This chapter has abbreviated trend descriptions for landed volume, value, and vessel counts. The descriptions are for aggregated species groups and port groups. (Appendix C shows the mapping scheme used for the aggregation.) Landings are itemized for onshore and offshore deliveries. Later chapters have more specific fishery descriptions.

A. Landed Volume

Historically, the U.S. West Coast ocean fishing fleet shifted from salmon and tuna toward groundfish, shrimp, and crab (Table II.1 and Figure II.1). In the late 1980's, groundfish landings stabilized and shrimp landings increased. In the late 1990's and early 2000's, Dungeness crab landings increased. Landings and prices (except for shrimp) were such that 1987 and 1988, then 2003 and 2004, were banner years. Because of declining resource availability or species cyclical abundance lows, the value of landings in most U.S. West Coast ports is expected to decrease in the near future unless prices dramatically rise.

With the development of the groundfish fishery and the heydays in the southern California tuna fishery, historical landings in terms of volume increased to 1.1 billion pounds in 1981. These landings decreased during the low years of adverse oceanic conditions in 1984 and 1985 and again in the early 1990's. The volume of landings increased when Pacific whiting was brought onshore to be processed into "surimi" starting in the middle 1990's. Because of the influence of Pacific whiting prices, total landings have changed generally from high value-low volume to low value-high volume species.

There is an offshore fishery targeting Pacific whiting along the U.S. West Coast. This species, as well as many others, were harvested by foreign countries prior to the passage of the MFCMA, which defined a U.S. fishery management zone called the EEZ to be within 200 miles of the coast. The offshore fishery shifted to a joint-venture (U.S. registered vessels selling to foreign owned motherships) and to a wholly domestic fishery by 1991 and recent years landings were highest in that year (Table II.4).

B. Landed Value

The value of landings (in inflation adjusted, real terms) peaked by 1981 at $781 million when high levels of landings in tuna, groundfish, crab, and salmon combined with strong prices for almost all species (Table II.2). In 2004 real terms, the ex-vessel value of all landed fish declined to an average of $431 million in 1984 and 1985, then increased to $626 million in 1988. The value has stabilized overall to around $325 million in the last five years. There were higher years of landing values in 1996 and again in 2000 due to increased prices and higher landings of certain species other than salmon (Table II.3). Increased salmon prices buoyed the ex-vessel value for this fishery in 2004.

The landings by states have been traditionally highest for California (Figure II.2). However, that share has decreased significantly since highly migratory species (HMS) like tunas have moved to

Table II.1
U.S. West Coast Onshore Landed Volume by Species Groups in 1981 to 2004

Year	Groundfish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Pelagic	Highly Migratory	Halibut	Sea Urchins	Other	Total
1981	256,762	11,263	61,268	23,234	42,136	316,863	335,722	3,676	26,702	41,793	1,119,420
1982	292,466	15,594	67,551	19,813	29,419	283,791	255,407	4,558	19,644	27,858	1,016,100
1983	247,274	17,405	31,880	19,187	14,865	155,194	252,574	2,870	18,169	25,740	785,157
1984	246,295	14,778	34,673	17,550	12,238	141,646	187,680	4,289	15,397	28,442	702,988
1985	230,139	29,076	78,072	20,886	29,835	151,253	74,697	5,003	20,640	27,783	667,384
1986	212,502	25,898	72,839	20,404	59,354	186,631	81,276	7,162	36,284	17,811	720,159
1987	222,999	38,837	83,168	22,781	69,044	200,620	79,094	6,523	50,061	17,144	790,271
1988	210,397	29,248	77,238	41,164	72,204	241,298	80,644	5,478	63,827	18,920	840,418
1989	225,389	34,201	72,711	39,830	80,379	251,542	60,616	6,121	60,586	20,226	851,601
1990	214,442	20,717	50,656	34,808	56,658	197,311	36,945	4,299	53,865	21,415	691,117
1991	213,259	50,793	55,321	17,569	44,754	202,112	24,797	3,179	53,208	19,087	684,080
1992	213,785	127,970	29,613	37,876	80,756	135,017	30,743	3,397	39,954	17,340	716,450
1993	201,302	93,869	41,648	42,791	52,342	175,956	38,172	5,150	32,581	14,147	697,957
1994	164,486	162,360	34,657	44,291	35,505	189,879	46,507	3,650	27,996	11,915	721,245
1995	152,281	168,294	35,694	44,227	28,529	283,600	41,754	3,210	25,397	10,853	793,839
1996	156,168	196,392	22,866	61,062	34,317	300,681	64,742	3,350	22,287	12,369	874,233
1997	143,059	197,379	31,112	35,814	42,728	333,840	58,342	4,441	19,661	11,785	878,160
1998	113,527	197,514	19,350	33,459	13,833	165,192	64,673	4,610	11,550	11,012	634,719
1999	106,721	185,284	13,484	41,469	32,652	377,473	38,849	3,498	15,069	11,519	826,019
2000	89,952	189,252	21,807	37,331	36,958	498,597	31,855	2,655	17,117	10,167	935,692
2001	73,155	162,290	37,517	34,351	41,971	432,105	32,614	2,781	15,137	10,660	842,581
2002	69,320	100,898	45,228	43,172	58,837	404,306	28,600	3,058	15,492	12,322	781,231
2003	66,395	122,124	46,097	81,991	33,052	277,191	44,264	2,245	11,636	12,168	697,163
2004	64,050	212,836	42,359	69,223	22,336	316,196	36,775	2,662	12,767	11,054	790,259

Notes: 1. Landings are reported in thousands of round pounds.
2. Aquaculture is not included.
3. Other in the most recent year includes landings (thousands of round pounds) of geoduck (4,494), sea cucumbers (1,151), California halibut (1,014), Manila clams (792), hagfish (523), smelt (479), white sturgeon (368), shad (354), and other species (1,880).

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

an offshore fishery. Oregon's share increased due to relatively recent developed fisheries for Pacific whiting.

C. Vessel Counts

The count of vessels making landings generally pattern landing volume (Table II.5). While the number of vessels overall has declined, the decreased numbers making landings for the species groups salmon and groundfish are most pronounced. There were a total of 4,111 vessels making onshore non-tribal landings in 2004. Fifteen vessels participated in the West Coast offshore fishery by delivering to four motherships in 2004 (Table II.7). There were six catcher-processors participating in this fishery in 2004.

Table II.2
U.S. West Coast Onshore Landed Value by Species Groups in 1981 to 2004

Year	Groundfish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Pelagic	Highly Migratory	Halibut	Sea Urchins	Other	Total
1981	92,643	627	131,326	40,584	40,407	53,633	365,139	7,844	9,263	39,339	780,805
1982	114,112	892	146,589	38,169	28,013	50,381	232,322	9,969	6,113	27,064	653,624
1983	97,284	1,026	45,097	46,951	18,568	42,780	195,663	6,227	6,518	22,155	482,270
1984	94,718	1,090	71,694	43,263	13,760	21,834	153,929	6,407	5,958	28,376	441,030
1985	97,160	2,048	110,882	47,076	17,721	30,600	70,649	9,827	7,692	28,197	421,853
1986	98,028	1,819	128,796	43,589	50,102	30,025	67,652	19,307	15,322	15,231	469,871
1987	117,384	2,813	196,704	47,248	70,934	31,844	71,982	18,629	21,177	17,251	595,965
1988	104,151	2,601	221,005	72,401	44,605	36,879	82,570	12,986	32,868	15,862	625,927
1989	100,882	2,573	115,760	66,180	42,068	32,186	51,788	15,739	35,145	20,449	482,769
1990	92,833	1,572	98,496	73,253	39,130	30,856	34,224	13,051	38,211	20,167	441,793
1991	99,913	3,400	60,833	37,497	34,239	30,840	22,304	9,348	52,525	20,376	371,276
1992	96,882	7,639	38,230	59,046	37,730	24,516	32,586	6,338	44,031	23,040	370,038
1993	86,570	3,535	41,346	62,199	24,852	21,257	37,397	10,504	39,099	26,355	353,113
1994	86,516	5,887	40,520	75,687	28,827	26,460	46,679	9,788	35,343	25,328	381,034
1995	101,148	9,343	31,337	90,713	27,841	44,690	32,830	9,030	30,193	20,882	398,007
1996	96,260	6,260	21,084	102,221	29,196	49,863	52,612	10,413	24,078	24,726	416,713
1997	89,430	9,528	27,109	83,300	27,316	50,743	46,103	12,311	18,959	27,971	392,770
1998	60,697	5,547	17,517	71,430	16,823	11,494	44,764	8,425	9,790	26,406	272,892
1999	60,701	7,672	16,107	93,506	23,515	47,784	36,444	9,706	15,683	27,771	338,889
2000	61,703	8,623	26,344	88,675	23,621	45,744	35,349	8,147	17,872	25,747	341,825
2001	50,649	6,103	24,054	76,376	18,892	34,636	33,190	6,693	13,786	28,786	293,165
2002	41,967	4,749	28,616	80,998	23,342	34,578	23,053	8,217	11,613	30,507	287,640
2003	46,008	5,654	33,971	137,874	12,877	36,448	34,609	7,112	8,413	27,139	350,106
2004	42,169	7,739	48,444	120,195	12,368	32,356	33,251	8,313	7,724	29,764	342,322

Notes: 1. Value is in thousands of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Aquaculture is not included.
3. Other in the most recent year includes (thousands) geoduck ($20,139), California halibut ($3,165), sea cucumbers ($1,542), Manila clams ($1,123), white sturgeon ($661), white seabass ($607), Pacific oyster ($420), and other species ($2,107).

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

D. Harbors

Many communities along the U.S. West Coast have harbors for the fishing fleet (Table II.5). Each community has evolved around the type of vessels used to take advantage of harvest opportunities at nearby fishing grounds and the attendant processor and provisioning businesses. Each has a presence of key fishing industry facilities and services that make them unique. Some serve a locally based fleet and others are regional fisheries centers. The comparative size of the port groups can be described by how much volume and value of fish is delivered. The coastal Washington south/central port group that includes Westport and Ilwaco had the highest value share of onshore landings along the U.S. West Coast in 2004. The individual harbor called Astoria (includes Hammond, Warrenton, Cannon Beach, and Seaside as well as Astoria) had the

Table II.3
U.S. West Coast Selected Species and Groups Onshore Landed Prices in 1981 to 2004

Year	Groundfish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Pelagic	Highly Migratory	Halibut	Sea Urchins
1981	0.36	0.056	2.14	1.75	0.96	0.17	1.09	2.13	0.35
1982	0.39	0.057	2.17	1.93	0.95	0.18	0.91	2.19	0.31
1983	0.39	0.059	1.41	2.45	1.25	0.28	0.77	2.17	0.36
1984	0.38	0.074	2.07	2.47	1.12	0.15	0.82	1.49	0.39
1985	0.42	0.070	1.42	2.25	0.59	0.20	0.95	1.96	0.37
1986	0.46	0.070	1.77	2.14	0.84	0.16	0.83	2.70	0.42
1987	0.53	0.072	2.37	2.07	1.03	0.16	0.91	2.86	0.42
1988	0.50	0.089	2.86	1.76	0.62	0.15	1.02	2.37	0.51
1989	0.45	0.075	1.59	1.66	0.52	0.13	0.85	2.57	0.58
1990	0.43	0.076	1.94	2.10	0.69	0.16	0.93	3.04	0.71
1991	0.47	0.067	1.10	2.13	0.77	0.15	0.90	2.94	0.99
1992	0.45	0.060	1.29	1.56	0.47	0.18	1.06	1.87	1.10
1993	0.43	0.038	0.99	1.45	0.47	0.12	0.98	2.04	1.20
1994	0.53	0.036	1.17	1.71	0.81	0.14	1.00	2.68	1.26
1995	0.66	0.056	0.88	2.05	0.98	0.16	0.79	2.81	1.19
1996	0.62	0.032	0.92	1.67	0.85	0.17	0.81	3.11	1.08
1997	0.63	0.048	0.87	2.33	0.64	0.15	0.79	2.77	0.96
1998	0.53	0.028	0.91	2.13	1.22	0.07	0.69	1.83	0.85
1999	0.57	0.041	1.19	2.25	0.72	0.13	0.94	2.77	1.04
2000	0.69	0.046	1.21	2.38	0.64	0.09	1.11	3.07	1.04
2001	0.69	0.038	0.64	2.22	0.45	0.08	1.02	2.41	0.91
2002	0.61	0.047	0.63	1.88	0.40	0.09	0.81	2.69	0.75
2003	0.69	0.046	0.74	1.68	0.39	0.13	0.78	3.17	0.72
2004	0.66	0.036	1.14	1.74	0.55	0.10	0.90	3.12	0.60

Notes: 1. Prices adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery.
3. Groundfish price calculation excludes Pacific whiting.
4. Prices are annual and species averaged expressed in round weight. Average prices for salmon include seasonal and size considerations.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

highest volume share of U.S. West Coast ports in 2004 because of the influence of sardines and Pacific whiting, both of which have much lower prices per unit of weight. Astoria was ranked ninth of all U.S. ports (Table II.8). Other ports are important for hosting distant water fishery fleet participants, and may not have higher volume landings. Recent initiatives by NMFS to investigate community dependence on the commercial fishing industry provide a wealth of information about these communities (NMFS 2006 and Langdon-Pollock 2004).

Table II.4
U.S. West Coast At-Sea Fisheries Volume in 1990 to 2004

Year	Groundfish	Pacific whiting	Salmon	Crab/ lobster	Pelagic	Highly migratory	Halibut	Other	Total
1990	168.7	4,388.8	2.6	0.5	22.2		0.5	35.1	4,618.4
1991	1,883.6	204,687.6	22.3	0.0	484.7	0.8	0.1	89.4	207,168.6
1992	1,994.5	151,210.5	14.3		1,850.3		0.3	114.3	155,184.2
1993	601.4	93,510.6	17.1	-	75.7		0.5	32.2	94,237.5
1994	1,100.4	166,248.2	10.6	0.0	190.1		0.5	56.4	167,606.2
1995	1,381.0	100,383.3	34.5		33.9	0.2	0.0	76.9	101,910.0
1996	1,328.0	125,937.7	9.4		360.8		0.4	113.9	127,750.3
1997	1,050.1	145,750.8	12.7		268.3	0.3	0.1	43.6	147,125.9
1998	1,301.6	144,546.4	13.8		973.7	1.0	0.1	96.9	146,933.6
1999	1,964.6	140,882.9	29.7		367.5	0.4	0.9	433.5	143,679.5
2000	1,211.0	120,712.6	25.9	0.0	176.7	1.1	5.3	248.5	122,381.0
2001	1,170.0	100,329.7	11.3	0.0	235.3	1.6	1.1	168.9	101,917.8
2002	1,587.5	84,750.2	9.5		33.2	0.1	1.1	26.0	86,407.7
2003	1,376.1	86,612.0	23.0		38.7	0.6	2.6	104.2	88,157.2
2004	930.1	120,735.9	12.2		1,165.6	0.4	1.1	42.2	122,887.6

Notes: 1. Volume is in metric tons.
2. Landed value for at-sea fisheries is not reported.
3. There was no tribal allocation before 1999.

Source: PacFIN offshore data, March and November 2005 extractions.

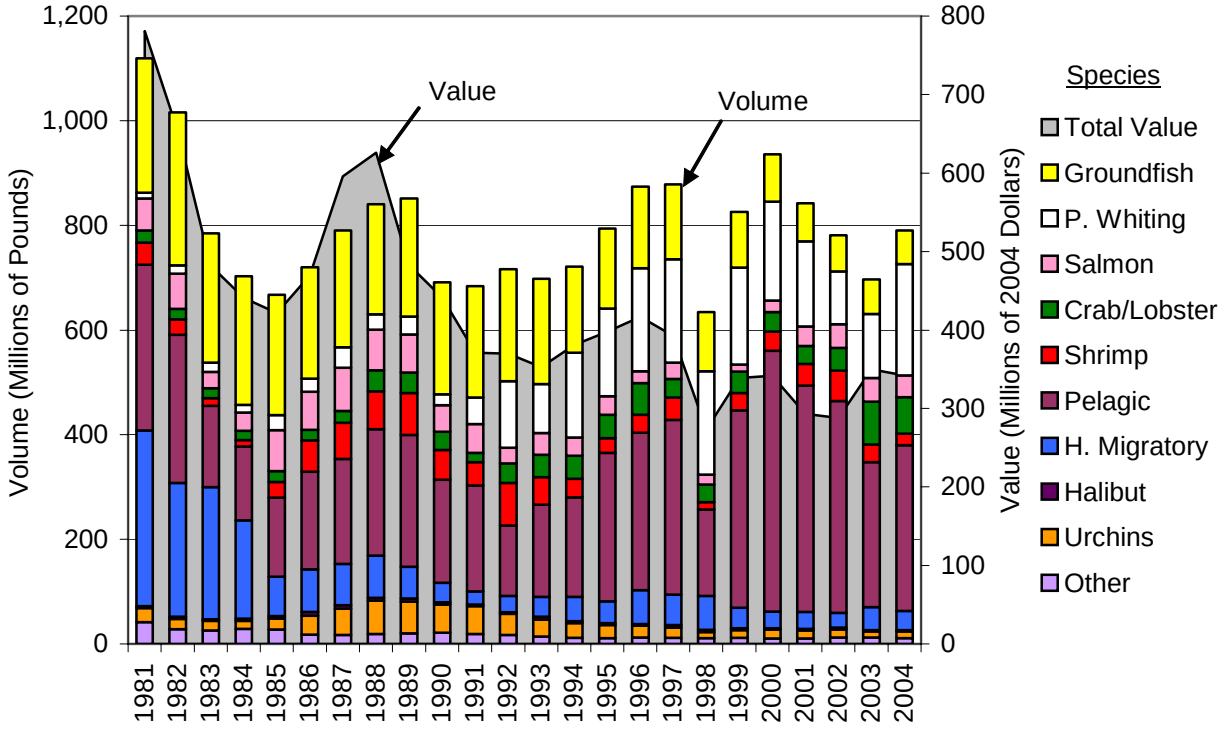
Table II.5
Counts of Vessels Landing at U.S. West Coast Ports in 1981 to 2004

Year	Groundfish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Pelagic	Highly Migratory	Halibut	Sea Urchins	Other	Total
1981	6,158	49	11,807	1,855	471	1,172	2,356	306	276	2,616	15,446
1982	5,585	42	11,197	1,841	412	1,039	1,380	280	240	2,621	14,667
1983	4,889	97	10,089	1,826	390	1,649	2,268	250	243	2,550	13,704
1984	3,551	96	5,880	1,812	287	992	1,613	264	201	2,453	9,693
1985	3,898	94	7,839	1,798	300	911	1,312	297	212	2,127	11,270
1986	4,091	120	7,905	1,755	392	824	979	424	293	2,239	11,186
1987	4,797	111	7,272	1,892	441	1,090	1,045	460	445	2,299	10,947
1988	4,516	85	7,130	2,051	441	954	1,023	340	603	2,475	10,704
1989	4,655	69	7,136	1,993	414	999	783	306	563	2,423	10,850
1990	4,257	52	6,388	2,007	414	1,043	814	314	606	2,308	10,190
1991	3,634	72	5,634	1,993	457	652	518	319	637	2,231	9,502
1992	3,498	53	4,120	1,967	455	869	996	336	626	2,256	8,314
1993	3,029	49	4,096	1,810	445	613	968	413	568	2,048	7,805
1994	2,530	61	2,873	1,823	396	551	1,025	346	518	1,839	6,666
1995	2,408	71	2,877	1,772	375	549	782	212	486	1,703	6,379
1996	2,409	78	2,384	1,683	361	581	979	262	426	1,863	5,959
1997	2,404	91	2,318	1,590	385	672	1,438	350	389	1,822	5,769
1998	2,025	76	1,761	1,551	354	562	1,109	303	324	1,561	4,896
1999	1,956	66	1,585	1,529	334	450	1,015	284	313	1,416	4,661
2000	1,890	61	1,874	1,479	321	499	985	281	275	1,489	4,802
2001	1,690	54	1,762	1,429	297	393	1,137	321	258	1,376	4,480
2002	1,544	50	1,736	1,436	291	375	890	278	229	1,327	4,285
2003	1,445	55	1,677	1,449	212	356	1,043	266	211	1,230	4,285
2004	1,306	50	1,857	1,408	176	347	929	329	184	1,126	4,111

Notes: 1. Excludes vessels with identifier code "ZZ..." or "NONE" and counts of vessels that participate exclusively in distant water fisheries or treaty fisheries.
2. Vessel counts across species groups are not unique vessels because vessels land within more than one species group. The column titled "total" is unique vessels.

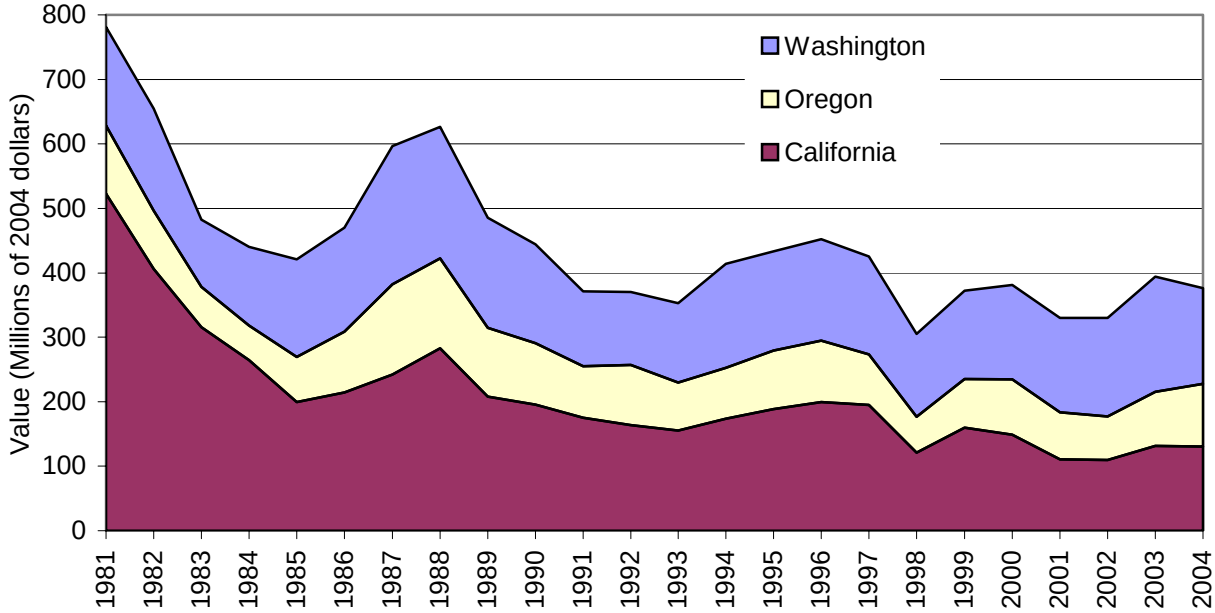
Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Figure II.1
U.S. West Coast Onshore Landed Value and Volume by Species Groups in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Notes and sources from volume table concerning species composition also apply to this figure.
Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Figure II.2
U.S. West Coast Onshore Landed Value by States in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table II.6
U.S. West Coast Port Group Share of Onshore Landings and Home-Port Vessels in 2004

	Onshore Landings								
	Volume			Value			Home-Port Vessels		
Port Group/Major Port	Amount	State Share	Total Share	Amount	State Share	Total Share	Count	State Share	Total Share
Washington	194.1	100%	25%	$114.3	100%	33%	1,052	100%	26%
Northern Puget Sound		18%	5%		29%	10%		35%	9%
Bellingham Bay		12%	3%		19%	6%			
Southern Puget Sound		9%	2%		20%	7%		11%	3%
Seattle		4%	1%		7%	2%			
Coastal Washington North		6%	1%		15%	5%		9%	2%
Neah Bay		2%	1%		4%	1%			
Coastal Washington South/Central		65%	16%		31%	10%		45%	12%
Westport		47%	11%		17%	6%			
Ilwaco/Chinook		16%	4%		10%	3%			
Unidentified Washington		2%	0%		5%	2%		0%	0%
Oregon	294.1	100%	37%	$97.4	100%	28%	1,079	100%	26%
Astoria		47%	18%		24%	7%		29%	8%
Astoria		46%	17%		20%	6%			
Tillamook		1%	0%		4%	1%		10%	3%
Tillamook/Garibaldi		1%	0%		4%	1%			
Newport		38%	14%		30%	9%		23%	6%
Newport		38%	14%		30%	9%			
Coos Bay		10%	4%		27%	8%		24%	6%
Charleston		10%	4%		26%	7%			
Brookings		3%	1%		14%	4%		14%	4%
Port Orford		1%	0%		5%	1%			
Brookings		2%	1%		9%	3%			
California	302.1	100%	38%	$130.3	100%	38%	1,980	100%	48%
Crescent City		6%	2%		15%	6%		6%	3%
Crescent City		6%	2%		15%	6%			
Eureka		7%	3%		12%	5%		6%	3%
Eureka		6%	2%		10%	4%			
Fort Bragg		2%	1%		6%	2%		8%	4%
Fort Bragg		2%	1%		5%	2%			
Bodega Bay		1%	0%		5%	2%		9%	5%
Bodega Bay		1%	0%		4%	2%			
San Francisco		5%	2%		15%	6%		18%	9%
San Francisco		3%	1%		9%	4%			
Princeton/Half Moon Bay		1%	1%		5%	2%			
Monterey		20%	8%		8%	3%		13%	6%
Moss Landing		18%	7%		5%	2%			
Morro Bay		2%	1%		3%	1%		5%	3%
Morro Bay		1%	0%		2%	1%			
Avila		1%	0%		1%	0%			
Santa Barbara		25%	10%		18%	7%		13%	6%
Port Hueneme		16%	6%		6%	2%			
Santa Barbara		2%	1%		5%	2%			
Los Angeles		31%	12%		14%	6%		15%	7%
San Pedro		17%	7%		6%	2%			
Terminal Island		13%	5%		6%	2%			
San Diego		1%	0%		4%	1%		6%	3%
San Diego		0%	0%		2%	1%			
Unidentified California		0%	0%		0%	0%		1%	0%
Total U.S. West Coast	790.3		100%	$341.9		100%	4,111		100%

Notes:
1. Value is in millions of 2004 dollars and volume is in millions of pounds.
2. Aquaculture is excluded.
3. Individual harbors and communities mapped to the table port groups are shown in Appendix C.
4. Home-port group is defined as the port group where a vessel made the most landings by value.
5. Vessel counts exclude vessels with identification codes "NONE" and "ZZ..."
6. Major individual harbors are defined as those with at least 25% of the port group's landed value. For example, Ventura's landings were 23% of the value and 22% of the pounds in the Santa Barbara group, so Ventura is not depicted.
7. Vessel home ports are only resolved at the port group level.

Source: PacFIN March 2005 extraction and ODFW Table 4 and 42 for Oregon landings.

Table II.7
U.S. West Coast At-Sea Vessel Counts by Sector in 1990 to 2004

	Catcher Vessels and Motherships				
	CV	MS		Catcher-Processors	
Year	Count	Count	Volume	Count	Volume
1990	0	0	0.0	4	4,618.4
1991	40	8	87,172.3	13	119,996.3
1992	24	10	36,245.5	23	118,938.7
1993	10	4	14,715.2	15	79,522.3
1994	43	11	81,935.7	9	85,670.5
1995	36	8	40,263.3	9	61,646.6
1996	30	8	61,179.4	10	66,570.8
1997	30	6	75,857.9	10	71,268.1
1998	28	6	75,748.9	7	71,184.7
1999	28	6	74,847.4	6	68,832.1
2000	28	6	53,775.6	8	68,605.4
2001	24	5	42,684.1	7	59,233.7
2002	15	4	49,788.4	5	36,619.2
2003	16	4	46,724.0	6	41,433.2
2004	15	4	48,112.1	6	74,775.6

Notes: 1. Volume is in metric tons. Landed value for at-sea fisheries is not reported.
2. At-sea Pacific whiting is allocated to sectors, which are defined by vessel types for motherships and catcher-processors. A separate tribal allocation is usually delivered to a mothership. The table includes the sector and tribal allocations. There is also an onshore Pacific whiting allocation whose volume trends are shown in Table II.1.

Source: PacFIN offshore data, March and November 2005 extractions.

Table II.8
Landings and Value at U.S. and West Coast Ports in 2004

Major U.S. Ports

Rank	Port	Pounds (thousands)	Rank	Port	Value (thousands)
1	Dutch Harbor-Unalaska, AK	886,400	1	New Bedford, MA	$206,500
2	Reedville, VA	400,500	2	Dutch Harbor-Unalaska, AK	$155,000
3	Empire-Venice, LA	379,000	3	Hampton Roads Area, VA	$100,600
4	Kodiak, AK	312,600	4	Kodiak, AK	$91,000
5	Intracoastal City, LA	301,800	5	Cape May-Wildwood, NJ	$68,100
6	Cameron, LA	243,100	6	Empire-Venice, LA	$60,200
7	New Bedford, MA	175,100	7	Seward, AK	$49,700
8	Pascagoula-Moss Point, MS	162,800	8	Honolulu, HI	$44,600
9	Astoria, OR	135,800	9	Sitka, AK	$43,300
10	Gloucester, MA	113,300	10	Key West, FL	$43,200
11	Newport, OR	111,200	11	Dulac-Chauvin, LA	$42,800
12	Petersburg, AK	102,600	12	Gloucester, MA	$42,700
13	Cape May-Wildwood, NJ	97,500	13	Naknek-King Salmon, AK	$41,400
14	Ketchikan, AK	96,700	14	Brownsville-Port Isabel, TX	$40,300
15	Westport, WA	92,800	15	Homer, AK	$39,800
16	Naknek-King Salmon, AK	92,600	16	Port Arthur, TX	$38,900
17	Los Angeles, CA	92,400	17	Petersburg, AK	$34,200
18	Port Hueneme-Oxnard-Ventura,	69,500	18	Golden Meadow-Leeville, LA	$31,600
19	Beaufort-Morehead City, NC	63,500	19	Point Judith, RI	$31,500
20	Portland, ME	58,000	20	Galveston, TX	$31,400
21	Moss Landing, CA	55,500	21	Newport, OR	$29,600

West Coast Port Groups

Rank	Port Group	Pounds (thousands)	Rank	Port Group	Value (thousands)
1	Astoria	138,721	1	Coastal Washington So./Cent.	$35,123
2	Coastal Washington So./Cent.	125,954	2	Northern Puget Sound	$33,475
3	Newport	111,432	3	Newport	$30,016
4	Los Angeles	93,173	4	Coos Bay	$26,769
5	Santa Barbara	76,819	5	Astoria	$23,436
6	Monterey	59,847	6	Santa Barbara	$22,857
7	Northern Puget Sound	35,647	7	Southern Puget Sound	$22,681
8	Coos Bay	30,740	8	Crescent City	$20,089
9	Eureka	21,261	9	San Francisco	$19,464
10	Southern Puget Sound	17,486	10	Los Angeles	$18,864
11	Crescent City	16,851	11	Coastal Washington North	$17,376
12	San Francisco	15,661	12	Eureka	$16,202
13	Coastal Washington North	11,576	13	Monterey	$9,901
14	Fort Bragg	7,274	14	Brookings	$8,950
15	Brookings	6,328	15	Fort Bragg	$7,889
16	Morro Bay	4,857	16	Bodega Bay	$6,314
17	Tillamook	3,804	17	Unidentified Washington	$5,615
18	Bodega Bay	3,729	18	San Diego	$5,058
19	Unidentified Washington	3,424	19	Port Orford	$4,765
20	Port Orford	3,043	20	Tillamook	$3,854
21	San Diego	2,533	21	Morro Bay	$3,507
22	Unidentified California	101	22	Unidentified California	$119

Notes: 1. To avoid disclosure of private enterprise, certain leading ports have not been included.
2. The record landings for quantity was 908.7 million pounds in Dutch Harbor-Unalaska, AK in 2003 and for value was $224.1 million in Dutch Harbor-Unalaska, AK in 1994.
3. Discrepancy between U.S. West Coast ports is due to differences in sources.

Source: NOAA Fisheries (2006) and PacFIN March 2005 extraction.

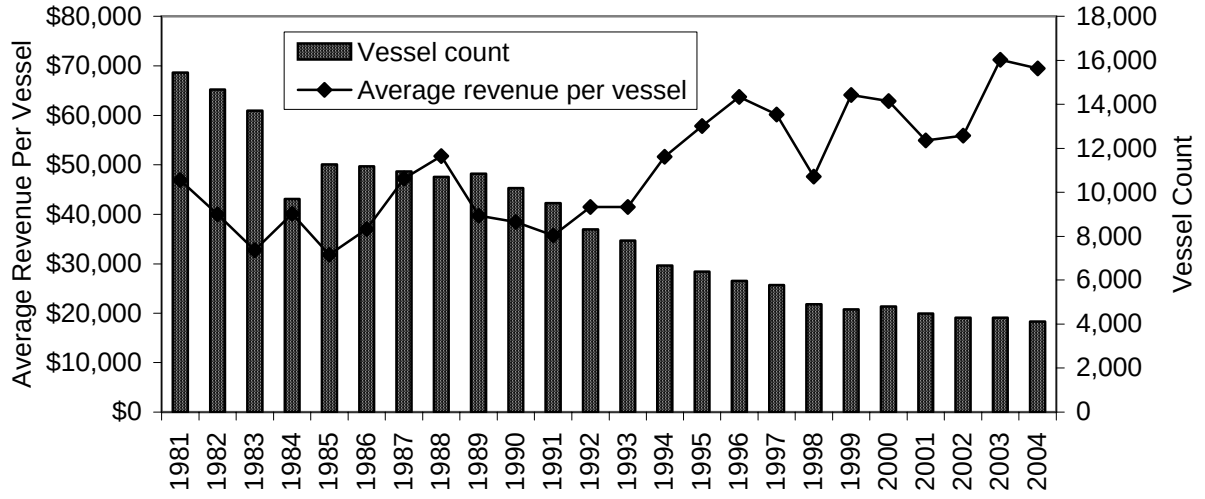
III. VESSEL PARTICIPATION DESCRIPTION

This chapter has historical and recent descriptions of characteristics for vessels that participate in U.S. West Coast fisheries. Discussions include vessels' financial and physical attributes.[1] Specialization patterns are discussed which reveal the multi-fisheries participation nature of the small proportion of the fishing fleet that makes a large proportion of the landings.

A. Vessel Characteristics

The aggregate number of vessels landing at U.S. West Coast ports has decreased almost 67 percent since 1981 (Figure III.1). There was a large drop in the count of vessels delivering in the adverse oceanic conditions years of 1984 and the early 1990's. There were strategic buyout programs for vessels participating in the salmon fisheries in the 1990's and groundfish fishery in 2003. Vessel counts continued to drop until the late 1990's and have remained somewhat stable since then.

Figure III.1
U.S. West Coast Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2004



Notes: 1. Revenues adjusted to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes vessels with identifier codes "NONE" or "ZZ…," which are generally attributable to deliveries made in tribal fisheries.
3. Average revenue per vessel is for onshore landings; distant water fisheries revenue and aquaculture revenue are not included.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

1. Where certain vessel characteristics are discussed, sometimes there is a filter for only vessels landing at least $500 within a particular fishery. The filter was used for two reasons. First, it reduces the influence of vessels that may not be an active participant in a particular fishery for that year. Second, it helps show vessels that target within fisheries rather than vessels that might land bycatch within a species group. While some analysis may have this filter, total vessel counts and fishery landings are also mentioned.

Table III.1
Vessel Revenue Frequency Distribution in 2004

Category	Vessel Counts		Average Vessel Length	Revenue Category	Average Per Vessel Revenue
<$500	288	7%	27'	0.02%	$238
$500 - $4,999.99	743	18%	28'	1%	$2,296
$5,000 - $49,999.99	1,796	44%	33'	13%	$20,983
$50,000+	1,284	31%	49'	86%	$191,632
Total	4,111	100%	36'	100%	$69,452

Notes: 1. Revenue excludes offshore and distant water fisheries sources.
2. Excludes vessel identification codes "NONE" and "ZZ..."
3. Length mean excludes vessels with missing or an assigned zero length. Where a vessel has more than one assigned length, the smallest non-zero assignment is used.

Source: PacFIN March 2005 extraction.

Vessels have had to add fisheries to their portfolio in order to sustain revenue levels. Figure III.2 shows vessel counts since 1989 by the number of gear categories they used. The revenues from gear and species combinations are shown in Table III.2. This table also shows vessel counts by the dimensions for gear and species combinations.

Vessel size measured by length is not a good predictor of a vessel's total revenue. Table III.1 shows it is not until vessels generate more than $50,000 does the length change significantly. Figure III.3 is a scattergram showing vessel length versus vessel revenues in 2004. The displayed linear relationship between length and revenues shows the poor relationship between these two variables. A similar causal relationship was found using vessel gross weight.

B. Vessel Revenue Categories

1. Distant Water Fisheries Revenues

In recent years, there have been around 400 vessels with ownership ties to Washington, Oregon, and California residences that made landings at U.S. West Coast ports and Alaska or other Pacific Ocean locations (Table I.3). There were about another 2,500 vessels with owner registration residency in West Coast states that fished in Alaska. Revenue returning to U.S. West Coast economies from these fisheries is important and the fisheries description section in the next chapter provides a discussion of this contribution.

2. Revenue Distribution

Revenues are not evenly distributed among vessels (Table III.1). In 2004, 69 percent of the vessels landed 14 percent of the total ex-vessel value of U.S. West Coast onshore revenue. The average per vessel revenues for the other 31 percent that land 86 percent of the value is $191,632, while the average for the rest of the fleet is $13,958. This characteristic is not unique to 2004; the distribution has been about the same following the adverse oceanic conditions years

Table III.2
U.S. West Coast Vessel Revenue, Vessel Counts, and Gear Profile by Species and Gear Groups in 2004

Revenue

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	4.04%	0.04%	0.00%	0.85%	7.37%	0.02%	$42,169	12%
2 Pacific whiting	0.00%	0.00%			2.26%	0.00%	$7,739	2%
3 Salmon	0.03%	5.20%	0.00%	0.00%	0.02%	8.89%	$48,444	14%
4 Crab/lobster	0.00%	0.01%	0.02%	35.08%	0.00%		$120,195	35%
5 Shrimp	0.00%	0.00%	0.11%	1.07%	2.43%		$12,368	4%
6 Pelagic	0.01%	9.42%	0.01%	0.00%	0.01%	0.00%	$32,356	9%
8 Highly migratory	1.41%	0.21%	0.19%	0.00%	0.32%	7.58%	$33,251	10%
9 Halibut	2.38%				0.00%	0.05%	$8,313	2%
10 Sea urchins	0.00%	0.11%	2.14%		0.00%	0.00%	$7,724	2%
11 Other	0.32%	0.94%	6.60%	0.14%	0.68%	0.01%	$29,764	9%
All species	$28,043	$54,572	$31,053	$127,164	$44,832	$56,658	$342,322	100%
Percent	8%	16%	9%	37%	13%	17%	100%	

Vessel Counts

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	19.61%	1.99%	0.10%	3.45%	4.72%	7.42%	1,306	32%
2 Pacific whiting	0.24%	0.02%			0.80%	0.15%	50	1%
3 Salmon	1.29%	12.99%	0.02%	0.12%	0.66%	31.55%	1,857	45%
4 Crab/lobster	0.10%	0.73%	0.85%	32.96%	0.49%		1,408	34%
5 Shrimp	0.05%	0.19%	0.19%	1.51%	2.46%		176	4%
6 Pelagic	1.36%	5.35%	0.27%	0.07%	1.22%	0.54%	347	8%
8 Highly migratory	4.69%	1.56%	0.66%	0.02%	1.44%	17.42%	929	23%
9 Halibut	3.82%				0.34%	3.87%	329	8%
10 Sea urchins	0.17%	0.41%	4.09%		0.02%	0.19%	184	4%
11 Other	10.24%	9.95%	1.61%	4.21%	4.43%	1.58%	1,126	27%
All species	1,170	886	264	1,439	306	1,707	4,111	
Percent	28%	22%	6%	35%	7%	42%		

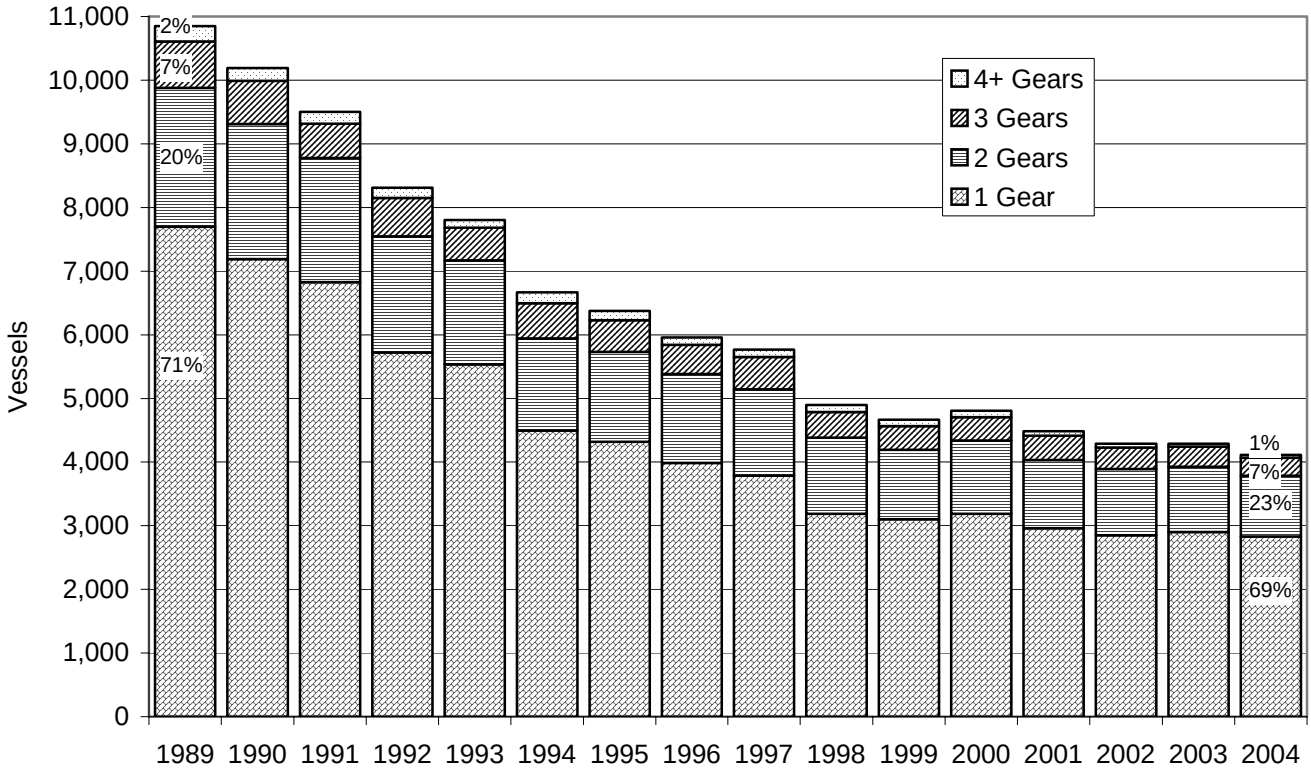
Gear Profile

Gear Use	Vessels
1 gear	69%
2 gears	23%
3 gears	7%
4+ gears	1%

Notes: 1. Revenue in thousands of 2004 dollars.
2. Revenue excludes offshore and distant water fisheries sources.
3. Vessel counts and revenue exclude vessels with identification codes "NONE" and "ZZ..."
4. Vessel counts are not unique within species and gear combinations.

Source: PacFIN March 2005 extraction.

Figure III.2
Vessel Counts by Number of Gear Groups for Vessel Landings at U.S. West Coast Ports in 1989 to 2004



Notes: 1. Excludes vessels with identifier codes "ZZ…" or "NONE."
2. Gears are summarized into six categories, then vessels are analyzed for their participation in the gear categories.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

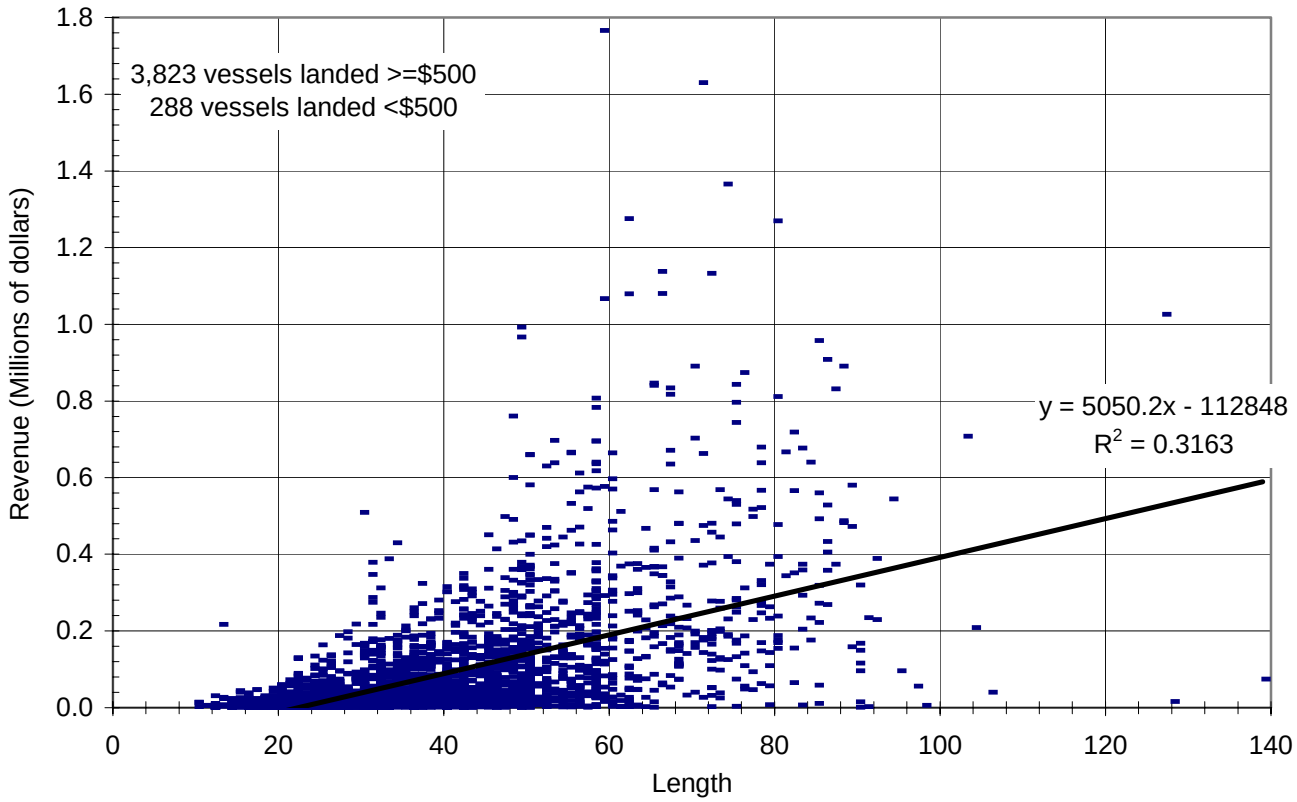
of 1983 and 1984. Prior to those years, landings were spread somewhat more evenly among vessel revenue categories.

Vessel participation within a single fishery will vary over the years. Table III.3 and Figure III.4 show vessel experience in single fisheries over the last five years ending in 2004. Vessels fishing for crab/lobster (46 percent in five of the last five years) and sea urchins (38 percent) tend to stay in the fisheries each year. Vessels participating in the other fisheries will exit and enter fisheries at a higher rate. Reductions in open access fisheries through limited entry and state licensing management schemes will undoubtedly reduce the mobility rate even further in the future.

C. Fisheries Specialization

Specialization for 33 percent, 50 percent, and 90 percent revenue levels within fisheries for 2004 is shown in Table III.4. The fisheries with high specialization are sea urchin (86 percent for greater than 33 percent) and crab/lobster (85 percent for greater than 33 percent). The highest average revenue per vessel was the Pacific whiting fishery ($145,787) and the lowest besides

Figure III.3
Scattergram Showing Revenue for U.S. West Coast States Vessels by Length in 2004 for All Species



Notes: 1. Excludes vessels with identifier codes "ZZ…" or "NONE" (DRVID only).
2. Excludes vessels with missing or an assigned zero length and vessels with revenues less than $500.
3. Each dot represents a unique vessel.

Source: PacFIN annual vessel summary, March 2005 extraction.

"other" fisheries was salmon ($19,504). Vessels using trawl gear (75 percent) had the highest proportion of vessels earning greater than $50,000 from a particular fishery and vessels using net gear (20 percent) had the lowest proportion. This makes sense since trawl gear is used for mid-water and bottom dwelling fish, like Pacific whiting and groundfish (Recht 2003). Different types of net gear are used in in-river salmon fisheries.

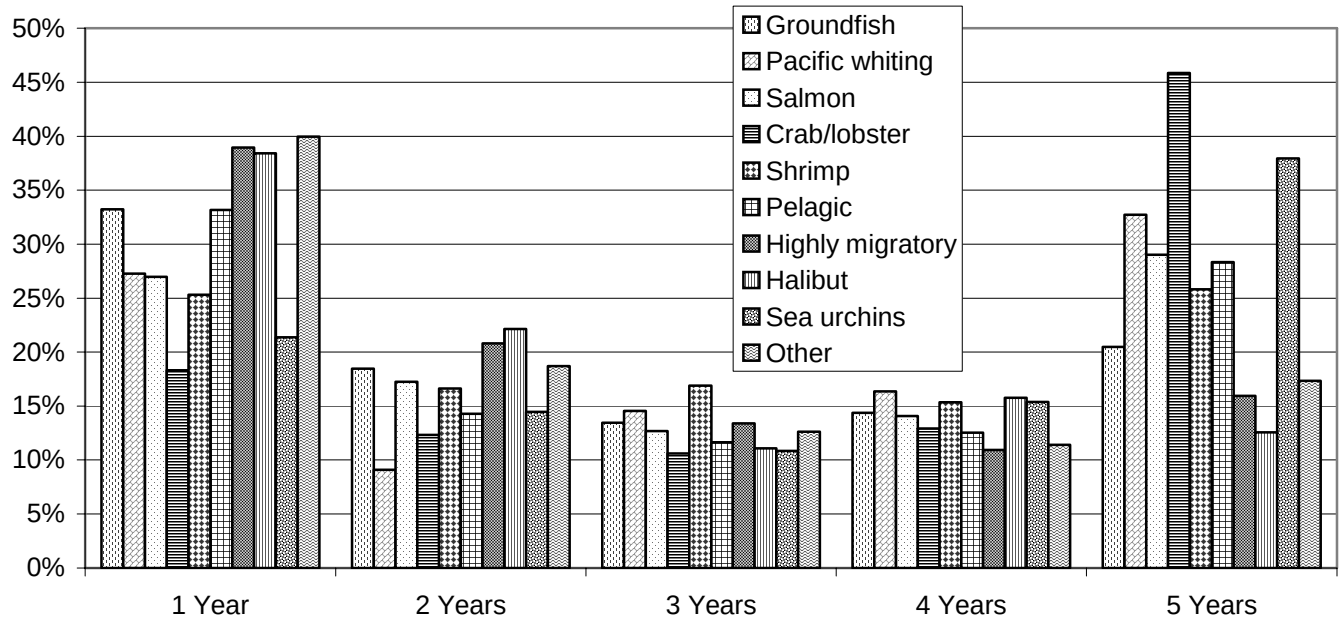
D. Vessel Permits

Many fisheries are regulated by vessel entry as well as managed for conservation purposes. The federal government has administered a limited entry program for the groundfish fishery since 1994. There are other federal limited entry permit programs, such as for coastal pelagic species started in 2003. Several other fisheries or allocation sectors within fisheries have control dates

Table III.3
Vessel Participation by Fishery During Period 2000 to 2004

	Period Participation											
	1 Year		2 Years		3 Years		4 Years		5 Years		Total	
Fishery	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
1 Groundfish	643	33%	357	18%	260	13%	278	14%	396	20%	1,934	100%
2 Pacific whiting	15	27%	5	9%	8	15%	9	16%	18	33%	55	100%
3 Salmon	694	27%	443	17%	326	13%	362	14%	746	29%	2,571	100%
4 Crab/lobster	343	18%	231	12%	199	11%	242	13%	860	46%	1,875	100%
5 Shrimp	99	25%	65	17%	66	17%	60	15%	101	26%	391	100%
6 Pelagic	151	33%	65	14%	53	12%	57	13%	129	28%	455	100%
8 Highly migratory	648	39%	346	21%	223	13%	182	11%	265	16%	1,664	100%
9 Halibut	156	38%	90	22%	45	11%	64	16%	51	13%	406	100%
10 Sea urchins	71	21%	48	14%	36	11%	51	15%	126	38%	332	100%
11 Other	558	40%	261	19%	176	13%	159	11%	242	17%	1,396	100%
Total	1,360	22%	890	15%	670	11%	830	14%	2,363	39%	6,113	100%

Figure III.4
Vessel Participation by Fishery During Period 2000 to 2004



Notes: 1. Includes U.S. West Coast vessels, excludes vessels with identifier "NONE" or "ZZ...", includes only vessels with species revenue >$500.
2. Vessels are tracked over years by their plate numbers. If a vessel is re-documented and continues participation in the same fishery, then its previous experience is omitted. Only vessels that make deliveries in each year are included in the analysis.
3. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table III.4
Count of Vessels Within Species and Gear Revenue Groups and Specialization Categories in 2004

	Sum of Revenue (thousands)	Vessel Count	Count of Vessels Within Revenue Categories				Count of Vessels Within Revenue Specialization Categories			Revenue Distribution		
			<$500	$500-$5K	$5K-$50K	>$50,000	>90%	>50%	>33%	Mean	90th Percentile	50th Percentile
Species												
Groundfish	42,169	1,306	5%	15%	42%	39%	30%	38%	43%	29,284	83,132	2,298
Pacific whiting	7,739	50	0%	0%	26%	74%	12%	30%	36%	145,787	384,847	112,152
Salmon	48,444	1,857	7%	19%	48%	27%	51%	72%	79%	19,504	50,337	9,954
Crab/lobster	120,195	1,408	2%	8%	37%	53%	46%	75%	85%	75,722	186,314	34,546
Shrimp	12,368	176	1%	7%	24%	68%	27%	45%	59%	65,545	186,478	27,316
Pelagic	32,356	347	3%	12%	38%	48%	50%	54%	56%	93,095	344,375	4,552
Highly migratory	33,251	929	3%	10%	32%	55%	29%	41%	47%	34,746	102,707	8,574
Halibut	8,313	329	0%	4%	41%	55%	7%	9%	13%	19,582	76,378	906
Sea urchins	7,724	184	3%	11%	51%	35%	68%	82%	86%	41,823	112,982	24,239
Other	29,764	1,126	7%	18%	47%	28%	19%	27%	32%	6,119	15,277	803
Gear												
Hook and line	28,043	1,170	9%	19%	39%	33%	46%	53%	58%	20,015	46,440	3,516
Net	54,572	886	6%	21%	53%	20%	84%	87%	90%	49,050	71,763	10,581
Other	31,053	264	5%	18%	47%	30%	71%	77%	78%	32,977	97,505	12,854
Pot	127,164	1,439	2%	8%	38%	52%	51%	77%	87%	78,508	191,407	35,138
Trawl	44,832	306	2%	4%	19%	75%	48%	67%	77%	140,768	368,739	78,522
Troll	56,658	1,707	6%	16%	40%	38%	55%	69%	76%	31,568	81,730	13,508

Notes: 1. Excludes vessel identification codes reported as "NONE" or "ZZ..."
2. Total revenue does not include deliveries to offshore processors or revenues from distant water fisheries.

Source: PacFIN March 2005 extraction.

established, but limited entry programs have not been initiated.[1] And states also have limited entry programs for several fisheries. The fisheries include such species as nearshore groundfish, ocean troll salmon, pink shrimp, Columbia River gillnet salmon, ocean Dungeness crab, ocean scallop, sea urchin, abalone, and others. Limited entry programs are one method to control effort and keep a fishery economically viable to participants. A more thorough discussion of methods to reduce overcapitalization can be found in Committee (1999).

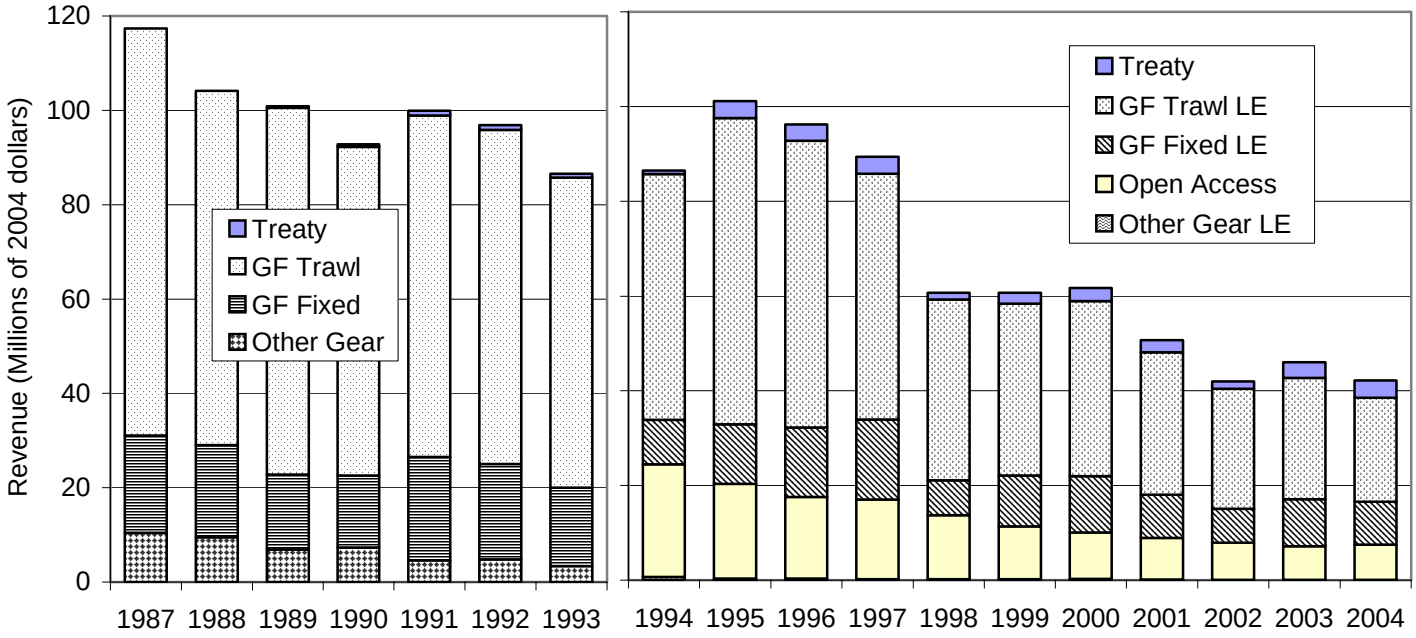
Federal groundfish fishery permits are capped at vessel numbers that existed prior to 1994 and permits are transferable. Permits were issued based on the fishing history and length of a qualifying vessel. There are separate caps on groundfish trawl gear and fixed gear [longline and/or pot (trap) gear] vessels. A sablefish fishery endorsement for fixed gear was added in 1997. A small harvest guideline is still allocated to non-permitted vessels, in what is called the open-access fishery. There are initiatives to also bring this allocation under a limited entry program. There are separate trip limits and harvest guidelines for each groundfish fishery, and the sablefish fixed gear fishery has vessel cumulative limits. Vessels without permits may participate in the open access fishery with any gear except groundfish trawl, subject to any open access trip limits and harvest guidelines in effect. There are other exempted trawl gears, such as shrimp trawls, that can harvest in the open access fishery. Groundfish quota allocations for treaty fisheries started in 1990. Tribal allocations are not subject to federal vessel limited entry programs, although some tribes maintain their own restrictions on who may participate.

Groundfish quota allocations by gear groups since 1987 are shown in Figure III.5. The figure shows a decreasing trend in overall revenues from this fishery and a higher share of revenues received by the limited entry, fixed gear user group after 1994. The increasing share is mostly due to higher prices received for sablefish, which is the dominant species harvested by the fixed gear user group.

The implementation of the groundfish limited entry permit program began substantial changes to this fishery. The federal groundfish limited entry program allows permits to be combined in order to promote fishing capacity reduction, allow increased trip limits, encourage prolonged fisheries, reduce bycatch, and have more efficient vessel operations. This has resulted in a reduction in the number of vessels making landings in U.S. West Coast states without permits and an increase in revenues for vessels with permits since the federal groundfish entry program has been in existence. The number of vessels in the smaller revenue categories has fallen, while the vessels in higher revenue categories have gained about the same. A federally sponsored buyout program for vessels associated with trawl gear permits reduced permit numbers by one-third in December 2003. In 2004, vessels with federal groundfish permits represented seven percent of the U.S. West Coast fleet, but captured 13 percent of all vessel revenue. Limited entry permits can be sold and leased out by their owners, so the distribution of permits among the three states often shifts. At the end of 2004, roughly 44 percent of the limited entry permits were assigned to vessels making landings in California, 43 percent to vessels making landings in Oregon, and 22 percent to vessels making landings in Washington. (The shares add to more than 100 percent because of vessels being able to land LE harvests in more than one state.)

1. Control dates are established to preclude a speculative rush of vessels into a fishery when the development of a limited entry program is being considered.

Figure III.5
Groundfish Onshore Revenue by User Group Allocations 1987 to 2004



Note:
1. Revenue is ex-vessel value in millions of 2004 dollars adjusted using the GDP Implicit Price Deflator.
2. Revenue excludes Pacific whiting, and offshore and distant water fisheries sources.
3. Revenue inclusive of vessels with identification codes "NONE" and "ZZ..."
4. "Other Gear LE" is groundfish landed under LE permits using other gear types, such as shrimp trawl, prawn traps, drift gillnet, etc.
5. Groundfish quota allocations by gear groups started in 1987. Groundfish quota allocations for the federal limited entry program started in 1994. Groundfish quota allocations for treaty fisheries started in 1990.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

IV. FISHERIES DESCRIPTION

This chapter contains descriptions of important fisheries. Individual species and gear groupings used to define the fisheries were selected by considering fishing strategies, management approaches, and the need to distill down complex ecosystem and fishing industry structures to a finite number of categories. Narrative descriptions only touch upon obvious characteristics, current management issues, and recent market trends. Much more detail is shown in supporting tables and figures than is described in the narrative. Many fisheries have management quota allocations or significant fishing pressure from recreational anglers. Recreational harvests and characteristics are not described in this report.

A. Annual Fishing Cycle

There is a seasonal pattern to U.S. West Coast fisheries (Figure IV.1). However, not every active vessel participates in all fisheries in this cycle. Different species are available at different times of the year, and general fishing, processing, and marketing patterns have developed over time. It is more appropriate to view the fishing year as a pattern of activities rather than in terms of individual species seasons. Individual species, when viewed in isolation, may not appear important, but these often affect the harvesting, processing, and marketing of other species and the fishing industry as a whole. Fishing vessels as well as crew members move from one fishery to another, depending on seasons and alternatives available.

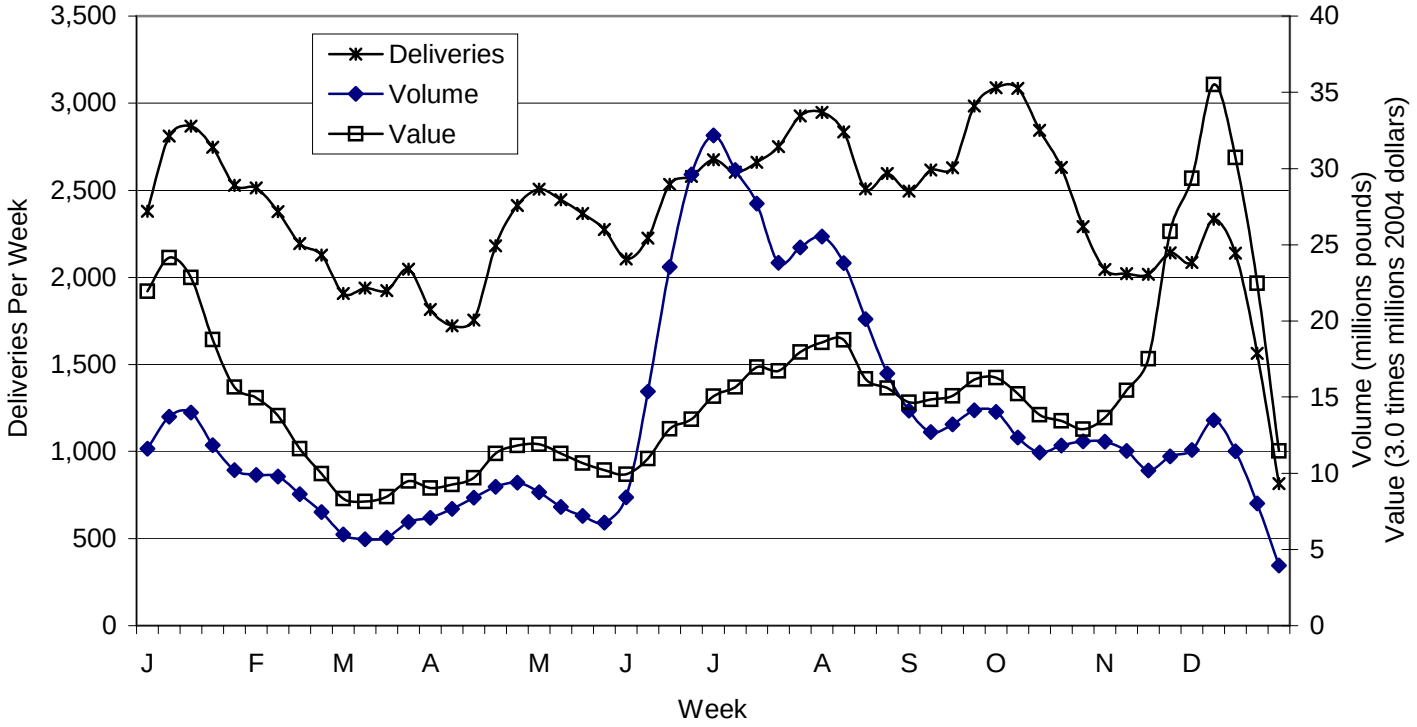
Offshore and Alaska fisheries are important for the total fish harvesting/processing industries in coastal communities. During the year, some crew members and fishing vessels will travel to Alaska to fish for salmon, halibut, sablefish, shellfish, and groundfish.

B. Distant Water Fisheries

The U.S. West Coast based fishing fleet also lands fish in other parts of the Pacific Ocean. These landings are an integral part of the U.S. West Coast fishing industry. There are several distinct components of this distant water fishery. Perhaps the oldest component is the gillnet salmon fishery in Bristol Bay and Cooks Inlet in Alaska waters. The Alaskan vessels are stored in Alaskan ports, usually under a contract with a processor. Some of these gillnetters also participate in the Willapa Bay and Grays Harbor, Washington gillnet fishery as well as the Columbia River gillnet fishery. The second component is the longline and pot fleet that fishes for crab and groundfish. This segment had its start from the old "halibut schooners" that sent salted and iced fish to eastern U.S. markets. Many of these vessels also do some fishing off the Pacific Northwest Coast and tend to homeport their vessels in Astoria, Oregon and Bellingham, Washington. The MFCMA created an opportunity for midwater trawlers (the third component) to fish for pollock in Alaska and Pacific whiting off the Pacific Northwest. The earlier ventures included foreign "motherships" that received their catch in the open ocean. Many of these vessels are now bringing their catch onshore in Alaska or U.S. West Coast states. The major homeports for these trawlers is Newport, Oregon or at marinas in Puget Sound, Washington.

During the 1970's and 1980's, increasing salmon supplies and prices also attracted new American immigrants to the salmon fisheries in lower Alaska. This component consists of a large number

Figure IV.1
Onshore Deliveries, Volume, and Value by Week During Three Year Average of 2002 Through 2004



Notes:
1. Values adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Deliveries per week are fish ticket counts. Fish tickets issued for sales by vessels to the public are excluded, since they do not correspond to a harvest trip. This will slightly undercount the estimate of total coastwide deliveries. This will be offset by situations where a vessel delivers to more than one processor following a trip.
3. Data is adjusted using a three week moving average over a three year period to remove weather events that alter delivery schedules. However, dramatic weather and harvest management changes within the three year period will influence depictions.

Source: PacFIN fish ticket data, December 2004, February 2005, and May 2006 extractions, with "ZZ..." and "NONE" identified vessels excluded. These vessel identifiers are usually associated with tribal fisheries and non-boat fisheries such as shellfish harvesting.

of "Russian Old Believers" from all over the world who settled near Woodburn, Oregon. Many of them now fish in Alaska waters with purse seines for salmon and long line for halibut in Alaska based combination vessels. The last component is the tuna boats that fish in waters off the Pacific Northwest and the western Pacific. Some of their albacore catch is landed in iced or frozen form in U.S. West Coast coastal communities. However, sometimes they will offload at sea for deliveries to American Samoa or Hawaii in the southern Pacific Ocean. The large purse seiners may deliver their catch of skipjacks and yellowfin tuna to island canners or bring a portion to southern California ports.

Of the 400 or so vessels that delivered to ports in Washington, Oregon, or California and Alaska or other Pacific locations in 2004, 233 delivered at U.S. West Coast ports; 11 delivered to Alaska motherships or acted as catcher-processors, 15 delivered to motherships and acted as catcher-

processors off the U.S. West Coast, and 148 delivered elsewhere in Hawaii and other western Pacific Ocean nations (Table I.3). There were about another 2,500 vessels with owner registration residency in West Coast states that fished in Alaska that did not also have deliveries in Washington, Oregon, or California. Distant water fisheries provide a significant source of revenue for some vessels and definitions were needed to categorize the vessels that deliver in U.S. West Coast states, but whose revenue is mostly from elsewhere. If a vessel's distant water fisheries revenues were greater than 50 percent of its total revenues, then it is treated in a special distant water fisheries category for vessel classification purposes.

The earnings by Alaska permit owners for onshore deliveries are shown in Table IV.1 and Figure IV.2. (Earnings by crewmembers and skippers who do not own permits are not reflected in the table.) Total onshore harvest revenue for Alaska permits held by residents or corporations with home addresses in Washington, Oregon, and California was about $515 million in 2004. This is about 52 percent of all onshore harvest revenue. Permit owner residents in Washington accounted for 82 percent of the earnings. The Alaska onshore groundfish fishery generated the most (49 percent) of the earnings for U.S. West Coast residents. Oregon registered catcher vessels and Washington registered catcher vessels, catcher-processors, and motherships are very active in Alaska groundfish fisheries. The Gulf of Alaska and Bering Sea/Aleutian Island groundfish harvests were $625 million in 2004. About 89 percent of those earnings are from vessels not registered in Alaska (NMFS October 2006). About 55 percent of the groundfish harvests are caught by catcher-processors or delivered to motherships and the rest to shoreside processors. The West Coast at-sea fishery harvest is estimated to be about $9.5 million in 2004 using onshore price assumptions. Similar distant water harvest values are not estimated for other than Alaska fisheries and the West Coast at-sea fishery for this project.

C. U.S. West Coast Fisheries

This section describes vessel participation, harvest trends, and product markets by summary species and gear groupings. The descriptions are from a U.S. West Coast perspective.[1] Appendix B has detailed information by states for vessel participation and harvest trends. Table IV.2 shows indicator participation statistics for the species and gear groupings.

1. Groundfish Fishery

This category includes a number of species such as roundfish (lingcod, sablefish, Pacific cod), rockfish, flatfish (sole, flounder), sharks, and skates. Halibut is managed separately from other groundfish species, but is included in this fishery's description narrative to minimize discussion categories. Data for the halibut fishery is itemized separately from the groundfish fishery. Pacific whiting is a major market species that because of such high volumes is treated separately when species are grouped for this report's fishery category descriptions.

There were 1,306 vessels that landed groundfish in 2004 (Table III.2). Of these, 1,242 landed more than $500 (Table IV.2). The itemization by states is shown in Table IV.3. Most of the groundfish are harvested by trawlers using midwater or bottom trawl nets. The bottom trawlers are often referred to as draggers. Trawlers drag funnel-shaped nets through the water (Figures

1. Parts of the discussions are paraphrased from NMFS (December 2005).

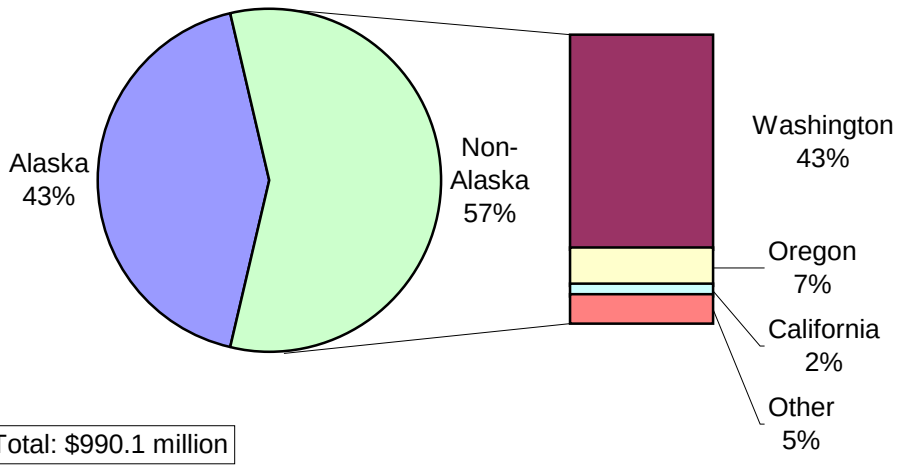
Table IV.1
Estimated Gross Earnings for Alaska Permit Holders by Onshore Fisheries and Residency in 2004

Fishery Group	Residents of Alaska	Residents of Washington	Residents of Oregon	Residents of California	WOC Subtotal	Residents of Other	Non-Alaska Subtotal	Total
All Fisheries Combined	422.6	422.6	71.3	20.7	514.7	52.9	567.5	990.1
Crab	40.1	92.2	11.4	0.6	104.2	9.7	113.9	154.0
Halibut	114.6	37.8	7.1	1.7	46.6	7.9	54.5	169.1
Herring	11.2	2.4	0.0	0.0	2.4	0.4	2.8	14.0
Other Finfish	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other Groundfish	48.9	196.9	42.8	10.7	250.5	5.2	255.7	304.7
Other shellfish	7.2	2.5	0.4	0.3	3.2	1.5	4.6	11.9
Sablefish	37.0	29.7	1.8	1.4	32.9	4.3	37.2	74.2
Salmon	163.5	61.1	7.8	5.9	74.8	16.7	91.5	255.0
Unknown Permit Landings	0.0	0.0	0.0	0.0	0.0	7.2	7.2	7.2

Notes: 1. Earnings are in millions of 2004 dollars.
2. Fisheries may not sum to "all fisheries combined" due to proxy earnings being used where fisheries are confidential. Proxy earnings are assigned to some permit codes where reveal is precluded due to confidentiality rules. The assigned earnings are based on the average earnings per permit for combined permit areas or combined permit residencies.
3. Fishery group definitions are different than U.S. West Coast onshore landed fisheries.
4. Some offshore fisheries earnings are not included in the tabulations.

Source: CFEC database, February 2007 extraction.

Figure IV.2
Share of Estimated Gross Earnings for Alaska Permit Holders for Onshore Fisheries by Residency in 2004



Notes: 1. See notes for Table IV.1.
Source: CFEC database, February 2007 extraction.

Table IV.2
U.S. West Coast Fishery Vessel Participation in 2004

	Groundfish		Pacific whiting		Salmon		Crab/lobster		Shrimp		Pelagic		Highly migratory		Halibut		Sea urchins		Other		Total	
Volume (thousands pounds)	64,050		212,836		42,359		69,223		22,336		316,196		36,775		2,662		12,767		11,054		790,259	
Price	$0.66		$0.04		$1.14		$1.74		$0.55		$0.10		$0.90		$3.12		$0.60					
Ex-vessel value (thousands)	$42,169		$7,739		$48,444		$120,195		$12,368		$32,356		$33,251		$8,313		$7,724		$29,764		$342,322	
Change from 2003	-8%		37%		43%		-13%		-4%		-11%		-4%		17%		-8%		10%		-2%	
3 year average	-9%		41%		68%		22%		-33%		-8%		10%		13%		-31%		3%		10%	
10 year average	-39%		12%		82%		33%		-47%		-15%		-14%		-7%		-58%		12%		-1%	
	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share	Count	Share
Vessels >$500	1,242	95%	50	100%	1,736	93%	1,386	98%	175	99%	338	97%	900	97%	329	100%	178	97%	1,048	93%	3,823	93%
Average fishery revenue	$30,744		$145,759		$20,840		$76,914		$65,909		$95,544		$35,833		$19,501		$43,210		$6,510		$74,666	
Fishery share		15%		3%		13%		38%		4%		12%		12%		2%		3%		3%		100%
Vessels 50% value	64	5%	9	18%	258	14%	161	11%	27	15%	19	5%	76	8%	17	5%	29	16%	48	4%	338	8%
Vessels 90% value	278	21%	21	42%	884	48%	648	46%	77	44%	62	18%	312	34%	55	17%	93	51%	256	23%	1,535	37%
Top 10 vessels	10	1%	10	20%	10	1%	10	1%	10	6%	10	3%	10	1%	10	3%	10	5%	10	1%	10	0.2%
Average fishery revenue	$587,842		$403,691		$172,656		$944,535		$263,149		$1,057,644		$388,389		$214,312		$183,767		$135,873		$1,280,368	
Fishery share		91%		74%		67%		91%		64%		99%		99%		57%		99%		73%		100%

Note: 1. Revenue is ex-vessel value in millions of 2004 dollars adjusted using the GDP Implicit Price Deflator.
2. Revenue excludes offshore and distant water fisheries sources.
3. Revenue by vessel excludes vessels with identification codes "NONE" and "ZZ..."

Source: PacFIN annual vessel summary, March 2005 extraction.

Table IV.3
U.S. West Coast Groundfish Fishery Vessel Participation in 2004

	Washington (excl. whiting)		Oregon (excl. whiting)		California (incl. whiting)	
Volume (thousands pounds)		21,872		25,597		26,849
Price		$0.58		$0.64		$0.51
Ex-vessel value (thousands)		$12,593		$16,315		$13,702
Change from 2003		0%		-9%		-11%
3 year average		9%		-10%		-17%
10 year average		-26%		-38%		-48%
	Count	Share	Count	Share	Count	Share
Vessels >$500	135	71%	268	55%	471	69%
Vessels 50% value	10	5%	26	5%	31	5%
Vessels 90% value	45	24%	83	17%	182	27%
Type: Limited Entry, Trawl and Fixed Gear						
Landing volume (million lbs)	9.9	--	24.9	--	25.2	--
Landing value (million)	$6.0	--	$15.3	--	$10.3	--
Vessels >$500	59	100%	112	95%	119	98%
Average LE GF revenue	$101,534		$136,686		$86,941	
LE GF share		58%		39%		56%
Vessels 50% value	9	15%	24	20%	20	17%
Vessels 90% value	33	56%	66	56%	71	59%
Top 10 vessels	10	17%	10	8%	10	8%
Average LE GF revenue	$328,576		$414,423		$303,089	
LE GF share		91%		79%		80%
Type: Open Access						
Landing volume (million lbs)	7.7	--	0.7	--	1.7	--
Landing value (million)	$2.9	--	$1.1	--	$3.4	--
Vessels >$500	92	61%	158	39%	355	63%
Average OA GF revenue	$29,199		$7,103		$9,364	
OA GF share		31%		8%		26%
Vessels 50% value	2	1%	24	6%	57	10%
Vessels 90% value	25	17%	91	22%	190	34%
Top 10 vessels	10	7%	10	2%	10	2%
Average OA GF revenue	$213,639		$31,941		$46,248	
OA GF share		80%		52%		70%
Puget Sound						
Landing volume (million lbs)	1.2	--				
Landing value (million)	$0.4	--				
Vessels >$500	15	65%				
Average GF revenue	$22,434					
GF share		39%				
Vessels 50% value	1	4%				
Vessels 90% value	4	17%				
Top 10 vessels	10	43%				
Average GF revenue	$33,159					
GF share		46%				
Ocean						
Landing volume (million lbs)	20.7	--				
Landing value (million)	$12.2	--				
Vessels >$500	126	72%				
Average GF revenue	$66,192					
GF share		51%				
Vessels 50% value	9	5%				
Vessels 90% value	43	25%				
Top 10 vessels	10	6%				
Average GF revenue	$444,292					
GF share		93%				

Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

IV.3 and IV.4). The nets are wider at the mouth and taper back to a narrow "cod" end that collects the catch. Trawls can be over 100 feet across the opening and 150 feet long. Most of the trawl vessels are in the 50 to 75 foot length category and groundfish species comprise about half of total revenue (Table I.6).

There are several species generally referred to as groundfish that are harvested by long-lines, other hook and line gear, pots, and gillnets in southern California. Halibut and sablefish are harvested by long-lines, which stretch along the ocean bottom as long as three miles. Anchored at each end, marked with buoys, and containing up to 800 hooks, the line is soaked six to 12 hours before hauling (Figure IV.5). Sablefish (also called black cod) has a high oil content and is favored in the Asian market. About half are harvested by trawlers and the remainder by fixed gear (pots, longlines, or hook and line). Vessels that harvest sablefish by fixed gear are generally less than 50 feet long. Their total revenue was about one-fifth from sablefish in 2004. The other major species group revenue was 49 percent from the crab/lobster group, 28 percent from the groundfish group, nine percent from the halibut group, seven percent from the salmon group, four percent from the highly migratory, two percent from the shrimp group, one percent from the pelagic group, and one percent other (Table I.6).

In recent years, a market for hook and line caught live fish developed. Although this fishery is considered a "value added" market, there are concerns that the fishery is targeting on small fish and thereby decreasing future harvests from the fecundity of mature adults.

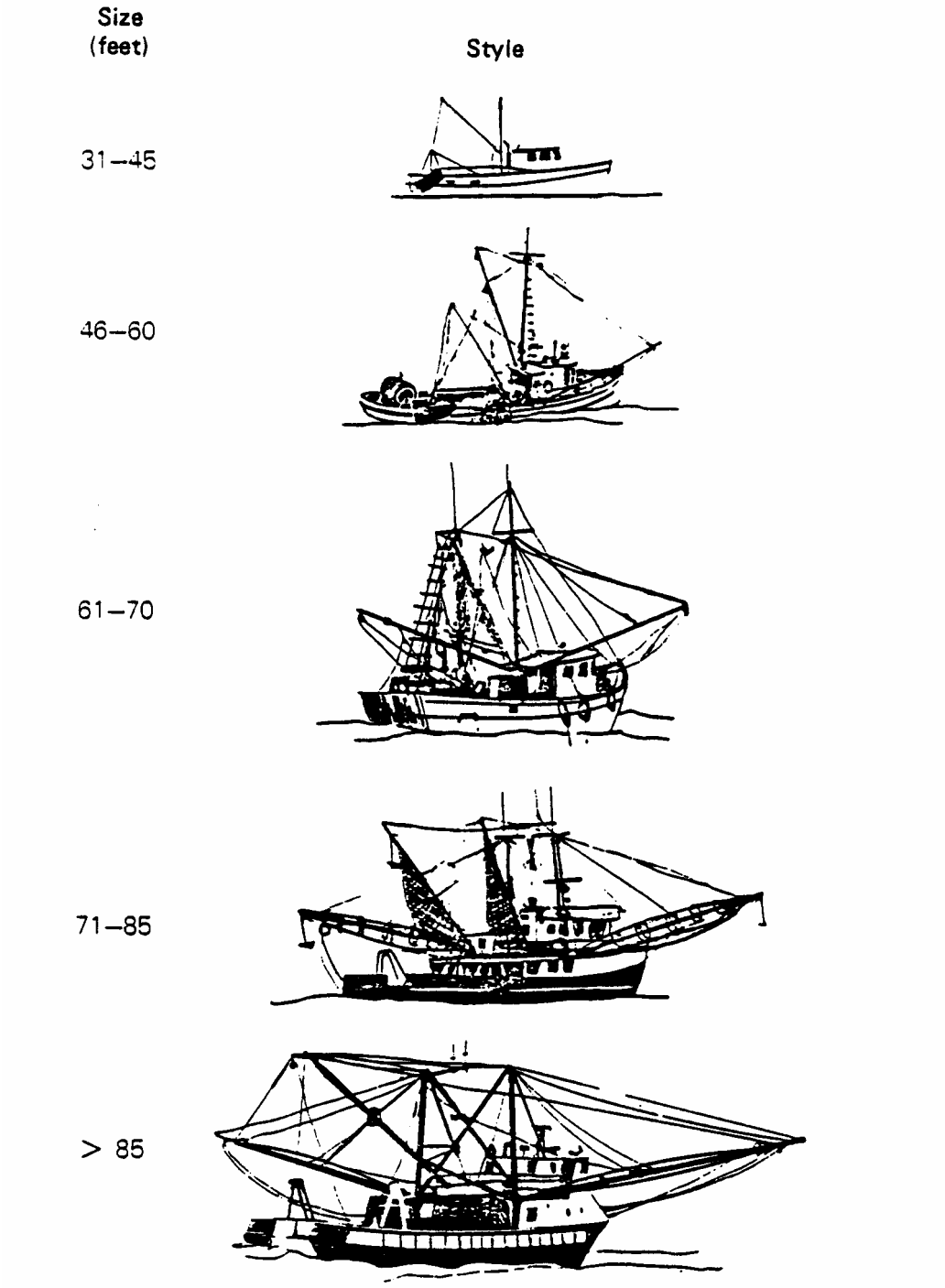
The volume of groundfish harvested increased steadily to 290 million pounds in 1982, then declined to about 150 million pounds in the late 1990's (Table II.1). The 2004 harvest volume is less than half what it was in the late 1990's.

Most of the groundfish species are now harvested at or near the MSY rates. In order to dampen catch rates, time closures, trip limits, bimonthly cumulative landing limits, mandatory gear modifications, and vast ocean exclusion zones have been initiated by fishery managers. This had the unfortunate outcome of causing high discard rates. Trawl nets towed to target one species will catch others with lower MSY's, and those species under tighter quotas must not be delivered.

There are several groundfish species that are declared overfished. The MFCMA requires rebuilding plans for stocks considered overfished. These plans resulted in drastic curtailment in overall harvest guidelines to avoid taking the few overfished species. Mortality avoidance for the overfished stocks means healthy stocks cannot be accessed. The economic implications are foregone revenue.

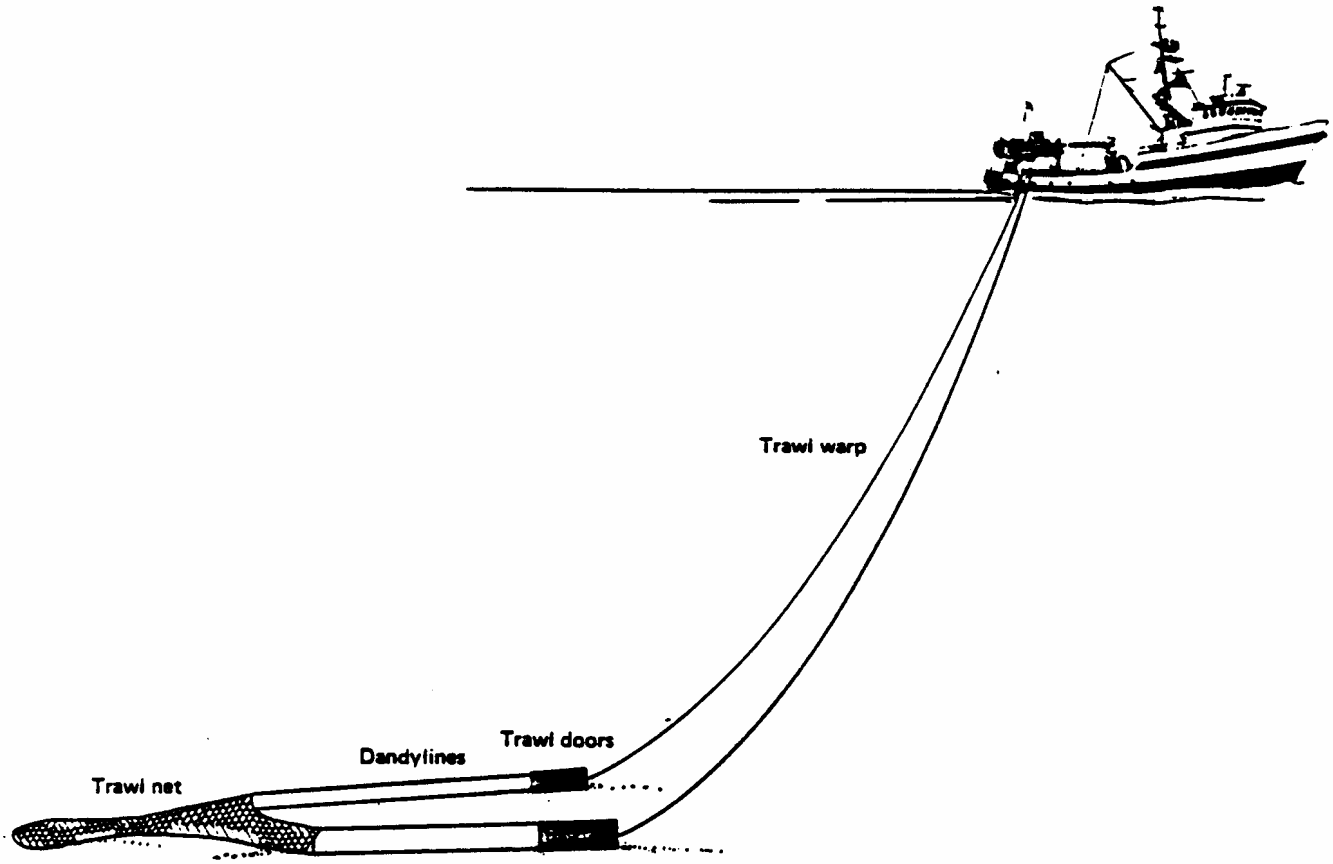
The groundfish fishery is very tightly managed due to the stock status. There are closures called Resource Conservation Areas (RCA's) that have special regulations based on historical landings of target species and discard rates. Observers on a sample of vessels are used to monitor bycatch rates. Coverage was about one-quarter of the vessels in 2004 and includes limited entry permitted trawlers and fixed gear vessels, as well as some open access vessels. Locator beacons called vessel monitoring systems (VMS's) are required to help enforce the complicated

Figure IV.3
U.S. West Coast Shrimp Trawlers



Source: Kramer, Chin & Mayo, Inc. (1982).

Figure IV.4
Shrimp Trawls in Operation



Source: Kramer, Chin & Mayo, Inc. (1982).

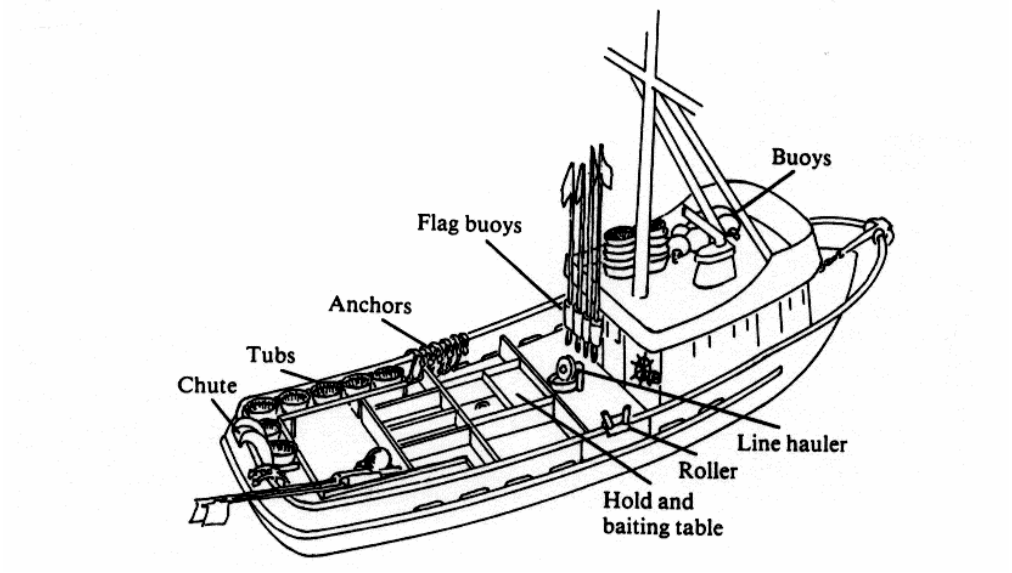
boundaries declared for the exclusion zones and RCA's. There have been several programs to assist in the rationalization of this fishery.

- The sudden imposition of regulations led to a groundfish fishery disaster being declared in January 2000. Five million dollars was appropriated for direct aid to fishermen and to assist communities affected by the fishery downturn.

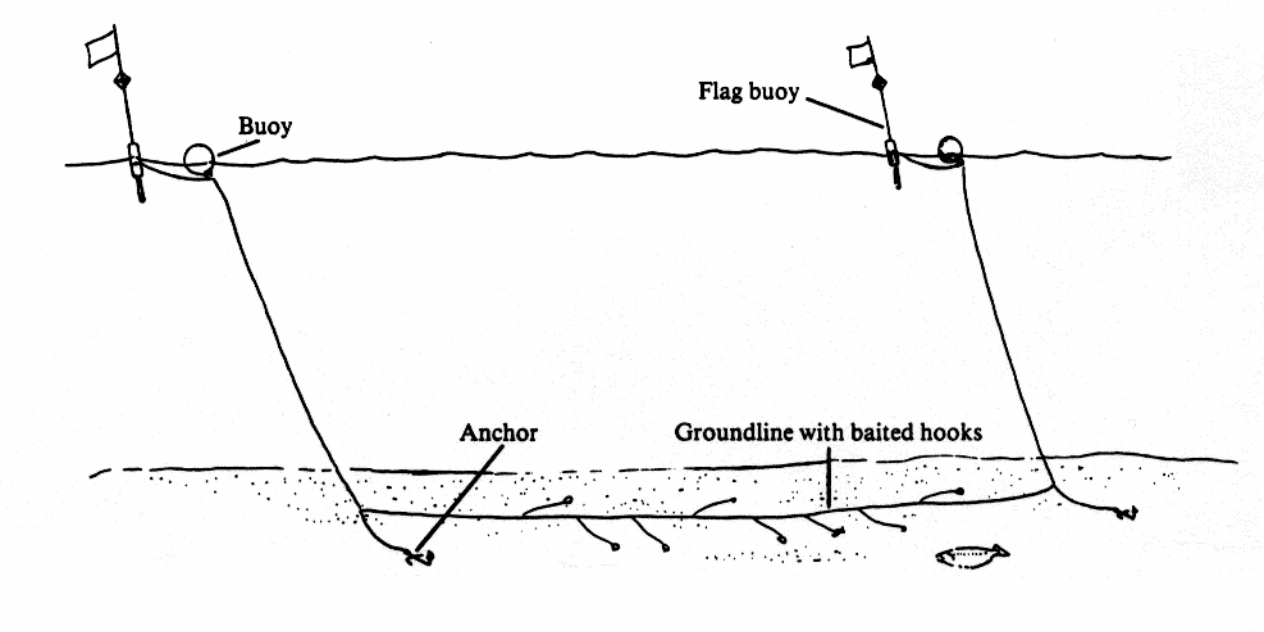
- A capacity reduction system was implemented in 2001 for fixed gear vessels with sablefish permit endorsements to stack permits. A landing limit is associated with a permit, so the transfer of one vessel's permit to another takes a vessel out of the fishery when that vessel only has a single permit. This has resulted in the movement of about half of the vessels now holding more than one permit.

- A federal and industry funded vessel buy back program for trawlers in the groundfish fishery was undertaken in 2003, which reduced these vessel types by 91 or about one third of the participating vessels and approximately half of the historical catch. Vessels

Figure IV.5
Longliner (Using Tub Gear)



Longline Gear Set



Source: Oregon State University Extension Sea Grant.

were then sold, scrapped, or converted to non-fishing purposes. The vessels cannot be used for U.S. fishing again.

- A more encompassing rationalization system is now being investigated for groundfish trawl vessels. Individual quotas (IQ's) would be assigned based on historical performance. IQ's could be traded or sold. Voluntary sales between vessels could result in the desired capacity reduction.

Both the limited entry portion of groundfish quotas (about 90 percent) and the open access portion (about 10 percent) face decreased quota amounts. There are some quota species, such as shortbelly and rosefish (splitnose) rockfish that fetch lesser prices which may have future markets. However, monthly vessel trip quotas that encourage discards in favor of higher priced species may prevent market development. Any increase in revenues to vessels or processors will be in terms of adding value. This might be accomplished by directing harvests at specific markets, such as the whole rockfish market.

More than half of the total MSY of groundfish available off of the Washington, Oregon, and northern California coasts is Pacific whiting. In a regional perspective, it is therefore an important fishery, even though the current market prices for whiting are significantly lower than prices of other commercially harvested groundfish.

2. Pacific Whiting Fishery

The Pacific whiting fishery has evolved from a foreign fishery to a domestic fishery within about 15 years. Much of the expansion of the domestic fishery has been dependent on the Alaska pollock resource. This fishery has invited massive investment in harvesting and processing capacity. The fishing industry of the U.S. West Coast has taken part in this investment. Many of the same vessels that were involved in the Alaska pollock fishery were also taking part in the Pacific whiting fishery. These vessels are generally over 75 feet and Pacific whiting comprises most of their total revenue.

The Pacific whiting fishery has been an integral part of the annual fishing cycle, and revenues generated in that fishery are an important part of the total revenues of a large segment of the trawl fleet and support industries. Since Pacific whiting is fully utilized by the domestic harvesting and processing fleet, the potential exists for resources use that will disrupt coastal communities that have become dependent upon the income generated by the revenues and therefore expenditures of the pollock and whiting fleet.[1]

There were 27 vessels that actively participated (defined by landing more than $500) in the onshore fishery in 2004 (Table IV.4). Some of these vessels also participated in the West Coast

1. The potential exists for economic disruption of fisheries that depend on whiting as well as other fish resources. On the U.S. West Coast, groundfish and shrimp are prime examples. For example, the $300,000 to $400,000 that each vessel in the whiting fishery depends on is equivalent to $20 million in revenues for groundfish or shrimp. The consequence of a fleet larger than is necessary to harvest a finite amount of resources is that members of the fleet and dependent communities are going to face financial hardships. This pressure to shift effort was addressed in the design of the groundfish trawl vessel buyout program. Buyout participants had to surrender all federal and state fishing permits in order to participate.

Table IV.4
U.S. West Coast Onshore Pacific Whiting Fishery Vessel Participation in 2004

	Washington		Oregon	
Volume (thousands pounds)		72,247		130,238
Price		$0.034		$0.036
Ex-vessel value (thousands)		$2,460		$4,488
Change from 2003		40%		22%
3 year average		67%		18%
10 year average		129%		-18%
	Count	Share	Count	Share
Vessels >$500	7	88%	20	80%
Average whiting revenue	$287,214		$231,995	
Whiting share		77%		48%
Vessels 50% value	3	38%	7	28%
Vessels 90% value	6	75%	15	60%
Top 10 vessels	8	100%	10	40%
Average whiting revenue	$251,313		$327,337	
Whiting share		74%		70%

Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

at-sea fishery (Table II.7). There were 15 vessels delivering to four motherships in the at-sea fishery in 2004. There were another six catcher-processor vessels in the at-sea fishery in 2004.

Pacific whiting was declared overfished prior to 2004, but because of new information indicating better stock conditions, the 2004 MSY allowed for higher at-sea and onshore landings. There were constraints in the fleet harvesting at MSY due to incidental catch of other groundfish species under strict rebuilding plans.

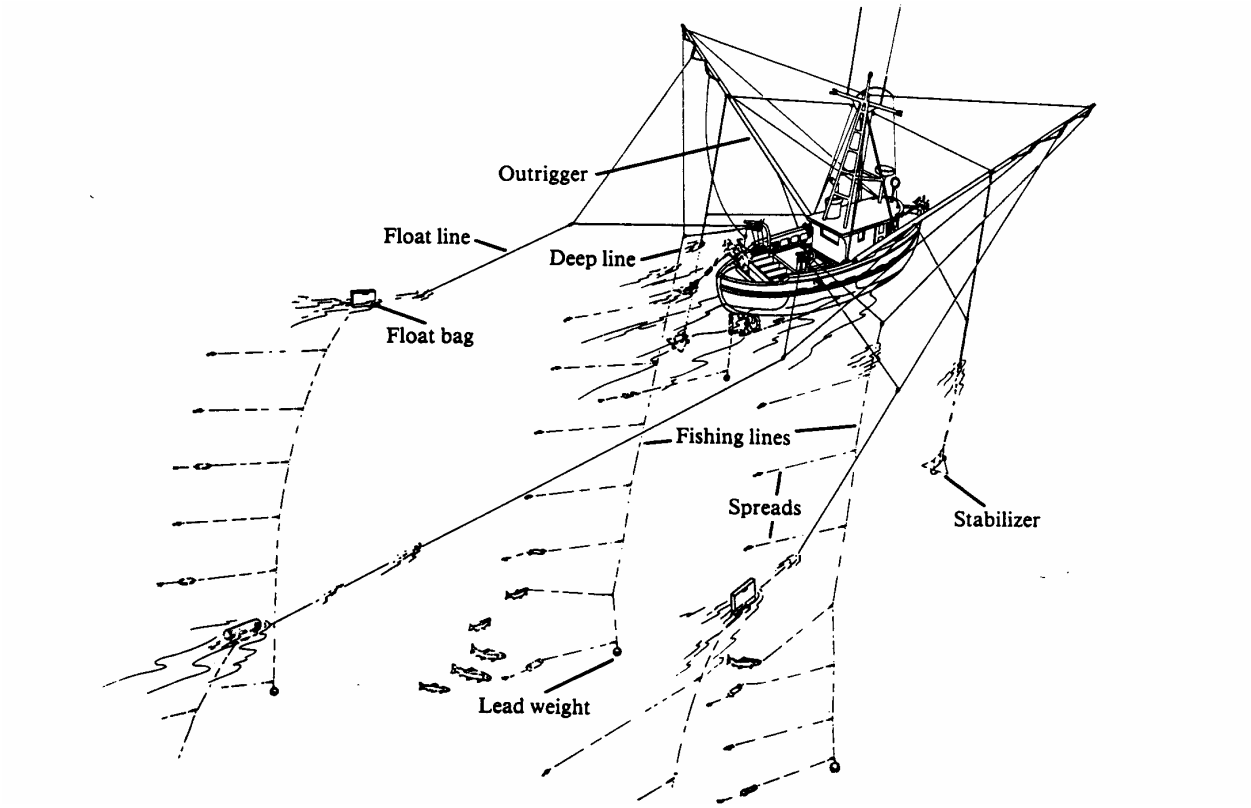
3. Salmon Fishery

The first commercial use of fishery resources for the new settlers was the packing of salmon. In the mid 1800's, packing and canning operations created a large industry for many coastal communities. By 1940, salmon were becoming less abundant from the Sacramento River to the Puget Sound rivers. Fishing pressures and habitat destruction caused salmon runs decline. The U.S. West Coast states salmon canning industry was dramatically reduced as the demand for fresh fish decreased the markets for canned products. The adverse oceanic conditions years of the early 1980's caused another reduction in harvest. These harvests rebounded in 1988, but decreased dramatically in 1991 as both inland deterioration of habitat and unfavorable ocean conditions took their toll. International treaties, Indian tribe treaties, and allocation agreements limit the expansion that the fishery may take. Of special concern are the decreased runs of some natural stocks in the Columbia, Sacramento, and Klamath Rivers.

Northern California and Pacific Northwest watersheds produces two main species of salmon (Chinook and coho) that are harvested along the coast by two main gear methods (troll and gillnet). In Puget Sound, Washington other methods such as purse seiners and set nets are also used to harvest sockeye and pink salmon in the summer and chum and coho in the fall. Trollers tow a number of lures or baited hooks through the water at depths of up to 80 fathoms (Figure IV.6). Vessels vary in size from 18-foot day boats to 60-foot trip boats (Figure IV.7). There were 1,857 vessels that landed salmon in 2004 (Table III.4). Vessels that used troll gear are about 70 percent of this count, and salmon provided about 38 percent of their revenue (and crab/lobster provided 42 percent). Non-treaty net gear vessels comprised 29 percent of the count and about 60 percent of their total revenue was from salmon landings (and 26 percent from pelagic species). Table IV.5 shows salmon fishery vessel revenue by state. Oregon had the highest number of active non-tribal fishery vessels (40 percent) of all the states.

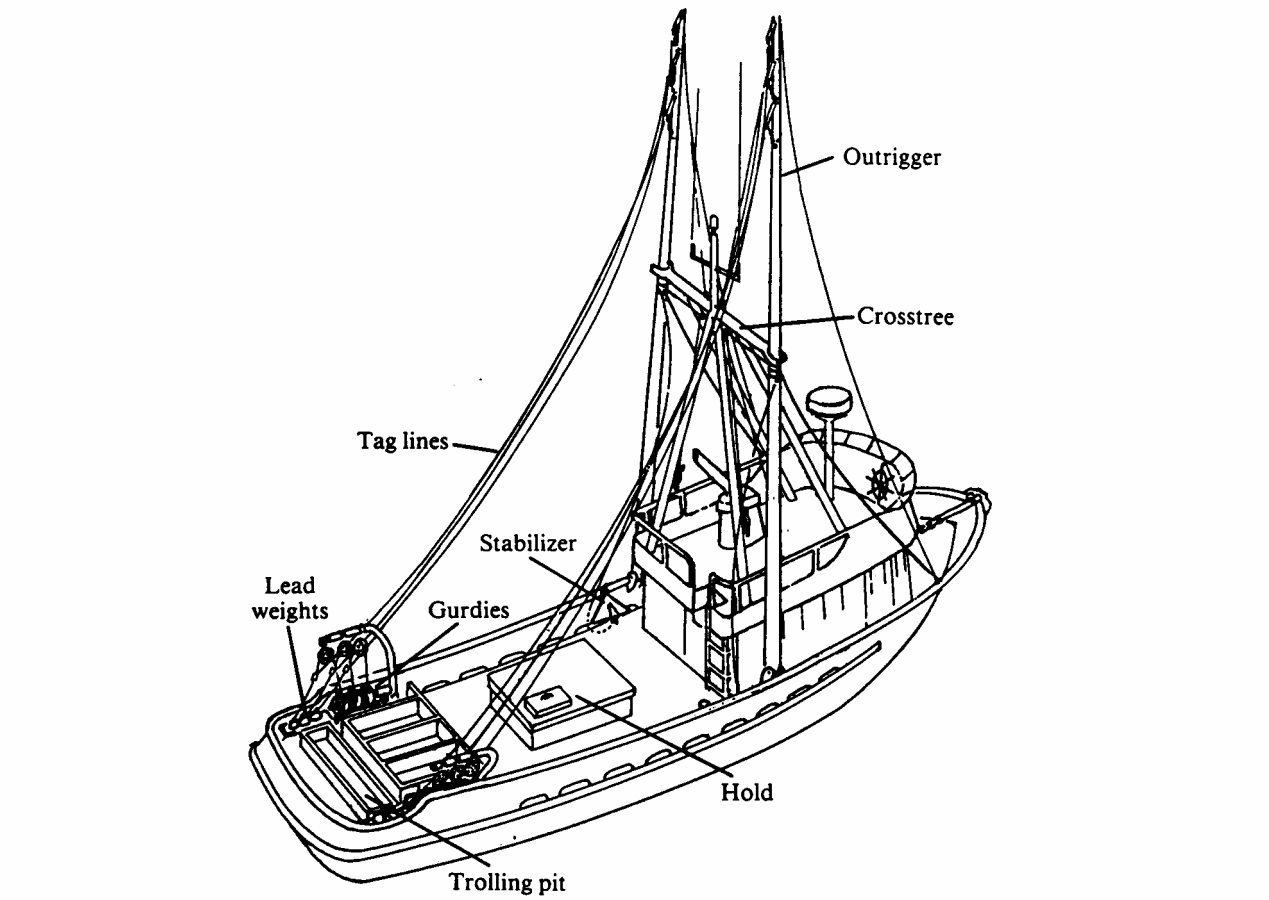
A variety of nets are used on the Columbia River. The traditional gillnet gear is used in both the Indian treaty fisheries above Bonneville Dam and non-treaty fisheries in-river below Bonneville Dam. Salmon swim into the net and are caught by the gills; when the net is lifted, the fisherman picks out salmon as they come aboard (Figure IV.8). The mainstem Columbia River non-treaty fishery has been drastically reduced in recent years to avoid impacts to wild stocks in a depleted status. The gillnet fishery below Bonneville Dam has the advantage of fishing in Youngs Bay and other off-channel areas for hatchery derived stocks that have been acclimated and released from net pens. There are also non-treaty and treaty fisheries that use net gear in Puget Sound,

Figure IV.6
Salmon Troll Gear Set



Source: Oregon State University Extension Sea Grant.

Figure IV.7
Salmon Troller



Source: Oregon State University Extension Sea Grant.

Grays Harbor, and Willapa Bay, Washington; treaty fisheries on coastal rivers in Washington; and treaty fisheries on the Klamath River.

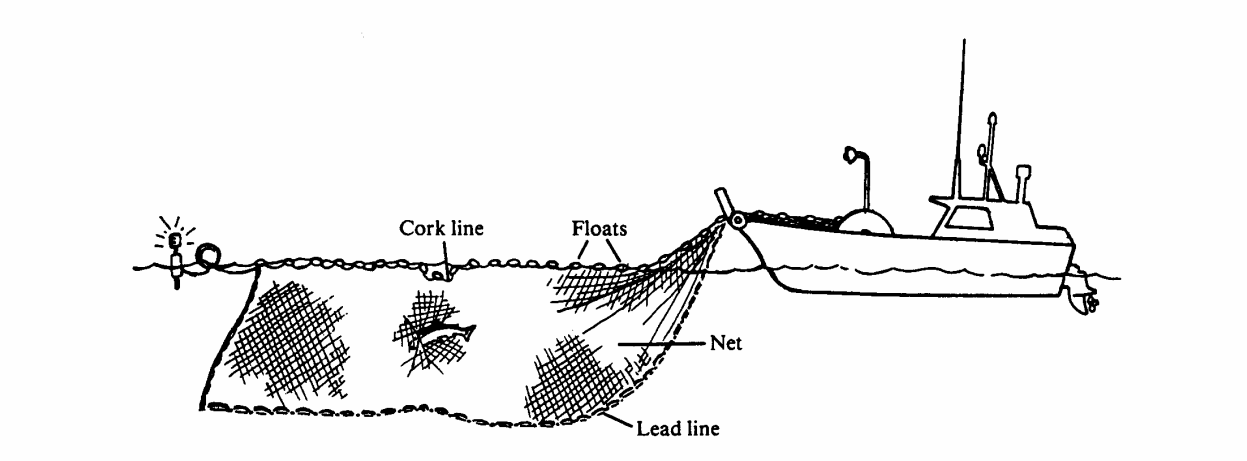
Coho abundance is closely related to favorable ocean conditions. The sockeye harvest by Washington nets are mostly Fraser River, Canada produced fish. In the past these have been fairly abundant. However, there is a great amount of controversy between the U.S. and Canada about the allocation of the Fraser River sockeye and pink salmon runs. Chinook harvests have been relatively good in recent years, however fishery managers are generally projecting downturns of these harvests for the next few years due to ocean conditions and the need to protect certain depleted wild stocks. The growth of aquaculture increased the availability of salmon in the marketplace and decreased the price of salmon paid to fishermen. However, consumer concerns about aquaculture have promoted a niche market for wild caught salmon. Marketing programs that differentiate West Coast troll caught salmon can lead to future price increases.

Table IV.5
U.S. West Coast Salmon Fishery Vessel Participation in 2004

	Washington		Oregon		California	
Volume (thousands pounds)	29,384		5,922		7,040	
Ocean troll price	$1.48					
Troll Chinook price			$3.00		$2.51	
Ex-vessel value (thousands)	$17,763		$12,954		$17,656	
Change from 2003	42%		44%		42%	
3 year average	37%		74%		108%	
10 year average	30%		189%		108%	
	Count	Share	Count	Share	Count	Share
Vessels >$500	409	91%	736	90%	682	91%
Average salmon revenue	$15,445		$16,582		$25,864	
Salmon share		60%		31%		46%
Vessels 50% value	68	15%	145	18%	105	14%
Vessels 90% value	231	52%	428	53%	346	46%
Top 10 vessels	10	2%	10	1%	10	1%
Average salmon revenue	$76,705		$82,037		$152,322	
Salmon share		94%		50%		65%
Type: Troll, Non-Tribal						
Landing volume (million lbs)	0.7	--	3.3	--		
Landing value (million)	$1.2	--	$9.9	--		
Vessels >$500	86	99%	539	90%		
Average salmon revenue	$13,770		$18,339			
Salmon share		46%		35%		
Vessels 50% value	21	24%	110	18%		
Vessels 90% value	57	66%	315	53%		
Permits authorized			1,200	floor		
Permits active			1,188			
Type: Net, Non-Tribal						
Landing volume (million lbs)	12.3	--	1.7	--		
Landing value (million)	$5.5	--	$2.3	--		
Vessels >$500	321	90%	180	90%		
Average salmon revenue	$15,963		$12,580			
Salmon share		80%		88%		
Vessels 50% value	50	14%	37	19%		
Vessels 90% value	174	49%	113	57%		
Permits authorized			200	floor		
Permits active			314			
Type: Net, Tribal						
Landing volume (million lbs)	15.0	--	0.9	--		
Landing value (million)	$9.3	--	$0.7	--		
Type: Troll, Tribal						
Landing volume (million lbs)	1.3	--				
Landing value (million)	$1.7	--				

Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

Figure IV.8
Bow Reel and Roller - Floating Gillnet



Source: Oregon State University Extension Sea Grant.

4. Crab/Lobster Fishery

This fishery description category includes Dungeness crab for all three states. It also includes descriptions for California lobster and prawn fisheries.

The states, and in Washington the coastal treaty tribes, manage the Dungeness crab fishery. The PSMFC provides interstate coordination. The Dungeness crab fishery is divided between non-treaty and a Washington treaty sector. This fishery is managed on the basis of simple "3-S" principles: sex, season, and size. The commercial fishery may retain only male crabs (thus protecting the reproductive potential of the populations); the fishery has open and closed seasons; and the commercial fishery must comply with a minimum size limit on male crabs.

Dungeness crab landings historically have been quite volatile. Two very low periods occurred in the early 1970's and again in the early and mid-1980's. Crab landings off the U.S. West Coast seem to show an eight to 11 year abundance cycle. The reasons for this cyclical abundance are unknown; although several theories have been advanced. The abundance cycle could be caused or modified by several other factors, including oceanographic conditions and interspecies relationships.

Crab harvests usually start in the early part of December, although the Puget Sound fishery starts as early as October. The fishery is characterized by extremely high effort in the first part of the season, followed by a rapid decrease in effort. During some years, 75 percent of the total catch is landed in the first month of the season. The larger crab boats are very mobile, moving from the Puget Sound area to northern California, to Oregon and Washington and then on to Alaska.

Dungeness crab is harvested by vessels of various types and sizes, from small troller/crabbers to large trawler/crabbers. There were 1,408 vessels that landed crab in 2004 (Table III.4). Over half of these vessels were in the 30 foot to 50 foot length category. For this length category, crab

comprises over half of their total revenue. Vessel participation in the Dungeness crab fishery by states is shown in Table IV.6.

Crab pots are circular, 36 to 48 inches across, and have a line and buoy to mark their position on the ocean bottom (Figures IV.9 and IV.10). Placed in the ocean during the December to August season, they are checked every one to seven days, depending on weather and fishing conditions. Only male Dungeness crabs at least six and one quarter inches across the shell may be harvested; the rest are returned live to the sea.

The crab fishery is a source of revenue, during the off-season, for many other vessels from trollers to trawlers. The decline of the Alaska crab fishery has most likely had a positive effect on Dungeness crab prices. The price of crab is very sensitive to harvest levels and season. Years of low abundance mean higher prices and beginning season prices can be higher than in the later season. Ex-vessel crab prices averaged over $2.00 per pound in 1983 through 1987 and have averaged 15 percent less than these highs since then. The increase in crab substitutes made from groundfish (surimi) can affect the price of crab. Dungeness crab, however, is a distinctive product that can effectively be marketed; there are special markets being developed for both crab sections and live crabs.

There is another pot and trap gear fishery in California, and to a lesser extent in Washington and Oregon, for lobster and prawns. The ridgeback and spotted prawn fishery used to be caught by trawling, but the gear was prohibited by California in 2003 due to concerns about groundfish bycatch. Washington and Oregon have also banned trawl fishing in favor of pot and trap gear. The prawn fishery occurs exclusively in California, centered in the Santa Barbara Channel and off Santa Monica Bay. Traditionally, a number of boats fish year-round for both ridgeback and spot prawns, targeting ridgeback prawns during the closed season for spot prawns and vice versa. California manages the prawn fishery. Similar to the pink shrimp fisheries, prawns are an "exempted" fishery in the federal open access groundfish fishery. The spotted shrimp, may demand as much as seven dollars per pound live. The lobster and prawn fishery vessel participation is shown in Table IV.7. The Pacific lobster vessel that harvests the spiny lobster in southern California is a small craft that utilizes up to 160 pots to deliver live products directly to the market. There were 80 to 100 vessels that specialize in this fishery.

5. Shrimp Fishery

The states of Washington, Oregon, and California manage the Pacific shrimp fisheries. The Council has no direct management authority. In 1981, the three coastal states established uniform coastwide regulations for the pink shrimp fishery. The season runs from April 1 through October 31. Regulations authorize pink shrimp commercial harvest only by trawl nets or pots. Trawl gear harvests most of these shrimp off the West Coast from northern Washington to central California at depths from 300 feet and 600 feet with the majority taken off the Oregon Coast.

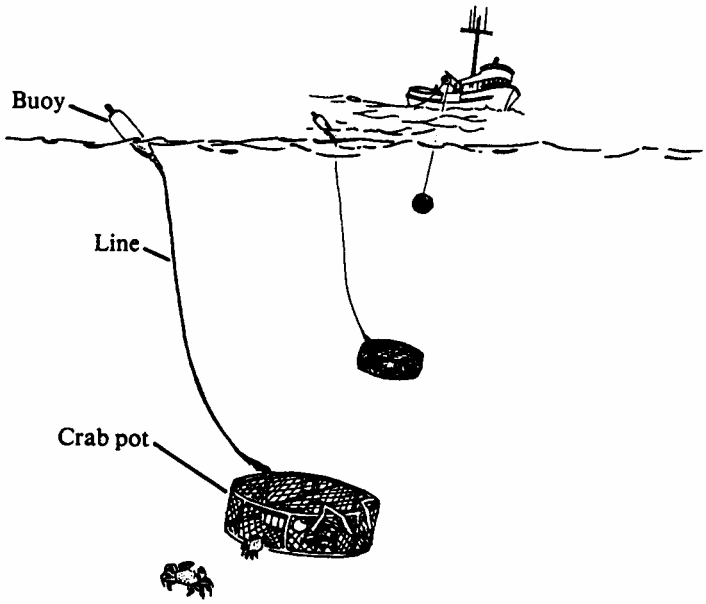
The introduction of technological improvements in processing made pink shrimp (cocktail shrimp) more economical to process, which increased the ability of processors to handle more product. Automatic peeling machines were introduced in 1957. Previously, the shrimp were

Table IV.6
U.S. West Coast Dungeness Crab Fishery Vessel Participation in 2004

	Washington		Oregon		California	
Volume (thousands pounds)	14,969		27,246		24,781	
Price	$1.94		$1.58		$1.63	
Ex-vessel value (thousands)	$29,049		$42,787		$40,467	
Change from 2003	-49%		15%		12%	
3 year average	-36%		63%		103%	
10 year average	-28%		85%		106%	
	Count	Share	Count	Share	Count	Share
Vessels >$500	386	99%	346	96%	432	94%
Average D. crab revenue	$40,097		$122,840		$93,661	
D. crab share		72%		70%		73%
Vessels 50% value	68	17%	53	15%	58	13%
Vessels 90% value	233	60%	182	50%	210	46%
Top 10 vessels	10	3%	10	3%	10	2%
Average D. crab revenue	$179,481		$725,556		$634,799	
D. crab share		92%		83%		96%
Permits authorized			464			
Permits active			433			
Puget Sound						
Landing volume (million lbs)	6.4	--				
Landing value (million)	$12.3	--				
Vessels >$500	205	99%				
Average D. crab revenue	$21,406					
D. crab share		75%				
Vessels 50% value	54	26%				
Vessels 90% value	139	67%				
Top 10 vessels	10	5%				
Average D. crab revenue	$55,717					
D. crab share		86%				
Ocean						
Landing volume (million lbs)	8.6	--				
Landing value (million)	$16.8	--				
Vessels >$500	189	99%				
Average D. crab revenue	$58,674					
D. crab share		66%				
Vessels 50% value	42	22%				
Vessels 90% value	115	60%				
Top 10 vessels	10	5%				
Average D. crab revenue	$175,178					
D. crab share		84%				

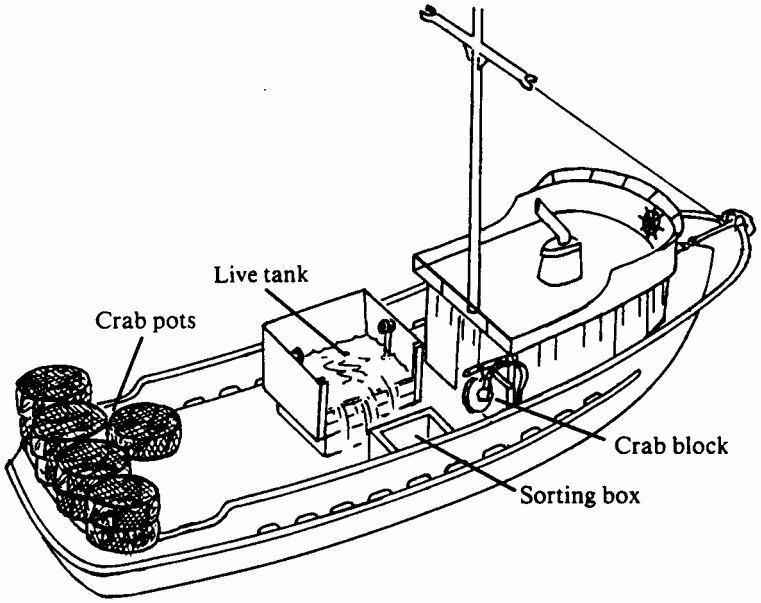
Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

Figure IV.9
Crab Pot Sets



Source: Oregon State University Extension Sea Grant.

Figure IV.10
Crabber



Source: Oregon State University Extension Sea Grant.

Table IV.7
U.S. West Coast Lobster and Prawn Fishery Vessel Participation in 2004

Volume (thousands pounds)		1,108
Price		$7.49
Ex-vessel value (thousands)		$8,294
Change from 2003		11%
3 year average		-4%
10 year average		-19%
	Count	Share
Vessels >$500	170	92%
Average lobst/prn revenue	$48,776	
Lobster/prawn share		79%
Vessels 50% value	25	14%
Vessels 90% value	90	49%
Top 10 vessels	10	5%
Average lobst/prn revenue	$233,745	
Lobster/prawn share		95%

Notes: 1. Participation is filtered for California landings.

entirely peeled by hand, an expensive operation that often made the fishery uneconomical given the existing market prices and labor availability. The shrimp harvest peaked in 1978, collapsed in the early 1980's, and rebounded in 1989. Because of prices that averaged over $1.00 per pound, the harvest produced a revenue record in 1987.

The pink shrimp is short-lived (three or four years). Because of their short lifespan, the relative success or failure of any year class can have a considerable effect on the size of the exploitable stock, resulting in sizable fluctuations in abundance. The pink shrimp is a major food item for a number of other species. The strength of a pink shrimp year class loss also appears to be related to upwelling. During years of poor upwelling - adverse oceanic conditions years - surface water temperatures during the summer will be higher than during years of strong upwelling, and these differences may be high enough to have a negative effect on larval survival and feeding conditions for young shrimp. The Pacific Northwest states produce a substantial amount of shrimp. The Norwegian shrimp industry and eastern Canada are other high producer of the cold water variety that is in direct competition with this shrimp. In recent years, when the Norwegians produced a record of 200 million pounds, the worldwide as well as the domestic price declined. In 1993, the average price for pink shrimp from U.S. West Coast states declined to $0.41 per pound. Subsequently, when the Norwegian shrimp industry collapsed, the Pacific Northwest pink shrimp industry received $0.86 per pound in 1995. The price again declined to $0.45 per pound in 1997, but after a slight rebound in 1998 to $0.59 decreased to a record low of $0.26 in 2003, then slightly rebounded to $0.39 in 2004.

The success of the pink shrimp fishery can be a factor determining participation in other fisheries. If production in the shrimp fishery is down, fishermen turn to other alternative fisheries such as salmon and crab. Shrimp trawl nets are used to harvest the resource. Shrimpers tow one or two small meshed (one and one half inch) nets just above the ocean floor for the

small, pink cocktail shrimp found off the Pacific Northwest coast. Tickler chains attached to the nets drag along the muddy bottom, stirring shrimp up and into the net (Figures IV.2 and IV.3). Finfish excluders have been required in pink shrimp trawls in California since September 2001 and since July 2002 in Oregon and Washington. Most vessels landing shrimp are in the 50 to 75 foot range. There were a total of 176 vessels landing shrimp in 2004 (Table III.4). Shrimp landings revenue was 49 percent of vessels' total revenue for vessels landing more than $500 shrimp in 2004 (Table IV.8).

The shrimp market in the United States is not only supplied by products from capture fisheries (domestic and foreign) but also aquaculture (primarily foreign). The major producers of cultured shrimp are Mexico, Ecuador, and China. Even though the cold water pink shrimp is not the same product as warm water cultured shrimp, there are cross product effects in price between these two products.

6. Pelagic Fisheries

Coastal pelagic fisheries (CPS) include species such as anchovy, Pacific mackerel, Pacific sardine, jack mackerel, and market squid. The PFMC manages the CPS fishery under a FMP originally adopted in 1995 and that went into effect in 1999. The CPS FMP evolved from the Northern Anchovy FMP which went into effect in 1978. The latest FMP amendment (Amendment 12) completely bans commercial fishing for all species of krill in the EEZ starting in 2006.

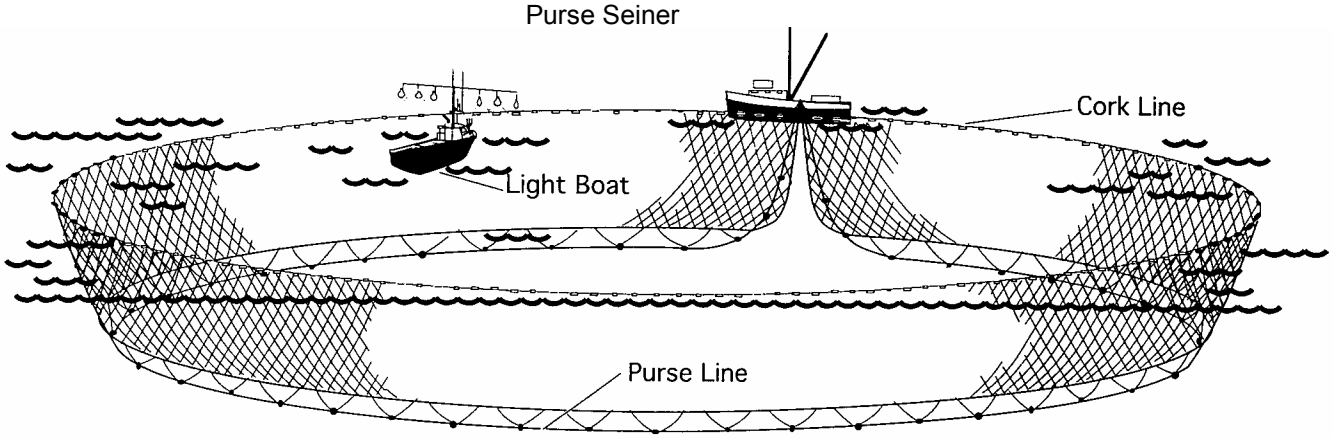
Table IV.8
U.S. West Coast Pink Shrimp Fishery Vessel Participation in 2004

	Washington		Oregon		California	
Volume (thousands pounds)		6,020		12,207		2,191
Price		$0.36		$0.39		$0.42
Ex-vessel value (thousands)		$2,195		$4,740		$925
Change from 2003		4%		-8%		38%
3 year average		-7%		-43%		-9%
10 year average		-29%		-48%		-72%
	Count	Share	Count	Share	Count	Share
Vessels >$500	26	100%	44	100%	7	88%
Average p. shrimp revenue	$84,383		$107,738		$132,157	
P. shrimp share		69%		32%		46%
Vessels 50% value	6	23%	12	27%	2	25%
Vessels 90% value	16	62%	26	59%	4	50%
Top 10 vessels	10	38%	10	23%	8	100%
Average p. shrimp revenue	$158,617		$214,638		$115,642	
P. shrimp share		83%		50%		46%
Permits authorized			150			
Permits active			143			

Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

Vessels using roundhaul gear (purse seines and lampara nets) are responsible for 99 percent of total CPS landings and revenues in any given year (Figure IV.11). The southern California round haul fleet is known locally as the "wetfish fleet." The wetfish fleet is based primarily in Los Angeles Harbor, with smaller segments in the Monterey and Ventura areas. It harvests Pacific bonito, market squid, bluefin tuna and other tunas, as well as CPS. There were a total of 347 vessels landing pelagic species in 2004, however the active (landing greater than $500 pelagic species) fleet specializing (greater than 50 percent of vessel revenue is pelagic species) in these species consists of about 181 vessels (Table III.4). The length is an average of 46 feet and pelagic species comprise 99 percent of the total revenue. Approximately one third of the wetfish fleet are steel-hulled boats built during the last 20 years. The rest are wooden-hulled, built in the heyday of the Pacific sardine fleet, from 1930 to 1949. Vessel participation in the pelagic fishery is shown in Table IV.9.

Figure IV.11
Purse Seiner



Source: Starr et al. (1998).

Anchovy is used for reduction to fish meal and oil, live and dead bait, and human consumption. Reduction landings, which generally receive much lower ex-vessel prices than non-reduction landings, have been exceedingly low since 1983 due to competition with other sources of protein meal. Reduction was the main use for anchovy prior to 1983. Anchovy is more recently a critical source of live bait for recreational fishing.

Commercially harvested Pacific mackerel is processed into canned products for pet food and human consumption, and a small but increasing amount is sold to fresh fish markets that cater to California's growing Asian population. Jack mackerel, when available in southern California, is processed in the same canned product.

Pacific sardine is canned for human consumption and sold as live and dead bait. With sardine biomass increasing after years of low biomass levels, markets are being developed. For example, harvests of the northern abundances in the Astoria Canyon area caused landings to change from zero pounds in Astoria and Ilwaco in 1995 (and trivial landings in 1996 to 1998, with the rest in California) to 98.8 million pounds in 2004 (50 percent of all U.S. West Coast), with an average of 35.0 million pounds in the 10 year period ending in 2004.

Table IV.9
U.S. West Coast Pelagic Fishery Vessel Participation in 2004

PACIFIC SARDINE FISHERY		
Year 2004		
Volume (thousands pounds)		98,242
Price		$0.04
Ex-vessel value (thousands)		$3,960
Change from 2003		35%
3 year average		-24%
10 year average		-14%
	Count	Share
Vessels >$500	54	87%
Average P. sard. revenue	$73,322	
P. sardine share		20%
Vessels 50% value	9	15%
Vessels 90% value	26	42%
Top 10 vessels	10	16%
Average P. sard. revenue	$210,784	
P. sardine share		27%

OTHER PELAGIC FISHERY		
Year 2004		
Volume (thousands pounds)		29,723
Price		$0.09
Ex-vessel value (thousands)		$2,660
Change from 2003		9%
3 year average		-38%
10 year average		-71%
	Count	Share
Vessels >$500	121	62%
Average oth. pel. revenue	$21,936	
Other pelagic share		13%
Vessels 50% value	12	6%
Vessels 90% value	65	33%
Top 10 vessels	10	5%
Average oth. pel. revenue	$118,991	
Other pelagic share		19%

MARKET SQUID FISHERY		
Year 2004		
Volume (thousands pounds)		86,981
Price		$0.22
Ex-vessel value (thousands)		$19,192
Change from 2003		-26%
3 year average		-8%
10 year average		-14%
	Count	Share
Vessels >$500	101	87%
Average m. squid revenue	$189,914	
M. squid share		75%
Vessels 50% value	13	11%
Vessels 90% value	41	35%
Top 10 vessels	10	9%
Average m. squid revenue	$785,961	
M. squid share		83%

Notes: 1. Participation is filtered for California landings.

Market squid are generally frozen or canned and exported for human consumption. Smaller amounts are sold domestically in fresh fish markets and used for live and dead bait. In the last several years, the demand for squid has increased greatly, which has raised concerns about protecting the resource. Very little is known about the biology of squid.

7. Highly Migratory Species Fishery

The PFMC adopted a HMS FMP in 2003 to federally regulate the take of HMS within and outside the U.S. West Coast EEZ. Complex management of HMS results from the multiple management jurisdictions, users, and gear types targeting these species, and from the oceanic regimes that play a major role in determining species availability and which species will be harvested off the U.S. West Coast in a given year. The HMS managed species are: tunas, sharks, billfish/swordfish, and others such as dorado. Halibut and salmon are designated prohibited species when targeting HMS.

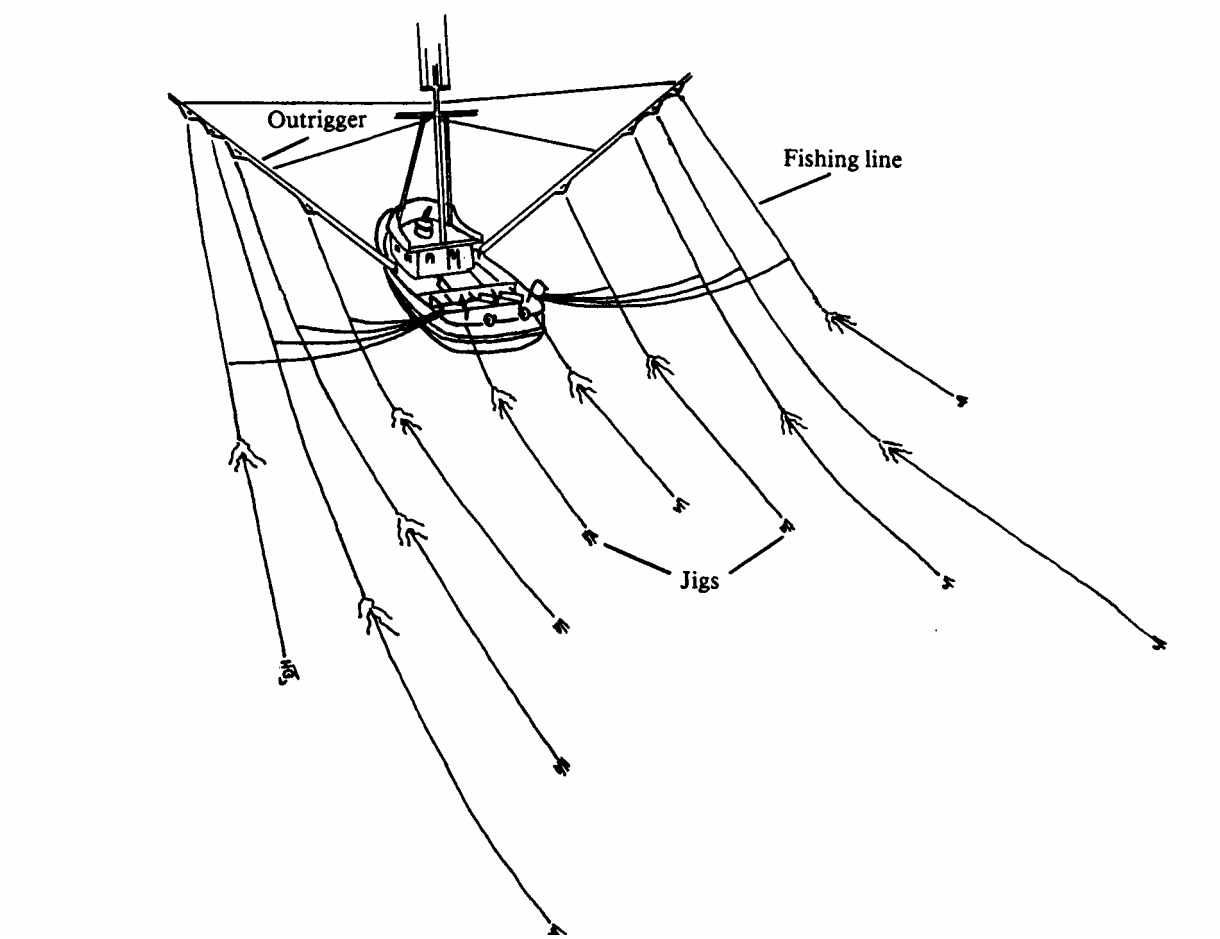
The commercial tuna fishery can be divided into two major categories. Albacore tuna are harvested by hook and line boats along the U.S. West Coast. Skipjack and yellowfin are harvested mostly by purse seiners operating out of southern California ports. Both of these fisheries expanded in the 1960's and 1970's when processing facilities in Astoria, Oregon and in Long Beach, California canned large amounts of tuna annually. As domestic processing costs increased and environmental concerns emerged, many of these processing plants and dependent harvesters moved offshore to places such as Guam and Thailand. Presently, the tuna fishery, although smaller, remains an important part of the U.S. West Coast fishing industry.

Albacore tuna vessels range far offshore; some venture to the mid-Pacific Ocean. They tow as many as 13 lines (Figure IV.12). Many vessels fish for salmon during the early part of the season, switch to tuna, and then turn to crab during the winter. There were a total of 929 vessels that landed tuna or other HMS in 2004 (Table III.4). The number of vessels participating in the tuna fishery since 1981 has varied widely. Most vessels that harvest tuna are in the 50 foot range (Table III.1). For the larger tuna vessels, species revenue accounts for more than half of total revenue. The albacore tuna vessel participation by states is shown for 2004 in Table IV.10. The shark and swordfish fishery vessel participation in California is shown in Table IV.11.

Historically, tuna has been one of the U.S. West Coast major fisheries. The tuna is a wide-ranging fish and therefore susceptible to interception in many parts of the Pacific Ocean. Most tuna canneries have left the U.S. and the fishery has declined steadily. Some of the albacore currently harvested by trollers is destined for the fresh/frozen markets on the west coast of the United States, while the bulk of the catch is shipped to southern California or overseas to be canned.

There are no seasonal restrictions in the albacore tuna fishery. Rather, the beginning and end of the season fished depends on water temperature. The fish generally show up in the south during July and move north. The fishery generally ends with the onset of southerly winds and cooling water temperatures in late September or early October. California Current warming decreases salmon survival, but is a positive factor for tuna harvests.

Figure IV.12
Albacore Gear Set



Source: Oregon State University Extension Sea Grant.

Concern for HMS such as tunas (as well as swordfish and some sharks) has resulted in an international process for management and allocations at the international level through fishery management plans recognized by treaties.

The U.S. is a member 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. A new intergovernmental organization to coordinate management of HMS in the western and central Pacific was established in 2004. The U.S. is a signatory to the convention establishing the Central and Western Pacific Fisheries Commission.

The new HMS FMP framework provides a mechanism to meet U.S. responsibilities under the United Nations Agreement on the Conservation and Management of Straddling Fish Stocks and High Migratory Fish Stocks (known as the UNIA). The UNIA interprets the duties of nations to cooperate in conserving and managing fisheries resources, and dictates that coastal states may not adopt measures that undermine the effectiveness of regional measures to achieve conservation of the stocks. The U.S. is also a member of the Food and Agriculture Organization

Table IV.10
U.S. West Coast Albacore Tuna Fishery Vessel Participation in 2004

	Washington		Oregon		California	
Volume (thousands pounds)		18,319		10,595		4,919
Price		$0.87		$0.85		$0.67
Ex-vessel value (thousands)		$15,891		$9,003		$3,301
Change from 2003		-1%		44%		-10%
3 year average		48%		56%		-37%
10 year average		78%		48%		-76%
	Count	Share	Count	Share	Count	Share
Vessels >$500	258	95%	407	90%	203	74%
Average tuna revenue	$57,821		$21,973		$16,193	
Tuna share		69%		25%		12%
Vessels 50% value	35	13%	57	13%	18	7%
Vessels 90% value	125	46%	195	43%	88	32%
Top 10 vessels	10	4%	10	2%	10	4%
Average tuna revenue	$319,930		$151,269		$123,539	
Tuna share		100%		68%		68%

Notes: 1. Some vessels land outside the state, but only landings to each state are included. Vessel counts include home-port vessels as well as out-of-state vessels making landings in each state.

Table IV.11
U.S. West Coast Shark and Swordfish Fishery Vessel Participation in 2004

Volume (thousands pounds)		3,031
Price		$1.69
Ex-vessel value (thousands)		$5,126
Change from 2003		-41%
3 year average		-41%
10 year average		-45%
	Count	Share
Vessels >$500	113	58%
Average shark/sw revenue	$45,251	
Shark/sword share		57%
Vessels 50% value	11	6%
Vessels 90% value	40	21%
Top 10 vessels	10	5%
Average shark/sw revenue	$235,870	
Shark/sword share		97%

Notes: 1. Participation is filtered for California landings.

of the United Nations (FAO), which has implications for HMS management. In 1995 the FAO's Committee on Fisheries developed a Code of Conduct for Responsible Fisheries, which more than 170 member countries, including the U.S., have adopted.

8. Other Fisheries

There are several other species that generate significant harvest revenues. In 1981, two New England scallopers on their way to Alaska located good beds off Coos Bay. In 1981 landings totaled over 16 million pounds. After 1991, these landings dropped to a low yearly average. The abalone fishery in California seems to have experienced the same fate, although local overfishing in this case was fueled by high prices and liberal management practices.

The sea urchin fishery has been developed along the U.S. West Coast from San Diego to Washington. Because of anticipated increased pressures, a revised limited entry program for this fishery has been adopted for most areas. Sea urchins are harvested by divers. The eggs are packaged for the Japanese sushi and gift markets. Sea urchin landings have decreased from 63.8 million pounds in 1988 to record lows (less than 12 million pounds in 1998 and 2003) and have averaged 27.1 million pounds since then. The price has also decreased to low levels as a result of the Japanese economic downturn. Periods of low kelp production due to adverse oceanic conditions has resulted in poor quality uni. The resulting low prices has decreased overall production along the U.S. West Coast. Vessel participation in 2004 is shown in Table IV.12.

Sea cucumbers are harvested by diving or trawling. Targeted fishing for this species takes other groundfish species and is subject to the groundfish open access (exempted trawl) fishery restrictions. Sea cucumbers are managed by the states. In Washington, the sea cucumber fishery only occurs inside Puget Sound and the Straight of Juan de Fuca. Most of the harvest is taken by diving, although the tribes can also trawl for sea cucumbers in these waters. Two species of sea cucumbers are fished in California: the California sea cucumber, also known as the giant red sea cucumber, and the warty sea cucumber. The warty sea cucumber is fished almost exclusively by divers. The California sea cucumber is caught principally by trawling in southern California, but is targeted by divers in northern California. In 1997 the state established separate, limited entry permits for the dive and trawl sectors. Permit rules encourage transfer to the dive sector, which now accounts for 80 percent of landings. There are currently 113 sea cucumber dive permittees and 36 sea cucumber trawl permittees. Many commercial sea urchin and/or abalone divers also hold sea cucumber permits and began targeting sea cucumbers more heavily beginning in 1997. At up to $20 per pound wholesale for processed sea cucumbers, there is a strong incentive to participate in this fishery. The participation in the sea cucumber fishery in California for 2004 is shown in Table IV.13.

California halibut is a state managed species caught with hook-and-line, trawl, and gillnet gear. Trawling for California halibut is permitted in federal waters using trawl nets, but trawling is prohibited within state waters except in certain designated areas between Point Arguello (Santa Barbara County) and Point Mugu (Ventura County). California requires a nearshore trawl bycatch permit to land shallow nearshore species.

Table IV.12
U.S. West Coast Sea Urchin Fishery Vessel Participation in 2004

Volume (thousands pounds)		11,933
Price		$0.60
Ex-vessel value (thousands)		$7,214
Change from 2003		-10%
3 year average		-31%
10 year average		-57%
	Count	Share
Vessels >$500	149	90%
Average sea urch. revenue	$48,383	
Sea urchin share		92%
Vessels 50% value	25	15%
Vessels 90% value	81	49%
Top 10 vessels	10	6%
Average sea urch. revenue	$183,767	
Sea urchin share		99%

Notes: 1. Participation is filtered for California landings.

Table IV.13
U.S. West Coast Sea Cucumber Fishery Vessel Participation in 2004

Volume (thousands pounds)		572
Price		$0.94
Ex-vessel value (thousands)		$540
Change from 2003		-23%
3 year average		-25%
10 year average		-4%
	Count	Share
Vessels >$500	38	72%
Average sea cuc. revenue	$14,125	
Sea cucumber share		23%
Vessels 50% value	5	9%
Vessels 90% value	18	34%
Top 10 vessels	10	19%
Average sea cuc. revenue	$40,827	
Sea cucumber share		49%

Notes: 1. Participation is filtered for California landings.

There is a separate fishery in California for species caught with ocean gillnet gear. The gillnet fishery is comprised of two gear types. Set nets are used to target California halibut, white seabass, white croaker, and sharks. Drift nets are used for California halibut, white croaker, and angel sharks. Most of the commercial catch is sold in the fresh fish market, although a small amount is used for live bait.

The commercial harvest of giant kelp forests has occurred in California since 1910. However, harvest has declined in recent years to about one-third of that in the early 1990's. Specially designed ships harvest kelp. The ships cut the surface canopy no lower than 1.2 meters below the surface in a strip eight meters wide, much like a lawn mower. Regulations imposed by the State of California ensure that harvesting activities have a minimal impact on kelp forests. Kelp canopies cut according to this regulation generally grow back within several weeks to a few months.

Aquaculture and mariculture in the rivers and estuaries of the U.S. West Coast also produce seafood products. Oysters, clams, and other species commercially grown by farming are generally not included in commercial fishery statistics because the products are usually not harvested by commercial fishing boats. However, these species are very dependent on the same abundant water resources as are other fishery products. One significant trend is the increase in oyster production in estuaries that have resulted from increased water quality from pollution abatement programs. Two other bay commercial fisheries that are important on a local basis are the limited entry roe herring fishery in Yaquina Bay, and the Alsea Bay commercial crab fishery.

V. SEAFOOD PROCESSOR AND BUYER CHARACTERISTICS

This chapter is to review the fish processing segment of the commercial fishing industry. Background information is provided about raw product purchases, finished products, and seafood markets. The profile includes classifications of processors and buyers by amount of raw product purchased and degree of dependence on particular fisheries. The processor classification scheme is based on 2004 fish purchase information. Following chapters contain discussion of processor ownerships and seafood market trends.

Processor counts in this chapter are the buying entity identified on an issued fish ticket. The next chapter describes how many of these entities are under single ownerships.

A. Purchaser Counts and Purchase Volume

U.S. West Coast fish purchases by processors, dealers, and individual consumers buying directly from vessels totaled 803.7 million pounds with an ex-vessel value of $376.3 million in 2004 (Table V.1). The volume landed is slightly more than one third in California, but the value landed is highest (40 percent) in Washington. Data sources only show where the purchase occurs; not all landings are processed at their geographical location of deliveries. Purchased fish are transported to processors in other locations and there is cross hauling of species between processor facilities.

Table V.1
Volume and Value of Fish Landings by State in 2004

	Processor/ Buyer	Landed Volume		Ex-Vessel Value	
Area	Count	Amount	Percent	Amount	Percent
Washington	367	207.4	26%	$148.7	40%
Oregon	228	294.1	37%	$97.4	26%
California	620	302.1	38%	$130.3	35%
Total	1,215	803.7	100%	$376.3	100%

Notes: Volume is in millions of pounds and value is ex-vessel value in millions of 2004 dollars.
Source: PacFIN March 2005 extraction.

There were 1,215 unique names of processors or buyers in 2004. These companies include operators of processing plants, buyers that may do little more than hold the fish prior to their shipment to a primary or secondary processor, and consumers buying directly from vessels. A relatively small number of processors and buyers handle most of the deliveries in the U.S. West Coast.

B. Multi-Fisheries Dependency

The major processing firms in the U.S. West Coast are multi-species, multi-market oriented. Most of the firms' plants are located in areas where, by natural conditions or by management decisions, the availability of products changes over the year. Out of competitive necessity, they

therefore process most species harvested. There is an increasing trend in multi-fisheries dependency for the higher volume processors. Most species groups' landings have seasonal peaks but, because of fishery management regulations, groundfish is now landed on a more even flow throughout the year. Some of these primary processing firms also include distributing and wholesaling as their function.

Processing of fish products includes a variety of functions. For some products, processing involves icing fish and selling the product directly to consumers or shipping the iced or frozen product to be canned. In the case of albacore tuna, most of the product is frozen and shipped offshore to be canned. Other products, such as Dungeness crab and pink shrimp, are cooked and picked for local sale or shipment to final markets. Groundfish are generally filleted, except for sablefish which is marketed as whole. The primary product for fillets is about 30 percent of the total weight. The processing of the residue (carcasses) is therefore an important component in the total value of the product.

The processing and distribution of seafood is complex (Figure V.1). Some products flow directly to the consumer, while others are processed, brokered, distributed, and retailed by separate entities. Value may be added to the product at any stage. This may involve selling a product whole, or retaining only a portion of the landed product for sale. Value may be added also by small, local processors that prepare (smoke, can, etc.) specialty items. The preparation and sale of the secondary product then becomes a key consideration in total value of the product.

The higher volume processors and buyers especially depend upon year-around deliveries from many fisheries (Table V.2). Many of licensed processor and buyers received salmon, Dungeness crab, pelagics, migratory, and groundfish (other than Pacific whiting) in 2004. However, only the larger volume firms took deliveries of pink shrimp (266 firms of which 42 percent had revenues greater than $1 million) and Pacific whiting (30 firms of which 90 percent had revenue greater than $1 million). The species group causing the greatest specialization was sea urchins

Figure V.1
Seafood Product Distribution Chain

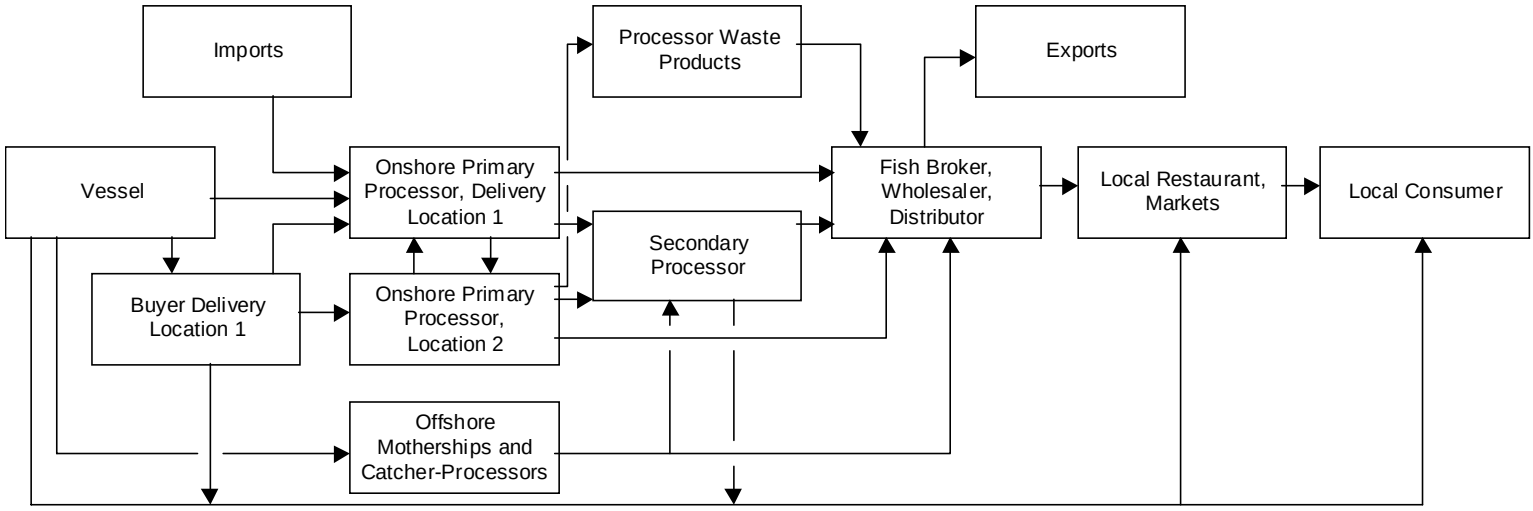


Table V.2
Counts and Purchase Distribution of Major Processors or Buyers by Species Groups in 2004

Species	Count Total	Processor Counts Within Purchase Categories <=$10K	<=$100K	<=$1,000K	>$1,000K	Counts Within Purchase Specialization Categories >90%	>50%	>33%
Groundfish	279	14%	40%	32%	15%	5%	13%	18%
Pacific whiting	21	0%	24%	29%	48%	0%	5%	10%
Salmon	319	21%	40%	26%	13%	29%	50%	59%
Crab/lobster	376	16%	41%	30%	12%	21%	53%	62%
Shrimp	105	10%	34%	35%	20%	15%	24%	30%
Pelagic	118	10%	29%	36%	25%	25%	30%	31%
Highly migratory	216	13%	38%	31%	19%	8%	17%	23%
Halibut	77	8%	32%	31%	29%	3%	6%	12%
Sea urchins	50	10%	18%	56%	16%	30%	36%	38%
Other	350	16%	39%	31%	15%	14%	21%	28%
Total	642	22%	41%	28%	10%			

Species	Sum of Purchase (thousands)	Purchase Distribution (thousands) 90th Percentile	50th Percentile	Mean
Groundfish	41,574	167	3	149
Pacific whiting	7,358	1,265	1	334
Salmon	47,694	424	19	150
Crab/lobster	118,975	695	23	316
Shrimp	11,539	308	15	110
Pelagic	32,260	779	1	273
Highly migratory	32,626	227	6	151
Halibut	8,254	168	3	107
Sea urchins	7,711	523	6	154
Other	19,245	96	4	55
Total	327,238	978	52	510

Notes: 1. Purchases are in thousands of 2004 dollars.
2. Purchases exclude vessels selling fish directly to the public and processors or buyers whose activity is less than $500.
3. Table shows counts of unique processors or buyers for >50% specialization, but counts are repeated in species groups for <=50% specialization.

Source: PacFIN March 2005 extraction.

(55 percent of processors or buyers had 90 percent specialization within this species group and 62 percent had greater than 50 percent specialization). Predictably, salmon (not considering the other species category) had the lowest average ex-vessel value of deliveries ($49 thousand mean and $3 thousand median) and Pacific whiting had the highest ($279 thousand mean and $20 thousand median).

C. Processor Classifications

Finding categories of processors is analogous to determining a vessel classification scheme. Processors making the higher volume purchases are a generalized category for using many species and manufacturing many product forms. The rules adopted for a classification scheme adopted the threshold purchase levels as shown in the first column on Table V.3. The ex-vessel values by purchased species for these categories are shown in the other columns.

D. Processed Product Value

The value of primary seafood products produced in the U.S. West Coast can be calculated using sales price of product forms and the landed species group finished product poundage. Davis (2003) used an analysis of final product form to estimate ex-processor pricing (Table I.4). The ex-processor price was determined using financial information about five components of product cost or published sales price for product forms.

- Raw product purchase = Average price ÷ Product form yield
- Labor = Cost for labor associated with product form processing
- Tax/fee = Costs for ad valorem and poundage taxes and fees paid on deliveries of raw product by the processor. For Oregon, taxes are 0.0109 of ex-vessel value for all fish except salmon. Salmon taxes are 0.0315 of value, plus $0.05 per round pound for salmon habitat restoration programs. This cost category includes loan payment fees for groundfish trawlers after November 2005.
- Other = Fixed plant costs, etc.
- Contribution = Profit, etc.

The estimated ex-processor value from processing the U.S. West Coast landings in 1996 was about double the ex-vessel value of the landings. Using the same relationship between ex-vessel price and ex-processor price in 1996, the 2004 ex-processor sales, including non-edible products, such as fish meal, are estimated to be $752.6 million.

E. Fish Processing Facilities

A modern processing facility is an expensive investment. It would be expected that a medium sized plant handling crab and shrimp, and having groundfish fillet lines would cost a minimum of $10 million. This includes site development, structures, processing equipment, and cold storage facilities. It does not include specialty product manufacturing equipment such as for surimi, does not include land acquisition costs, and does not include startup and working capital. Investors are faced with a very competitive setting and many uncertainties on species availability and market situations. Due to the high risk, substantial equity participation is required: 25

Table V.3
Processor Purchases by Species Group and Purchase Size Categories in 2004

U.S. West Coast Onshore

Purchase Size	Ground-fish		Pacific Whiting		Salmon		Crab/ Lobster		Shrimp		Pelagic		Highly Migratory		Halibut		Sea Urchins		Other		Total Onshore		Processor Count
<=$10K	107	6%	0	0%	495	29%	476	27%	80	5%	44	3%	227	13%	38	2%	14	1%	251	14%	1,731	100%	597
	0%		0%		1%		0%		1%		0%		1%		0%		0%		1%		1%		
<=$100K	896	7%	0	0%	3,161	24%	4,143	32%	1,224	9%	421	3%	1,285	10%	163	1%	69	1%	1,772	13%	13,135	100%	360
	2%		0%		7%		3%		10%		1%		4%		2%		1%		6%		4%		
<=$1,000K	4,130	6%	382	1%	17,602	25%	22,294	32%	2,558	4%	4,373	6%	3,906	6%	804	1%	5,156	7%	8,441	12%	69,645	100%	192
	10%		5%		36%		19%		21%		14%		12%		10%		67%		28%		20%		
<=$5,000K	10,339	10%	1,507	1%	13,283	12%	26,981	25%	1,910	2%	25,547	24%	4,388	4%	3,326	3%	2,483	2%	18,551	17%	108,316	100%	49
	25%		19%		27%		22%		15%		79%		13%		40%		32%		62%		32%		
>$5,000K	26,697	18%	5,850	4%	13,904	9%	66,301	44%	6,594	4%	1,972	1%	23,445	16%	3,981	3%	2	0%	749	1%	149,496	100%	17
	63%		76%		29%		55%		53%		6%		71%		48%		0%		3%		44%		
Total revenue	42,169	12%	7,739	2%	48,444	14%	120,195	35%	12,368	4%	32,356	9%	33,251	10%	8,313	2%	7,724	2%	29,764	9%	342,322	100%	1,215
	100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		100%		
Processor count	377		24		524		529		160		145		321		107		58		499		1,215		

Notes: 1. Revenue is ex-vessel value in thousands of 2004 dollars. Percents are column \ row total revenue shares.

2. Processor counts across species group categories are not unique but the column total is for unique vessels.

Source: PacFIN March 2005 extraction.

percent should be considered a minimum level. Borrowing terms on equipment generally have short periods, like five years. Given the expected high debt servicing, plants must operate year around and at full capacity. Financial feasibility is drastically affected by whether processed products can be immediately brokered to market or they are kept in inventory. Cold storage must be -20 degrees for most products and operating costs for power are high.

Part of the challenge of full utilization of processor capacity is to maintain and develop the infrastructure (utilities, docks and unloading facilities, cold storage, navigation channels, and product shipping ground and air transportation routes) required for processing. The greatest concern is whether water and byproduct use will overwhelm existing infrastructure. Increased demands for potable water from growth and fixed supply sources will probably increase water costs as an overall share of production costs in the future. Seafood processors would benefit from water conservation measures, as well as improved controls for waste utilization and disposal methods. With industry participation, seafood processing wastes can be put to further use by existing plants.

F. Facility Production Costs and Retail Prices

Processor production costs have been modeled by the authors. A rule-of-thumb is a factor of about two across all species to calculate ex-processor price from ex-vessel price. It is necessary to make a much more detailed analysis of a specific use of a species to translate prices at the consumer level to prices at the ex-processor level to prices at the fisherman level.

Some example products are modeled to show processing costs and expected retail prices of selected product forms (Table V.4).[1] In the models, the ex-vessel price is a backwards calculated quantity. Example consumer retail prices are from market research. Then, ex-processor prices are estimated based on specie, timing of harvest, and expected world supply market conditions. Next, processor costs and yields are used to arrive at an input purchase price. This results in a chain of calculations that translate consumer prices to harvester prices.[2]

Fees, tendering costs (if applicable), processing labor, and other variable and fixed costs add about $0.70 to $1.00 per finished pound to the cost of producing a primary seafood product. The market and distribution costs tend to be about 12 percent; and, because most seafood products have a high "spoilage and shrinkage" factor, the retail margin is about 40 percent. Processing for lower valued raw products becomes a higher percentage of total ex-processor price. As the complexity of processing increases, the yield for the primary product decreases. Therefore, decisions on how much can be paid at the harvesting level have to be made based on the expected recovery for the product form, the cost of the added processing, and the expected

1. The analysis is based both upon existing accounting models and on new interviews with the processors and distributors. The production margins should be considered averages. Each situation is different; however the general overview should provide information on price spread within the industry.
2. An example column in Table V.4a for fresh troll Chinook fillets skin-on should be read as follows: total cost of the raw product, plus variable and fixed costs, is $5.98 per finished pound. Since the processor receives a "credit" for eggs and waste product worth $0.02, he can sell the primary product for $6.00. The marketing costs add another $3.11, so that the final consumer is expected to pay $9.09 (with rounding adjustments in the table). This amount will cover the ex-vessel price to harvesters and the processor/distributor and related margins.

Table V.4a
Salmon Troll and Net Fishery Product Price Conversion Model

Fishery: Troll Chinook, Net Chinook	Fresh or Frozen					
Product Form: Whole - Head Off, Fillets - Skin On	Troll Chinook			Net Chinook		
	Whole - Head Off		Fillets - Skin On	Whole - Head Off		Fillets - Skin On
Ex-vessel price /2,3	3.02	3.02	3.02	0.89	1.78	1.78
Fish fees:						
.0315 ad valorem management fee	0.095	0.095	0.095	0.028	0.056	0.056
.05 per lb restoration and enhancement	0.05	0.05	0.05	0.05	0.05	0.05
.05 per lb marketing assessment /4	0.05	0.05	0.05	0.05	0.05	0.05
Total fees	0.195	0.195	0.195	0.128	0.156	0.156
Tendering cost or buyer /5	0.00	0.00	0.00	0.15	0.15	0.15
Total landed cost	3.22	3.22	3.22	1.17	2.09	2.09
Egg yield (percent) /6	0%	0%	0%	4%	4%	4%
Green egg credit @ $5.00/lb coho, $4.50/lb Chinook and chum, $2.50/lb steelhead /7	0.00	0.00	0.00	0.18	0.18	0.18
Waste product sale @ $0.06 lb /8	0.00	0.01	0.02	0.02	0.02	0.03
Yield for primary product (percent)	98%	82%	65%	72%	72%	55%
Raw product cost of primary product	3.28	3.92	4.95	1.62	2.90	3.80
Variable costs:						
Direct labor	0.10	0.15	0.50	0.15	0.15	0.50
Packaging and material	0.05	0.05	0.10	0.05	0.05	0.10
Other costs	0.05	0.05	0.05	0.05	0.05	0.05
Total variable costs	0.20	0.25	0.65	0.25	0.25	0.65
Raw product and variable costs	3.48	4.17	5.60	1.87	3.15	4.45
Contribution margin to fixed costs /9	0.40	0.40	0.40	0.40	0.40	0.40
Primary ex-processor price of product	3.88	4.56	5.98	2.08	3.35	4.64
Sales of green eggs and waste /10	0.00	0.01	0.02	0.20	0.20	0.21
Total revenues (equals total variable plus fixed costs) /11	3.88	4.57	6.00	2.27	3.55	4.85
Marketing margins						
Brokerage (2%)	0.08	0.09	0.12	0.04	0.07	0.09
Distribution (10%)	0.39	0.46	0.60	0.21	0.34	0.46
Retailer (40%)	1.55	1.83	2.39	0.83	1.34	1.86
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	5.90	6.94	9.09	3.16	5.10	7.05

Notes:
/1 Raw egg prices have declined sharply over the last two years. For example, pink and steelhead prices presently are about $1.00 per pound and in some cases were as low as $0.10 per pound.
/2 All calculations are based on a delivery weight. These are round pounds for net caught and dressed pounds for some troll caught. Net caught ex-vessel prices use example non-Indian Columbia River fishery in 2004. Troll caught uses ex-vessel annual prices for deliveries to Astoria in 2004.
/3 Ex-vessel prices are expected long-term prices based on historic prices of similar species.
/4 Assessment fee $0.05 paid by harvester is included in ex-vessel price. Another $0.05 paid by processor. These charges may not be appropriate in all cases, so reduce costs by this amount if no assessment fees.
/5 Not all inland fisheries include a tender or buyer/gatherer. If not, reduce costs by this amount.
/6 Egg yield is on average fish (male and female).
/7 Eggs are a credit which is worth $4.50 and $5.00 per lb green. Egg credit per lb ($0.25 for coho, $0.18 for fall Chinook) is adjusted for overall yield.
/8 Some processed waste products sold for $0.06 per pound. At 75% overall yield, on a round pound basis, this would generate $0.015 of revenues, at 50% yield these sales would generate $0.03, etc. This may not be appropriate in every area.
/9 Contribution margin includes financing, administrative costs, marketing and sales staff, etc. This item is sometimes called "plant overhead costs."
/10 Eggs' primary product is for the Japanese market. There are also European markets. Bait eggs may also have a market. Increased yield of 5% is used to offset the bait egg gain.
/11 In general, the processing plant sells its goods at the processor's door. If a broker is involved, this adds about 2% to the cost of the product. The distributor will add 8% to 15%, depending on the cost of transportation. The retailer margin is generally 35% to 40% of the distributor price for fresh products and specialty canned or vacuum packed products. General canned goods retail margins may be as low as 16%, but will generally be about 20%.
/12 Processing derived from variable and fixed costs from FEAM.

Source: Radtke and Davis (June 2003).

Table V.4b
Salmon Specialty Product Price Conversion Model

Fishery: All Net Caught	Specialty Products					
Product Form: Specialty Products	Canned (7 1/2 oz) or Vacuum Packed			Smoked and Vacuum Packed		
	Net Coho	Net Chinook	Net Sockeye	Net Coho	Net Chinook	Net Sockeye
Ex-vessel price /2,3	0.79	1.00	1.10	0.79	1.00	1.10
Fish fees:						
.0315 ad valorem management fee	0.025	0.032	0.035	0.025	0.032	0.035
.05 per lb restoration and enhancement	0.05	0.05	0.05	0.05	0.05	0.05
.05 per lb marketing assessment /4	0.05	0.05	0.05	0.05	0.05	0.05
Total fees	0.125	0.132	0.135	0.125	0.132	0.135
Tendering cost or buyer /5	0.15	0.15	0.15	0.15	0.15	0.15
Total landed cost	1.07	1.28	1.39	1.07	1.28	1.39
Egg yield (percent) /6	5%	4%	4%	5%	4%	4%
Green egg credit @ $5.00/lb coho,	0.25		0.20	0.25		0.20
$4.50/lb Chinook and chum,		0.18			0.18	
$2.50/lb steelhead /7						
Waste product sale @ $0.06 lb /8	0.03	0.03	0.03	0.03	0.03	0.03
Yield for primary product (percent)	45%	45%	45%	43%	43%	43%
Raw product cost of primary product	2.37	2.85	3.08	2.48	2.98	3.22
Variable costs:						
Direct labor	1.10	1.10	1.10	1.75	1.75	2.50
Packaging and material	0.60	0.60	0.60	0.50	0.50	1.50
Other costs	0.30	0.30	0.30	0.50	0.50	0.60
Total variable costs	2.00	2.00	2.00	2.75	2.75	4.60
Raw product and variable costs	4.37	4.85	5.08	5.23	5.73	7.82
Contribution margin to fixed costs /9	0.40	0.40	0.40	0.40	0.40	0.40
Primary ex-processor price of product	4.49	5.04	5.48	5.34	5.92	8.22
Sales of green eggs and waste /10	0.28	0.21		0.28	0.21	
Total revenues (equals total variable	4.77	5.25	5.48	5.63	6.13	8.22
plus fixed costs) /11						
Marketing margins						
Brokerage (2%)	0.09	0.10	0.11	0.11	0.12	0.16
Distribution (10%)	0.45	0.50	0.55	0.53	0.59	0.82
Retailer (40%)	1.79	2.02	2.19	2.14	2.37	3.29
Customer price for primary product (primary						
ex-processor price plus marketing						
margins before shrinkage cost markups)	6.82	7.66	8.33	8.12	9.00	12.50

Notes: 1. Ex-vessel prices are from Puget Sound salmon fisheries in 2004.
2. Other notes from Table V.4a also apply to this table.

Source: Radtke and Davis (2003).

Table V.4c
Dungeness Crab Product Price Conversion Model

Fishery: Dungeness Crab Product Form: Three Primary	Dungeness Crab /2
Ex-vessel price /2,3	1.58
Yield for primary product (percent)	58%
Raw product cost of primary product	2.72
Variable costs:	
Direct labor	0.61
Packaging and material	0.05
Other costs (including taxes)	0.10
Total variable costs	0.76
Raw product and variable costs	3.48
Contribution margin to fixed costs /9	0.40
Primary ex-processor price of product	3.88
Marketing margins	
Brokerage (2%)	0.08
Distribution (10%)	0.39
Retailer (40%)	1.55
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	5.89

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2004.
2. Other notes from Table V.4a also apply to this table.
3. Dungeness crab are sold primarily by processors in three forms: whole, sections, and picked meat. The costs and margins are a weighted average of all three forms.

Source: Study.

Table V.4d
Pink Shrimp Product Price Conversion Model

Fishery: Pink Shrimp Product Form: Frozen	Frozen (IQF) /2
Ex-vessel price /2,3	0.39
Yield for primary product (percent)	26%
Raw product cost of primary product	1.49
Variable costs:	
Direct labor	0.25
Packaging and material	0.31
Other costs (including taxes)	0.06
Total variable costs	0.62
Raw product and variable costs	2.11
Contribution margin to fixed costs /9	0.40
Primary ex-processor price of product	2.51
Marketing margins	
Brokerage (2%)	0.05
Distribution (10%)	0.25
Retailer (40%)	1.01
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	3.82

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2004.
2. Other notes from Table V.4a also apply to this table.
3. Pink shrimp are primarily sold as individually quick frozen blocks.

Source: Study.

Table V.4e
Groundfish Product Price Conversion Model

Fishery: Groundfish	Groundfish Fillet to Japan Markets	
Product Form: Fillet	Cod/Rockfish	Flatfish
Ex-vessel price /2,3	0.60	0.42
Yield for primary product (percent)	0.29	0.24
Raw product cost of primary product	2.07	1.75
Variable costs:		
Direct labor	0.25	0.38
Packaging and material	0.05	0.05
Other costs (including taxes)	0.07	0.07
Total variable costs	0.37	0.50
Raw product and variable costs	2.44	2.25
Contribution margin to fixed costs /9	0.40	0.40
Primary ex-processor price of product	2.84	2.65
Marketing margins		
Brokerage (2%)	0.06	0.05
Distribution (10%)	0.29	0.27
Retailer (40%)	1.27	1.19
Customer price for primary product (primary ex-processor price plus marketing margins)	4.46	4.16

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2004.
2. Other notes from Table V.4a also apply to this table.
3. Groundfish is primarily sold as fresh fillets.

Source: Study.

Table V.4f
Pacific Whiting Headed and Gutted and Surimi Product Price Conversion Model

Fishery: Pacific Whiting		
Product Form: H/G and Surimi	Headed and Gutted	Surimi
Ex-vessel price /2,3	0.04	0.04
Yield for primary product (percent)	61%	22%
Raw product cost of primary product	0.07	0.18
Variable costs:		
Direct labor	0.10	0.12
Packaging and material	0.05	0.15
Other costs (including taxes)	0.06	0.15
Total variable costs	0.21	0.42
Raw product and variable costs		
Contribution margin to fixed costs /9	0.14	0.04
Primary ex-processor price of product	0.40	0.62
Marketing margins		
Brokerage (2%)	0.01	0.01
Distribution (10%)	0.04	0.06
Retailer (40%)	0.16	0.25
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	0.61	0.94

Notes: 1. Notes from Table V.4a also apply to this table.

Source: Study.

wholesale price for the final product. Products requiring more intensive manufacturing do not necessarily bring in higher total gross or net revenues to a processor.

The purpose of the analysis is to indicate the ex-vessel price that could be paid in order to cover processing costs, assuming there is a market at expected ex-processor price. Any lower ex-processor price would, over time, send signals to the processor to discontinue that product line. The analysis is useful in that it allows harvesters, processors, and marketers to decide the ex-vessel price that can be paid facing certain market conditions. The results should be considered approximations for the shown product forms and useful for understanding seafood distribution pricing. More in-depth analysis is needed for financial planning purposes.

G. Seafood Processing Trends

Historically the fishing processing industry on the West Coast expanded rapidly with the influx of settlers and improvements in technology. Early methods of preserving fish, mostly salmon, included drying, pickling, salting, and smoking. Two new developments, freezing and canning, produced fundamental changes in the trade. The rapid over-expansion of the salmon canning industry after 1878 culminated in a series of business failures. Subsequent reorganizations resulted in the consolidation of such companies as the Alaska Packers Association, the Columbia River Packers Association, and the Pacific American Fisheries.

The consolidation of processing and the entry of processors into purchases of "drift rights" led to organization of harvesters and subsequently strikes for "market contracts." The period of abundant resources and war developed markets ended in 1920. The major salmon canning firms became subsidiaries of large packing firms outside the salmon industry.

The development of the tuna industry and subsequently the passage of the MFCMA provided for diversification into seafood products other than salmon. The expansion of processing capacity was overly optimistic for the availability of marine resources on the West Coast, underestimated worldwide competition for substitute processing capability, and overestimated the growth in market demand.

In the late 1970's, for the most part, the large food conglomerates left the seafood industry in the Pacific Northwest. Reemerging in the 1970's and 1980's were independent seafood processors that were also involved in seafood distribution for retail markets. Examples of this trend are Ocean Beauty and Pacific Choice Seafood. Ocean Beauty redirected its efforts to distribution, leaving Pacific Choice Seafood the only general processor/distributor on the West Coast.

The collapse of the salmon industry removed organizations that provided collective bargaining services for harvesters. The expansion of the groundfish fishery resulted in bargaining organizations, such as the Fishermen's Marketing Association (FMA), that strived to set "market orders" for specific species, and at one time supplied weigh masters to assure reliable volume and species data. The decrease in groundfish resources and the recent consolidation of the processing and distribution sector has diminished the use of the market order approach and has resulted in no unbiased validation (except law enforcement) of volume and prices of harvests.

Processing is being centralized to occur at plants in only a few regional commercial fisheries centers. The expense for equipment and refrigeration to meet new quality standards balanced against business risk makes it unlikely this trend will change. For example, only processors making purchases over $1 million accepted deliveries for pink shrimp and Pacific whiting in 2004. Smaller processors specialize in products, but processors making purchases of over $1 million are year-around operations with product forms from all species harvested in Oregon fisheries.

There is a growing number of harvesters selling whole, dressed (cleaned and gutted) salmon, crab, and tuna directly to the consumer from vessels. This direct marketing concept is not without controversy, since participating vessels would be in competition with the local retail markets for customers. Harvesters can receive about double the price from what is received when delivering to processors. While the direct sale price appears to be an attractive return, there are costs (advertising, packaging, spoilage, etc.) and legal risks for this type of sale. In addition, there can be lost fishing effort while the vessel is used as a base for sales.

The above are two examples of six major trends taking place in the fish processing industry. Tracing back to the early 1990's, the six trends are:

(1) Infrastructure issues;
(2) Decreased seafood product wholesale prices;
(3) Major expansion of the onshore Pacific whiting fishery;
(4) Centralization of general processing plants in limited locations a few consolidated companies;
(5) Vertical integration into distribution and harvesting operations; and,
(6) Return of small processors to offering particular products in niche markets.

The following is a more detailed explanation of each trend.

(1) Infrastructure Issues. Part of the challenge of full utilization will also be to develop the infrastructure (utilities, docks and unloading facilities, cold storage, navigation channels, and product shipping ground and air transportation routes) required for processing. Seafood processing requires significant water usage and generates large amounts of byproducts. Table V.5 shows typical water usage by species for a medium sized plant. Shrimp requires the greatest amount of water (25 to 40 gallons per one pound shrimp reported by Nielsen 1983), while groundfish water demand varies widely, depending on the product being produced. Fillets require much higher water usage than processing for headed-gutted products.

According to CH2M Hill (1993), surimi requires around two gallons of water for every pound of surimi. Surimi is high in water use because of the repetitive washings the mince must undergo. Surimi processing for the offshore allocation (about half of total harvest) takes place on factory ships where desalinated water is used.

Wastewater discharges by onshore processing plants are generally done to the waterway where they are located. This is allowed in U.S. West Coast states as long as adequate

Table V.5
Water Use in Seafood Processing (Gallons per Day)

Bottom fish	6,100	-	420,000
Dungeness	38,000	-	74,000
Fish meal	38,000	-	93,000
Salmon	50,000	-	52,000
Shrimp	90,000	-	161,000
Surimi	50,000		

Source: Carawan et al. 1979; CH2M 1993; Nielsen et al. 1983.

mixing occurs in the waterway. Wastewater discharged to municipal sewer systems is very costly to plants because they are charged on strength and volume. Some processors in U.S. West Coast states use pretreatment methods prior to discharge to municipal systems to recover useful byproducts and meet local regulations for wastewater acceptance.

Brown (1995) found in a survey that seafood processors have learned to be efficient with their solid byproducts. Very few hauled any byproducts to the land fill. The two most popular methods of disposal were recovery either in fish meal production or agricultural use (direct field application and composting).

Most of the shells from shrimp, crab and urchins are composted, which encompasses both the careful biological breakdown through a process of oxygenating and heating or simply applying the byproducts to a field to decompose without the benefit of aeration (Hilderbrand 1995). The cost of disposal of shrimp, crab, and urchin shells varies between processors; some farmers and reducing plants will pick up the byproducts, while other processors need to deliver their materials to a receiving facility. Shell disposal is generally a barter arrangement where the processor is able to dispose of the material and farmers are able to fertilize their fields at minimal cost to either party.

There are valid concerns for whether water and byproduct use will overwhelm existing infrastructure. Increased demands for potable water from growth and fixed supply sources will probably increase water costs as an overall share of production costs in the future. Seafood processors would benefit from water conservation measures, as well as improved controls for waste utilization and disposal methods. With industry participation, seafood processing wastes can be put to further use by existing plants. Creative options for waste disposal exist, but additional research and product development needs to make sure these options are cost effective. Further study of the composition of seafood wastes may show that they are a benefit rather than a hindrance for improved utilization of marine resources.

(2) Prices. Since the late 1980's, largely because of the expansion of the farmed salmon industry, real prices for troll caught Chinook salmon dropped to below $1.50 per landed pound in the early 2000's. There was a price increase to $1.75 in 2003 and a jump in prices to $3.00 per pound in 2004. Despite these price increases, they still are not equal

to inflation adjusted prices in the 1970's and 1980's of $4.00 to $5.00 per pound. Pink shrimp prices have also decreased from around $0.70 per pound in the middle 1990's to about $0.25 per pound in 2003 with an increase to $0.39 in 2004. While these longer trend price decreases have eliminated valuable product lines and in some cases led to the demise of some processors, the effects mostly are the earnings power of harvesters. Processors will continue to purchase salmon and shrimp as long as their margins are covered. Vessels sometimes will continue to harvest at losses in order to protect their investment and permits. To remain in business, operation losses for both harvesters and processors in single fisheries will have to be covered by other fisheries.

(3) Onshore Pacific Whiting Fishery. At the present time, three surimi plants along the West Coast have the capacity to process up to 20 million pounds per week. Except for a couple of years in the early 2000's, an average 150 million pounds of whiting has been delivered onshore annually. The surimi product form's prices are subject to the Alaska pollock surimi market and downturns in the Japanese market have lowered prices in recent years. As a consequence, more whiting is being directed to the developing fillet and H/G market.

(4) Owner Consolidation and Plant Centralization. There have been dramatic changes in processor business ownership and where fish processing occurs. Ownerships are being consolidated to a few major companies and landings are being hauled to general processing plants at a few locations along the central West Coast.[1]

Ownership consolidation has typically been accomplished by purchasing seafood buying or seafood processing facilities that are in financial difficulties. At times, this has meant only buying the name of the distressed company. Other times it has involved purchasing working capital and inventory from ongoing businesses. Processing employment was then moved out of smaller ports and replaced by buying stations. Most of the other landings go to specialty buyers or are landed in one port to be hauled to regional processing plants in another location.

(5) Vertical Integration. Vertical integration has been witnessed for both harvesters and processors. Harvesters are participating in direct marketing of their landings to consumers, and large processing companies have acquired vessel ownership positions. Major processing companies are becoming more involved in distribution as its capacity to fill large orders grows.

(6) Specialized Products for Niche Markets. There is a trend is for some small processors to return to particular product and species specialization. Salmon, live groundfish, albacore tuna, and Dungeness crab are species used in these markets. There is a minimum amount

1. The Pacific Seafood Group has become the dominant processing/distribution entity in the Pacific Northwest. It has grown from a small, local fish peddler in Portland, Oregon to a major aquaculture, fish harvesting, fish buying, fish processing, and food distribution company on the West Coast, in the U.S., and also in the export market. By its own press releases, the Pacific Group has more than 20 working facilities throughout the West Coast (ranging from Kodiak, Alaska and San Antonio, Texas) employing over 3,000 people. (http://www.pacseafood.com/)

of investment needed to set up a buying station and ship products to consumer markets. A number of small ports are studying how they can assist in this marketing technique.

The process of ownership consolidation has resulted in only a few general fish processing plants left operating. Even though fish are landed in one area, they are hauled to a facility in another region for processing. The smaller competing fish buyers specialize in products for which they have established niche markets. This leaves harvesters with very limited markets in any geographic area.

The relationship between harvesters and processors that results in a harvester "having a market" is largely determined by the relative bargaining power of the two sectors. A case-in-point to discuss this harvester-processor relationship is the U.S. West Coast groundfish fishery. The fishery is managed under a license limitation system with equal trip limits for all vessels. Under the status quo:

- Processor ownership consolidation has been increasing.
- There has been a large oversupply of vessels relative to harvest levels.
- There is an information asymmetry as processors know the end value of fishery resources and harvesters do not.

If governing fishery regulations change, the relative bargaining power of harvesters and processors will also change.

New management techniques for assigning access privileges to vessels and processor shares to companies will be controversial for those directly involved.[1] It will be argued that individual transferable quotas (ITQ's) have unequal distributional impacts. Processor concerns are that harvester-only ITQ's will increase the bargaining power of harvesters. Harvesters argue that ITQ's will allow them to seek better markets and therefore increase economic contribution generated for the dependent coastal communities. Individual processor quotas (IPQ's) may have the potential effect for continuation and possible acceleration of consolidation and centralization. If this would occur, it would reduce market opportunities for harvesters and impact the influence that communities have in keeping or attracting fleets and processing facilities.

H. Seafood Marketing Issues

A powerful configuration of domestic and global forces has reshaped the way the U.S. seafood processing industry perceives its role and its opportunities. These forces include the globalization of trade, the rise in aquaculture production, the concern of product safety, and the continued growth in product demand. These forces have compelled the industry to re-evaluate traditional production, distribution and marketing strategies (Sylvia et al. undated). The industry today needs to develop market driven, rather than merely supply-side strategies. Projections are

1. Access privileges can be assigned to vessels and other entities, such as communities, crewmen, and processors. They are a means for reducing the Olympic fisheries and allowing harvesters to target their catch for available markets. When assigned to a processor, they would have the effect of tying a certain harvest share to identified processors. In such cases, an assigned share of the harvested share would have to be delivered to a specific processor (sometimes referred to as the two pie system).

that the U.S. consumer will continue for less red meat consumption, continued increasing poultry consumption, and a fairly steady but increasing per capita consumption of fresh and frozen finfish and shellfish seafood (H.M. Johnson & Associates 2004).

There have been some tremendous changes in the U.S. seafood market as a result of the introduction of convenience value added products. The most notable is the growth of the surimi market. Surimi is used in all types of pasta dishes, soups, seafood salads, and sushi. In addition to surimi products, portion control of fresh and frozen products is becoming more prevalent. The aquaculture factor, especially salmon and catfish is leading the way in the development of these products.

All of the fisheries along the central U.S. West Coast have a number of substitutes for products in the regional food distribution (PFMC 2003). Most supermarkets and restaurants do not rely on local supplies to stock their shelves or prepare menus [although some retail or restaurant patrons may place a premium on knowing the product they are purchasing is locally caught (Parrish et al. 2001)]. Locally caught products are often replaced with close substitutes obtained from elsewhere in the global supply chain. Some fisheries, such as Columbia River spring Chinook, early caught Dungeness crab, and certain rockfish, are considered to be of high quality and are valued in fresh markets. Generally, however, there are similar products from South America, Mexico, Canada or Alaska to substitute for West Coast production.

I. Consumer Perception About Seafood

Consumers' perceptions drive demand and hence prices in the marketplace. Several surveys highlight the positive as well as the negative perceptions regarding seafood (Seafood Choices Alliance 2003). These point out the importance of health, nutrition, and quality as being the most important factors (Table V.6). Obstacles to increased seafood sales and reasons for not eating seafood are mostly preparation difficulty and inconsistent quality.

A consumer survey completed in Oregon showed that for the consumer contemplating a salmon purchase, quality was the most important attribute followed by state (fresh/frozen), flesh, color, and price (Sylvia et al. undated). Source of production (wild or farmed) was the least important attribute and species and product form were of intermediate importance. However, preferences for specific characteristics depended on the socio-economic profile of the respondents. Results

Table V.6
Most Common Customer Concerns About Seafood and Obstacles to Increased Sales

	Customer Concerns		Sales Obstacles
1.	Quality	1.	Inconsistent quality
2.	Price (tie)	2.	Consumer education
2.	How to cook (tie)	3.	Poorly trained counter personnel
3.	Taste	4.	High wholesale prices (tie)
4.	Safety	4.	Consumer safety concerns (tie)
5.	How to store	5.	Inconsistent availability
6.	Inspection		
7.	Nutritional labeling		

Source: Perkins (1994).

indicate potential opportunities for niche marketing of certain types of wild salmon, conditional on resource conservation and management. Consistent quality is a major decision criteria in consumer choice of seafood.

J. Trends in Seafood Consumption

The amount and kind of food that people consume depends on many factors. The basic factors are the availability of a product and the ability of the consumer to pay for that product. As explanation of the demand for certain foods is refined, other important factors emerge. Some of these are: total number and consumer level of income (total and comparison to other groups), cultural and historical influences, and price and availability of substitutes.

Seafood has had a gradual increase in per capita consumption over the years 1996 to 2004 (Table V.7). Much of the increase in consumption has been due to the availability of fresh and frozen seafood, and the publicity that the industry has received concerning the "healthiness" of seafood. Seafood was available more cheaply that it had been for many years, mostly due to higher national imports.

According to NOAA Fisheries (News Release November 9, 2005), Americans ate 4.8 billion pounds of seafood in 2004, which is 16.6 pounds of seafood per person. Of these, 11.8 pounds were fresh or frozen fish or shellfish (including 1.1 pound of farm-raised catfish), 4.5 pounds were canned seafood, and 0.3 pound was cured. Americans also ate a record 4.2 pounds of shrimp per person in 2004. There has been a decrease in canned tuna consumption, which is probably attributed to a decline in consumer awareness about quality and competition from fresh seafood products. The latest data from the FAO show that the U.S. ranks as the third largest consumer of seafood in the world, importing 76 percent of its seafood fare.

Table V.7
Annual U.S. Per Capita Consumption of Seafood Products in 1996 to 2004

	Primary Product			
Year	Fresh and Frozen	Canned	Cured	Total
1996	10.0	4.5	0.3	14.8
1997	9.9	4.4	0.3	14.6
1998	10.2	4.4	0.3	14.9
1999	10.4	4.7	0.3	15.4
2000	10.2	4.7	0.3	15.2
2001	10.3	4.2	0.3	14.8
2002	11.0	4.3	0.3	15.6
2003	11.4	4.6	0.3	16.3
2004	11.8	4.5	0.3	16.6

	Species					
Year	Salmon	Sardines	Tuna	Shellfish	Other	Total
1996	0.5	0.2	3.2	0.3	0.3	4.5
1997	0.4	0.2	3.1	0.3	0.4	4.4
1998	0.3	0.2	3.4	0.3	0.2	4.4
1999	0.3	0.2	3.5	0.4	0.3	4.7
2000	0.3	0.2	3.5	0.3	0.4	4.7
2001	0.4	0.2	2.9	0.3	0.4	4.2
2002	0.5	0.1	3.1	0.3	0.3	4.3
2003	0.4	0.1	3.4	0.4	0.3	4.6
2004	0.3	0.1	3.3	0.4	0.4	4.5

	Secondary Product		
Year	Fillets and Steaks	Sticks and Portions	Shrimp, including all Preparations
1996	3.0	1.0	2.5
1997	3.0	1.0	2.7
1998	3.2	0.9	2.8
1999	3.2	1.0	3.0
2000	3.6	0.9	3.2
2001	3.7	0.8	3.4
2002	4.1	0.8	3.7
2003	4.3	0.7	4.0
2004	4.6	0.7	4.2

Notes: 1. The calculation of per capita consumption is based on a disappearance model. The total U.S. supply of imports and landings is converted to edible weight and decreases in supply such as exports and inventories are subtracted out. The remaining total is divided by a population value to estimate per capita consumption. Data for the model are derived primarily from secondary sources and are subject to incomplete reporting; changes in source data or invalid model assumptions may each have a significant effect on the resulting calculation.

Source: NMFS (November 10, 2005).

VI. MAJOR PROCESSING COMPANIES AND FACILITIES

A. Background

The purpose of this section is to convey an understanding that the seafood processing industry has fluid ownership. Dominant industry players change as resource availability and general economic conditions change. The makeup of the industry today doesn't mean that the same participants will be involved in the future.

The major processing firms in the Pacific Northwest are located in areas where, by natural conditions or by management decisions, there is an active harvesting fleet that is capable of fishing year around. There is an increasing trend in multi-species dependency with year around deliveries for the higher volume processors. Out of competitive necessity, they process most species harvested. Expensive plant capital facilities cannot sit idle for just seasonal operations. Most species groups' landings have seasonal peaks. However, because of new fishery management regulations, groundfish is now landed on a more even flow throughout the year.

It requires considerable capital to invest in processing equipment for manufacturing seafood products. The amount of value added from processing landed fish differs depending on the final seafood product form. Some seafood products are exported fresh or frozen from the Pacific Northwest with a minimal amount of processing, such as fresh salmon, tuna, and whole crab. However, most of the fish products shipped out include a fair amount of processing, such as filleting. Intensive processing, such as smoking and canning, is also carried out by the smaller processors. Another very intensive type of processing with a fairly low yield, from raw to processed product, of about 22 to 25 percent is Pacific whiting "surimi" production. Pacific whiting is purchased from harvesters at around $0.03 to $0.05 per pound and surimi sells for close to one dollar per pound at the ex-processor level. The changed value is because only about one quarter of the resource is used in the primary product and because labor and capital is used to modify the fish resource. The more intensive the processing, the higher contributions are being made to local economies from worker wages and other processing costs.

B. Parent Group Ownership

There are numerous processing and fish buyers licenses in all three states. The major processor groups can be categorized by estimated ex-processor sales in four classifications: largest (greater than $10 million), medium ($5 million to $10 million), small ($1 million to $5 million), or very small (less than $1 million). The largest classification is composed of 11 companies (parent groups) and processed 50 percent of the fish by volume and 49 percent of the total fish by value in 2004 (Table VI.1). These processors average about $15 million in landed value and about $30 million in ex-processor value annually.[1] Some may be identified as individual or business groups. Several groups have significant amounts of landings in more than one area. Table VI.2 lists the top 11 processing groups with the larger total amount of landings (by value) on the West Coast. The medium sized processor category process 29 percent of the landed volume and 16 percent of the landed value. This group averages about $3.6 million in purchases per year. The

1. These estimates are based on fish ticket information, so it does not necessarily include purchases from small buyers that take delivery from harvesters and sell their products to the larger processors.

Table VI.1
Ranking of U.S. West Coast Processor Groups in 2004

	Count	Percent of Volume	Percent of Value	Average Annual Ex-Vessel Value	Annual Estimated Ex-Processor Sales
Largest	11	50.4%	49.2%	$15.3 million	> $10 million
Medium	15	27.8%	15.5%	$3.5 million	$5 million to $10 million
Small	78	15.9%	22.6%	$1.0 million	$1 million to $5 million
Very small	221	4.9%	10.5%	$161,886	$100,000 to $1 million
All others	847	1.0%	2.3%	NA	NA
Total	1,172				

Source: PacFIN March 2005 extraction and anecdotal information.

Table VI.2
Largest Processing Groups on the West Coast With Purchases in 2004

Report Category	Processor Name
(22)	Arrowac Fisheries (W)
(5)	Bornstein Seafoods (W)(O)
(41)	Caito Fisheries (C)
(1)	California Shellfish Co. (O)(C)
(55)	Carvalho (O)(C)
(39)	Delmar Seafoods (C)
(11)	Jessie's Ilwaco Fish Co. (W)
(3)	Pacific Choice Seafood (A)(W)(O)(C)
(32)	Quinault Tribal Enterprises (W)
(151)	Starvin Marvin (O)
(91)	WF Alber (C)

Notes: 1. The numbers preceding the parent company identify the major processing group associated with the processing facility. See Table VI.3 for full list of parent companies by number codes.
2. Identified are processing and/or buying plants in West Coast states and Alaska. Some of these processors may also have minor (less than $500 thousand in ex-vessel value) purchases in other states. The letters following the parent company identify the states where purchases are made:
(A) Alaska
(W) Washington
(O) Oregon
(C) California

Source: Study.

large and medium processors purchase 79 percent of the landed volume and 65 percent of the landed value along the U.S. West Coast. The other smaller processors purchase an additional 22 percent of the total volume. The rest are either individual vessels that also act as dealers and other very small buyers found along the U.S. West Coast.

Of the 11 largest processor groups, on the U.S. West Coast in 2004, the three largest seafood processors purchased 60 percent of the groundfish landed in the three states. Pacific whiting purchases are even more concentrated, with 98 percent by value purchased by three companies. For other species groups, the concentration percentage decreases. Because of the dominance of the Pacific Group in Oregon ports, the Oregon seafood processing sector ownership is most concentrated of the states. In Washington and California, most of the marine products are landed close to the metropolitan centers of Seattle, San Francisco, and Los Angeles. This allows for smaller buyer/processors who process and sell their products to "niche" markets in the area. The important difference in Oregon processor plant capacities from Washington and California is Pacific whiting surimi production at plants in Astoria and Newport and the expanding sardine packing/freezing facilities in the lower Columbia River area. These are generally considered "commodity" products destined for out of area or overseas markets.

While many processing plants are located in many locations along the U.S. West Coast, only some of these processing plants serve to hold inventories and distribute products in the U.S. and to the rest of the world. U.S. West Coast seafood production and distribution is primarily to serve the closest major regional markets. The San Francisco and Los Angeles market areas dominate the absorption of seafood products. Strong markets for some groundfish have also developed in Japan. This includes products from sablefish, Pacific whiting, and relatively modest amounts of salmon and shrimp. Most of the Pacific whiting processing capability being developed by U.S. West Coast firms is for surimi production. Surimi markets are mostly in Japan and Korea. Some domestic and European markets for Pacific whiting headed and gutted, fillet and other product forms are also developing. A study of groundfish markets by Oregon State University (Shriver 1996) concluded that Pacific whiting surimi markets and sablefish markets were mostly destined for the Asian markets, while other groundfish and Pacific whiting (headed and gutted) markets were mostly in the U.S. These markets for groundfish were evenly divided between the U.S. northwest, California, and the rest of the U.S.

Major processing companies often own several processing plants under different names, usually the names of former companies. Table VI.3 lists existing buying/processing facilities along the West Coast. The 2004 landings information includes those facilities with annual landing purchases (ex-vessel values) greater than $100,000 in a port group, and indicates each port group with purchases greater than $10,000. There are some other significant buyers and processors in local areas that are not shown on this table. Many of these small companies are especially important in adding value via canning, smoking, etc. to local fish harvests.

After accounting for buying entity ownerships, the distribution of companies by port groups can be made. Table VI.4 shows species group purchases by purchase size categories for the ownerships. The number of major companies for each port group is shown. The number of companies operating as general processing plants (processing multiple species on a year-around

Table VI.3
Location and Parent Company of Major Seafood Processing Groups as of 2004

WASHINGTON

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) N. Puget Sound	S. Puget Sound	Coastal Washington N.	Coastal Washington S. and C.	Unidentified
ALASKA ICE SEAFOODS INC	5485	167	Alaska Ice Seafoods Inc			X	X		
ALASKA LIVE SHELLFISH LLC	114283					X			
AMERICAN CANADIAN FISHERIES INC	5692				X			X	
ARROWAC FISHERIES INC	0432	22	Arrowac Fisheries		X				
BARCLAY SEAFOOD & MEAT CO INC	1315					X			
BELL BUOY CRAB CO INC	0063	36	Bell Buoy Crab Co. Inc.	(O)				X	
BEST FISH CO LLC	5639					X		X	
BIGFOOT SEAFOOD	4220					X			
BLACK ROCK SEAFOODS	115201				X				
BLAINE CRAB INC	5562				X				
BLUE HERON FISH INC	3911							X	
BOB WARD FISH CO	5177						X		
BORNSTEIN SEAFOODS INC	0090	5	Bornstein Seafoods	(O)	X		X	X	
BOUNDARY FISH CO INC	0094	27	Boundary Fish Co.		X				
BRISTOL PACIFIC FISH CO	5747							X	
BUY RITE SEAFOODS	3573					X			
CAPE FLATTERY FISHERMENS COOPERATIV	4607	168	Cape Flattery Fishermens Cooperative				X		
CARL H JOHNSON CLAMS & OYSTERS INC	0435						X		
CHAD'S SEAFOOD	5427				X	X			
D & M LIVE CRAB INC	3907							X	
DANA F BESECKER CO INC	1697	14	Dana F. Besecker Co. Inc.		X			X	
DOUGLAS H FRICKE	1770							X	
DUNGENESS DEVELOPMENT ASSOC INC	5593							X	
DUNGENESS SEAFOOD	113928	144	Dungeness Seafood				X		
EVERGREEN MARINE PRODUCTS INC	114400	165	Evergreen Marine Products Inc			X			
FINKBONNER SHELLFISH	4337				X				
FISH PEDDLER LLC	114736							X	
FRANCO FISH PRODUCTS INC	1268					X			
GILMORE FISH SMOKE HOUSE	3421							X	
GREAT NORTHERN SEA PRODUCTS INC	5519						X		
GREG MOE	5214	171	Greg Moe		X				
HANSEA LTD INC	114133				X				
HIGH TIDE SEAFOODS	0765	3	Pacific Seafood Group	(A)(O)(C)			X		
ICY STRAIT SEAFOODS INC	5794				X				
JAMESTOWN SEAFOOD	5126						X		
JAMESTOWN S'KLALLAM TRIBE	4137	166	Jamestown S'Klallam Tribe				X		
JESSIE'S ILWACO FISH CO INC	0414	11	Jessie's Ilwaco Fish Co. Inc.	(O)				X	
JOHN C HANSELMAN	113532				X				
JOLLY ROGERS INC	5199							X	
JOSEPH'S SEAFOODS	112832				X				
KAMCO SEAFOODS INC	5643					X		X	
K-C FISH CO INC	0797	29	K-C Fish Co.	(C)	X				
KLAHHANE FISH CO	3991						X	X	
L & N SEAFOODS	4409				X				
LONE TREE POINT SEAFOODS INC	5624				X			X	
LONGSHORE'S FRESH SEAFOOD	4253					X			
MCDONALD FISH	112389	162	McDonald Fish		X				
MUCKLESHOOT INDIAN FISH COMPANY	1156					X			

WASHINGTON (CONT.)

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) N. Puget Sound	S. Puget Sound	Coastal Washington N.	Coastal Washington S. and C.	Unidentified
NATIVE SHELLFISH	4596					X			
NATIVE HARVEST II	4198					X			
NATIVE SEAFOODS	4425				X				
NEAH BAY CHARTER AND TACKLE COMPAN'	4611						X		
NELSON ALASKA SEAPRODUCKS INC	5640	35	Nelson Crab Inc.			X			
NELSON CRAB INC	0635	35	Nelson Crab Inc.					X	
NEW DAY FISHERIES INC	1533	34	New Day Fisheries Inc				X		
NEW OREGON	114316					X			
NORTHPORT FISHERIES INC	5305					X			
OCEAN BEAUTY SEAFOODS INC	0840	2	Ocean Beauty	(A)(O)	X				
OCEAN GOLD SEAFOODS INC	3611	3	Pacific Seafood Group	(A)(O)(C)				X	
OCEAN NOVA MARINE PRODUCTS LLC	112604	170	Ocean Nova Marine Products LLC		X				
ORIENT SEAFOOD	1542				X				
PACIFIC BLUE SEAFOOD	114701						X		
PACIFIC OCEAN PRODUCTS INC	114432				X				
PACIFIC URCHIN PRODUCTS LLC	115250				X	X			
PALOMINO FOODS LLC	114490				X				
PUGET SOUND SALMON INC	115672				X				
PUYALLUP TRIBE	4116					X			
QUINAULT TRIBAL ENTERPRISES	0749	32	Quinault Tribal Enterprises						X
RAYMOND KAO	4410	169	Raymond Kao		X				
ROLLER BAY QUICK CLAW SEAFOODS	114597							X	
SEA WORLD FISHERIES LTD	3792	161	Sea World Fisheries Ltd		X	X	X		
SEAFOOD PRODUCERS COOP	0340	97	Seafood Producers Co-op, Bellingham	(O)(C)	X				
SEAPRODUCKS INC	114263				X	X			
SMOKI FOODS INC	5105					X			
SOUND SEAFOOD & BAIT CO	5652				X				
SOUTH BEND PACKERS INC	5394							X	
SQUAXIN ISLAND TRIBE	0873	164	Squaxin Island Tribe			X			
STAR FISH INC	5759				X				
STW SEAFOOD LLC	115411					X			
SUNDOWNER SEAFOODS	4609					X			
SUNRISE MARINE	3612					X			
SUN'S ENTERPRISE	112839				X	X			
SUQUAMISH SEAFOODS	4252	163	Suquamish Seafoods			X			
TOM COD FISH CO	4606						X		
TRADER BAY LTD	5224					X			
TRIDENT SEAFOODS CORP	1301	30	Trident Seafoods Corp.	(A)(O)	X	X			
TRILOGY CRAB CO INC	3714				X				
TWANA LONGSHORE	4152					X			
ULTIMATE SEAFOODS	3880					X			
VIKING INDEPENDENT PRODUCERS	114297							X	
WASHINGTON CRAB PRODUCERS INC	0921	3	Pacific Seafood Group	(A)(O)(C)				X	
WESTPORT SEAFOOD INC	0185	154	Westport Seafood Inc.					X	
WILD OCEAN SEAFOOD	114873				X	X			
WILLAPA BAY SHELLFISH INC	114393							X	

Table VI.3 (continued)

OREGON

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) Astoria	Tillamook	Newport	Coos Bay	Port Orford	Brookings
ASTORIA HOLDINGS INC, ASTORIA, OR	0728	155	Astoria Holdings Inc.		X					
ASTORIA PACIFIC SEAFOODS, ASTORIA, OR	0739	5	Bornstein Seafoods	(W)	X					
AUE, ROBERT, TOLEDO, OR	0792						X			
BANDON PACIFIC INC, CHARLESTON, OR	0698	3	Pacific Seafood Group	(A)(W)(C)				X		
BAY OCEAN SEAFOOD CO, GARIBALDI, OR	0767	158	Bay Ocean Seafood Co.			X	X			
BELL BUOY, SEASIDE, OR	0769	36	Bell Buoy Crab Co. Inc.	(W)	X					
BILL'S SEAFOOD, MCMINNVILLE, OR	0652				X		X	X	X	
BORNSTEIN SEAFOODS OF OREGON, ASTORIA, OR	0646	5	Bornstein Seafoods	(W)	X		X			
CARVALHO FISHERIES INC, NEWPORT, OR	0680	55	Carvalho Fisheries Inc.	(C)			X	X		
CUSTOM FREEZERS LLC, ASTORIA, OR	0869				X					
FISHHAWK FISHERIES, ASTORIA, OR	0385	9	Fishhawk Fisheries	(A)(W)	X					
FOX, BINGHAM, HARBOR, OR	0847	160	Fox, Bingham Harbor OR						X	X
GRANVILLE FISHERIES INC, LOGSDEN, OR	0818						X			
HALLMARK FISHERIES, CHARLESTON, OR	1505	1	California Shellfish Co.	(C)			X	X	X	X
HEUKER BROTHERS INC, WARRENDALE, OR	0096				X					
JESSIE'S ILWACO FISH CO, WARRENTON, OR	1280	11	Jessie's Ilwaco Fish Co. Inc.	(W)	X					
K LYN FISHERIES, CHARLESTON, OR	0756	159	K Lyn Fisheries				X	X		
LOCAL OCEAN SEAFOODS INC, NEWPORT, OR	0777						X			
NETARTS SEAFOOD COMPANY, TILLAMOOK, OR	0281				X	X	X	X	X	
NEWELL SEAFOODS, NEWPORT, OR	0686					X	X			
NOR-CAL SEAFOODS, GOLD BEACH, OR	0684	93	Nor-Cal Seafoods	(C)	X				X	X
OCEAN BEAUTY SEAFOODS INC NWF, NEWPORT, OR	0544	2	Ocean Beauty	(A)(W)			X			
OCEAN BRITE SEAFOOD, DEPOE BAY, OR	0418					X	X			
OREGON BAIT CO, PORT ORFORD, OR	0848								X	
OREGON BRAND SEAFOOD LLC, COOS BAY, OR	0692							X		
OREGON GOURMET CRAB, GARIBALDI, OR	0640					X				
PACIFIC CHOICE SEAFOODS, BROOKINGS, OR	0736	3	Pacific Seafood Group	(A)(W)(C)						X
PACIFIC COAST SEAFOODS COMPANY, WARRENTON, OR	0081	3	Pacific Seafood Group	(A)(W)(C)	X	X				
PACIFIC SHRIMP COMPANY, NEWPORT, OR	0654	3	Pacific Seafood Group	(A)(W)(C)			X	X		
POINT ADAMS PACKING CO - HAMMOND, HAMMOND, OR	0242	1	California Shellfish Co.	(C)	X					
SPORTSMEN'S CANNERY & SMOKEHOUSE, WINCHESTER	0116							X		
STARVIN MARVIN'S SEAFOOD, CHARLESTON, OR	0807	151	Starvin Marvin's Seafood	(W)			X	X		
TARABOCHIA, BRIAN, ASTORIA, OR	0672				X					
TILLAMOOK BAY BOATHOUSE LLC, GARIBALDI, OR	0726					X				
TRIDENT SEAFOODS CORP, NEWPORT, OR	0714	30	Trident Seafoods Corp.	(A)(W)			X			
WEST BAY MARKETING, ASTORIA, OR	0803	156	West Bay Marketing		X					

CALIFORNIA

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) Crescent City	Eureka	Fort Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay	Santa Barbara
blank	32172									X		
blank	72032									X		X
ALIOTTI MONTEREY	60281	72	Aliotti Fish Co.							X		
ALIOTTI FISH CO, INC MONTEREY	31613	72	Aliotti Fish Co.							X		X
ALL WAYS FISHING SAN DIEGO	80582											
AVICENA NETWORK TEMPLE CITY	71504	122	Avicena Network									X
BAY FRESH SEAFOODS MOSS LANDING	60325	39	Del Mar Seafood							X		
BAYSHORES FISH CO MORRO BAY	60375	105	Bayshores Fish Co.							X	X	X
BUGATTO ENT INC BODEGA BAY	04333	1	California Shellfish Co.	(O)				X				
CAITO FISHERIES INC FORT BRAGG	02832	41	Caito Fisheries Inc.	(O)	X	X	X	X	X			
CALIFORNIA UNI INCORP GARDENA	07261	47	California Uni Inc.									X
CAPTAIN KIDDS FISH MARKET REDONDO BEACH	07730											
CARVALHO FISHERIES MCKINLEYVILLE	20175	55	Carvalho Fisheries Inc.	(O)	X	X	X	X	X			
CASE VISTA	80484											
CATALINA OFFSHORE PRODUCTS INC SAN DIEGO	08407	84	Catalina Offshore								X	X
CENTRAL COAST SEAFOOD INC ATASCADERO	06866										X	
CHESAPEAKE FISH CO INC SAN DIEGO	08905	85	Chesapeake Fish Co.									X
CHURCHMAN BOLINAS	41010							X				
CRYSTAL FOOD INC FULLERTON	71855											X
D & A SEAFOOD HAWAIIAN GARDENS	72045											
DC SEAFOOD INC ALAMEDA	32129								X			
DEL MAR SEAFOODS INC SALINAS	60088	39	Del Mar Seafood						X	X	X	X
DILLER ATASCADERO	60585										X	
DUPUY TARZANA	71540											X
EMK PRODUCT INC SALINAS	31964									X		X
EMPRESS SEAFOOD LLC FORT BRAGG	20624						X					
EXCLUSIVE FRESHNESS EL GRANADA	04282	132	Exclusive Freshness			X	X	X	X	X		
FAR WEST MARINE SEAFOOD SAN JOSE	04638						X			X	X	
FISH HOUSE VERA CRUZ INC SAN MARCOS	80140											
FITZ EL GRANADA	40785								X			
FLAGSHIP FISHERIES LTD RICHMOND CANADA V6X2T	41028								X			
FREDERICK FISHERIES INC CAPISTRANO BEACH	70391											
FTI PRODUCE OAKLAND	41607										X	
FUKUSHIMA LEMON GROVE	32162											
GAROFALO FISH CO SAUSALITO	41326								X			
GHIO SEAFOOD PRODUCTS SAN DIEGO	08904	86	Ghio Seafood Products									
GOLD MINE SEAFOOD CO SAN FRANCISCO	04325								X			
H C SEAFOODS INC OXNARD	71625											X
HALLMARK FISHERIES CHARLESTON	04250	1	California Shellfish Co.	(O)	X	X		X			X	
HASHIMOTO SEA BRIDGE INC VENTURA	71029											X
HUENEME FISH PROCESSORS INC PORT HUENEME	06811											X
J & D SEAFOODS SAN PEDRO	70762										X	X
J & S LIVE SEAFOOD CRESCENT CITY	20600				X							
JEOSHIN INTERNATIONAL CO EL MONTE	71505											X
JUAN VAZQUEZ CO ORANGE	71978											
K C FISH CO INC SAUSALITO	41489	29	K-C Fish Co.	(W)				X	X			
K MARINE PRODUCT CO LOS ANGELES	71698											X
KEN S SIO INC OAKLAND	41472				X	X			X	X		
KINGFISHER TRADING CO INC SAN GABRIEL	70938	98	Kingfisher Trading Co.								X	X
L C Z UNLOADERS CRESCENT CITY	20605				X	X						
LB SEAFOOD LONG BEACH	72021											
LOS ANGELES FISH & OYSTER INC SAN PEDRO	07818											
LUCAS WHARF INC BODEGA BAY	04491	95	North Coast Fisheries Incorporated	(O)			X	X	X			
LY NORTH STAR SEAFOOD INC S EL MONTE	71895										X	X

CALIFORNIA (CONT.)

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) Crescent City	Eureka	Fort Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay	Santa Barbara
M A SEAFOOD HAWAIIAN GARDENS	71871	141	MA Seafood							X		X
MARUHIDE MARINE PRODUCTS INC LONG BEACH	07759	83	Maruhide Marine Products									X
MARUJU SEAFOOD INC GARDENA	71384											X
MILLER,KEN SCOTTS VALLEY	60735									X		
MINDUS FISHING EUREKA	02370					X						
MONTEREY FISH COMPANY INC SAND CITY	05019	45	Monterey Fish Co.							X	X	X
MONTEREY FISH MARKET BERKELEY	04312	149	Monterey Fish Market					X	X			
MOORES SEAFOOD INC CAMARILLO	71101											X
MORGAN FISH SAN FRANCISCO	04556	152	Next Seafood Co. Inc.				X		X			
MORNING STAR FISHERIES EL GRANADA	04053	173	Morning Star Fisheries						X			
MU'S SEAFOOD COMPANY SANTA BARBARA	06446											X
NEWPORT DORY FLEET CO-OP COSTA MESA	70834											
NEXT SEAFOOD CO INC OXNARD	71802	152	Next Seafood Co. Inc.		X	X	X	X	X	X		
NOR CAL SEAFOOD INC OAKLAND	40708	93	Nor-Cal Seafoods	(O)	X	X	X	X	X	X		
NORTH COAST FISHERIES INCORPORATED SANTA RO	31238	95	North Coast Fisheries Incorporated	(O)	X		X	X	X	X		
OCEAN FRESH SEAFOOD PRODUCTS, JV FORT BRAGC	31614						X	X	X			
OCEAN HARVESTORS CO COVINA	71254											X
OCEAN QUEEN 87 INC LOS ANGELES	07936	111	Ocean Queen 87 Inc.								X	X
P & T FLANNERY SEAFOODS INC SAN FRANCISCO	41488	146	P&T Flannery Seafoods Inc., S.F.		X		X	X	X			
P SEAFOOD SAN FRANCISCO	41636						X					
PACIFIC AMERICAN FISH CO INC LOS ANGELES	07906											
PACIFIC CHOICE SEAFOOD COMPANY EUREKA	02436	3	Pacific Seafood Group	(A)(W)(O)	X	X	X	X	X			
PACIFIC FRESH SEA FOOD COMPANY SACRAMENTO	30684	3	Pacific Seafood Group	(A)(W)(O)				X	X			
PACIFIC SHELLFISH INC SAN DIEGO	08289											
PACIFIC SUN PRODUCTS LLC VENTURA	32105	174	Pacific Sun Products LLC									X
PACIFIC WEST SEAFOOD COMPANY INC PETALUMA	51396	145	Pacific West Seafood Company Inc.		X	X	X	X	X			X
PAK FAMILY CORPORATION LOS ANGELES	07052											
PEMBERTON FISH EL GRANADA	04626								X			
PEZZOLO SEAFOODS NOVATO	51049						X		X			
PIERPONT SEAFOOD VENTURA	70581											X
POINT ST JOSEPH FISH CO INC POINT REYES	51048							X				
PONDS NIPOMO	60517	137	Ponds								X	X
QUALY PAK SPECIALTY FOODS INC WILMINGTON	07688											X
REICHLE BRIDGETON	71201	172	Reichle									X
REUTER SAN JOSE	40090						X		X	X		
ROYAL HAWAIIAN SEAFOOD SAN FRANCISCO	51014						X	X	X			
ROYAL SEAFOODS INC MONTEREY	05817	71	Royal Seafoods							X		
S M UNI INC LOS ANGELES	07550	75	S.M. Uni Inc.									X
SAN PEDRO FISH MARKET & RESTAURANT SAN PEDR(	07990										X	X
SANTA BARBARA SHELLFISH CO SANTA BARBARA	06448											X
SARASPE,ANDRES/LAURO SAN DIEGO	31696											
SEAFOOD PRODUCERS CO-OP BELLINGHAM	60456	97	Seafood Producers Co-op, Bellingham	(W)(O)			X	X	X	X		
SEAFOOD SUPPLIERS SAN FRANCISCO	30782						X	X	X	X		
SEAFOOD WHOLESALERS KENMORE	41367								X			
SEVEN SEAS FISHERIES CORP SAN PEDRO	80600											
SHIN FISH ARTESIA	70116											
SOLOMON LIVE FISH MOSS LANDING	41131	147	Solomon Live Fish							X		
SOUTHERN CAL SEAFOOD INC SANTA BARBARA	71199	139	Southern Cal Seafood									X
SOVEREIGN SEAFOODS,INC SANTA BARBARA	09056											X
SQUID PRODUCERS INK VENTURA	72023									X		X
STANDARD SEAFOOD INC SAN PEDRO	07821											
STAR FISHERIES, INC SAN PEDRO	07804											
STATE FISH CO, INC SAN PEDRO	07857	46	State Fish Co.								X	X
T & L TRADING INC MONTEBELLO	71049	140	T&L Trading Ind.		X							X

CALIFORNIA (CONT.)

Landing Processor or Buyer Name	Identification Code	Parent Company Report Identifier	Parent Company Name	Out-of-State Presence	Facility Location (Port Group Area) Crescent City	Eureka	Fort Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay	Santa Barbara
TAIWAN SEAFOOD & FISH CORP LOS ANGELES	07150											
THE SANTA BARBARA FISHERMAN'S SANTA BARBARA	31478											X
THREE CAPTAINS SEA PRODUCTS EL GRANADA	04609	61	Three Captains Sea Products						X	X		
TOMICH BROS FISH CO, INC SAN PEDRO	07803	76	Tomich Bros.							X		X
TRADEWIND SEAFOOD INC OXNARD	06479											X
TRI MARINE INTERNATIONAL INC SAN PEDRO	07325	82	Tri-marine International									X
VOYATZIS FISH CO FOUNTAIN VALLEY	71630											
W F ALBER INC SAN FRANCISCO	40988	91	W F Alber Inc.		X		X	X	X			
WEST BASIN TRAP & LOBSTER SAN CLEMENTE	71716											X
WESTERN FISH CO INC SAN PEDRO	71729	138	Western Fish Co.									X
YALE FISH COMPANY LOS ANGELES	71052											X
ZEPHYR FOODS FORT BRAGG	51368						X					

Notes:
1. Landing processor or buyer name and identification code is from fish dealer license information. The numbers preceding the parent company identify the major processing group associated with the processing facility. Blanks identify small, independent, local processing plants.
2. Parent company assignment is from personal communication or other investigation of cross ownership. Parents are assigned to subsidiaries groups by interpretations and evidence of various legal arrangements that include ownership ties, lease contracts, and purchasing arrangements.
3. Only named processors or buyers making substantial purchases in any port group area are shown.
4. The legend for report identifiers is:

Parent Company	Report Identifier	Parent Company	Report Identifier	Parent Company	Report Identifier
Alaska Ice Seafoods Inc	167	Fishhawk Fisheries	9	Pacific West Seafood Company Inc.	145
Alioto Fish	42	Fox, Bingham Harbor OR	160	Ponds	137
Aliotti Fish Co.	72	Ghio Seafood Products	86	Quinault Tribal Enterprises	32
Arrowac Fisheries	22	Greg Moe	171	Raymond Kao	169
Astoria Holdings Inc.	155	Jamestown S'Klallam Tribe	166	Reichle	172
Avicena Network	122	Jessie's Ilwaco Fish Co. Inc.	11	Royal Seafoods	71
Bay Ocean Seafood Co.	158	K Lyn Fisheries	159	S.M. Uni Inc.	75
Bayshores Fish Co.	105	K-C Fish Co.	29	Sea World Fisheries Ltd	161
Bell Buoy Crab Co. Inc.	36	Kingfisher Trading Co.	98	Seafood Producers Co-op, Bellingham	97
Bornstein Seafoods	5	MA Seafood	141	Solomon Live Fish	147
Boundary Fish Co.	27	Maruhide Marine Products	83	Southern Cal Seafood	139
Caito Fisheries Inc.	41	McDonald Fish	162	Squaxin Island Tribe	164
California Shellfish Co.	1	Monterey Fish Co.	45	Starvin Marvin's Seafood	151
California Uni Inc.	47	Monterey Fish Market	149	State Fish Co.	46
Cape Flattery Fishermens Cooperative	168	Morning Star Fisheries	173	Suquamish Seafoods	163
Carvalho Fisheries Inc.	55	Nelson Crab Inc.	35	T&L Trading Ind.	140
Catalina Offshore	84	New Day Fisheries Inc	34	Taylor United Inc.	28
Chesapeake Fish Co.	85	Next Seafood Co. Inc.	152	Three Captains Sea Products	61
Columbia River Fish Factory	501	Nor-Cal Seafoods	93	Tomich Bros.	76
Cowlitz River Smelt Co.	502	North Coast Fisheries Incorporated	95	Trident Seafoods Corp.	30
Dana F. Besecker Co. Inc.	14	Ocean Nova Marine Products LLC	170	Tri-marine International	82
Del Mar Seafood	39	Ocean Queen 87 Inc.	111	W F Alber Inc.	91
Dungeness Seafood	144	P&T Flannery Seafoods Inc., S.F.	146	West Bay Marketing	156
Evergreen Marine Products Inc	165	Pacific Seafood Group	3	Western Fish Co.	138
Exclusive Freshness	132	Pacific Sun Products LLC	174	Westport Seafood Inc.	154

Source: PacFIN annual vessel summary March 2005 extraction and Study estimates.

Table VI.4
Purchases Onshore at Port Groups and States, and Purchases Offshore by Sector for Species Groups in 2004

Processor Category	Owner-ship/ Count	Port Group Purchase Share	Major Company	Processing General	Processing Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.urchin	Other
North Puget Sound																		
>$1M	9	66%	1	3	6	23,089,714	22,204,079	5,963,225	17,653	2,271,665	5,031,555	236,798		618	2,321,213	4,933,959	6,298	1,421,095
$500K-$1M	7	16%	0	0	7	9,464,105	5,245,201	153,388	0	1,411,488	3,003,031	31,960		0	0	10,043	0	635,291
$100K-$500K	18	14%			√	4,757,607	4,570,822	3,158	0	1,270,529	2,022,918	56,772		0	0	158,586	177,188	881,671
$50K-$100K	8	2%			√	1,557,948	619,041	0	0	50,785	427,017	33,666		0	0	38,052	0	69,521
$10K-$50K	30	2%			√	715,837	715,837	0	0	186,999	189,591	300,346		0	21,789	3,641	517	12,954
<$10K	44	0%			√	795,685	119,541	6,315	0	48,284	49,366	2,801		1,710	0	659	0	10,406
Subtotal	116	100%				40,380,896	33,474,521	6,126,086	17,653	5,239,750	10,723,478	662,343		2,328	2,343,002	5,144,940	184,003	3,030,938
South Puget Sound																		
>$1M	5	51%	0	0	5	13,367,113	11,474,293	0	0	410,042	15,830	697		0	0	0	0	11,047,724
$500K-$1M	10	29%	0	0	10	6,771,756	6,675,824	151,134	0	3,226,498	524,338	193,727		67	428	521,372	0	2,058,260
$100K-$500K	14	12%			√	4,586,641	2,722,931	0		1,017,379	457,841	12,282		112,482	0	0	0	1,122,947
$50K-$100K	13	4%			√	1,092,147	919,357	0		351,570	67,771	97,205		79,525	0	0	9,847	313,439
$10K-$50K	29	3%			√	1,573,707	771,044	101		351,120	48,129	106,371		66,679	17,291	3,233	44,086	134,034
<$10K	35	1%			√	922,363	117,435	8		57,076	34,234	7,163		2,913	0	0	0	16,041
Subtotal	106	100%				28,313,727	22,680,884	151,243	0	5,413,685	1,148,143	417,445		261,666	17,719	524,605	53,933	14,692,445
Coastal Washington North																		
>$1M	7	89%	2	2	5	23,993,162	20,415,940	4,361,145	0	3,057,774	6,672,752	362,097		0	17,905	1,338,068	0	4,606,199
$500K-$1M	0	0%	0	0	0	0	0	0		0	0	0		0	0	0	0	0
$100K-$500K	9	9%			√	6,697,106	1,950,336	152,267		837,793	317,765	960		0	0	12,212	143,779	485,560
$10K-$100K	10	2%			√	725,101	376,857	18,803		227,466	35,529	0		30,105	19,756	24,326	5,312	15,560
<$10K	36	0%			√	116,276	113,054	387		70,446	24,311	3,718		0	1,142	9,565	0	3,485
Subtotal	62	100%				31,531,645	22,856,187	4,532,602	0	4,193,479	7,050,357	366,775		30,105	38,803	1,384,171	149,091	5,110,804
Westport																		
>$1M	3	77%	2	2	1	15,042,854	15,042,854	1,460,191	2,192,528	302,606	4,016,697	1,366,000		475,794	4,929,460	283,928	0	15,650
$500K-$1M	3	11%	0	0	3	2,108,026	2,081,384	0	0	37,243	1,949,095	94,398		0	465	0	0	183
$100K-$500K	7	9%			√	17,152,967	1,755,353	198,632	497	324,807	1,051,038	33,278		111	109,939	36,551		500
$50K-$100K	4	2%			√	352,125	352,125	486	0	34,590	163,075	115,955		0	29,661	2,279		6,079
$10K-$50K	14	2%			√	3,982,489	354,211	7	0	0	235,303	11,227		0	98,930	3,518		5,226
<$10K	20	0%			√	1,245,487	56,831	32	0	13,728	18,733	3,264		0	21,000	74		0
Subtotal	51	100%				39,883,948	19,642,758	1,659,348	2,193,025	712,974	7,433,941	1,624,122		475,905	5,189,455	326,350	0	27,638
Ilwaco																		
>$500K	3	79%	1	2	1	12,614,325	12,294,812	128,789	249,433	552,525	1,732,236	413,373		838,817	8,249,719	33,447	0	96,473
$100K-$500K	9	16%			√	3,430,945	2,541,576	300	0	1,285,498	774,534	145,051		0	5,528	3,905		326,760
$50K-$100K	5	2%			√	303,731	295,361	1,936	0	75,731	134,749	0		0	23,392	0		59,553
$10K-$50K	15	2%			√	563,797	296,198	1,363	0	171,968	35,100	25,362		0	17,353	5,487		39,565
<$10K	19	0%			√	375,486	51,851	2,800	0	16,274	4,759	3,408		0	4,405	11,318		8,887
Subtotal	51	100%				17,288,284	15,479,798	135,188	249,433	2,101,996	2,681,378	587,194		838,817	8,300,397	54,157	0	531,238

Table VI.4 (cont.)

Processor Category	Owner-ship/ Count	Port Group Purchase Share	Major Company	Processing General	Processing Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.urchin	Other
Washington Statewide																		
>$5M	6	38%	6	6	0	43,430,376	43,430,376	6,867,551	2,442,456	3,230,460	9,916,669	1,812,651		1,120,802	14,552,678	3,289,412	0	197,697
$1M-$5M	18	34%	0	2	16	38,431,047	38,431,047	5,345,785	17,653	3,519,512	6,746,436	599,592		194,538	938,526	3,321,680	6,298	17,741,027
$500K-$1M	23	15%			√	16,637,671	16,637,671	311,608	0	5,219,209	7,918,298	326,515		67	115,751	546,069	0	2,200,154
$100K-$500K	47	10%			√	11,019,156	11,019,156	64,662	2	4,157,897	3,174,651	208,635		112,482	27,702	180,353	374,900	2,717,872
$50K-$100K	29	2%			√	2,126,716	2,126,716	2,755	0	646,899	710,727	246,826		79,525	54,769	56,381	0	328,834
$10K-$50K	92	2%			√	2,161,233	2,161,233	2,564	0	770,126	461,454	443,306		96,784	175,119	18,712	5,829	187,339
<$10K	152	0%			√	462,471	462,471	9,542	0	219,396	121,132	20,354		4,623	27,020	22,214	0	38,190
Subtotal	367	100%				114,268,670	114,268,670	12,604,467	2,460,111	17,763,499	29,049,367	3,657,879		1,608,821	15,891,565	7,434,821	387,027	23,411,113
Astoria																		
>$1M	6	88%	2	2	4	23,326,207	20,558,402	6,657,756	1,277,177	1,956,584	2,351,113	1,722,412	4,109,803	21,304	2,023,843	217,599	0	220,811
$500K-$1M	3	8%	0	0	3	1,973,541	1,766,410	0	0	1,226,911	0	0	488,559	5,409	0	0	0	45,531
$50K-$500K	5	3%			√	812,936	809,154	417	0	289,970	56,667	0	244,778	23	2,015	446		214,838
$10K-$50K	11	1%			√	2,329,161	222,686	1,840	0	85,889	45,928	0	0	0	26,228	13,806		48,995
<$10K	42	0%			√	567,350	79,116	209	0	34,184	0	0	0	0	20,409	6,742		17,572
Subtotal	67	100%				29,009,195	23,435,768	6,660,222	1,277,177	3,593,538	2,453,708	1,722,412	4,843,140	26,736	2,072,495	238,593	0	547,747
Tillamook																		
>$50K	5	90%			√	14,073,003	3,484,525	90,162		369,490	2,469,078	369,557		22,880	139,975	14,591	0	8,792
$10K-$50K	13	8%			√	989,551	318,160	98,286		42,617	71,404	64,715		28	4,282	0	64	36,764
<$10K	25	1%			√	35,604,382	51,018	13,689		7,175	4,465	5,702		0	9,549	0	0	10,438
Subtotal	43	100%				50,666,936	3,853,703	202,137	0	419,282	2,544,947	439,974		22,908	153,806	14,591	64	55,994
Newport																		
>2.5M	3	69%	3	1	2	36,913,803	20,775,007	4,160,862	1,155,353	1,483,101	9,433,897	1,647,312		9,434	2,668,404	215,623	0	1,021
$750K-$2.5M	3	19%	2	0	3	15,294,598	5,756,614	128,874	1,489,071	858,411	1,931,814	565,983		19,151	725,936	37,230	0	144
$100K-$750K	7	8%			√	2,463,153	2,301,478	20,181	380,640	1,130,507	351,118	0		1,763	321,317	51,586	44,366	0
$50K-$100K	8	2%			√	3,497,692	664,210	8,538	0	267,486	268,662	66,491		0	31,504	21,529	0	0
$10K-$50K	13	1%			√	2,732,486	364,570	9,914	1	169,036	37,470	20,120		7	102,687	24,961	0	374
<$10K	51	1%			√	475,772	153,991	2,568	0	36,249	41,435	3,330		584	52,862	14,415	0	2,548
Subtotal	85	100%				61,377,504	30,015,870	4,330,937	3,025,065	3,944,790	12,064,396	2,303,236		30,939	3,902,710	365,344	44,366	4,087
Coos Bay																		
>$1M	6	95%	5	1	5	52,412,947	25,470,611	3,435,108	338,558	3,784,802	14,681,622	402,258		3,304	2,568,977	209,740	28,393	17,849
$500K-$1M	0	0%	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
$50K-$500K	5	3%			√	885,651	794,448	56,490	0	235,672	322,252	0		0	65,373	3,871	0	110,790
$10K-$50K	19	1%			√	2,258,710	374,003	1,016	0	132,606	80,587	2,991		0	127,730	19,825	0	9,248
<$10K	51	0%			√	5,429,539	129,926	1,735	0	28,454	17,135	3,982		7,955	50,528	9,502	0	10,635
Subtotal	81	100%				60,986,847	26,768,988	3,494,349	338,558	4,181,534	15,101,596	409,231		11,259	2,812,608	242,938	28,393	148,522
Brookings																		
>$1M	4	94%	1	0	4	22,503,480	12,883,192	1,709,608	1	729,459	10,373,756	30,367		735	9,402	15,074	8,875	5,915
$500K-$1M	0	0%	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
$50K-$500K	4	4%			√	1,198,694	537,244	56,803	0	89,657	310,998	0		0	6,711	288	41,006	31,781
$10K-$50K	10	2%			√	1,148,910	249,795	44,088	0	49,852	108,523	13,985		0	32,599	0	0	748
<$10K	18	0%			√	18,888,093	44,727	2,907	0	16,960	5,358	0		0	18,424	1,078	0	0
Subtotal	36	100%				43,739,177	13,714,958	1,813,406	1	885,928	10,798,635	44,352		735	67,136	16,440	49,881	38,444

Table VI.4 (cont.)

Processor Category	Owner-ship/ Count	Port Group Purchase Share	Major Company	Processing General	Processing Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.urchin	Other
Oregon Statewide																		
>$5M	7	70%	7	3	4	68,025,869	68,025,869	14,496,542	2,771,089	6,899,056	30,329,435	4,182,780		840,484	7,657,197	691,916	1,893	155,477
$1M-$5M	10	20%			√	19,962,889	19,962,889	1,659,813	1,489,071	2,019,197	10,315,918	557,514		3,346,127	444,550	4,490	35,375	90,834
$500K-$1M	5	4%			√	3,602,807	3,602,807	12,251	0	1,879,220	879,119	0		493,968	269,073	14,975	0	54,201
$100K-$500K	16	4%			√	3,772,307	3,772,307	131,327	380,640	1,587,284	775,680	0		246,564	174,625	62,620	85,436	328,131
$50K-$100K	12	1%			√	872,793	872,793	53,527	0	295,225	309,047	64,086		0	72,492	49,084	0	29,332
$10K-$50K	51	1%			√	1,229,306	1,229,306	137,345	1	280,400	313,487	103,378		35	253,829	39,167	0	101,664
<$10K	127	0%			√	323,316	323,316	10,246	0	64,690	40,596	11,447		8,539	136,989	15,654	0	35,155
Subtotal	228	100%				97,789,287	97,789,287	16,501,051	4,640,801	13,025,072	42,963,282	4,919,205		4,935,717	9,008,755	877,906	122,704	794,794
Crescent City																		
>$1M	5	83%	5	1	4	41,568,977	16,580,588	761,140	132,712	821,151	14,550,285	65,730		8,835	236,456	0	0	4,279
$100K-$1M	5	15%			√	4,199,414	3,042,652	42,629	0	5,218	2,813,775	171,551		0	9,294		0	185
$50K-$100K	4	1%			√	1,991,833	292,433	89,253	0	68,681	128,130	844		0	4,880		0	645
$10K-$50K	7	1%			√	4,925,792	153,543	12,257	0	2,978	88,474	314		0	49,520		0	0
<$10K	10	0%			√	1,375,932	19,878	228	0	0	15,584	0		0	3,315		402	349
Subtotal	31	100%				54,061,948	20,089,094	905,507	132,712	898,028	17,596,248	238,439		8,835	303,465	0	402	5,458
Eureka																		
>$1M	3	90%	3	1	2	31,585,726	14,524,378	2,228,910	503,868	215,138	9,979,621	538,267		2,172	938,209	0	0	118,193
$500K-$1M	0	0%	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
$100K-$500K	4	6%			√	4,751,590	990,470	11,609	0	178,654	797,652	0		216	0		0	2,339
$50K-$100K	5	2%			√	3,848,846	381,958	5,598	0	41,999	273,449	60,306		60	529		0	17
$10K-$50K	11	1%			√	959,925	210,595	12,534	0	32,554	122,065	5		10,683	31,694		0	1,060
<$10K	33	1%			√	6,558,604	94,317	6,141	0	11,498	48,306	0		10	19,427		2,519	6,416
Subtotal	56	100%				47,704,691	16,201,718	2,264,792	503,868	479,843	11,221,093	598,578		13,141	989,859	0	2,519	128,025
Ft. Bragg																		
>$500K	3	57%	3	1	2	25,933,604	4,528,288	2,076,918	0	1,418,940	975,352	0		0	56,332	0	348	398
$100K-$500K	10	31%			√	12,505,018	2,479,799	208,538		1,618,009	263,112	0		0	28,063		361,702	375
$50K-$100K	5	5%			√	5,488,428	382,061	80,271		200,372	15,006	0		0	720		85,619	73
$10K-$50K	14	5%			√	12,359,689	424,429	45,045		236,736	87,551	0		83	17,286		37,610	118
<$10K	32	1%			√	3,319,788	74,839	14,990		34,664	20,666	545		124	1,373		1,791	686
Subtotal	64	100%				59,606,527	7,889,416	2,425,762	0	3,508,721	1,361,687	545		207	103,774	0	487,070	1,650
Bodega Bay																		
>$500K	3	64%	1	0	3	6,193,271	4,052,614	12,319	0	1,619,333	2,368,755	0		322	44,420	0	0	7,465
$100K-$500K	6	20%			√	3,642,806	1,291,411	24,153		573,875	512,940	0		142,149	3,157		0	35,137
$50K-$100K	4	5%			√	11,861,084	286,577	13,333		220,271	52,923	0		0	0		0	50
$10K-$50K	23	8%			√	37,759,152	521,749	60,200		178,798	220,913	13,592		10	72		12,942	35,222
<$10K	67	3%			√	3,341,581	162,007	16,342		74,172	53,061	8,285		30	230		7,190	2,697
Subtotal	103	100%				62,797,894	6,314,358	126,347	0	2,666,449	3,208,592	21,877		142,511	47,879	0	20,132	80,571

Table VI.4 (cont.)

Processor Category	Owner-ship/ Count	Port Group Purchase Share	Major Company	Processing General	Processing Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.urchin	Other
San Francisco																		
>$1M	6	49%	3	3	3	23,510,015	9,599,649	956,456	0	2,896,768	4,931,538	0		0	72,404	0	0	742,483
$500K-$1M	4	16%	1	0	4	13,605,968	3,153,305	90,667	0	2,253,326	558,798	0		0	188,209	0	0	62,305
$100K-$500K	15	24%			√	13,509,041	4,707,543	506,182	0	1,736,112	1,391,149	0		727,861	12,551		0	333,688
$50K-$100K	12	4%			√	2,678,332	772,310	56,048	36	314,964	146,704	125,432		78,322	1,350		1,263	48,191
$10K-$50K	39	5%			√	15,895,453	892,974	65,021	140	272,348	214,886	89,428		60,003	16,962		14,057	160,129
<$10K	109	2%			√	8,986,593	338,050	21,634	0	127,245	83,658	17,890		7,351	12,777		7,308	60,187
Subtotal	185	100%				78,185,402	19,463,831	1,696,008	176	7,600,763	7,326,733	232,750		873,537	304,253	0	22,628	1,406,983
Monterey																		
>$500K	4	61%	3	1	3	14,361,532	6,010,687	882,491	0	1,094,351	15,672	0		3,735,066	262,467	0	0	20,640
$100K-$500K	10	31%			√	7,822,250	3,024,624	775,118	125	810,188	173,064	461,647		520,381	73,072			211,029
$50K-$100K	5	3%			√	542,188	345,991	3,966	0	111,291	104,078	0		83,651	16,573			26,432
$10K-$50K	17	4%			√	8,688,560	372,203	86,392	0	141,169	2,514	46,615		34,594	866			60,053
<$10K	60	1%			√	9,099,093	147,352	23,548	0	63,210	12,838	14,557		19,558	986			12,655
Subtotal	96	100%				40,513,623	9,900,857	1,771,515	125	2,220,209	308,166	522,819		4,393,250	353,964	0	0	330,809
Morro Bay																		
>$100K	9	83%			√	12,392,740	2,923,056	1,869,438		120,280	78,884	391,694		406,023	20,557		0	36,180
$50K-$100K	3	5%			√	206,019	174,048	72,588		83,179	7,214	0		0	9,411		0	1,656
$10K-$50K	15	10%			√	8,741,808	335,110	60,439		20,440	87,589	0		35,276	83,780		13,962	33,624
<$10K	39	2%			√	5,628,242	74,978	18,953		11,492	12,311	0		3,540	20,882		698	7,102
Subtotal	66	100%				26,968,809	3,507,192	2,021,418	0	235,391	185,998	391,694		444,839	134,630	0	14,660	78,562
Santa Barbara																		
>$1M	8	54%	4	0	8	21,119,955	12,449,348	0	0	0	1,013,504	0		9,115,411	0	0	2,317,308	3,125
$500K-$1M	5	15%	2	0	5	7,784,442	3,367,166	0	0	0	577,328	0		1,477,108	0	0	1,312,730	0
$100K-$500K	27	24%			√	12,263,119	5,394,075	286,647	32	33,599	705,085	428,407		1,244,143	333,110		1,145,581	1,217,471
$50K-$100K	11	3%			√	2,026,591	793,306	15,310	0	3,707	250,468	47,715		112	15,053		60,579	400,362
$10K-$50K	23	3%			√	4,519,741	596,461	91,967	6	0	242,289	16,392		29,649	35,936		79,893	100,329
<$10K	76	1%			√	5,560,692	256,935	49,404	0	729	104,781	17,391		5,319	687		2,613	76,011
Subtotal	150	100%				53,274,540	22,857,291	443,328	38	38,035	2,893,455	509,905		11,871,742	384,786	0	4,918,704	1,797,298
Los Angeles																		
>$1M	4	48%	4	0	4	13,022,145	9,007,043	5,379	0	0	0	0		6,357,674	2,537,962	0	0	106,028
$500K-$1M	5	17%	0	0	5	3,820,740	3,246,701	747,053	0	6,173	307,706	160,045		553,319	1,236,873	0	0	235,532
$100K-$500K	25	25%			√	11,161,754	4,688,860	356,228	1,141	0	968,929	492,296		942,084	420,347		1,038,856	468,979
$50K-$100K	16	6%			√	7,669,138	1,194,873	38,620	0	0	317,330	102,913		92,548	180,889		130,762	331,811
$10K-$50K	25	3%			√	6,797,658	581,810	1,704	0	0	206,249	0		68,689	112,390		51,728	141,050
<$10K	54	1%			√	2,232,957	144,898	9,094	0	0	43,781	2,076		14,148	27,754		1,571	46,474
Subtotal	129	100%				44,704,392	18,864,185	1,158,078	1,141	6,173	1,843,995	757,330		8,028,462	4,516,215	0	1,222,917	1,329,874

Table VI.4 (cont.)

Processor Category	Owner-ship/ Count	Port Group Purchase Share	Major Company	Processing: General	Processing: Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.urchin	Other
San Diego																		
>$500K	3	41%	0	0	3	2,294,821	2,074,301	23,719	0	0	724,261	0		106	800,415	0	476,330	49,470
$100K-$500K	8	30%			√	3,388,203	1,514,211	154,654			753,352	416,648		1,477	118,879		26,257	42,944
$50K-$100K	12	18%			√	1,442,426	899,208	51,459			459,084	23,944		83	213,069		0	151,569
$10K-$50K	19	10%			√	2,565,460	481,543	13,564			271,611	65,390		27,488	45,341		17,565	40,584
<$10K	32	2%			√	4,563,803	88,760	7,106			22,030	1,583		6,061	34,334		4,663	12,983
Subtotal	74	100%				14,254,713	5,058,023	250,502	0	0	2,230,338	507,565		35,215	1,212,038	0	524,815	297,550
California Statewide																		
>$5M	4	29%	4	1	3	38,039,321	38,039,321	5,332,614	636,580	3,774,729	26,054,523	598,939		11,007	1,234,685	0	348	395,896
$1M-$5M	21	38%	9	3	18	49,921,986	49,921,986	3,333,676	0	7,744,054	9,919,116	753,390		22,005,876	3,005,228		2,441,113	719,533
$500K-$1M	28	14%			√	18,381,054	18,381,054	1,257,821	40	2,616,475	5,008,362	980,678		1,781,310	2,325,995		3,475,746	934,627
$100K-$500K	73	12%			√	16,231,799	16,231,799	2,352,301	1,258	2,141,789	4,537,798	1,042,563		1,738,322	992,756		1,219,450	2,205,562
$50K-$100K	54	3%			√	3,875,809	3,875,809	426,823	174	800,989	1,261,374	177,704		97,427	502,923		11,138	597,257
$10K-$50K	122	2%			√	2,869,373	2,869,373	272,686	8	367,144	1,086,697	189,072		147,356	226,180		52,167	528,063
<$10K	318	1%			√	945,186	945,186	87,566	0	210,667	314,082	48,156		30,441	63,096		13,885	177,293
Subtotal	620	100%				130,264,528	130,264,528	13,063,487	638,060	17,655,847	48,181,952	3,790,502		25,811,739	8,350,863	0	7,213,847	5,558,231
Offshore Processor MS																		
Subtotal	4	100%				4,670,678	4,670,678	759,337	3,812,602	25,688	0	0		1,231	0	2,217	0	69,604
Offshore Processor CP																		
Subtotal	6	100%				6,910,678	6,910,678	590,647	5,865,832	5,131	0	0		261,734	783	5,528	0	181,024

Notes:
1. A "major" company is defined to be a purchaser of at least $5 million in any state's landings. A processing plant is defined to be "general" if it has the capacity (such as fillet lines and refrigeration equipment) as well as the recent history for processing multiple species on a year-around basis. This definition's purpose is to identify plants that maintain a large, local commitment to labor. These definitions exclude companies and plants that specialize in offering product forms or packaging services for such species as salmon, tuna, and sardines on a seasonal or part-time basis. There are general processing plants not identified in this list, because they are not located at ports where vessel deliveries are made. For example, general processing plants are or recently have been located in Woodland, Washington; Portland, Oregon; Salem, Oregon; Sacramento, California; and Watsonville, California. There are also several large custom cutting and cold storage businesses which are primary seafood processors, however they do not make vessel purchases so are not represented in this table.
2. Landing data at the port group level was used to verify the thresholds for the table's processor categories and interviews with processing company representatives were used to determine plant capacity.
3. Vessels are counts of unique vessels from which purchases were made. The "ZZ" vessel documentation was not excluded in the counting.
4. Ownership unique identifier tags were assigned if a processor purchased more than $1 million at any one port group.
5. Parents are assigned to subsidiaries groups by interpretations and evidence of various legal arrangements that include ownership ties, lease contracts, and purchasing arrangements.
6. Several processing companies in Washington also manufacture products from oysters and other shellfish, however processor purchases of aquaculture are excluded.
7. A small amount of deliveries in Washington ($134,522) and California ($118,563) were not associated with a port of landing so are excluded from the table at the port group level.
8. Offshore revenue estimated using onshore average species group prices for West Coast.

Source: PacFIN annual vessel summary data March 2005 extraction, PacFIN offshore November 2005 extraction, and ownership information from interviews with company representatives.

basis) for each port is also shown. If a plant is not tagged a general processor, then it is a buyer or specialty plant.

The information in these tables may be compared to existing buyer/processor facilities that were included in a previous report (The Research Group 2000).[1] The comparison points out the changing nature of marine buying/processing facilities on the coast.

Geographic and ownership changes have resulted in general processing plants being located in only a few larger ports, such as Newport, Eureka, or Astoria. There are other centralized processing plants located away from harbors where deliveries are made, such as Woodland, Washington; Portland, Oregon; Salem, Oregon; Sacramento, California; and Watsonville, California. These locations are near cold storage facilities used for other industry products, like agriculture. The locations are also near transportation centers. Many remaining coastal located plants are buying stations for centralized processing or for smaller processors that specialize in one or two species. The consolidation over the last 15 years has resulted in processing and distributing being dominated by only a few companies on the U.S. West Coast.

C. Ownership Trends by State

1. Washington

The Washington fishing industry has several components that are different from Oregon and California. These are:

- A large component of the fishing industry is from vessels operating in distant water fisheries mainly in waters off Alaska (these are mostly home ported in the Puget Sound area);
- There are some large oyster production and processing facilities along the central Washington Coast; and,
- There are several fairly large Native American processing facilities. The largest of these is Quinault Tribal Enterprises in Taholah, Washington.

There are several general processing facilities in Washington: Pacific Group facility (Washington Crab Producers Inc.) in Westport, Jessie's Ilwaco Fish Co. in Ilwaco (a major processor/freezer/shipper of albacore tuna), the Ocean Gold facility in the East Point area (formerly Marino's), and the Quinault Tribal Enterprises facility in Taholah. (The Ocean Gold facility is in partnership with the Pacific Group.) Most of the product landed for High Tide Seafoods comes from tribal fisheries and is shipped to the Pacific Group for processing.

Arrowac Fisheries in the north Puget Sound area specializes in products such as dog shark, halibut, and other products that lend themselves to the export market. Bornstein Seafoods in the north Puget Sound area specializes in groundfish from Canada. This company has recently expanded its operation into the Astoria area, where it will concentrate on sardines and H/G

1. For a more detailed historical description of changes in processor changes in Oregon, see The Research Group (2003).

whiting. A significant but smaller all around buyer/processor is K-C Fish Co. (or Sea-K) in Blaine, Washington.

Besides salmon and groundfish, several specialty products have developed in the state. One is the production of headed and gutted (H/G) whiting by Ocean Gold Seafoods (in partnership with the Pacific Group) and Jessie's Ilwaco Fish Co. The other recent development is sardine packing and freezing. The Pacific Group transports its product that is landed in Oregon to be frozen in Woodland, Washington. Jessie's Ilwaco Fish Co. also packs and freezes sardines, as does Ocean Gold Seafoods.

Dungeness crab harvesting has always been a mainstay of the Washington fishing industry. Besides the general processors such as the Pacific Group (which owns Washington Crab Producers Inc.), Jessie's Ilwaco Fish Co. and several others specialize in live and cooked crab production. Examples are McDonald Fish, Greg Moe, Bell Buoy Crab Co., High Tide Seafoods, Nelson Crab, Chad's Seafood, Blue Heron, and D&M Live Crab.

There are also several marine product buyers of specialty items, such as sea cucumbers, prawns, and geoduck or Manila clams. A good example is the Sea World Fisheries in the Puget Sound and the northern Washington Coast.

The Bellingham area has a very large cold storage facility. This is used to freeze and store (and then ship) marine products from Alaska as well as from the all areas of the Pacific Northwest. Along with custom freezing and storage, a custom processing facility in this area receives product from the Pacific Northwest as well as Alaska. These facilities receive products from as far as Norway and Russia for reprocessing.

2. Oregon

The Astoria area historically was the key to the development of the Columbia River salmon industry. Other species, such as tuna and sardines, also were included in this growth. As the salmon fishery expanded to the ocean, Newport and Coos Bay received an ever increasing part of the salmon and groundfish landings. The decline of the abundance of these species affected Coos Bay and Newport negatively. Coos Bay is concentrating on the shrimp and crab industry, while Newport continues to be a center for whiting and crab processing.

Ownership of seafood processing has changed along the Oregon Coast. The Pacific Group is the dominant buyer/processor of marine products in all the major ports of Oregon. Trident produces surimi from whiting in Newport. The Astoria area is again becoming the dominant port area for seafood processing. Besides salmon and Dungeness crab (which are landed along the Oregon Coast), the Astoria area is receiving a large proportion of the Pacific whiting landings and most of the sardine landings.

The dominance of the regional purchasing of seafood processing of the Pacific Group is challenged by strong investments by companies such as Bornstein Seafoods in Astoria. Smaller companies, such as Starvin Marvin's Seafoods and Fishhawk Fisheries, specialize in specific

species; salmon and Dungeness crab have managed to develop a niche in the processing and marketing.

3. California

In northern California, the majority of groundfish, crab, and shrimp are landed in the communities from Fort Bragg to Crescent City. Most of the salmon are landed in the area from Bodega Bay to Morro Bay. Santa Barbara is the leading port of sea urchins in California. Almost all of the herring harvested in California is landed in San Francisco. In southern California, the pelagic species, most of the squid is landed in Santa Barbara, anchovy in the Monterey area, and mackerel and sardines in the Los Angeles area.

The variety of marine resources harvested in California has resulted in numerous individual or company groups along the California coast. The changing availability of marine resources and the influence of the expanding Pacific Group out of Oregon has resulted in major changes in processing and buying plants in northern California.

In the 1980's, California Shellfish, Lazios, Eureka Fish, and Caito's were a large part of the fish processing industry in northern California. Lazios in Eureka sold to the Pacific Group in 1986. In the late 1980's to early 1990's, when new interest started with Pacific whiting, two plants used Pacific whiting for a H/G product. Sea Products and Castle Rock went through several different ownerships, but are no longer in business. Some of the brand names and dock facilities have been taken over by the Pacific Group and Carvalho. Eureka Fisheries closed its business in 2000-2001; the Pacific Group has purchased some of its facilities.

There are basically two general processing companies remaining in northern California in 2003: Caito Fisheries in Fort Bragg and Pacific Choice Seafood in Eureka. Pacific Choice has buying stations in all three areas; this includes Ocean Fresh Seafoods that buys for them. The Pacific Group trucks some of the seafood to be processed in the Sacramento area. Carvalho Fisheries, primarily a crab buying facility in Crescent City, has a buying station in Eureka. They buy some trawl caught groundfish or flatfish, but in limited amounts. Caito Fisheries has buying stations in all three areas.

Hallmark occasionally has someone else hoist crab for them in Crescent City. WF Alber is a relatively new entrant into this area that buys mostly crab and sablefish in all three areas. North Coast Fisheries out of Santa Rosa is also a buyer of fish and crab out of all areas in northern California. Nor-Cal Seafood buys mostly fresh fish and crab for the San Francisco market. They have buying stations in all three areas.

The more southern part of the California coast is dominated by the processing companies that specialize in the squid and sardine fisheries. These are the old historic fish companies, such as State Fish Company and the Monterey Fish Company. The concentration in this sector is fairly low. Other companies, such as Southern Cal Seafood, Trimarine International, and Tomich Bros. Fish also process a substantial amount of squid and sardines.

The sea urchin fishery has declined from previous years, both because of reduced resources and changing markets. But, increased domestic demand has allowed companies such as Catalina Offshore Products, Pacific Sun Products, and SM Uni Inc. to survive in this business. There has been some change in ownership in the more general seafood processing sector of southern California. The most significant event in this area is the merging of the Olde Port and the Del Mar Seafood company. In San Diego, the Chesapeake Fish Co. and Ghio Seafood Products are small companies that specialize in local sea products.

D. Processor Consolidation

Processor consolidation is a difficult issue to address. Neither NOAA Fisheries nor any other government agency collects the kind of traditional economic information that would define the degree of concentration in the processing sector. Even if they did, confidentiality restrictions (which require that there must be three or more entities in a collective statistic for it to be released) would prevent publishing the data. To make matters worse, the MFCMA specifically precludes collecting economic information regarding fish processors (see Sec. 303 (b) (7), sec 401 (a) (9) and sec. 402 (a)).

To examine trends in the processing industry it helps to confine the discussion to major groundfish processors.[1] There are many different groundfish buyers and processors: some purchase groundfish incidentally from shrimpers, some are purchasing fish only for their own market, and some are really harvesters who are marketing their own fish. There is also an extensive network of "live fish" buyers who purchase groundfish. The live fish buyers are commonly called the "white van" fleet because they operate out of small white vans. Landing statistics (both weight and species) are notoriously unreliable for the white van sector. All of these smaller operators certainly qualify as groundfish buyers or processors in some sense, but they do not affect the majority of vessels or the majority of fish landed on the West Coast.

Three lists were reviewed to determine an indication of processor consolidation.

- List One. A list of major groundfish processors in 1980, 2000, and 2002 was compiled from the FMA (Table VI.5). The 1980 list reflects processors that had dealer agreements with the FMA during the late 1970's and early 1980's. It is not an exhaustive list as there were certainly some companies that were not in the FMA directly.

  The 2002 list comprises major groundfish processors operating from north of Pt. Conception to the Canadian border (i.e. Morro Bay to Bellingham). This list was constructed by personal interviews with harvesters and consequently may also not be an exhaustive list. Based on the counts by year, it would be fair to say there has been an 80 percent reduction in major fish processors during the past twenty years.

- List Two. Table VI.6 displays a list of members of the West Coast Seafood Processors Association (WCSPA) directory. They have 15 regular members, eight of whom claim to be groundfish processors. Their membership does not include every groundfish

1. Major groundfish processors are defined in this section's narrative to be one business purchasing non-whiting groundfish from at least three trawlers.

Table VI.5
Trends in Processor Association Membership

Year		
1980 (37)	2000 (12)	2002 (7)
Alioto Seafood	Bornstein Seafoods	Bornstein Seafoods
Astoria Seafood	Caito Fisheries	Caito Fisheries
Barbey Packing	Hallmark Seafoods	Hallmark Seafoods
Bornstein Seafoods	Sea Products	Pacific Seafoods
Astoria Fish Factors	Depoe Bay Fish	North Coast Fisheries
Bumble Bee	Eureka Fisheries	Del Mar/Olde Port
Caito Fisheries	Jessie's Ilwaco Fish Co.	SeaK Fish Co.
Del Monte Fish Co.	Pacific Seafoods	
Western Cal. Fish Co.	Pacific Coast	
California Shellfish Co.	Pacific Choice	
Alaska Packers	Bandon Pacific	
Hallmark Seafoods	Washington Crab Producers	
Humboldt Seafood	Pacific Shrimp	
Point Adams Packing	S & S Seafoods	
Point St. George Fisheries	Castle Rock Fisheries	
Central Coast Seafoods	Olde Port	
Crescent Fisheries	SeaK Fish Co.	
Depoe Bay Fish	Del Mar	
Eureka Fisheries		
Grader Fish Co		
Harbor Fish Co		
Jessie's Ilwaco Fish Co.		
Lucas Wharf		
Merideth Fish Co.		
Monterey Fish Co.		
New England Fish Co.		
Tom Lazio Fish Co.		
Bandon Fisheries		
Washington Crab Producers		
Orca Seafoods		
Newport Shrimp Co.		
Newport Seafoods		
North Beach Star Fish Co.		
Ocean Foods Seafood		
Chinook Packing		
Ocean Fresh Seafoods		
Pacific Shrimp of Warrenton		
Paladini Fish Co.		
Petersen Seafoods		
Producers' Seafoods		
Regal Fish Co.		
Schnabelts Seafood		
Standard Fish		
Tarantino Seafoods		
SeaK Fish Co.		

Notes: 1. The list may be incomplete of all active processors. The list purpose is to demonstrate the reduction in the number of processor entities over the last 25 years.
2. The 1980 list is from Fishermen's Marketing Association records. Year 2000 and 2002 lists are verified from various harvester and processor personal interviews.

Table VI.6
West Coast Seafood Processors Association Members by Area of Operation

	Southern Washington	Northern Oregon	Southern Oregon	Northern California	Other Areas
Bornstein Seafoods	✓	✓			✓
Caito Fisheries			✓	✓	
Cal Shell		✓	✓	✓	
F. Alioto Fish Co.				✓	
Fishhawk Fisheries		✓			✓
Ocean Beauty		✓			✓
Pacific Seafood Group	✓	✓	✓	✓	✓
Number of processors by area	2	4	2	2	
Number of major processors	2	3	2	2	

Notes: 1. Oregon is split in two geographic regions to be north and inclusive of Newport and south of Newport.
2. This list is not inclusive of all processors within the study area. It is only shown as an indication of consolidation using WCSPA membership directory.

Source: West Coast Seafood Processors Association, http://www.wcspa.com/regular_members.htm.

processor. North Coast Fisheries/Lucas Wharf has purchased fish from a number of trawlers in the San Francisco to Crescent City area and is not listed among their members.

The eight self proclaimed groundfish processors in WCSPA are very different. Fishhawk Fisheries would probably not qualify as a major groundfish processor. This company processes mostly shrimp and may purchase incidental groundfish. F. Alioto Fish Co. also would probably not qualify as a major processor. They may buy from one or two vessels, but they are certainly not a major presence in groundfish processing. Ocean Beauty is primarily a distributing company for the West Coast that has a small buying station in Newport, Oregon. The processors also operate in very different areas. The key fact to notice in the table is that for many ports and areas there are only one or two processors where harvesters may sell their catch. The situation is even worse if you consider that each harvester must find a match for the licenses and fishing activities he engages in and the processing activities of a buyer.

The WCSPA membership list does not show any trend as it is constantly updated. One list that does allow some inference about trends is at the Oregon Dungeness Crab Commission's web site listing of major crab processors and out of state shippers. They list 15 companies. Of these, two were really part of California Shellfish Co. (Hallmark Fisheries and Pt. Adams Packing Co.) and two were part of Pacific Seafoods (Pacific Coast Seafoods and Pacific Marketing Group). Bell Buoy Crab Co., Fishhawk Fisheries, and International C-Food Marketing are small, specialized buyer/processors. Ocean Beauty is basically a distributing company. So, there were originally 13 separate companies on this list. Today, there are seven. Pacific Seafoods has purchased or

otherwise acquired the other six companies. Based on this list, the consolidation ratio of seafood processors has probably doubled in the last five years.

Only Bornstein, Cal Shell, and Pacific are major purchasers of groundfish and crab. Several companies that formerly were major groundfish purchasers have been acquired by Pacific Seafoods, such as Eureka Fisheries and S&S Seafoods.

- List Three. A list of processors is also available at Oregon's seafood commodity commissions web site (Table VI.7). These lists did not add information to the number or activities of groundfish processors that are on the WCSPA list.

It is difficult to draw numeric conclusions about changes in processor consolidation from the tables. It is clear, however, that the processor markets available to harvesters are at historic, and unprecedented, low numbers.

Table VI.7
Major Crab Processors and Out of State Shippers

1. Bell Buoy Crab Co.
2. Bornstein Seafoods
3. Fishhawk Fisheries
4. California Shellfish Co. (Hallmark Fisheries and Pt. Adams Packing Co.)
5. International C-Food Marketing
6. Ocean Beauty
7. Pacific Seafoods (Pacific Coast Seafoods and Pacific Marketing Group)
    - 7.1 Bandon Bay Fisheries (now Bandon/Pacific Fisheries)
    - 7.2 Del Mar Seafoods (gone from Oregon and northern California, operating only from Monterey, California and south)
    - 7.3 Depoe Bay Fisheries
    - 7.4 Pacific Shrimp Co.
    - 7.5 S&S Seafoods
    - 7.6 Eureka Fisheries

Source: Oregon Dungeness Crab Commission, http://www.ucinet.com/~dcrab/ooss.htm.
Oregon Trawl Commission, http://www.ortrawl.org/otpsupply.html.

VII. ECONOMIC CONTRIBUTION

Economic contribution estimates are measured by the increment of personal income received by households due to the fishing industry. The estimates include wages and proprietary income made by crewmen and captains during harvesting and workers at processing plants. It includes income earned by people working at suppliers for fishing industry businesses. It also includes the respending of wages throughout the economy, therefore is inclusive of the "multiplier effect" of the industry.[1]

Using economic contribution for describing the industry simplifies details, is a more revealing measure of the economic importance of certain fisheries within this industry, and is useful for comparing the size of the fishing industry to other industries.[2] For an example, some fish have a higher labor cost per pound to harvest and process (like groundfish made into fillets) and therefore have a higher impact (generate more personal income) on the economy. Other fish (like salmon) are sold whole-fresh and have lower labor costs per pound.

Overall, the fishing industry generated about $845 million in total personal income from onshore landings in 2004 (Table VII.1 and Figure VII.1). The highest economic contributor in any state was the species group Dungeness crab in California, which was also the highest within Washington and within Oregon (Table VII.2). Shellfish aquaculture added another $88 million (Figure VII.2).[3] Another $95 million of personal income was generated in the Oregon economy by the distant water fleet making landings to at-sea processors and onshore processors in Alaska, other West Coast states, southern Pacific Ocean, and elsewhere (Table VII.3).[4]

- Economic contributions from salmon fisheries were up in 2004. It is more than triple what was seen during the late 1990's. The increase was partly due to higher landings and partly due to a price increase.

- Dungeness crab economic contribution was $219 million in 2004. This was nearly as much as Year 2003's record $258 million.

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1. The multiplier effects are calculated using the Fishery Economic Assessment Model (FEAM). The FEAM is based on 1998 economic response coefficients generated from the IMPLAN input-output model.
2. There are three simplifying assumptions used in the economic analysis methodology: (1) the economic analysis is based on past relationships between vessel and processor expenditure patterns, ex-vessel and final product prices and regional economy responses, (2) there are no effects from increased effort in fisheries for vessels protecting status for future limited entry licensing or other vessel capacity constraining management procedures, (3) there are no effects from increased effort in other fisheries from vessels displaced in a fishery. Improved information about any of these assumptions may mean that the methodology may overestimate the calculated economic contribution from changes in fisheries. Paramount in the assumptions is that economic contributions are calculated in direct relation to reduced landings. In a growing economy, some lost personal income from reduced landings will be offset by other sources of economic activity. Therefore, these estimates should not be viewed as a forecast of the effect on the total economy, only as an indication of personal income change from fishing industry sources.
3. Fish aquaculture (mostly steelhead trout in Washington) is generally reported as an agricultural statistic and is not included in this report.
4. The workscope to estimate distant water fisheries economic contributions in Washington and California was not a study task. The estimate for Oregon is from The Research Group (2005).

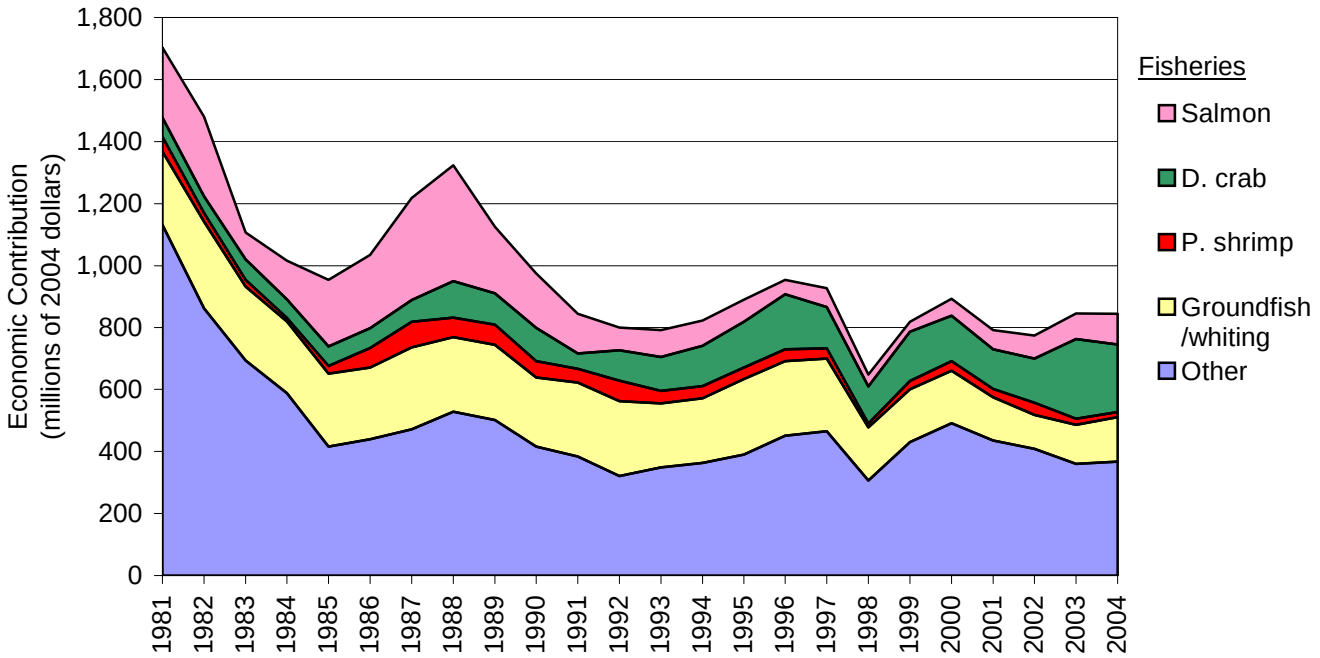
Table VII.1
U.S. West Coast Economic Contributions From Onshore Landings by Species Group in 1981 to 2004

Years	Salmon	Dungeness Crab	Pink Shrimp	Groundfish/ Whiting	Other Finfish and Shellfish	Total Landed Fish
1981	226.2	61.7	47.2	236.4	1,131.7	1,703.1
1982	256.4	53.6	28.3	279.5	862.3	1,480.2
1983	86.8	66.1	21.7	238.8	693.2	1,106.6
1984	125.6	59.6	10.8	232.6	587.9	1,016.5
1985	214.8	64.7	24.3	234.8	416.2	954.6
1986	236.8	63.6	63.7	231.6	438.9	1,034.7
1987	329.1	69.9	82.2	265.5	471.4	1,218.1
1988	373.3	117.2	63.2	241.1	528.5	1,323.3
1989	214.5	100.8	64.9	243.5	501.4	1,125.1
1990	175.6	108.3	52.4	223.1	415.3	974.7
1991	128.3	50.0	44.1	238.7	383.4	844.5
1992	74.2	98.0	66.4	241.7	320.3	800.6
1993	87.9	109.5	40.6	206.4	348.2	792.6
1994	81.2	131.3	39.5	207.4	363.5	823.0
1995	70.9	148.8	37.4	243.6	389.7	890.3
1996	46.6	178.2	38.1	240.0	451.2	954.0
1997	61.4	132.4	34.8	233.5	465.4	927.4
1998	38.2	119.8	11.8	171.8	306.2	647.8
1999	32.7	159.8	26.8	169.6	430.4	819.2
2000	54.1	148.1	30.1	169.7	490.8	893.0
2001	62.7	127.6	27.4	138.9	435.2	791.8
2002	75.3	142.2	39.7	109.3	408.4	774.9
2003	82.7	257.5	20.4	125.8	359.7	846.2
2004	98.9	219.2	16.8	142.7	367.5	845.1

Notes: 1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish and salmon aquaculture are not included.
3. Distant water fisheries economic contribution is not included.
4. Economic contributions from fish meal production are included in Pacific whiting.

Source: Study.

Figure VII.1
U.S. West Coast Economic Contributions From Onshore Landings in 1981 to 2004



Notes: 1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish and salmon aquaculture are not included.
3. Distant water fisheries economic contribution is not included.

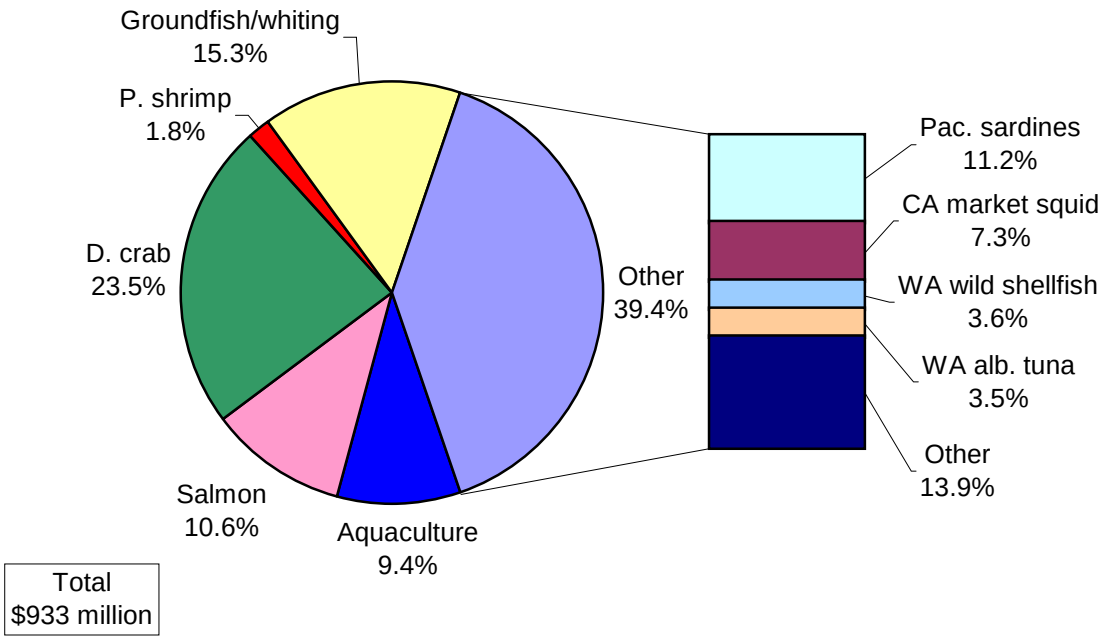
Source: Study.

- Pink shrimp decreased to $17 million in 2004. This is down from $40 million generated in 2002.

- Groundfish and Pacific whiting landings contributed $244 million in personal income to the economy in 1995, but this decreased to $109 million in 2002. Because of high sablefish landings, higher quotas for Pacific whiting, and better prices for some species, the total economic contribution increased to around $143 million in 2004.

- Fisheries other than the before mentioned salmon, crab, shrimp, and groundfish species groups also have measurable economic contributions. For example, sardines alone contributed about $104 million in 2004. Market squid in California contributed $68 million in 2004. Albacore tuna contributed another $56 million in 2004, mostly in Washington and Oregon. (Albacore tuna is $33 million for Washington and $17 million for Oregon. The California tuna group includes other tunas for a total of $8 million, of which $6 million is albacore.)

Figure VII.2
U.S. West Coast Economic Contributions by Species Group and Shellfish Aquaculture in 2004



Aquaculture economic contributions by species (millions of dollars):	
Pacific oysters	45.4
Manila clams	18.1
Geoduck	5.7
Blue or bay mussel	4.2
Abalone	11.6
Other oysters, clams, mussels	2.7
Total	87.7

Notes: 1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Salmon aquaculture is not included.
3. Distant water fisheries economic contribution is not included.

Source: Study.

Table VII.2
Economic Contributions From Onshore Landings by Selected Species Groups and State in 2004

Species Group	Washington	Oregon	California	Total
Groundfish	$27.0	$32.1	$31.8	$90.9
Pacific whiting	$20.6	$31.2		$51.8
Salmon	$46.9	$21.2	$30.7	$98.9
Dungeness crab	$54.4	$79.5	$85.3	$219.2
Lobster and prawn			$13.6	$13.6
Pink shrimp	$4.9	$9.9	$1.9	$16.8
Sardine	$11.1	$52.4	$40.6	$104.1
Market squid			$68.4	$68.4
Other pelagic			$22.9	$22.9
Albacore tuna	$32.6	$17.1	$8.0	$57.6
Shark and swordfish			$10.2	$10.2
Sea urchin			$13.2	$13.2
Sea cucumber			$1.5	$1.5
Shellfish aquaculture	$57.1	$7.7	$22.8	$87.7
Other	$57.5	$3.7	$14.9	$76.1
Total	$312.2	$254.9	$365.7	$932.8

Notes: 1. Economic contribution is in millions of dollars.
2. Pacific whiting is included in groundfish for California. Some pelagic fisheries are only calculated for California.
3. Other tunas are included in albacore tuna for California.

Table VII.3
Distant Water Fisheries Economic Contributions to U.S. West Coast Economies in 2004

	U.S. West Coast At-Sea	Alaska	Other	Total
Washington	--	--	--	--
Oregon	--	--	--	$95.4
California	--	--	--	--
Total	--	--	--	--

Notes: 1. Economic contributions are from vessel derived effects and do not include returns from such sources as processor workers or crew working on vessels registered to owners in non-West Coast states; and, out-of-area registered vessels only using repair and provisioning services from U.S. West Coast businesses.
2. Individual states' other category includes effects of that state's home-port vessels returning revenue to out-of-state ports.

Source: The Research Group (2005).

The commercial fishing industry is an important business segment to many communities along the U.S. West Coast. There are certain segments of the industry that are experiencing severe reductions in harvests. However, overall the fishing industry in 2004 generated higher than average economic contributions going back to 1990. The increases came mainly from increased prices from troll salmon, higher Dungeness crab landings, newly developed northern component of a sardine fishery, abundant stocks of Pacific whiting, and higher opportunities for certain coastal pelagic stocks. The 2004 economic contribution represents less than one percent of the U.S. West Coast's earned income, but is as high as seven percent for all earned income in coastal communities along coastal Oregon and northern California. At $30,000 income per year, the industry segment for onshore landings represents about 28,000 annual full time equivalent jobs.

The permanency of the economic contributions cannot be determined, because of several factors:

- Abundances depend on favorable ocean conditions through vertical mixing and lateral currents which are not completely predictable;

- Pressure to set aside areas for no-take marine protection areas for research and to preserve their intrinsic values;

- Social policies for allocations among user groups (commercial, recreational, and tribal fishermen) and communities;

- Judicial decisions on habitat protection and incidental take issues brought to the forefront by conservation organizations, like protection of sea birds and mammals either impacted by fishing techniques or dependent on protein from the same fish species now exploited;

- Compacts and international treaties, such as recently completed negotiations with Canada for allocation of Pacific whiting between the two nations that will lower the U.S. share; and the Multilateral High Level Conferences on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific which may result in new country allocations of HMS like albacore tuna;

- Better understanding in the science of ecosystem interactions and improved stock assessments that may cause fishery management agencies to reduce exploitation rates, control fishing gear, reduce trip limits, or have further restrictions in time/area closures;

- Not being able to reach harvest quotas on species in healthy stock status due to fishing techniques that have unavoidable mortalities on species in a depleted stock status where species occupy the same space at the same time;

- Stock building programs calculated using variables with large uncertainties; rebuilding programs will take many years for depleted species to return to sustaining harvest levels because of life cycle characteristics of these fish;

- For the most part, there are not underutilized species in which harvesters can move, but new fisheries may develop around some minor opportunities for filling niche markets;

- Looming issues for the reauthorization of the MFCMA and the use of groundfish fishery ITQ's and IPQ's for vessels, processors, and cooperatives.

In consideration of the before mentioned landing trends and in light of the above mentioned current issues, it is a prudent assessment that commercial harvesting of marine resources is not a growth industry. Goals for the industry would be to extract more value from the fishery resources that are available.

Raising resource value has several challenges. There will be continuing price pressures on seafood products from substitute aquaculture products. Consumer concerns about quality (freshness, inclusions of toxics, etc.) will affect seafood product demands. Considerations about health and wholesomeness of natural coldwater fish could be a marketing advantage to Oregon's industry. The fall-out from lower values will be disruptive to a fleet where profitability already suffers due to, among other influences, excess capacity. Modernization of vessels for better handling capabilities and initial onboard processing, modernization of processing plants that will improve seafood products, and assistance through commodity commissions and other entities for developing marketing strategies that will gain market power for U.S. West Coast seafood products should help the industry raise value at all levels of seafood production.

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APPENDIX A

ECONOMIC VALUE MEASUREMENTS

APPENDIX A
ECONOMIC VALUE MEASUREMENTS

This appendix explains two methods for measuring economic value: net economic value (NEV) and regional economic impacts (REI). Only REI measurements are used in this report's descriptions of the fishing industry

Economic Value Measurements

NEV refers to net benefits from a national or regional perspective. This approach addresses changes in economic welfare (i.e., the changes in consumer and producer surplus from the events being studied). The NEV of the fishery resource is defined as people's net willingness to pay to have the fishery resource. NEV is generally, willingness to pay of consumers above their costs, plus revenues of producers above costs of production. A common mistake is to add the costs associated with using the fishery resource (e.g., travel costs, lodging costs, equipment) to the NEV calculation. These associated costs, or expenditures, are drivers of local business activity that generate jobs and produce income to local households. REI's are the measurement of this activity and are often described in units of jobs, personal income, and business output. REI refers to the estimation of economic activity within a region and are sometimes called "economic impacts." NEV and REI calculations are "apples and oranges," and cannot be added together or even compared in any way.

The NEV must represent the value of the fishery resource itself, and not the value of the related travel and equipment items, because resources are consumed in the creation of value and the NEV estimate is only interested in the net value created. For example, suppose the fishery was threatened by a hydropower development and policy makers wanted to know whether the anglers could "buy out" the hydropower interests. All of the money spent on travel and equipment is not available to buy out the competing hydropower interests. However, the money that is left over, after all the costs of angling have been paid, is the net willingness-to-pay (consumer surplus) for the fishery resource (or fishing at the particular site). If extracted, this surplus could, in principle, be used to buy out the hydropower interests (or vice versa).

Another way to view the difference between NEV and REI is to consider NEV as the net loss to society if the resource were no longer available. Suppose that a specific river fishery were no longer available to anglers, and they had to either fish somewhere else or engage in some other activity. The money spent on travel and equipment would not be lost to the economy - in fact it could be spent on travel and equipment or some other commodities in some other location. But the value anglers received from fishing in that specific river would be lost. Their net value for the chosen fishery versus other fisheries or activities would be a loss to society, although that loss might be offset by gains elsewhere. Their expenditures or associated impacts on income or jobs would be a loss to the economy in the vicinity of the preferred river, but would be a gain to some other local economy. Regional impacts, therefore, describe the local or regional effects associated with any specific area chosen as the point of interest. The calculations for REI in this report use personal income as the unit of measurement.[1]

1. Corresponding measures for full time equivalent jobs may be developed by assuming the personal income is a person's average wage and salary or proprietors net income. It can be assumed in the Pacific Northwest that

It is clear that NEV and REI are two distinct measures, and each is useful for different purposes. NEV's are important if the goal is to allocate resources efficiently. REI's are important in assessing the distributional impacts of the different policies on the economies of local areas. It may often be the case that society will want to invest in a less valuable resource from a national perspective because the local area or economy that holds the resource is in need of economic development. Nevertheless, having the information on economic value will tell society how much it is giving up in order to achieve the redistribution of economic activity or development.

Sometimes an REI gain or employment in one area may be an REI loss to a different area. For example, the expenditures by BPA for hatchery funding may be a transfer from electricity paying consumers in Portland and Seattle to anglers and businesses in coastal communities. These are allocation and equity issues and are not addressed here.

Estimating Regional Economic Impacts With Input/Output Models

REI calculations start with an estimate of the costs or expenditures made in the pursuit of the fish or, in the case of commercial fishing, its subsequent primary processing to ready the product to be shipped out of the harvesting area.[1] These expenditures reverberate throughout the economy as the money is spent and respent by those that supply the fishing industry and then the households that spend their wages on other goods and services. Economic input/output (I/O) models are used to estimate the respending or multiplier effects. The basic premise of the I/O framework is that each industry sells its output to other industries and final consumers and in turn purchases goods and services from other industries and primary factors of production. Therefore, the economic performance of each industry can be determined by changes in both final demand and the specific inter-industry relationships.

The models developed for this project utilize one of the best known secondary I/O models available. The IMPLAN modeling software and database can be used to construct county or multi-county I/O models for any region in the U.S.[2] The regional I/O models provided by IMPLAN are derived from technical coefficients of a national I/O model and localized estimates of total gross output, income and employment by sectors.[3] IMPLAN adjusts the national level data to fit the economic composition and estimated trade balance of a chosen region. Areas that are any combination of single counties can be constructed using IMPLAN.

$30,000 is a representative estimate in 2004 for annual per job income associated with downstream effects with the fishing industry.

1. Harvesting as well as primary processing is included in the REI calculations. Some fish, such as salmon caught with troll gear, are partially processed at sea. Net caught fish are harvested and delivered in the round to a "tender" to be taken to a processor. The "ex-vessel" prices do not compare to similar product. Sometimes the ex-vessel price is the price paid to the net harvester, other times it is the price paid to the tender. Primary processing prices, or first wholesale prices, are for a comparable product.
2. The IMPLAN model is now being offered for general use by the Minnesota IMPLAN Group (Olson et al. 1993).
3. The available IMPLAN models are generally three to four years behind calendar years. This is due to data availability and the time it takes to prepare the models. Unless very dramatic changes take place in a regional economy, the sector coefficients will not change dramatically from year to year.

The Fishery Economic Assessment Model (FEAM) uses the IMPLAN coefficients to estimate the REI from salmon harvests.[1] The FEAM process starts with IMPLAN data. Fishing related expenditures are then used to develop harvest and primary processing expenditure related impact coefficients. The economic impacts, as measured by personal income or job opportunities, are then estimated by specific geographic areas.

Figure A.1
The Fisheries Economic Assessment Model Process

- Based on IMPLAN
- Build I/O coefficients for fishing related expenditures
- Harvest data
- Primary processing data
- Economic impacts measured by personal income
- Translate to full time job equivalents
- Geographic areas

Limitations of Regional Economic Impact Analyses

REI estimates are sometimes indicators of the dislocation costs that may occur from reductions in fisheries, but are not indicators of the net loss to the nation from such reductions, because losses of income and employment in some areas will likely be offset by gains in income and employment elsewhere.[2] If sufficient quantitative information and defensible analytical models are available, net gain or loss to the nation determined through a benefit-cost analysis is the value suggested by Executive Order 12866 and the Regulatory Flexibility Act (5 U.S. C. 601 *et seq.*) for analyzing actions of federally managed fisheries (NMFS 2000).[3,4] In general, there is no particular relationship between changes in NEV derived in a benefit-cost analysis and REI's.

REI estimates measured in units of personal income provide a value that is comparable to similar values often used to describe activities in non-fishing sectors of the economy. However, if fishing activity is reduced, personal income is not necessarily reduced by a proportional amount. The effect on personal income in local economies will depend on alternative available activities and the location(s) of those activities. If there were a reduction in the ocean salmon fisheries, over the long run, workers in the commercial and recreational fisheries, owners of vessels and processing plants and seafood consumers would be expected to adjust to the reductions by changing the activities in which they engage. Such adjustments would not be costless, of course, but are outside the scope of this study.

1. The FEAM was developed for the West Coast Fisheries Development Foundation by Hans Radtke and William Jensen in 1986.
2. We recognize, however, that shifts in economic activity are not immediate and inconsequential. In some cases, public policy-makers will want to consider assistance for those whose income is reduced by new environmental restrictions.
3. Other laws, such as the MFCMA, the National Environmental Policy Act, and the Endangered Species Act also have economic analysis requirements.
4. The benefit-cost analysis from management actions may include the sum of expected changes in: (1) potential changes in consumer surplus derived from recreational fishing, (2) potential changes in consumer surplus derived from non-consumptive use, (3) existence value, (4) consumer and producer surplus from commercial fishing landings, less (5) less management costs (administration, monitoring, and enforcement).

The personal income estimates provide information on a representative year basis and are an indicator of the magnitude of the possible redirection of money between nonfishing-dependent and fishing-dependent sectors that may occur with changes in the fishery. The amount of redirection of income and employment represents a dislocation that may have economic and social costs that would not be reflected in a typical NEV analysis.

APPENDIX B

STATE LEVEL LANDINGS AND ECONOMIC CONTRIBUTION

Table WA-1
Washington Onshore Landed Volume by Species Groups in 1981 to 2004

		Dungeness Crab		Pink	Albacore		Pacific	Shellfish			
Year	Salmon	PS	Coast	Shrimp	Tuna	Groundfish	Whiting	Wild	Aquaculture	Other	Total
1981	47,306	1,503	2,446	10,084	1,928	79,865	9,435	12,558		11,359	176,484
1982	49,776	1,201	2,797	5,042	586	87,563	13,334	13,657		10,370	184,325
1983	26,434	1,400	5,159	5,743	1,163	81,017	15,102	12,570		9,408	157,995
1984	27,648	1,338	3,406	3,453	147	91,469	8,884	15,150		15,318	166,813
1985	66,161	1,581	3,398	9,134	379	73,634	20,522	14,129		14,717	203,656
1986	50,303	1,421	3,895	17,455	1,808	71,458	18,396	3,787		16,345	184,870
1987	57,388	1,653	5,822	15,948	1,167	74,724	28,474	5,698		14,130	205,005
1988	42,478	1,937	16,147	18,204	4,188	65,847	14,303	5,469		23,424	191,998
1989	54,290	2,022	17,982	15,909	1,725	66,305	17,916	4,706		20,684	201,539
1990	40,140	2,099	9,980	13,570	2,659	66,825	3,492	4,813		15,241	158,818
1991	45,745	1,475	4,468	10,098	943	67,760	6,487	4,355		19,231	160,564
1992	25,490	2,283	13,112	12,363	4,110	70,841	9,162	2,569		18,949	158,879
1993	36,878	2,452	15,809	15,793	4,778	62,979	8,065	3,214		15,670	165,638
1994	29,800	3,741	14,833	6,058	11,855	52,977	10,832	3,239	13,349	9,403	156,087
1995	25,190	5,061	16,088	8,409	7,523	42,389	11,920	2,194	14,787	8,607	142,168
1996	15,288	4,980	22,525	6,512	10,954	42,009	34,409	3,477	14,593	7,894	162,640
1997	22,787	6,211	9,474	5,768	8,323	37,227	20,637	4,367	12,813	7,626	135,234
1998	15,248	5,403	7,806	2,720	14,368	32,971	27,001	4,399	12,343	7,738	129,998
1999	7,502	5,286	13,740	3,745	4,588	31,669	21,437	5,185	13,006	6,545	112,701
2000	12,753	6,726	11,033	5,061	7,022	25,387	26,800	4,342	15,764	16,286	131,174
2001	29,484	7,514	11,533	7,220	9,168	20,540	39,532	5,016	16,040	31,322	177,370
2002	33,428	6,944	14,458	10,711	11,811	19,658	23,564	5,587	17,563	50,072	193,797
2003	32,034	6,938	26,822	8,367	23,795	20,467	37,638	5,051	18,265	33,334	212,710
2004	29,384	6,376	8,593	6,020	18,319	21,872	72,247	5,650	13,358	25,623	207,444

Notes:
1. Landings are reported in thousands of round pounds.
2. Wild shellfish in the most recent year includes landings (thousands of round pounds) of geoduck (4,494), Manila clam (792), razor clam (183), and other species (181).
3. Salmon aquaculture is not included.
4. Other in the most recent year includes landings (thousands of round pounds) of Pacific sardines (19,697), Pacific halibut (2,317), Pacific herring (721), sea cucumbers (578), northern anchovy (471), other shrimp such as spots, sand or ghost, coon stripe, and side stripe (593), and other species (1,247).
5. Groundfish includes ocean and Puget Sound landings.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

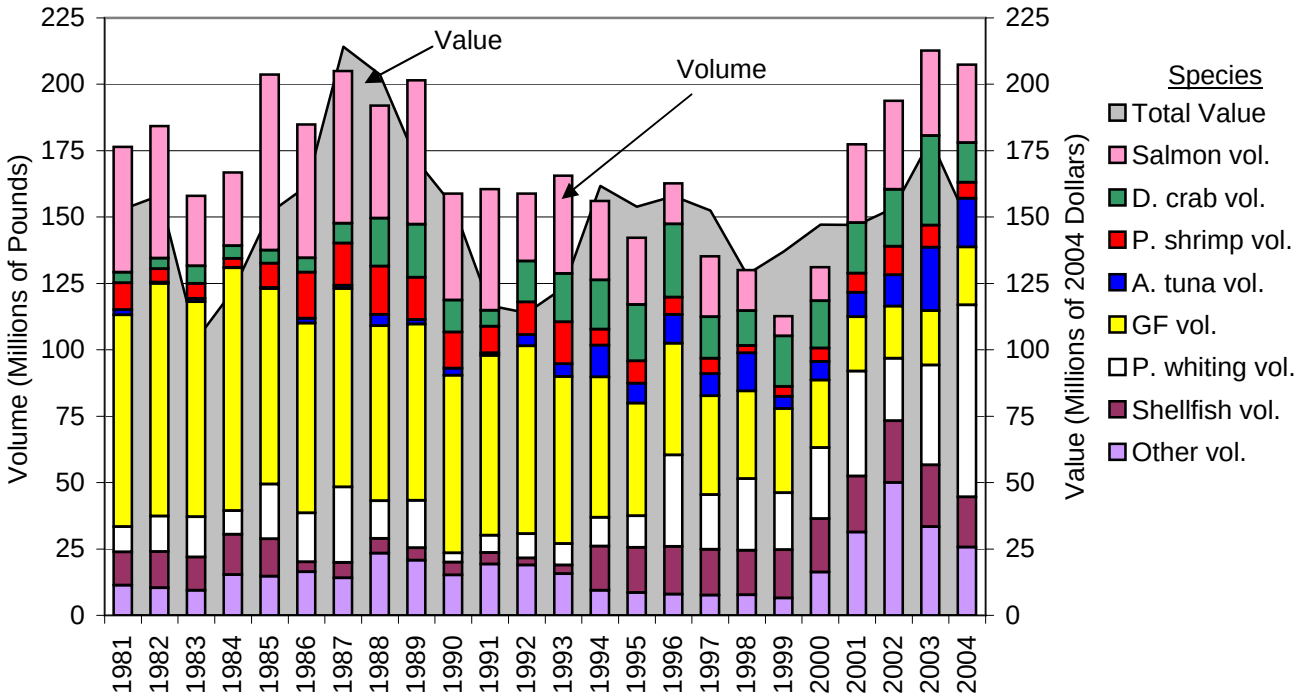
Table WA-2
Washington Onshore Landed Value by Species Groups in 1981 to 2004

				Dungeness Crab				Pink		Albacore				Pacific		Shellfish							
	Price	Salmon		Puget Sound		Coast		Shrimp		Tuna		Groundfish		Whiting		Wild		Aquaculture		Other		Total	
Year	Index	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal
1981	54.6	83,323	45,523	2,299	1,256	4,057	2,217	9,202	5,028	3,057	1,670	27,003	14,753	372	203	11,005	6,012			12,601	6,885	152,920	83,546
1982	58.0	90,659	52,550	1,876	1,087	5,055	2,930	4,572	2,650	628	364	31,410	18,207	580	336	11,003	6,378			12,324	7,143	158,106	91,646
1983	60.2	32,210	19,405	2,918	1,758	12,217	7,360	7,078	4,264	1,053	634	29,449	17,742	718	432	10,520	6,338			7,681	4,628	103,845	62,561
1984	62.5	50,651	31,663	3,173	1,984	8,935	5,585	2,565	1,603	146	91	33,134	20,713	451	282	14,513	9,073			8,743	5,465	122,309	76,459
1985	64.4	78,581	50,620	3,500	2,255	7,796	5,022	5,010	3,227	310	199	29,761	19,171	1,164	750	13,631	8,781			11,795	7,598	151,548	97,623
1986	65.8	82,770	54,495	2,872	1,891	7,714	5,079	14,084	9,273	1,393	917	29,544	19,451	1,145	754	1,754	1,155			20,293	13,361	161,568	106,375
1987	67.6	118,884	80,405	3,665	2,479	11,315	7,652	15,757	10,657	1,239	838	37,298	25,226	1,860	1,258	3,324	2,248			20,829	14,087	214,170	144,850
1988	69.9	105,242	73,606	3,674	2,569	24,812	17,354	10,507	7,349	4,994	3,493	30,685	21,461	1,006	703	2,129	1,489			20,668	14,456	203,716	142,480
1989	72.6	77,215	56,050	3,709	2,692	25,715	18,666	8,113	5,889	1,703	1,236	26,525	19,254	1,123	815	3,912	2,840			23,276	16,896	171,290	124,339
1990	75.4	69,787	52,618	4,924	3,712	19,667	14,829	8,985	6,774	2,863	2,159	24,877	18,757	256	193	4,441	3,349			18,248	13,759	154,049	116,149
1991	78.0	41,789	32,608	2,861	2,233	9,202	7,181	7,163	5,590	887	692	29,296	22,860	511	399	4,807	3,751			20,145	15,719	116,662	91,032
1992	79.8	28,206	22,515	3,523	2,812	18,508	14,774	5,044	4,026	5,462	4,360	28,070	22,406	529	422	5,620	4,486			18,954	15,130	113,916	90,932
1993	81.7	31,371	25,620	3,821	3,121	21,347	17,433	6,337	5,176	5,030	4,108	23,798	19,435	311	254	8,493	6,936			22,913	18,713	123,422	100,797
1994	83.4	31,051	25,897	7,086	5,910	23,456	19,563	4,150	3,461	11,624	9,694	22,896	19,096	309	258	11,696	9,755	33,107	27,612	16,406	13,683	161,780	134,930
1995	85.1	13,388	11,395	8,838	7,522	33,697	28,680	7,269	6,186	7,062	6,011	24,838	21,140	582	495	7,900	6,724	35,508	30,222	14,781	12,580	153,862	130,955
1996	86.7	10,384	9,005	8,930	7,744	35,699	30,960	4,433	3,845	10,450	9,063	22,345	19,379	1,202	1,043	13,739	11,915	36,081	31,291	14,637	12,694	157,901	136,938
1997	88.2	15,652	13,800	15,043	13,263	20,879	18,408	2,599	2,291	7,703	6,791	21,866	19,279	1,128	995	18,130	15,985	33,658	29,675	15,773	13,907	152,430	134,395
1998	89.1	11,181	9,968	12,428	11,079	15,525	13,840	1,587	1,415	9,861	8,791	14,355	12,797	892	795	18,430	16,430	32,337	28,827	11,769	10,492	128,366	114,433
1999	90.4	5,636	5,097	13,896	12,567	29,838	26,984	1,779	1,609	4,033	3,647	14,967	13,535	1,001	905	19,865	17,965	33,549	30,340	12,409	11,222	136,974	123,871
2000	92.4	10,814	9,993	15,230	14,074	26,193	24,204	2,116	1,956	6,318	5,838	14,362	13,271	1,214	1,122	18,136	16,759	40,356	37,292	12,420	11,476	147,158	135,984
2001	94.6	12,820	12,131	15,570	14,733	24,314	23,008	1,946	1,842	8,418	7,966	11,945	11,304	1,555	1,472	21,192	20,053	37,185	35,187	12,042	11,394	146,987	139,089
2002	96.2	13,459	12,946	14,084	13,547	24,663	23,723	3,003	2,889	7,736	7,441	10,219	9,830	1,117	1,074	22,563	21,703	42,870	41,236	13,640	13,121	153,356	147,510
2003	97.9	12,520	12,263	13,532	13,254	43,443	42,551	2,108	2,065	16,028	15,699	12,643	12,383	1,759	1,723	19,902	19,494	45,492	44,558	11,656	11,416	179,082	175,407
2004	100.0	17,763	17,763	12,255	12,255	16,794	16,794	2,195	2,195	15,891	15,891	12,593	12,593	2,460	2,460	21,959	21,959	34,431	34,431	12,357	12,357	148,700	148,700

Notes: 1. Nominal value is the revenue received by fishermen/harvesters in the landing year. Real value is in thousands of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Wild shellfish in the most recent year includes landings (thousands) of geoduck ($20,139), Manila clam ($1,123), Pacific oyster ($420), and other species ($278).
3. Salmon aquaculture is not included.
4. Other in the most recent year includes (thousands) Pacific halibut ($7,435), other shrimp such as spots, sand or ghost, coon stripe, and side stripe ($1,463), Pacific sardine ($1,245), sea cucumbers ($1,002), white sturgeon ($318), Pacific herring ($293), and other species ($601).
5. Groundfish includes ocean and Puget Sound landings.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

Figure WA-1
Washington Onshore Landed Value and Volume by Species Groups in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Notes and sources from volume table concerning species composition also apply to this figure.

Table WA-3a
Washington Selected Species and Groups Onshore Landed Prices in 1981 to 2004

	Ocean Troll	Dungeness Crab		Pink	Albacore		Pacific
Year	Salmon	PS	Coast	Shrimp	Tuna	Groundfish	Whiting
1981	2.64	1.53	1.66	0.91	1.59	0.34	0.039
1982	2.97	1.56	1.81	0.91	1.07	0.36	0.043
1983	1.91	2.08	2.37	1.23	0.90	0.36	0.048
1984	2.54	2.37	2.62	0.74	0.99	0.36	0.051
1985	1.92	2.21	2.29	0.55	0.82	0.40	0.057
1986	2.18	2.02	1.98	0.81	0.77	0.41	0.062
1987	2.91	2.22	1.94	0.99	1.06	0.50	0.065
1988	3.62	1.90	1.54	0.58	1.19	0.47	0.070
1989	2.01	1.83	1.43	0.51	0.99	0.40	0.063
1990	2.21	2.35	1.97	0.66	1.08	0.37	0.073
1991	1.68	1.94	2.06	0.71	0.94	0.43	0.079
1992	2.15	1.54	1.41	0.41	1.33	0.40	0.058
1993	1.76	1.56	1.35	0.40	1.05	0.38	0.039
1994	2.36	1.89	1.58	0.69	0.98	0.43	0.029
1995	0.84	1.75	2.09	0.86	0.94	0.59	0.049
1996	1.11	1.79	1.58	0.68	0.95	0.53	0.035
1997	1.19	2.42	2.20	0.45	0.93	0.59	0.055
1998	1.19	2.30	1.99	0.58	0.69	0.44	0.033
1999	1.33	2.63	2.17	0.48	0.88	0.47	0.047
2000	1.31	2.26	2.37	0.42	0.90	0.57	0.045
2001	0.95	2.07	2.11	0.27	0.92	0.58	0.039
2002	0.88	2.03	1.71	0.28	0.65	0.52	0.047
2003	0.98	1.95	1.62	0.25	0.67	0.62	0.047
2004	1.48	1.92	1.95	0.36	0.87	0.58	0.034

Notes: 1. Prices adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery.
3. Groundfish price calculation excludes Pacific whiting. Price calculation includes harvests from ocean and Puget Sound.
4. Prices are annual and species averaged expressed in round weight. Average prices for salmon include seasonal and size considerations.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

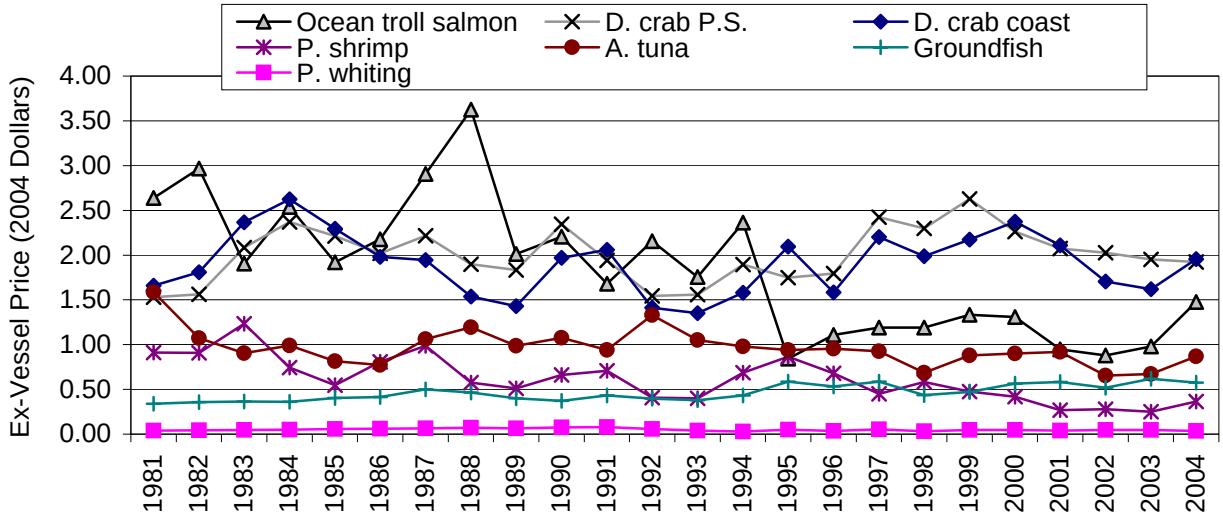
Table WA-3b
Washington Onshore Landed Salmon Prices by Gear and Catch Area Groups in 1981 to 2004

	Puget Sound										Ocean					Lower Columbia River					Upper Columbia River			
	Net						Troll				Troll					Net					Net			
Year	Chinook	Chum	Coho	Pink	Sockeye	Steelhead	Chinook	Chum	Coho	Pink	Chinook	Chum	Coho	Pink	Sockeye	Chinook	Chum	Coho	Sockeye	Steelhead	Chinook	Coho	Sockeye	Steelhead
1981	3.12	1.44	2.12	0.85	2.81	3.10	3.90		2.08	1.08	4.22		2.39	1.16	2.26	2.17	1.00	2.00			1.39	1.84		2.02
1982	2.84	0.95	1.46		2.19	2.80	2.86		2.12		3.98	1.70	2.13	0.91	2.09	1.77	0.78	1.49			1.24	1.63		1.97
1983	1.87	1.18	1.45	0.57	1.42		3.96		1.47	0.72	2.79	1.67	1.53	0.77		1.98	0.93	1.96			1.45		1.19	1.30
1984	2.78	0.98	1.61		2.27	1.55	3.85		1.78		3.83		2.00			2.33	0.91	1.89	2.02		1.84	1.61	1.77	1.71
1985	2.01	0.65	1.36	0.40	2.22	2.41	3.44		1.78	0.92	3.43	1.31	1.77	0.82		2.08	0.43	1.25	1.83		1.28	1.22	1.66	0.78
1986	1.72	0.58	1.62		2.47	2.66	3.67		1.60		3.08	1.80	1.50			1.43	0.56	1.53	1.74	1.40	1.29	1.06	1.59	0.93
1987	2.31	1.70	2.76	0.73	2.62	3.01	3.94		2.43	0.84	3.74		2.11	0.77		2.22	1.07	2.91	2.24		2.35	1.89	1.98	1.62
1988	3.15	1.18	3.26		5.02	2.98	3.66		3.13		3.76		3.11			2.99	1.00	3.19	2.72		2.75	2.34	2.94	2.06
1989	1.25	1.06	1.40	0.55	2.77	2.03	2.81		1.56	0.78	2.69		1.51	0.83		1.60	0.66	1.28			1.21	0.99	2.19	0.79
1990	1.65	1.05	1.71	0.50	2.35	1.59	2.52		1.62		2.93		1.72		1.89	2.69	0.78	1.66			1.77	1.39	1.98	1.16
1991	1.35	0.72	1.11	0.26	1.56	1.38	2.04		1.22	0.43	2.68		1.19	0.52	1.35	2.26	0.41	1.05			1.02	0.72	1.32	0.76
1992	1.51	0.62	1.25	0.32	2.40	1.24	1.77	0.91	1.46		2.49		1.44			2.03	0.38	1.14			1.44	1.00	1.08	0.81
1993	1.18	0.78	0.99	0.20	1.12	1.17	1.93		1.06	0.43	2.21	1.36	1.14	0.49		1.50		0.99			0.76	0.69	0.98	0.57
1994	1.35	0.33	0.88	0.26	1.85	1.01	1.86				2.37					3.81		0.98			0.88	0.54		0.62
1995	0.99	0.36	0.72	0.20	1.36	1.17	1.89		0.83	0.31	1.66		0.85	0.27				0.81			0.52	0.38		0.47
1996	0.93	0.22	0.60		1.75	1.14	1.61		0.74		1.49		0.89		0.90	0.71		0.76			0.47	0.37		0.47
1997	1.00	0.38	0.71	0.21	1.21	1.00	1.22		0.82	0.30	1.28		0.90	0.29		0.95		0.92			0.69	0.51		0.33
1998	0.86	0.22	0.62	0.77	1.66	0.82	1.70		0.80		1.26		0.81			1.17		0.54			0.53	0.41		0.25
1999	0.93	0.38	0.78	0.17	1.38	0.77	1.80		0.83	0.29	1.50		0.98	0.29		1.25	0.35	0.93			0.41	0.55		0.43
2000	0.98	0.46	0.53	0.97	1.29	1.09	1.36		0.95		1.53		0.98			1.13		0.55			0.70	0.45		0.29
2001	0.78	0.27	0.36	0.15	0.86	0.66	1.20		0.51	0.21	1.21	1.05	0.56	0.17		1.36	0.22	0.28	0.82		0.41	0.11	0.59	0.13
2002	0.69	0.26	0.44	0.35	0.88	0.72	1.06		0.66		0.92		0.42			1.43		0.34			0.30	0.13		0.08
2003	0.73	0.30	0.51	0.09	0.91	0.85	1.88		0.77		1.02		0.59	0.23		0.74		0.57			0.27	0.11		0.09
2004	1.00	0.31	0.79	0.34	1.10	1.28	1.76		0.77		1.71		0.82			1.74		0.94			0.67	0.22	1.00	0.22

Notes: 1. Prices are adjusted to 2004 dollars using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Prices not shown when less than 500 pounds were landed.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

Figure WA-2
Washington Selected Species and Groups Annual Ex-Vessel Price Trends in 1981 to 2004



Notes: 1. Prices adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery.
3. Groundfish price calculation excludes Pacific whiting. Price calculation includes harvests from ocean and Puget Sound.
4. Prices are annual and species averaged expressed in round weight. Average prices for salmon include seasonal and size considerations.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

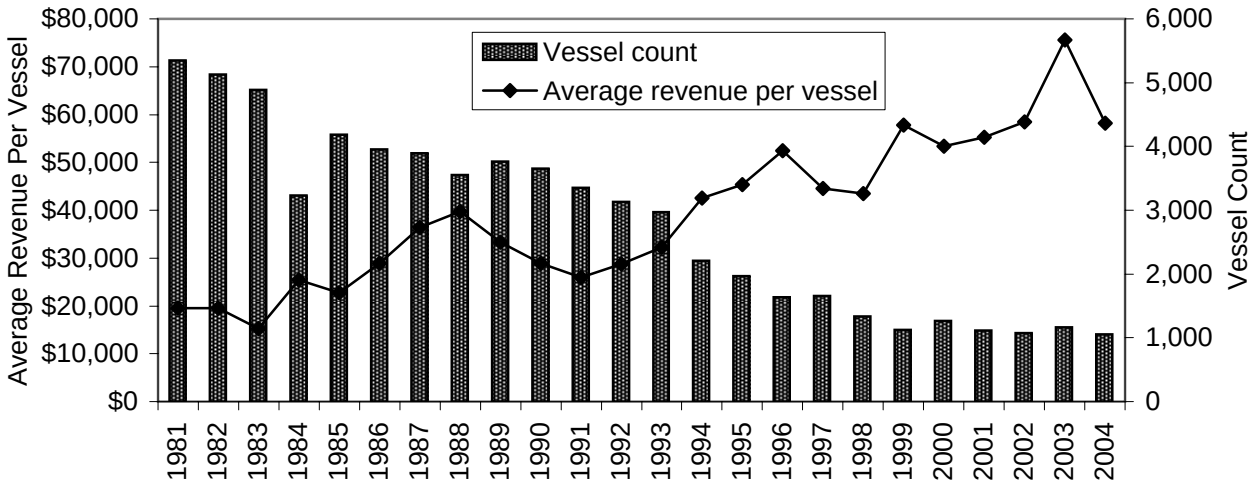
Table WA-4
Washington Port Group Share of Onshore Landings and Home-Port Vessels in 2001 to 2004

		2001			2002			2003			2004		
	Local/	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port
Port Group/Communities	Regional	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels
Northern Puget Sound		22%	28%	37%	18%	22%	36%	18%	19%	32%	18%	24%	35%
Southern Puget Sound		13%	23%	11%	14%	30%	9%	13%	25%	10%	12%	30%	11%
Coastal Washington North		6%	10%	11%	7%	10%	12%	6%	10%	10%	6%	13%	9%
Coastal Washington South and Cent		56%	35%	40%	58%	35%	44%	62%	43%	48%	62%	29%	45%
Unidentified Washington		2%	3%	1%	2%	4%	0%	2%	3%	0%	2%	4%	0%
Total		177.4 million pounds	$147.0 million ex-vessel	1,118 vessels	193.8 million pounds	$153.4 million ex-vessel	1,070 vessels	212.7 million pounds	$179.1 million ex-vessel	1,164 vessels	207.4 million pounds	$148.7 million ex-vessel	1,052 vessels

Notes:
1. Declaration of local or regional considers presence of vessel repair businesses, fishing equipment suppliers, ice services, cold storage, delivery services from buyers and processors, moorage and landing facilities, etc.
2. Value is in millions of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
3. Aquaculture is included in landings.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

Figure WA-3
Washington Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2004



Notes:
1. Revenues adjusted to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes vessels with identifier codes "NONE" or "ZZ…," which are generally attributable to deliveries made in tribal fisheries.
3. Includes only vessels with home-port group in Washington. Home-port group is defined as the port group where a vessel made the most landings by value.
4. Average revenue per vessel is for onshore landings; distant water fisheries revenue and aquaculture revenue are not included.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table WA-5
Washington Vessel Counts and Revenue Shares by Revenue Categories in 1981 to 2004

	<$500				$500 to $4,999				$5,000 to $49,999				>=$50,000				Total	
	Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average
Years	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue
1981	1,632	272	30.5%	0.4%	2,018	3,805	37.7%	7.4%	1,440	26,138	26.9%	36.1%	259	226,012	4.8%	56.1%	5,349	19,499
1982	1,673	253	32.6%	0.4%	1,766	3,562	34.4%	6.3%	1,436	25,951	28.0%	37.1%	254	222,492	5.0%	56.2%	5,129	19,593
1983	2,429	203	49.7%	0.7%	1,505	3,186	30.8%	6.5%	770	24,455	15.8%	25.4%	184	272,350	3.8%	67.5%	4,888	15,187
1984	847	250	26.2%	0.3%	1,098	3,353	34.0%	4.5%	1,075	23,886	33.3%	31.3%	212	247,640	6.6%	64.0%	3,232	25,393
1985	1,402	200	33.5%	0.3%	1,272	3,172	30.4%	4.2%	1,207	23,498	28.9%	29.8%	299	208,593	7.2%	65.6%	4,180	22,739
1986	1,273	183	32.2%	0.2%	988	3,189	25.0%	2.8%	1,346	25,744	34.0%	30.3%	349	219,205	8.8%	66.8%	3,956	28,953
1987	979	182	25.2%	0.1%	984	2,994	25.3%	2.1%	1,464	27,687	37.6%	28.6%	464	211,482	11.9%	69.2%	3,891	36,440
1988	639	220	18.0%	0.1%	870	3,150	24.5%	1.9%	1,576	28,277	44.4%	31.6%	467	200,624	13.1%	66.4%	3,552	39,734
1989	952	159	25.3%	0.1%	824	3,198	21.9%	2.1%	1,520	22,052	40.4%	26.7%	470	189,838	12.5%	71.1%	3,766	33,332
1990	736	178	20.1%	0.1%	1,040	2,936	28.5%	2.9%	1,477	21,713	40.4%	30.4%	402	174,993	11.0%	66.6%	3,655	28,892
1991	779	191	23.3%	0.2%	953	2,956	28.4%	3.2%	1,276	21,225	38.1%	31.2%	342	165,944	10.2%	65.4%	3,350	25,911
1992	752	166	24.1%	0.1%	913	2,881	29.2%	2.9%	1,074	20,048	34.4%	24.0%	387	169,380	12.4%	73.0%	3,126	28,738
1993	556	166	18.7%	0.1%	897	2,757	30.2%	2.6%	1,078	20,605	36.3%	23.2%	441	160,681	14.8%	74.1%	2,972	32,179
1994	250	254	11.3%	0.1%	646	2,819	29.3%	1.9%	837	22,437	37.9%	20.0%	473	154,496	21.4%	78.0%	2,206	42,494
1995	282	214	14.4%	0.1%	597	2,386	30.4%	1.6%	719	22,109	36.6%	17.9%	365	196,203	18.6%	80.5%	1,963	45,337
1996	254	204	15.5%	0.1%	424	2,514	25.9%	1.2%	606	20,748	37.0%	14.6%	356	203,198	21.7%	84.1%	1,640	52,457
1997	171	226	10.3%	0.1%	481	2,511	29.1%	1.6%	644	21,776	38.9%	19.0%	359	162,800	21.7%	79.3%	1,655	44,541
1998	76	198	5.7%	0.0%	358	2,519	26.9%	1.6%	605	21,926	45.4%	22.9%	294	148,715	22.1%	75.5%	1,333	43,439
1999	108	230	9.6%	0.0%	306	2,481	27.2%	1.2%	413	22,625	36.6%	14.3%	300	183,460	26.6%	84.5%	1,127	57,823
2000	95	235	7.5%	0.0%	327	2,478	25.8%	1.2%	510	20,445	40.3%	15.4%	333	169,094	26.3%	83.3%	1,265	53,413
2001	83	229	7.4%	0.0%	239	2,599	21.4%	1.0%	467	21,881	41.8%	16.6%	329	154,657	29.4%	82.4%	1,118	55,224
2002	44	250	4.1%	0.0%	187	2,499	17.5%	0.7%	506	21,332	47.3%	17.2%	333	154,201	31.1%	82.0%	1,070	58,524
2003	53	228	4.6%	0.0%	173	2,298	14.9%	0.5%	538	21,908	46.2%	13.4%	400	189,387	34.4%	86.1%	1,164	75,559
2004	41	246	3.9%	0.0%	180	2,342	17.1%	0.7%	510	22,004	48.5%	18.3%	321	154,261	30.5%	80.9%	1,052	58,148

Notes: 1. Revenue in 2004 dollars adjusted using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Includes only vessels with home-port group in Washington. Home-port group is defined as the port group where a vessel made the most landings by value.
3. Revenue excludes deliveries to offshore processors, revenues returned from distant water fisheries, and aquaculture.
4. Excludes vessel identification codes "NONE" and "ZZ..." which are usually used to identify vessels within tribal commercial fisheries.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

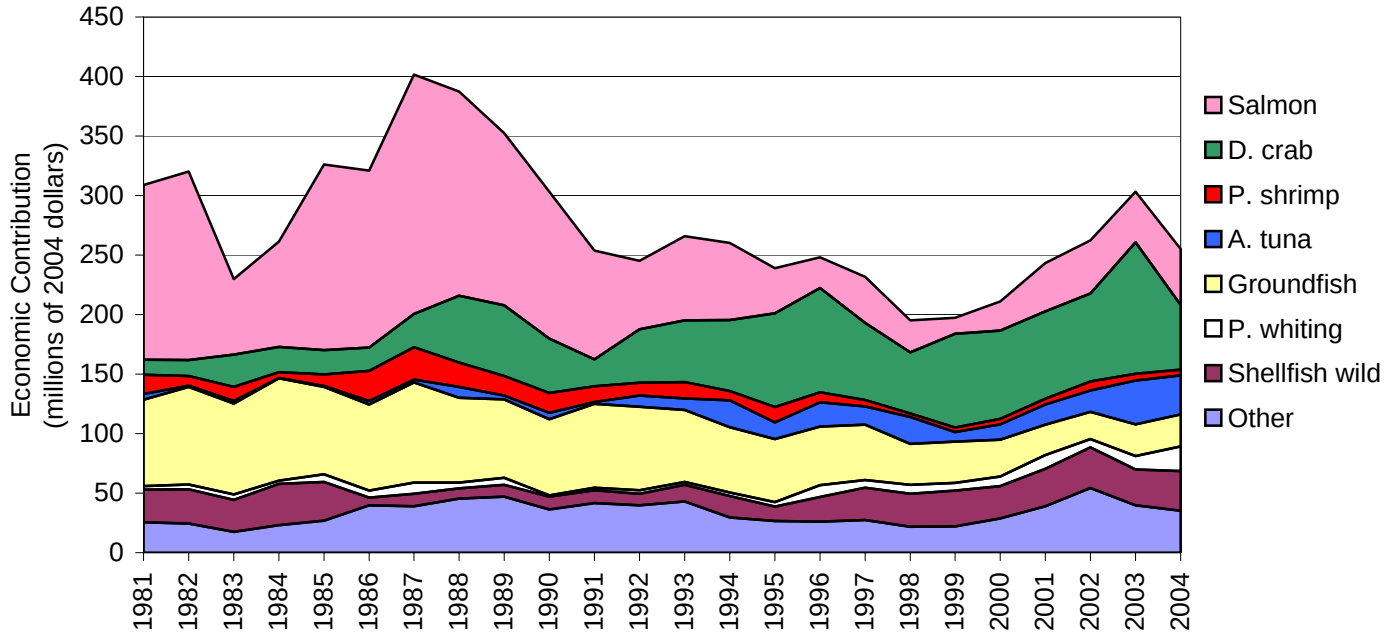
Table WA-6
Washington Economic Contributions by Species Group in 1981 to 2004

	Onshore Landings								
Years	Salmon	Dungeness Crab	Pink Shrimp	Albacore Tuna	Groundfish	Pacific Whiting	Shellfish Wild	Other	Total Landed Fish
1981	146.8	12.5	16.1	5.0	72.5	2.8	27.5	25.6	308.8
1982	158.4	13.4	8.0	1.2	82.0	4.0	28.7	24.5	320.1
1983	63.4	27.2	11.8	2.1	76.4	4.6	26.9	17.4	229.7
1984	88.4	21.3	4.7	0.3	86.1	2.7	34.7	23.0	261.2
1985	155.9	20.4	9.9	0.7	73.6	6.5	32.5	26.8	326.2
1986	148.6	19.7	25.2	3.0	72.3	5.9	6.4	39.8	320.9
1987	201.3	27.8	27.1	2.3	84.4	9.3	10.4	39.0	401.7
1988	171.5	56.4	20.4	9.0	71.4	4.8	8.7	45.4	387.4
1989	144.5	59.4	16.3	3.3	65.9	5.8	10.0	47.1	352.3
1990	123.4	45.5	16.8	5.4	63.8	1.2	10.8	36.2	303.1
1991	91.5	22.3	13.2	1.8	70.3	2.2	10.7	41.7	253.7
1992	57.4	44.9	10.9	9.5	70.0	2.9	9.8	39.8	245.1
1993	70.7	51.9	13.7	9.5	60.6	2.4	14.0	43.0	265.9
1994	64.6	59.7	7.7	22.6	55.0	3.0	18.0	29.5	260.1
1995	37.8	78.9	12.8	14.0	52.9	3.6	12.1	26.7	239.0
1996	25.9	87.6	8.2	20.6	49.3	9.9	20.7	26.0	248.2
1997	38.8	64.7	5.4	15.4	46.5	6.5	27.1	27.4	231.8
1998	26.9	51.3	3.1	22.6	34.3	7.7	27.5	21.9	195.2
1999	13.4	78.7	3.7	8.2	34.6	6.5	30.2	21.9	197.2
2000	24.4	74.3	4.5	12.7	31.0	8.1	27.1	28.8	211.0
2001	40.6	73.3	4.9	16.8	25.5	11.6	31.6	38.9	243.3
2002	44.6	73.8	7.5	18.1	22.8	7.2	33.9	54.4	262.3
2003	42.3	110.6	5.5	37.0	26.4	11.4	30.1	39.8	303.1
2004	46.9	54.4	4.9	32.6	27.0	20.6	33.3	35.3	255.1

Notes:
1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish and salmon aquaculture are not included.
3. Distant water fisheries economic contribution for Washington is not included.
4. Dungeness crab and groundfish species groups' economic contribution includes ocean and Puget Sound fisheries.

Source: Study.

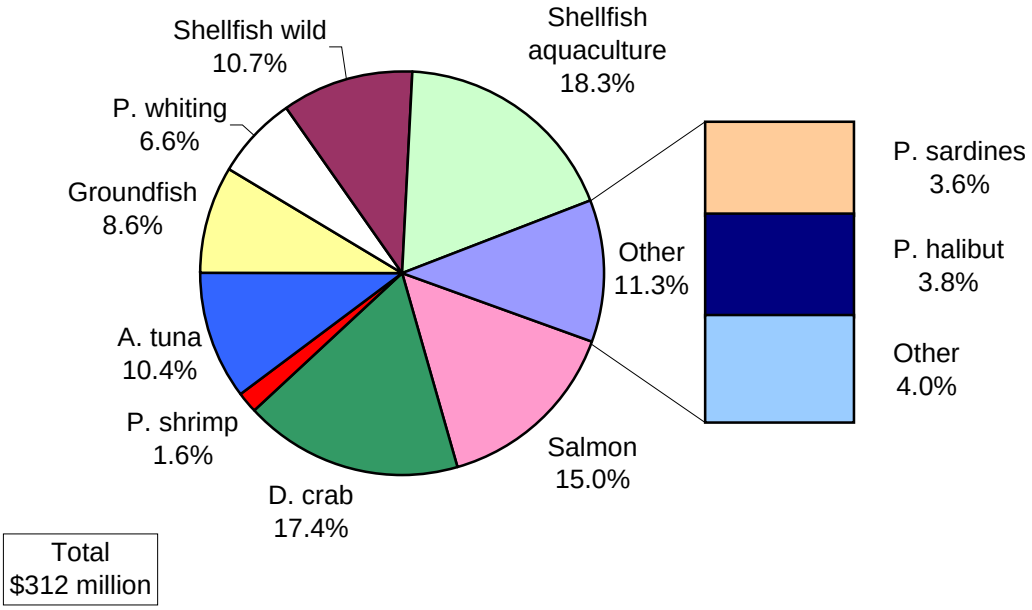
Figure WA-4
Washington Economic Contributions From Onshore Landings in 1981 to 2004



Notes:
1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish and salmon aquaculture are not included.
3. Distant water fisheries economic contribution for Washington is not included.
4. Dungeness crab and groundfish species groups' economic contribution includes ocean and Puget Sound fisheries.

Source: Study.

Figure WA-5
Washington Economic Contributions by Species Group and Shellfish Aquaculture in 2004

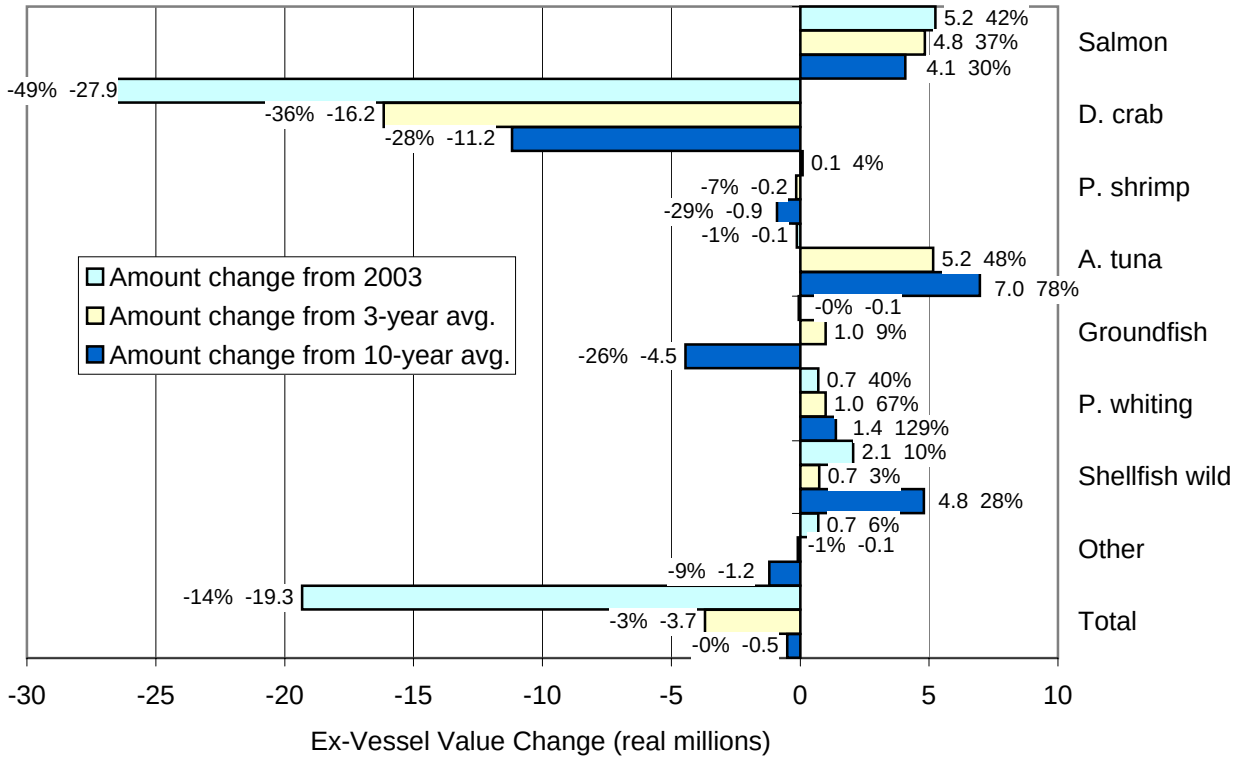


Aquaculture economic contributions by species (millions of dollars):	
Pacific oysters	26.6
Manila clams	18.1
Geoduck	5.7
Blue or bay mussel	4.2
Other oysters, clams, mussels	2.6
Total	57.1

Notes:
1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Salmon aquaculture is not included.
3. Distant water fisheries economic contribution for Washington is not included.
4. Dungeness crab and groundfish species groups' economic contribution includes ocean and Puget Sound fisheries.

Source: Study.

Figure WA-6
Washington Change Between Year 2004 Ex-Vessel Value and 2003, Three Year Average (2001-2003), and 10 Year Average (1994-2003)



Notes: 1. Ex-vessel value is in millions of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Shellfish includes only wild harvests. Shellfish and salmon aquaculture are not included.
3. Dungeness crab and groundfish species groups include ocean and Puget Sound fisheries.

Source: PacFIN November 2004, December 2004, February 2005, and March 2005 extractions.

Table WA-7
Washington Fishery Vessel Participation in 2004

SALMON FISHERY		
Year 2004		
Volume (thousands pounds)		29,384
Ocean troll price		1.48
Ex-vessel value (thousands)		$17,763
Change from 2003		42%
3 year average		37%
10 year average		30%
Economic contribution (millions)		$46.94
Share onshore total		18%
	Count	Share
Vessels >$500	409	91%
Average salmon revenue	$15,445	
Salmon share		60%
Vessels 50% value	68	15%
Vessels 90% value	231	52%
Top 10 vessels	10	2%
Average salmon revenue	$76,705	
Salmon share		94%
Type: Troll, Non-Tribal		
Landing volume (million lbs)	0.7	--
Landing value (million)	$1.2	--
Vessels >$500	86	99%
Average salmon revenue	$13,770	
Salmon share		46%
Vessels 50% value	21	24%
Vessels 90% value	57	66%
Type: Net, Non-Tribal, Washington Landings		
Landing volume (million lbs)	12.3	--
Landing value (million)	$5.5	--
Vessels >$500	321	90%
Average salmon revenue	$15,963	
Salmon share		80%
Vessels 50% value	50	14%
Vessels 90% value	174	49%
Type: Net, Tribal, Washington Landings		
Landing volume (million lbs)	15.0	--
Landing value (million)	$9.3	--
Type: Troll, Tribal		
Landing volume (million lbs)	1.3	--
Landing value (million)	$1.7	--

DUNGENESS CRAB FISHERY		
Year 2004		
Volume (thousands pounds)		14,969
Price		1.94
Ex-vessel value (thousands)		$29,049
Change from 2003		-49%
3 year average		-36%
10 year average		-28%
Economic contribution (millions)		$54.39
Share onshore total		21%
	Count	Share
Vessels >$500	386	99%
Average D. crab revenue	$40,097	
D. crab share		72%
Vessels 50% value	68	17%
Vessels 90% value	233	60%
Top 10 vessels	10	3%
Average D. crab revenue	$179,481	
D. crab share		92%
Puget Sound		
Landing volume (million lbs)	6.4	--
Landing value (million)	$12.3	--
Vessels >$500	205	99%
Average D. crab revenue	$21,406	
D. crab share		75%
Vessels 50% value	54	26%
Vessels 90% value	139	67%
Top 10 vessels	10	5%
Average D. crab revenue	$55,717	
D. crab share		86%
Ocean		
Landing volume (million lbs)	8.6	--
Landing value (million)	$16.8	--
Vessels >$500	189	99%
Average D. crab revenue	$58,674	
D. crab share		66%
Vessels 50% value	42	22%
Vessels 90% value	115	60%
Top 10 vessels	10	5%
Average D. crab revenue	$175,178	
D. crab share		84%

PINK SHRIMP FISHERY		
Year 2004		
Volume (thousands pounds)		6,020
Price		0.36
Ex-vessel value (thousands)		$2,195
Change from 2003		4%
3 year average		-7%
10 year average		-29%
Economic contribution (millions)		$4.93
Share onshore total		2%
	Count	Share
Vessels >$500	26	100%
Average shrimp revenue	$84,383	
Shrimp share		69%
Vessels 50% value	6	23%
Vessels 90% value	16	62%
Top 10 vessels	10	38%
Average shrimp revenue	$158,617	
Shrimp share		83%

ALBACORE TUNA FISHERY		
Year 2004		
Volume (thousands pounds)		18,319
Price		0.87
Ex-vessel value (thousands)		$15,891
Change from 2003		-1%
3 year average		48%
10 year average		78%
Economic contribution (millions)		$32.58
Share onshore total		13%
	Count	Share
Vessels >$500	258	95%
Average tuna revenue	$57,821	
Tuna share		69%
Vessels 50% value	35	13%
Vessels 90% value	125	46%
Top 10 vessels	10	4%
Average tuna revenue	$319,930	
Tuna share		100%

GROUNDFISH FISHERY		
Year 2004		
Volume (thousands pounds)		21,872
Price		0.58
Ex-vessel value (thousands)		$12,593
Change from 2003		0%
3 year average		9%
10 year average		-26%
Economic contribution (millions)		$26.99
Share onshore total		11%
	Count	Share
Vessels >$500	135	71%
Vessels 50% value	10	5%
Vessels 90% value	45	24%
Type: Limited Entry, Trawl and Fixed Gear		
Landing volume (million lbs)	9.9	--
Landing value (million)	$6.0	--
Vessels >$500	59	100%
Average LE GF revenue	$101,534	
LE GF share		58%
Vessels 50% value	9	15%
Vessels 90% value	33	56%
Top 10 vessels	10	17%
Average LE GF revenue	$328,576	
LE GF share		91%
Type: Open Access		
Landing volume (million lbs)	7.7	--
Landing value (million)	$2.9	--
Vessels >$500	92	61%
Average OA GF revenue	$29,199	
OA GF share		31%
Vessels 50% value	2	1%
Vessels 90% value	25	17%
Top 10 vessels	10	7%
Average OA GF revenue	$213,639	
OA GF share		80%

Note: Vessel counts include home-port vessels as well as out-of-state vessels making Washington landings.

GROUNDFISH FISHERY		
Year 2004		
Volume (thousands pounds)		21,872
Price		0.58
Ex-vessel value (thousands)		$12,593
Change from 2003		0%
3 year average		9%
10 year average		-26%
Economic contribution (millions)		$26.99
Share onshore total		11%
	Count	Share
Vessels >$500	135	71%
Vessels 50% value	10	5%
Vessels 90% value	45	24%
Puget Sound		
Landing volume (million lbs)	1.2	--
Landing value (million)	$0.4	--
Vessels >$500	15	65%
Average GF revenue	$22,434	
GF share		39%
Vessels 50% value	1	4%
Vessels 90% value	4	17%
Top 10 vessels	10	43%
Average GF revenue	$33,159	
GF share		46%
Ocean		
Landing volume (million lbs)	20.7	--
Landing value (million)	$12.2	--
Vessels >$500	126	72%
Average GF revenue	$66,192	
GF share		51%
Vessels 50% value	9	5%
Vessels 90% value	43	25%
Top 10 vessels	10	6%
Average GF revenue	$444,292	
GF share		93%
Note: Vessel counts include home-port vessels as well as out-of-state vessels making Washington landings.		

PACIFIC WHITING FISHERY		
Year 2004		
Volume (thousands pounds)		72,247
Price		0.034
Ex-vessel value (thousands)		$2,460
Change from 2003		40%
3 year average		67%
10 year average		129%
Economic contribution (millions)		$20.65
Share onshore total		8%
	Count	Share
Vessels >$500	7	88%
Average whiting revenue	$287,214	
Whiting share		77%
Vessels 50% value	3	38%
Vessels 90% value	6	75%
Top 10 vessels	8	100%
Average whiting revenue	$251,313	
Whiting share		74%

Note: Some vessels land outside Washington, but only Washington landings are included.

Table OR-1
Oregon Onshore Landed Volume by Species Groups in 1970 to 2004

Year	Salmon	Crab	Shrimp	Tuna	Groundfish	Whiting	Other	Total
1970	19,628	14,929	13,572	26,937	21,392	--	1,200	97,659
1971	17,268	14,876	9,075	13,092	22,040	--	1,036	77,387
1972	12,189	6,762	20,731	29,234	22,801	--	1,170	92,888
1973	17,385	2,350	24,517	24,425	21,944	--	917	91,538
1974	15,099	3,918	20,314	33,040	22,098	--	1,137	95,605
1975	12,390	4,027	24,084	23,584	21,024	--	937	86,046
1976	16,278	8,134	25,456	17,349	26,930	--	1,313	95,460
1977	10,774	19,902	48,580	9,899	23,366	--	1,835	114,357
1978	8,780	12,502	56,666	18,398	37,056	--	1,385	134,787
1979	11,129	15,634	29,587	8,821	64,430	--	2,267	131,868
1980	7,243	18,652	30,152	3,506	63,661	--	1,293	124,507
1981	7,041	6,984	25,924	7,727	82,502	--	18,047	148,224
1982	8,638	7,036	18,462	1,914	90,690	--	2,944	129,683
1983	2,673	5,368	6,547	3,411	78,152	--	4,211	100,361
1984	3,597	5,014	4,844	1,624	62,180	--	6,905	84,163
1985	6,577	7,518	14,855	1,525	63,872	--	5,258	99,606
1986	13,797	4,661	33,884	2,461	54,884	--	4,136	113,822
1987	15,093	5,991	44,589	2,288	67,374	--	3,380	138,716
1988	17,789	9,417	41,846	3,967	70,851	--	4,531	148,402
1989	11,724	11,676	49,129	1,080	81,232	--	10,784	165,624
1990	5,412	9,510	31,883	2,079	73,298	5,058	11,832	139,072
1991	5,344	4,924	21,711	1,259	80,843	29,109	6,843	150,033
1992	2,364	11,908	48,033	3,896	75,206	107,939	7,643	256,989
1993	1,848	10,456	26,923	4,754	81,297	78,970	6,166	210,415
1994	1,285	10,638	16,386	4,698	64,261	143,563	4,900	245,731
1995	2,862	11,954	12,106	5,034	55,037	147,355	4,348	238,695
1996	2,842	19,302	15,727	8,948	56,981	155,588	3,128	262,516
1997	2,245	7,777	19,560	9,168	52,691	162,782	6,738	260,960
1998	1,978	7,410	6,096	10,603	41,800	157,895	4,717	230,499
1999	1,560	12,347	20,451	4,553	44,112	160,965	5,532	249,520
2000	3,142	11,181	25,462	8,757	39,307	151,461	24,559	263,869
2001	5,266	9,690	28,482	8,957	31,543	117,673	32,163	233,773
2002	6,116	12,441	41,541	4,353	21,109	71,220	53,347	210,127
2003	6,657	23,483	20,546	9,126	25,743	80,648	58,759	224,962
2004	5,922	27,246	12,207	10,595	25,597	130,238	82,316	294,120

Notes:
1. Landings are reported in thousands of round pounds.
2. Salmon includes landings of steelhead, which have come exclusively from the treaty Indian fisheries since 1975.
3. Crab includes only Dungeness crab; shrimp only pink shrimp; and tuna only albacore tuna. Tuna includes landings of albacore, yellowfin and skipjack tuna for 1970 to 1979. Essentially all tuna landings from 1980 on are albacore.
4. Groundfish includes landings of cods, rockfish (snapper), sablefish, soles, flounders, halibut (until 1983), and Pacific whiting (until 1990). Pacific whiting (also known as hake) did not emerge as a major fishery species until after 1990.
5. Other in the most recent year includes landings (thousands of round pounds) of sardines (79,610), halibut (345), sea urchins (332), sturgeon (249), clams (230), shad (190), crayfish (58), squid (43), smelt (1), and other species (1,257). Shellfish volume excludes private lands harvests.
6. Landing data is preliminary for 2004.

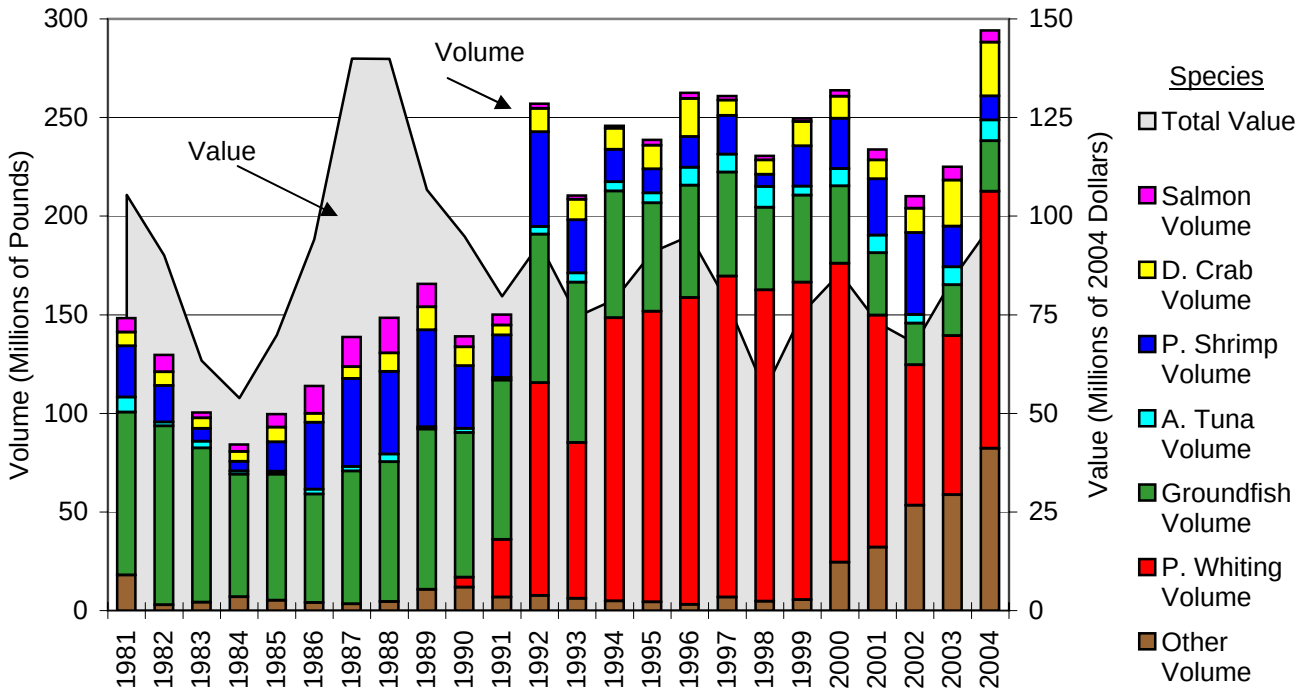
Source: Oregon Department of Fish and Wildlife Table 4 and 42.

Table OR-2
Oregon Onshore Landed Value by Species Groups in 1970 to 200

	Price	Salmon		Dungeness Crab		Pink Shrimp		Albacore Tuna		Groundfish		Pacific Whiting		Other		Total	
Year	Index	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal
1970	25.4	35,938	9,144	14,668	3,732	6,402	1,629	27,213	6,924	6,308	1,605	--	--	802	204	91,330	23,238
1971	26.7	21,505	5,745	15,890	4,245	4,155	1,110	13,581	3,628	6,783	1,812	--	--	771	206	62,685	16,746
1972	27.9	23,006	6,412	10,283	2,866	10,297	2,870	32,779	9,136	7,771	2,166	--	--	746	208	84,883	23,658
1973	29.4	48,082	14,150	4,553	1,340	18,329	5,394	29,556	8,698	8,913	2,623	--	--	775	228	110,208	32,433
1974	32.1	32,813	10,531	8,603	2,761	13,772	4,420	39,169	12,571	10,077	3,234	--	--	614	197	105,046	33,714
1975	35.1	28,060	9,851	9,175	3,221	9,220	3,237	21,363	7,500	8,471	2,974	--	--	689	242	76,978	27,025
1976	37.1	52,121	19,358	14,238	5,288	13,707	5,091	15,242	5,661	11,583	4,302	--	--	1,260	468	108,151	40,168
1977	39.5	39,679	15,672	27,597	10,900	28,356	11,200	6,492	2,564	12,406	4,900	--	--	1,496	591	116,025	45,827
1978	42.3	27,709	11,711	22,712	9,599	35,263	14,904	24,417	10,320	18,990	8,026	--	--	984	416	130,075	54,976
1979	45.8	45,755	20,947	25,397	11,627	24,770	11,340	10,170	4,656	38,018	17,405	--	--	2,007	919	146,117	66,894
1980	49.9	21,091	10,533	24,779	12,375	33,405	16,683	5,498	2,746	23,229	11,601	--	--	1,245	622	109,247	54,560
1981	54.6	20,308	11,095	12,285	6,712	23,873	13,043	12,223	6,678	26,937	14,717	--	--	9,723	5,312	105,350	57,557
1982	58.0	21,418	12,415	13,027	7,551	16,025	9,289	2,184	1,266	35,051	20,317	--	--	2,367	1,372	90,072	52,210
1983	60.2	5,046	3,040	13,191	7,947	7,729	4,656	3,122	1,881	31,480	18,965	--	--	2,754	1,659	63,322	38,148
1984	62.5	8,184	5,116	12,387	7,743	3,437	2,148	1,382	864	23,482	14,679	--	--	4,989	3,119	53,861	33,670
1985	64.4	14,074	9,066	16,508	10,634	8,138	5,242	1,248	804	25,818	16,632	--	--	4,049	2,608	69,835	44,986
1986	65.8	23,084	15,198	10,007	6,589	27,535	18,129	2,087	1,374	25,539	16,815	--	--	5,894	3,880	94,145	61,984
1987	67.6	39,917	26,997	12,349	8,352	44,762	30,274	2,477	1,675	35,805	24,216	--	--	4,666	3,156	139,976	94,670
1988	69.9	55,871	39,076	16,130	11,281	24,520	17,150	4,757	3,327	34,063	23,823	--	--	4,556	3,187	139,898	97,845
1989	72.6	19,643	14,259	18,686	13,564	24,668	17,906	1,222	887	34,738	25,216	--	--	7,697	5,587	106,654	77,420
1990	75.4	12,712	9,585	19,304	14,555	20,728	15,629	2,214	1,670	30,674	23,128	291	220	8,898	6,709	94,822	71,494
1991	78.0	7,474	5,832	9,563	7,462	15,468	12,069	1,250	976	36,929	28,816	1,790	1,397	7,190	5,610	79,664	62,162
1992	79.8	4,620	3,688	16,772	13,388	21,531	17,187	4,972	3,969	33,499	26,740	6,348	5,067	5,292	4,224	93,034	74,263
1993	81.7	2,971	2,426	14,446	11,798	10,912	8,912	4,753	3,881	33,839	27,636	2,790	2,279	4,811	3,929	74,522	60,861
1994	83.4	1,750	1,460	17,341	14,463	11,542	9,626	4,496	3,750	34,491	28,767	5,142	4,289	4,098	3,418	78,861	65,772
1995	85.1	4,200	3,575	23,551	20,045	10,104	8,599	4,406	3,750	36,382	30,965	8,225	7,000	3,964	3,374	90,831	77,308
1996	86.7	3,793	3,289	30,188	26,180	10,795	9,362	8,567	7,430	34,557	29,969	4,781	4,147	2,350	2,038	95,030	82,414
1997	88.2	3,145	2,773	16,601	14,637	8,972	7,911	7,420	6,542	31,742	27,986	7,738	6,823	2,513	2,215	78,130	68,886
1998	89.1	2,906	2,591	14,044	12,520	3,578	3,189	7,000	6,240	21,848	19,477	4,214	3,756	2,260	2,014	55,849	49,787
1999	90.4	2,259	2,043	25,331	22,908	10,583	9,571	4,184	3,784	24,537	22,190	6,543	5,917	2,085	1,886	75,523	68,299
2000	92.4	4,363	4,031	25,551	23,611	11,030	10,192	7,454	6,888	26,255	24,261	6,572	6,073	4,387	4,054	85,611	79,110
2001	94.6	6,185	5,852	20,281	19,192	7,989	7,560	7,986	7,557	21,505	20,350	4,363	4,129	4,663	4,413	72,974	69,053
2002	96.2	7,205	6,931	21,472	20,654	11,789	11,340	3,055	2,939	14,793	14,229	3,347	3,220	6,068	5,837	67,731	65,150
2003	97.9	8,969	8,785	37,052	36,292	5,150	5,044	6,253	6,125	17,835	17,469	3,676	3,601	5,116	5,011	84,052	82,327
2004	100.0	12,954	12,954	42,787	42,787	4,740	4,740	9,003	9,003	16,315	16,315	4,488	4,488	7,063	7,063	97,350	97,350

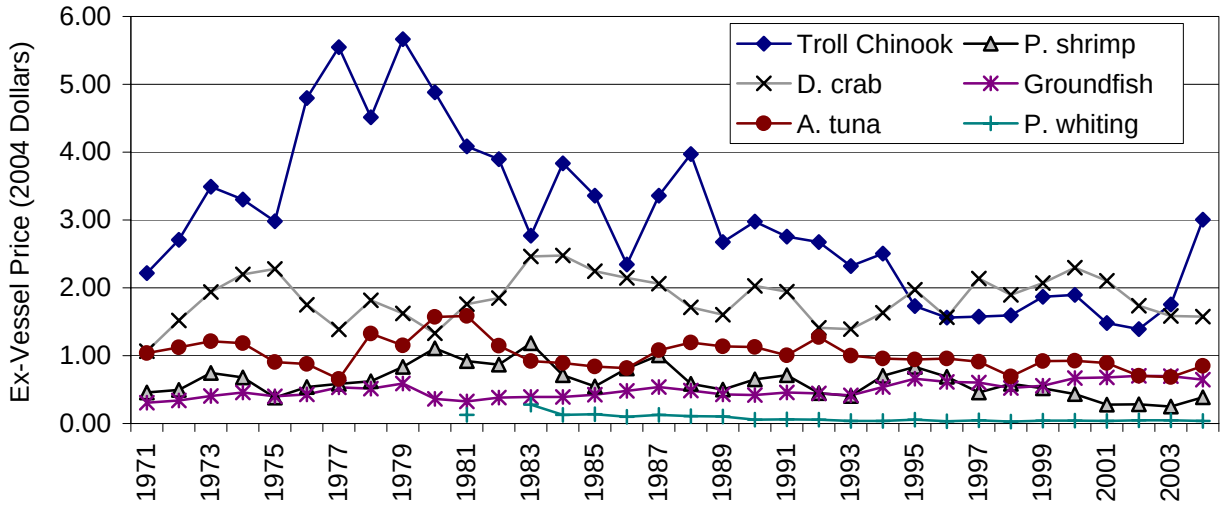
Notes:
1. Nominal value is the revenue received by fishermen/harvesters in the landing year. Real value is in thousands of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Other in the most recent year includes (thousands) sardines ($4,767), halibut ($875), sea urchins ($251), sturgeon ($157), clams ($193), shad ($26), crayfish ($90), squid ($6), smelt ($1), and other species ($697). Shellfish value excludes private lands harvest.
3. Notes and sources from volume table concerning species composition also apply to this table.

Figure OR-1
Oregon Onshore Landed Value and Volume by Species Groups in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Notes and sources from volume table concerning species composition also apply to this figure.

Figure OR-2
Oregon Species Group Annual Ex-Vessel Price Trends in 1971 to 2004



Notes: 1. Prices adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery.
3. Groundfish price calculation does not include Pacific whiting.
4. Prices are annual and species averaged expressed in round weight, except for troll Chinook prior to 1981 which are based on dressed weight, and are for onshore landings only. Average prices for salmon include seasonal and size considerations.

Source: Oregon Department of Fish and Wildlife for years prior to 1981. PacFIN January 2003, July 2003, January 2004, and February 2005 extractions for 1981 onward.

Table OR-3
Oregon Annual Ex-Vessel Prices by Selected Species and Species Groups in 1971 to 2004

Species	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Troll Chinook (ocean)	2.22	3.49	2.98	5.55	5.66	4.09	2.77	3.36	3.36	2.68	2.98	2.76	2.68	2.32	2.50	1.73	1.56	1.57	1.59	1.87	1.89	1.48	1.39	1.75	3.00
Troll coho (ocean)	1.35	2.67	2.22	3.41	4.98	2.65	1.38	2.04	2.22	1.28	1.85	1.10	1.17	1.21	-	-	-	-	-	0.99	1.00	0.72	0.68	0.75	1.08
Net Chinook (below Bonneville Dam)																			1.57	1.56	1.56	1.50	1.31	0.86	1.80
Spring																			2.91	3.14	3.01	2.97	3.31	2.81	3.77
Fall																			1.11	1.23	1.09	0.66	0.53	0.66	1.33
Net Chinook (above Bonneville Dam)																			0.54	0.60	0.70	0.43	0.30	0.26	0.75
Spring																			-	-	2.04	1.35	1.23	1.12	1.69
Fall																			0.56	0.63	0.68	0.26	0.19	0.19	0.77
Net coho (below Bonneville Dam)																			0.74	0.93	0.57	0.29	0.34	0.54	0.91
Net steelhead (above Bonneville Dam)																			0.26	0.46	0.31	0.16	0.10	0.08	0.37
Dungeness crab	1.07	1.94	2.28	1.39	1.62	1.76	2.46	2.25	2.06	1.60	2.03	1.94	1.41	1.39	1.63	1.97	1.56	2.13	1.90	2.07	2.29	2.10	1.73	1.58	1.58
Pink shrimp	0.46	0.75	0.38	0.58	0.84	0.92	1.18	0.55	1.01	0.50	0.65	0.71	0.45	0.41	0.70	0.83	0.69	0.46	0.59	0.52	0.43	0.28	0.28	0.25	0.39
Albacore tuna	1.04	1.21	0.91	0.66	1.15	1.58	0.92	0.84	1.08	1.14	1.13	1.01	1.28	1.00	0.96	0.95	0.96	0.91	0.69	0.92	0.93	0.89	0.70	0.69	0.85
Groundfish species group	0.31	0.41	0.40	0.53	0.59	0.32	0.39	0.42	0.54	0.43	0.42	0.46	0.45	0.42	0.54	0.66	0.61	0.60	0.52	0.56	0.67	0.68	0.70	0.70	0.64
Nearshore live fishery						-	-	-	-	-	-	-	-	-	-	-	-	1.62	2.16	2.98	3.55	3.26	3.30	3.00	2.77
Sablefish						0.38	0.37	0.46	0.65	0.61	0.58	0.77	0.82	0.67	1.03	1.56	1.66	1.80	1.34	1.30	1.60	1.48	1.46	1.58	1.26
Trawl gear						0.27	0.29	0.35	0.50	0.51	0.48	0.55	0.64	0.52	0.85	1.43	1.38	1.42	1.29	1.09	1.33	1.28	1.11	1.29	1.02
Fixed gear						0.52	0.48	0.59	0.80	0.81	0.79	1.14	1.15	0.94	1.20	1.75	2.18	2.43	1.41	1.58	1.91	1.78	1.88	1.97	1.60
Widow rockfish						-	-	0.39	0.47	0.35	0.34	0.35	0.33	0.33	0.37	0.38	0.35	0.34	0.39	0.41	0.47	0.43	0.43	0.45	0.43
Yellowtail rockfish						-	-	0.39	0.48	0.37	0.37	0.39	0.39	0.38	0.41	0.43	0.40	0.41	0.42	0.43	0.48	0.47	0.48	0.48	0.52
Thornyhead, longspine						-	-	-	-	-	-	-	-	-	-	1.12	0.94	0.82	0.67	0.78	0.92	0.93	0.88	0.66	0.51
Thornyhead, shortspine						-	-	-	-	-	-	-	-	-	-	1.31	1.17	0.95	0.82	0.99	1.10	1.06	1.03	0.81	0.66
Thornyhead, mixed						-	-	0.39	0.48	0.51	0.51	0.58	0.54	0.55	0.85	-	-	-	-	-	-	-	-	-	-
Pacific Ocean perch						0.29	0.35	0.37	0.47	0.35	0.34	0.38	0.35	0.33	0.33	0.34	0.32	0.31	0.37	0.38	0.46	0.44	0.46	0.45	0.46
Lingcod						0.41	0.41	0.41	0.56	0.46	0.45	0.42	0.46	0.45	0.48	0.50	0.50	0.53	0.79	0.84	1.21	1.22	1.20	1.10	1.01
Arrowtooth flounder						0.17	0.17	0.16	0.22	0.13	0.14	0.15	0.13	0.12	0.12	0.13	0.12	0.11	0.11	0.11	0.13	0.12	0.13	0.12	0.12
Dover sole						0.40	0.38	0.39	0.46	0.38	0.36	0.39	0.35	0.33	0.36	0.39	0.37	0.34	0.39	0.36	0.40	0.39	0.38	0.38	0.38
English sole						0.53	0.54	0.52	0.60	0.51	0.41	0.43	0.39	0.37	0.38	0.42	0.39	0.35	0.38	0.35	0.39	0.38	0.37	0.35	0.35
Petrale sole						0.97	1.16	1.14	1.22	1.15	1.10	1.05	1.00	0.94	0.98	1.14	1.12	1.05	1.06	1.06	1.09	1.04	0.94	1.03	1.02
Cod, Pacific						0.39	0.41	0.39	0.48	0.36	0.34	0.39	0.42	0.40	0.41	0.46	0.46	0.44	0.54	0.50	0.66	0.62	0.60	0.61	0.48
Whiting, Pacific						0.128	0.277	0.138	0.125	0.103	0.057	0.060	0.059	0.035	0.036	0.056	0.031	0.048	0.027	0.041	0.043	0.037	0.047	0.046	0.036
Sardines						-	-	-	-	-	-	-	-	-	-	-	-	-	0.392	0.056	0.059	0.060	0.059	0.054	0.061
Halibut, Pacific						1.95	1.81	1.52	2.30	1.95	2.38	2.40	1.46	1.59	2.25	2.04	2.61	2.09	1.53	2.18	2.28	2.01	1.99	2.57	2.54
Sturgeon, white						1.91	1.88	2.27	2.47	2.65	2.71	2.52	2.23	1.68	1.59	2.06	1.63	1.22	1.29	1.49	1.69	1.85	1.66	1.76	1.76
Sea urchin, red						-	-	-	0.37	0.48	0.68	0.98	0.97	1.07	0.92	0.95	0.61	0.61	0.50	0.62	0.75	0.67	0.45	0.43	0.37

Notes:
1. Annual prices are in 2004 dollars. Adjustment used GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Prices are for onshore landings. There will be differences for the same species, such as Pacific whiting, when delivered offshore.
3. Prices are for round pound equivalents, except for troll Chinook and troll coho prior to 1981 which are based on dressed weight.
4. Prices where landings are less than $500 annually are shown with a dash.
5. Inriver salmon prices include Oregon and Washington side landings.
6. The nearshore live groundfish fishery includes seven indicator species that are typically landed live in Oregon. These include cabezon, lingcod, black and blue rockfish, greenling, and other unspecified rockfish (not uniquely identified on a fish ticket).

Source: Oregon Department of Fish and Wildlife for years prior to 1981. PacFIN January 2003, July 2003, January 2004, and February 2005 extractions for 1981 onward. PFMC "Review of Ocean Salmon Fisheries" for inriver Chinook and coho.

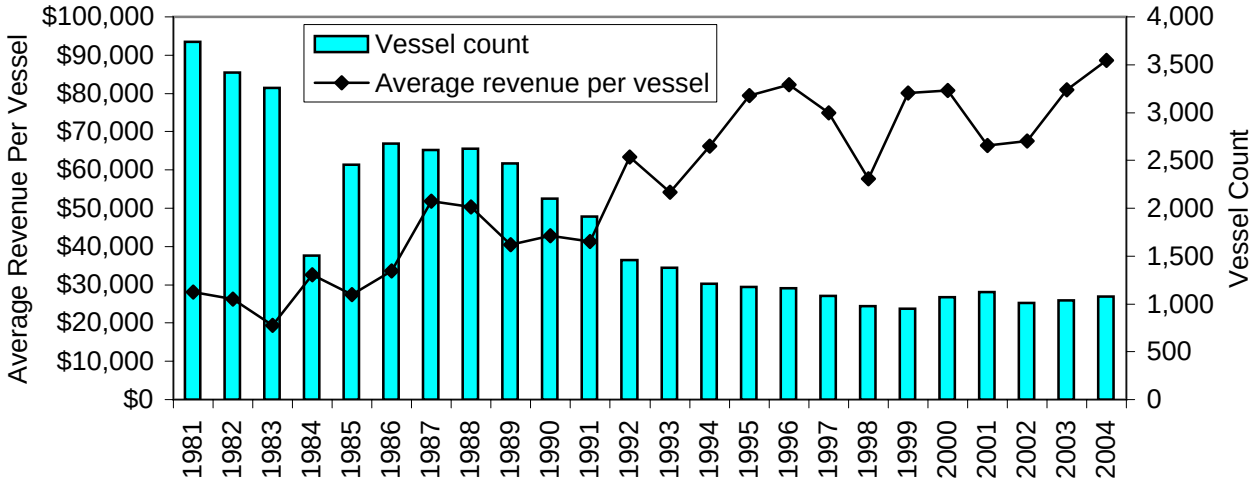
Table OR-4
Oregon Port Group Share of Onshore Landings and Home-Port Vessels in 2001 to 2004

		2001			2002			2003			2004		
	Local/	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port
Port Group/Communities	Regional	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels
Astoria		45%	37%	31%	52%	39%	32%	52%	33%	31%	47%	24%	29%
Astoria and Warrenton	R												
Tillamook		1%	3%	8%	2%	4%	9%	2%	4%	11%	1%	4%	10%
Garibaldi	L												
Pacific City	L												
Newport		40%	31%	26%	31%	27%	23%	31%	30%	24%	38%	30%	23%
Depoe Bay	L												
Newport	R												
Coos Bay		12%	21%	20%	13%	21%	21%	12%	22%	21%	10%	27%	24%
Florence	L												
Winchester Bay	L												
Charleston	R												
Bandon	L												
Brookings		2%	8%	14%	3%	7%	15%	3%	10%	13%	3%	14%	14%
Port Orford	L												
Gold Beach	L												
Brookings	R												
Total		233.8 million pounds	$73.0 million ex-vessel	1,125 vessels	210.1 million pounds	$67.7 million ex-vessel	1,011 vessels	225.0 million pounds	$84.1 million ex-vessel	1,037 vessels	294.1 million pounds	$97.4 million ex-vessel	1,079 vessels

Notes:
1. Declaration of local or regional considers presence of vessel repair businesses, fishing equipment suppliers, ice services, cold storage, delivery services from buyers and processors, moorage and landing facilities, etc.
2. Value is in millions of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.

Source: PacFIN November 2004, February 2005, and March 2005 extractions for vessels, and ODFW Table 4 and 42 for landings.

Figure OR-3
Oregon Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2004



Notes:
1. Revenues adjusted to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Average revenue per vessel is for onshore landings; distant water fisheries revenue is not included.

Table OR-5
Oregon Vessel Counts and Revenue Shares by Revenue Categories in 1981 to 2004

	<$500				$500 to $4,999				$5,000 to $49,999				>=$50,000				Total	
	Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average
Years	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue
1981	1,239	280	33.2%	0.3%	1,339	3,728	35.8%	4.7%	867	30,284	23.2%	25.0%	292	252,066	7.8%	70.0%	3,737	28,151
1982	1,041	248	30.4%	0.3%	1,308	3,534	38.2%	5.1%	820	27,918	24.0%	25.4%	251	248,118	7.3%	69.2%	3,420	26,331
1983	1,643	220	50.4%	0.6%	995	2,829	30.5%	4.5%	403	29,130	12.4%	18.6%	217	222,015	6.7%	76.4%	3,258	19,366
1984	350	275	23.2%	0.2%	526	3,341	34.9%	3.6%	460	27,392	30.5%	25.6%	171	203,397	11.3%	70.6%	1,507	32,671
1985	1,059	185	43.1%	0.3%	626	3,084	25.5%	2.9%	554	27,158	22.5%	22.3%	219	229,225	8.9%	74.5%	2,458	27,410
1986	827	196	30.9%	0.2%	840	3,210	31.4%	3.0%	757	26,847	28.3%	22.6%	251	266,075	9.4%	74.2%	2,675	33,633
1987	494	242	18.9%	0.1%	722	3,360	27.7%	1.8%	1,049	28,007	40.2%	21.7%	346	298,499	13.3%	76.4%	2,611	51,783
1988	276	306	10.5%	0.1%	620	3,325	23.7%	1.6%	1,299	28,117	49.6%	27.7%	424	219,484	16.2%	70.6%	2,619	50,298
1989	434	278	17.6%	0.1%	862	2,996	34.9%	2.6%	892	21,288	36.2%	19.0%	279	279,686	11.3%	78.2%	2,467	40,423
1990	444	240	21.1%	0.1%	722	2,837	34.4%	2.3%	641	21,862	30.5%	15.6%	293	251,913	14.0%	82.0%	2,100	42,847
1991	355	268	18.5%	0.1%	773	2,686	40.4%	2.6%	537	20,769	28.0%	14.1%	250	263,403	13.1%	83.2%	1,915	41,345
1992	294	211	20.2%	0.1%	428	2,464	29.3%	1.1%	417	23,587	28.6%	10.6%	320	254,739	21.9%	88.2%	1,459	63,378
1993	347	187	25.2%	0.1%	383	2,394	27.8%	1.2%	352	21,682	25.5%	10.2%	296	222,989	21.5%	88.5%	1,378	54,150
1994	316	196	26.1%	0.1%	327	2,534	27.0%	1.0%	285	22,842	23.5%	8.1%	283	257,201	23.4%	90.8%	1,211	66,217
1995	282	181	24.0%	0.1%	253	2,498	21.5%	0.7%	311	23,407	26.5%	7.8%	329	259,678	28.0%	91.5%	1,175	79,486
1996	184	214	15.8%	0.0%	266	2,409	22.8%	0.7%	360	22,285	30.9%	8.4%	355	245,631	30.5%	90.9%	1,165	82,319
1997	138	203	12.8%	0.0%	263	2,441	24.3%	0.8%	352	21,685	32.5%	9.4%	329	220,939	30.4%	89.7%	1,082	74,854
1998	124	199	12.7%	0.0%	252	2,556	25.8%	1.1%	331	22,233	33.9%	13.1%	268	180,166	27.5%	85.7%	975	57,756
1999	98	199	10.3%	0.0%	229	2,547	24.1%	0.8%	329	20,989	34.6%	9.1%	295	232,967	31.0%	90.2%	951	80,161
2000	88	222	8.2%	0.0%	219	2,472	20.5%	0.6%	415	21,237	38.8%	10.2%	347	221,576	32.5%	89.1%	1,069	80,694
2001	95	229	8.4%	0.0%	239	2,395	21.2%	0.8%	459	21,584	40.8%	13.3%	332	193,165	29.5%	85.9%	1,125	66,339
2002	81	213	8.0%	0.0%	208	2,375	20.6%	0.7%	426	20,495	42.1%	12.8%	296	199,397	29.3%	86.5%	1,011	67,521
2003	71	214	6.8%	0.0%	205	2,345	19.8%	0.6%	425	20,216	41.0%	10.2%	336	222,808	32.4%	89.2%	1,037	80,956
2004	81	224	7.5%	0.0%	176	2,312	16.3%	0.4%	453	20,365	42.0%	9.6%	369	233,214	34.2%	89.9%	1,079	88,699

Notes: 1. Revenue in 2004 dollars adjusted using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Includes only vessels with home-port group in Oregon. Home-port group is defined as the port group where a vessel made the most landings by value.
3. Revenue excludes deliveries to offshore processors and revenues returned from distant water fisheries.
4. Excludes vessel identification codes "NONE" and "ZZ..." which are usually used to identify vessels within tribal commercial fisheries.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table OR-6
Oregon Economic Contributions by Species Group in 1973 to 2004

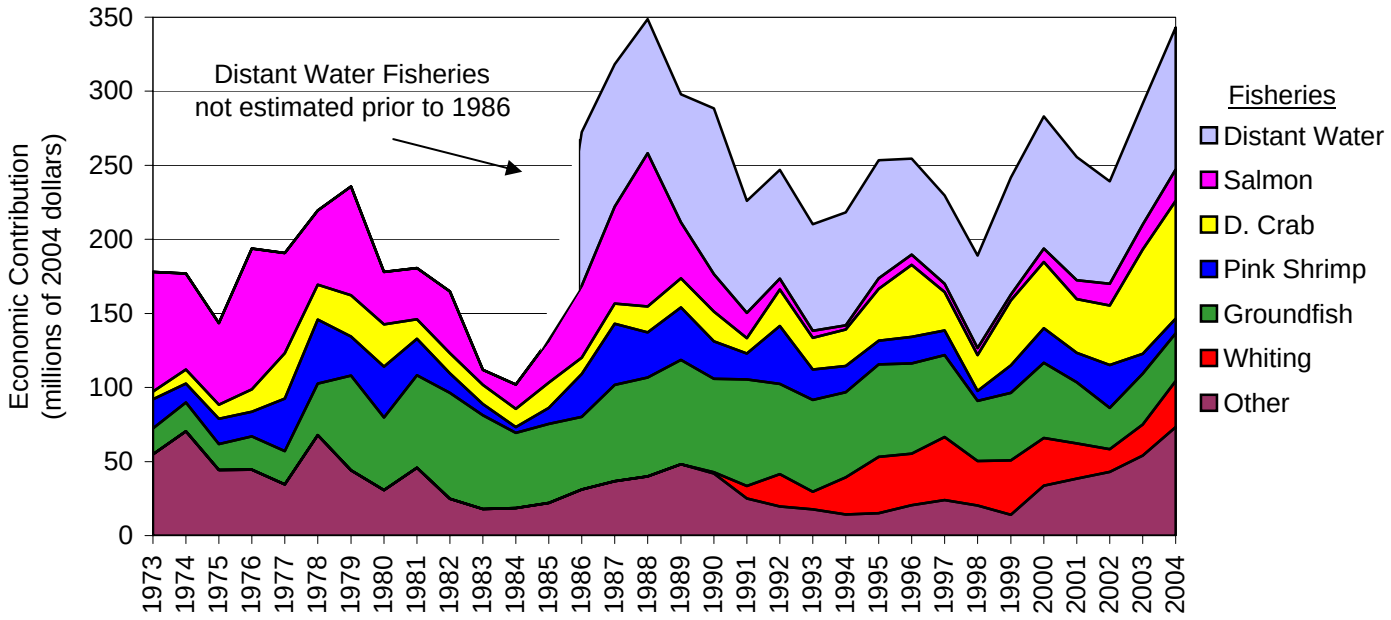
	Onshore Landings								
Years	Salmon	D. Crab	Pink Shrimp	Groundfish	Pacific Whiting	Other Finfish and Shellfish	Total Landed Fish	Distant Water Fisheries	Total
1973	80.8	5.0	19.9	17.4	-	54.8	177.9	-	177.9
1974	64.9	9.6	12.6	19.5	-	70.5	177.0	-	177.0
1975	55.1	9.6	16.9	17.5	-	44.3	143.5	-	143.5
1976	95.0	15.1	16.6	22.5	-	44.5	193.8	-	193.8
1977	67.7	30.7	35.5	22.4	-	34.5	190.8	-	190.8
1978	50.1	23.7	43.2	34.7	-	67.8	219.6	-	219.6
1979	73.5	27.7	26.3	64.0	-	44.1	235.7	-	235.7
1980	35.4	28.5	34.4	49.0	-	30.7	177.9	-	177.9
1981	34.5	13.2	24.6	62.4	-	45.8	180.6	-	180.6
1982	41.7	13.5	13.3	71.4	-	24.9	164.8	-	164.8
1983	10.1	13.1	7.5	63.3	-	17.9	112.0	-	112.0
1984	16.3	12.5	3.9	50.7	-	18.6	102.0	-	102.0
1985	28.7	17.1	10.9	53.4	-	21.9	132.1	-	132.1
1986	48.6	10.9	29.0	49.0	-	31.2	168.7	103.7	272.3
1987	65.6	13.6	41.2	65.1	-	36.6	222.2	96.1	318.2
1988	103.4	17.6	30.3	66.8	-	40.0	258.1	90.6	348.8
1989	37.8	19.8	35.4	70.5	-	48.1	211.6	86.3	297.9
1990	25.4	20.0	25.3	63.0	1.0	41.8	176.6	111.8	288.4
1991	17.0	10.3	17.5	72.0	8.5	25.0	150.3	75.7	226.0
1992	7.3	24.7	39.2	60.9	21.9	19.6	173.5	73.5	247.0
1993	4.8	21.4	20.5	61.9	11.9	17.8	138.3	72.0	210.3
1994	2.8	24.8	17.7	57.4	25.1	14.2	142.0	76.3	218.3
1995	7.3	34.8	16.1	62.5	37.9	15.2	173.7	79.6	253.4
1996	6.9	48.6	18.1	60.9	34.8	20.4	189.7	64.7	254.4
1997	5.7	25.8	16.8	55.2	42.5	24.1	170.1	59.5	229.6
1998	4.7	24.2	6.7	40.7	30.0	20.3	126.6	62.5	189.1
1999	4.0	43.8	18.7	45.4	36.9	14.0	162.7	79.0	241.8
2000	9.0	44.9	23.3	50.7	32.2	33.8	193.8	89.2	283.1
2001	12.7	36.4	19.9	41.3	23.6	38.5	172.4	83.1	255.6
2002	14.7	40.1	29.1	27.9	15.2	43.0	170.0	69.1	239.1
2003	16.7	70.5	13.3	34.5	20.9	54.0	209.9	81.8	291.7
2004	21.2	79.5	9.9	32.1	31.2	73.1	247.1	96.0	343.2

Notes:

1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Year 2004 is preliminary estimates.
3. The economic contributions from salmon fisheries include ocean troll and Columbia River gillnet fisheries, so the estimates will be greater than ocean salmon fisheries as reported by the Pacific Fishery Management Council.
4. Economic contributions from fish meal production are included in Pacific whiting. The largest source of fish carcasses is from surimi production.
5. The economic contribution from distant water fisheries includes the effects of vessel revenue returned to Oregon's economy from U.S. West Coast at-sea fisheries, Oregon home-port vessels landing in other U.S. West Coast states and Alaska, southern Pacific Ocean, and other fisheries. New fishing vessel construction, fishery management, and fishery research and training are not included.

Source: Study.

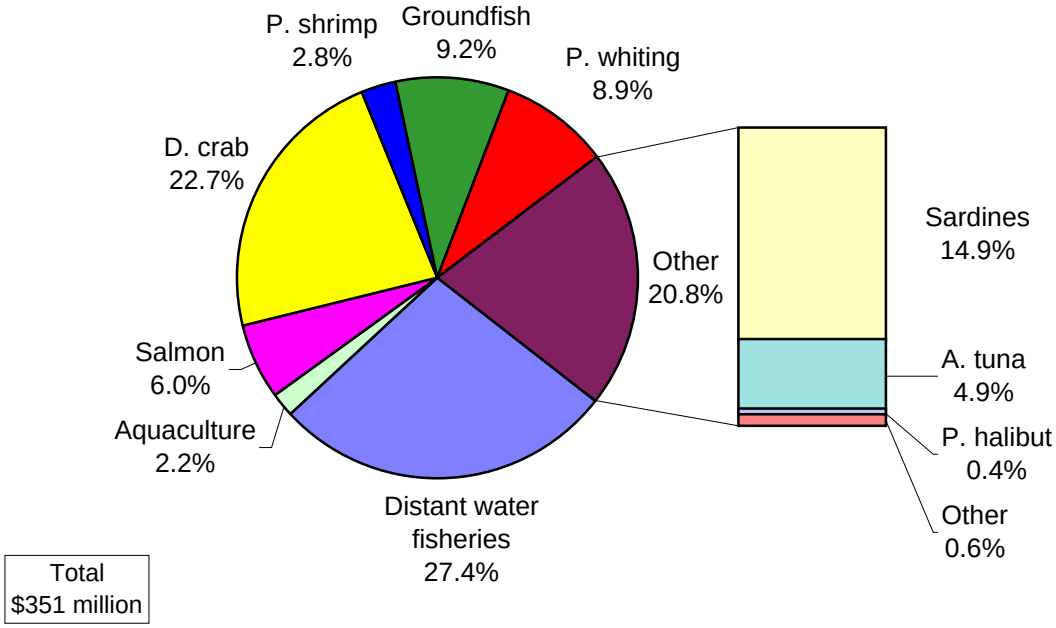
Figure OR-4
Oregon Economic Contributions From Onshore Landings in 1973 to 2004
and Distant Water Fisheries in 1986 to 2004



Notes: 1. Economic contributions are expressed as total personal income in millions of 2004 dollars. Dollar adjustment uses the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Shellfish aquaculture is not included.

Source: Study.

Figure OR-5
Oregon Economic Contributions by Species Group, Shellfish Aquaculture, and Distant Water Fisheries in 2004

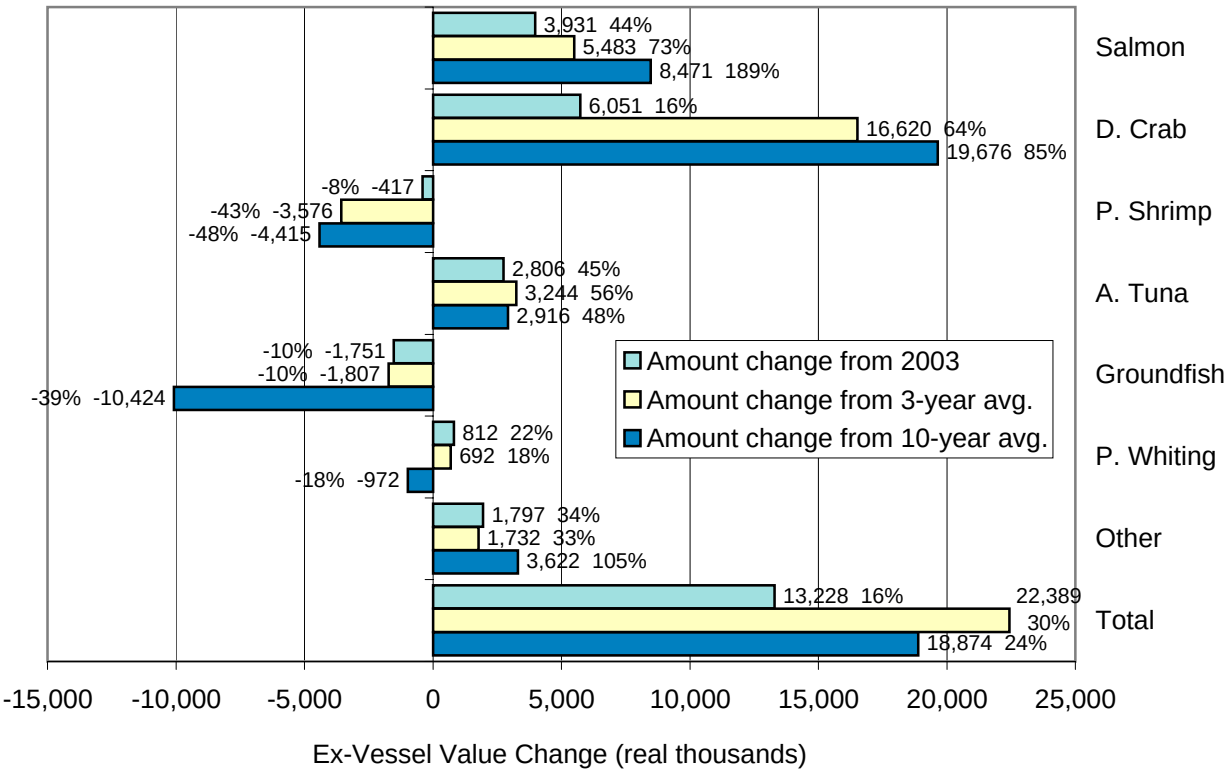


Aquaculture economic contributions by source (millions of dollars):	
Oysters, growing	3.8
Oysters, processing	3.9
Total	7.7

Notes: 1. Economic contributions are expressed as total personal income in millions of 2004 dollars. Dollar adjustment uses the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.

Source: Study.

Figure OR-6
Oregon Change Between Year 2004 Ex-Vessel Value and 2003, Three Year Average (2001-2003), and 10 Year Average (1994-2003)



Notes: 1. Ex-vessel value is in thousands of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Shellfish aquaculture not included.

Source: ODFW.

Table OR-7
Oregon Fishery Vessel Participation in 2004

SALMON FISHERY		
Year 2004		
Volume (thousands pounds)		5,922
Troll Chinook price		$3.00
Ex-vessel value (thousands)		$12,954
Change from 2003		44%
3 year average		74%
10 year average		189%
Economic contribution (millions)		$21.22
Share onshore total		9%
	Count	Share
Vessels >$500	736	90%
Average salmon revenue	$16,582	
Salmon share		31%
Vessels 50% value	145	18%
Vessels 90% value	428	53%
Top 10 vessels	10	1%
Average salmon revenue	$82,037	
Salmon share		50%
Type: Troll, Non-Tribal		
Landing volume (million lbs)	3.3	--
Landing value (million)	$9.9	--
Vessels >$500	539	90%
Average salmon revenue	$18,339	
Salmon share		35%
Vessels 50% value	110	18%
Vessels 90% value	315	53%
Permits authorized	1,200	floor
Permits active	1,188	
Type: Net, Non-Tribal, Oregon Landings		
Landing volume (million lbs)	1.7	--
Landing value (million)	$2.3	--
Vessels >$500	180	90%
Average salmon revenue	$12,580	
Salmon share		88%
Vessels 50% value	37	19%
Vessels 90% value	113	57%
Permits authorized	200	floor
Permits active	314	
Type: Net, Tribal, Oregon Landings		
Landing volume (million lbs)	0.9	--
Landing value (million)	$0.7	--

CRAB FISHERY		
Year 2004		
Volume (thousands pounds)		27,246
Price		$1.58
Ex-vessel value (thousands)		$42,787
Change from 2003		15%
3 year average		63%
10 year average		85%
Economic contribution (millions)		$79.53
Share onshore total		32%
	Count	Share
Vessels >$500	346	96%
Average crab revenue	$122,840	
Crab share		70%
Vessels 50% value	53	15%
Vessels 90% value	182	50%
Top 10 vessels	10	3%
Average crab revenue	$725,556	
Crab share		83%
Permits authorized	464	
Permits active	433	

SHRIMP FISHERY		
Year 2004		
Volume (thousands pounds)		12,207
Price		$0.39
Ex-vessel value (thousands)		$4,740
Change from 2003		-8%
3 year average		-43%
10 year average		-48%
Economic contribution (millions)		$9.93
Share onshore total		4%
	Count	Share
Vessels >$500	44	100%
Average shrimp revenue	$107,738	
Shrimp share		32%
Vessels 50% value	12	27%
Vessels 90% value	26	59%
Top 10 vessels	10	23%
Average shrimp revenue	$214,638	
Shrimp share		50%
Permits authorized	150	
Permits active	143	

GROUNDFISH FISHERY		
Year 2004		
Volume (thousands pounds)		25,597
Price		$0.64
Ex-vessel value (thousands)		$16,315
Change from 2003		-9%
3 year average		-10%
10 year average		-38%
Economic contribution (millions)		$32.14
Share onshore total		13%
	Count	Share
Vessels >$500	268	55%
Vessels 50% value	26	5%
Vessels 90% value	83	17%
Type: Limited Entry, Trawl and Fixed Gear		
Landing volume (million lbs)	24.9	--
Landing value (million)	$15.3	--
Vessels >$500	112	95%
Average LE GF revenue	$136,686	
LE GF share		39%
Vessels 50% value	24	20%
Vessels 90% value	66	56%
Top 10 vessels	10	8%
Average LE GF revenue	$414,423	
LE GF share		79%
Type: Open Access		
Landing volume (million lbs)	0.7	--
Landing value (million)	$1.1	--
Vessels >$500	158	39%
Average OA GF revenue	$7,103	
OA GF share		8%
Vessels 50% value	24	6%
Vessels 90% value	91	22%
Top 10 vessels	10	2%
Average OA GF revenue	$31,941	
OA GF share		52%

Note: Vessel counts include home-port vessels as well as out-of-state vessels making Oregon landings.

TUNA FISHERY		
Year 2004		
Volume (thousands pounds)		10,595
Price		$0.85
Ex-vessel value (thousands)		$9,003
Change from 2003		44%
3 year average		56%
10 year average		48%
Economic contribution (millions)		$17.11
Share onshore total		7%
	Count	Share
Vessels >$500	407	90%
Average tuna revenue	$21,973	
Tuna share		25%
Vessels 50% value	57	13%
Vessels 90% value	195	43%
Top 10 vessels	10	2%
Average tuna revenue	$151,269	
Tuna share		68%

WHITING FISHERY		
Year 2004		
Volume (thousands pounds)		130,238
Price		$0.036
Ex-vessel value (thousands)		$4,488
Change from 2003		22%
3 year average		18%
10 year average		-18%
Economic contribution (millions)		$31.18
Share onshore total		13%
	Count	Share
Vessels >$500	20	80%
Average whiting revenue	$231,995	
Whiting share		48%
Vessels 50% value	7	28%
Vessels 90% value	15	60%
Top 10 vessels	10	40%
Average whiting revenue	$327,337	
Whiting share		70%

Notes: Some vessels land outside Oregon, but only Oregon landings are included.

Table CA-1
California Onshore Landed Volume by Species Groups in 1981 to 2004

Year	Groundfish/ Whiting	Salmons	Lobsters/ Prawns	Dungeness Crab	Pink Shrimp	Pacific Sardine	Market Squid	Other Pelagics	Tunas	Sharks/ Swordfish	Sea Urchin	Sea Cucumbers	Others	Total
1981	94,571	6,954	1,065	10,438	4,166	33	51,830	262,285	320,875	6,790	26,434	1	9,948	795,390
1982	116,836	9,203	1,038	6,974	4,550	4	35,953	245,121	245,619	8,383	19,441	139	9,735	702,996
1983	90,053	2,777	819	5,304	1,151	1	4,020	148,701	240,752	8,530	17,756	163	7,161	527,190
1984	89,712	3,430	1,102	5,345	1,658	3	1,243	138,381	176,377	11,185	14,982	52	8,860	452,331
1985	94,718	5,341	1,421	6,218	3,381	13	22,655	125,712	62,362	13,408	19,998	59	9,197	364,483
1986	91,965	8,744	1,263	7,763	6,758	856	46,909	137,350	68,543	10,079	34,134	78	7,331	421,772
1987	91,342	10,697	782	6,860	8,023	969	44,057	153,709	69,545	7,874	46,062	108	7,362	447,389
1988	87,790	16,971	922	11,302	11,236	2,620	82,082	154,312	67,126	6,302	51,988	159	7,483	500,294
1989	93,890	6,699	1,095	5,720	13,351	1,845	90,153	157,246	53,130	5,288	51,194	160	10,482	490,252
1990	86,484	5,105	1,104	10,360	8,701	3,669	62,703	128,713	27,820	4,981	45,355	148	13,165	398,309
1991	79,007	4,254	1,047	4,246	10,365	16,727	82,427	100,806	18,508	4,494	42,337	582	9,022	373,822
1992	76,796	1,890	888	8,329	18,667	39,572	28,903	62,604	18,343	4,686	32,697	549	7,266	301,190
1993	61,934	2,923	987	12,050	7,106	33,830	94,422	44,659	23,958	5,045	27,012	646	7,452	322,025
1994	54,630	3,572	1,078	13,493	11,197	25,670	122,098	39,634	25,298	4,933	23,910	647	6,746	332,905
1995	63,320	7,642	1,434	9,235	5,786	88,748	154,877	37,518	25,972	3,511	22,326	590	6,928	427,887
1996	63,440	4,736	1,762	12,330	9,414	71,767	177,606	48,915	41,462	3,595	20,115	839	7,772	463,753
1997	67,368	6,080	2,063	9,912	13,967	95,437	155,046	77,168	36,659	4,424	18,131	453	8,157	494,866
1998	51,489	2,125	2,002	10,693	1,843	95,484	6,381	59,120	36,298	4,157	10,430	770	5,883	286,673
1999	33,935	4,422	2,503	8,713	4,242	131,374	202,853	38,413	24,596	5,294	14,206	600	5,738	476,888
2000	36,371	5,912	2,725	6,477	2,459	118,308	262,133	85,036	9,495	6,692	15,194	642	5,376	556,820
2001	26,420	2,767	1,487	3,541	3,612	114,404	190,042	71,930	8,762	5,821	13,121	718	5,029	447,654
2002	27,039	5,683	1,571	7,298	4,116	128,646	160,666	27,396	7,781	4,783	14,141	947	4,856	394,922
2003	23,422	7,344	1,373	22,312	2,147	76,469	99,185	17,065	5,788	5,595	11,105	759	4,526	277,091
2004	26,849	7,040	1,108	24,781	2,191	98,242	86,981	29,723	4,919	3,031	11,933	572	4,736	302,105

Notes: 1. Landings are reported in thousands of round pounds.
2. Others in the most recent year includes landings (thousands of round pounds) of California halibut (1,014), unspecified bait shrimp (905), rock crab (796), bairdi tanner crab (461), unspecified smelt (383), white seabass (315), and other species (862).
3. Excludes aquaculture.

Source: PacFIN Nov. 2004, Feb. 2005, and Mar. 2005 extractions.

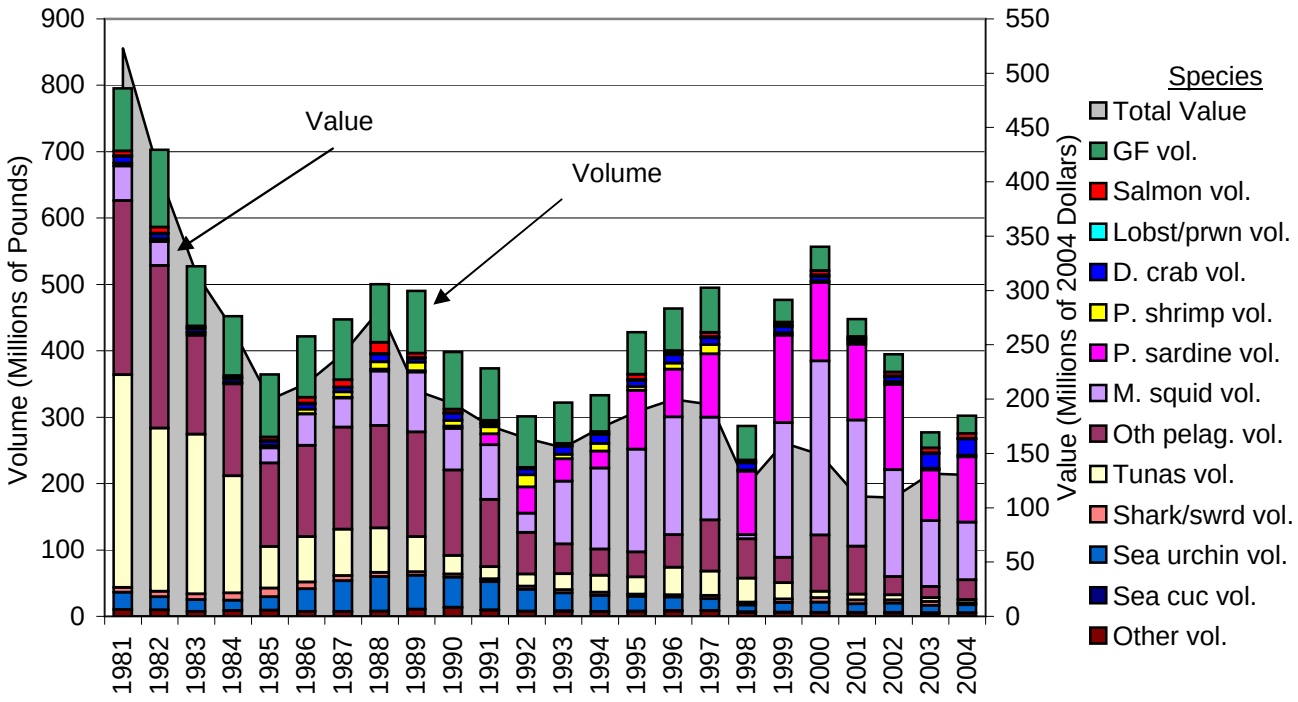
Table CA-2
California Onshore Landed Value by Species Groups in 1981 to 2004

	Price	Groundfish/ Whiting		Salmons		Lobsters/ Prawns		Dungeness Crab		Pink Shrimp		Pacific Sardine		Market Squid		Other Pelagics		Tunas		Sharks/ Swordfish		Sea Urchin		Sea Cucumbers		Others		Total	
Year	Index	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal
1981	54.6	39,059	21,339	27,782	15,179	4,798	2,621	17,066	9,324	3,880	2,120	6	3	9,294	5,078	43,080	23,536	341,006	186,305	10,196	5,571	9,210	5,032	0	0	17,549	9,588	522,926	285,695
1982	58.0	48,432	28,073	34,614	20,064	5,084	2,947	13,228	7,668	4,117	2,386	1	1	6,231	3,612	42,715	24,760	216,735	125,629	13,421	7,779	6,080	3,524	43	25	15,622	9,055	406,323	235,523
1983	60.2	37,585	22,643	7,840	4,723	4,241	2,555	13,510	8,139	1,490	898	0	0	1,256	757	40,195	24,215	177,402	106,875	14,796	8,914	6,429	3,873	43	26	10,524	6,340	315,311	189,957
1984	62.5	36,699	22,942	12,855	8,036	3,749	2,344	13,519	8,451	1,325	829	1	1	485	303	20,387	12,744	130,827	81,784	22,315	13,950	5,838	3,649	15	10	16,265	10,168	264,282	165,210
1985	64.4	40,875	26,331	18,242	11,751	4,387	2,826	13,872	8,936	1,843	1,187	2	1	6,166	3,972	22,929	14,770	45,297	29,179	25,199	16,232	7,496	4,829	19	12	13,208	8,508	199,536	128,535
1986	65.8	43,843	28,866	22,968	15,122	4,972	3,273	16,761	11,035	5,499	3,621	126	83	6,861	4,517	22,127	14,568	41,665	27,432	22,500	14,814	14,598	9,611	25	17	12,384	8,154	214,329	141,112
1987	67.6	45,604	30,843	37,908	25,638	4,271	2,889	14,404	9,742	8,367	5,659	92	63	5,848	3,955	24,442	16,531	49,056	33,178	19,760	13,364	19,659	13,296	34	23	12,817	8,669	242,261	163,849
1988	69.9	40,855	28,574	59,974	41,946	6,119	4,280	21,253	14,865	6,630	4,637	229	160	10,900	7,624	24,015	16,796	56,685	39,645	16,508	11,546	27,752	19,410	46	32	11,663	8,157	282,630	197,673
1989	72.6	41,116	29,846	18,933	13,743	6,989	5,074	10,545	7,654	6,654	4,830	269	195	10,367	7,526	20,081	14,577	35,406	25,701	13,750	9,981	29,446	21,375	50	36	14,160	10,279	207,767	150,818
1990	75.4	38,397	28,950	16,002	12,065	7,411	5,588	21,565	16,260	5,549	4,184	253	190	6,275	4,731	22,725	17,134	17,737	13,373	11,603	8,748	32,865	24,780	48	37	15,145	11,419	195,574	147,459
1991	78.0	34,880	27,217	11,600	9,052	7,209	5,626	8,716	6,802	7,474	5,832	1,144	893	7,783	6,073	20,419	15,933	10,255	8,002	10,094	7,877	43,509	33,951	243	190	11,834	9,234	175,163	136,681
1992	79.8	35,827	28,599	5,623	4,488	6,698	5,347	13,433	10,723	7,782	6,212	2,324	1,855	3,067	2,448	17,805	14,212	11,817	9,433	10,476	8,362	36,929	29,478	297	237	11,608	9,266	163,687	130,661
1993	81.7	29,062	23,735	7,005	5,721	7,295	5,958	16,312	13,322	3,055	2,495	1,892	1,545	12,574	10,269	5,987	4,890	15,864	12,956	11,938	9,750	32,489	26,533	422	344	11,276	9,209	155,172	126,726
1994	83.4	29,485	24,591	7,720	6,439	7,759	6,471	22,259	18,565	7,840	6,539	1,817	1,515	17,185	14,333	6,799	5,670	18,095	15,091	12,595	10,505	30,638	25,553	483	403	10,958	9,139	173,632	144,815
1995	85.1	40,401	34,386	13,751	11,703	9,297	7,913	17,203	14,641	4,939	4,204	4,179	3,557	26,201	22,300	13,496	11,487	12,600	10,724	8,510	7,243	26,600	22,640	488	416	10,971	9,337	188,635	160,552
1996	86.7	39,310	34,091	6,909	5,992	10,819	9,383	19,856	17,220	6,510	5,646	3,634	3,152	25,209	21,862	20,254	17,565	25,778	22,356	7,775	6,742	21,637	18,765	628	544	11,305	9,805	199,623	173,121
1997	88.2	36,519	32,198	8,313	7,330	14,124	12,453	21,192	18,684	6,072	5,354	5,037	4,441	23,422	20,651	21,722	19,152	22,174	19,550	7,992	7,046	17,312	15,263	252	222	10,966	9,669	195,097	172,014
1998	89.1	24,983	22,271	3,431	3,058	12,408	11,061	22,362	19,935	1,105	985	4,063	3,622	1,821	1,624	5,096	4,543	20,371	18,160	7,384	6,582	8,851	7,891	512	456	8,406	7,494	120,793	107,682
1999	90.4	21,493	19,437	8,213	7,427	10,474	9,472	18,972	17,157	2,258	2,042	5,630	5,091	36,905	33,375	4,828	4,366	18,166	16,428	9,980	9,026	14,856	13,435	461	417	7,570	6,846	159,806	144,519
2000	92.4	21,908	20,245	11,167	10,319	11,208	10,357	14,870	13,741	1,135	1,049	5,923	5,473	29,481	27,242	8,065	7,453	7,525	6,954	13,475	12,452	16,288	15,052	656	606	7,063	6,526	148,765	137,469
2001	94.6	17,363	16,430	5,040	4,769	9,274	8,775	9,509	8,998	1,049	993	6,645	6,288	17,896	16,934	6,482	6,133	6,949	6,576	9,939	9,405	12,347	11,684	618	585	7,250	6,860	110,361	104,431
2002	96.2	16,733	16,095	7,950	7,647	9,124	8,776	13,991	13,458	1,326	1,275	6,082	5,850	18,982	18,259	3,889	3,741	5,005	4,815	7,337	7,057	10,771	10,360	833	801	7,390	7,108	109,413	105,243
2003	97.9	15,321	15,007	12,426	12,171	7,472	7,318	36,201	35,458	670	657	2,931	2,871	25,885	25,354	2,449	2,398	3,682	3,607	8,663	8,486	8,055	7,890	702	688	6,820	6,680	131,280	128,585
2004	100.0	13,702	13,702	17,656	17,656	8,294	8,294	40,467	40,467	925	925	3,960	3,960	19,192	19,192	2,660	2,660	3,301	3,301	5,126	5,126	7,214	7,214	540	540	7,229	7,229	130,265	130,265

Notes: 1. Nominal value is the revenue received by fishermen/harvesters in the landing year. Real value is in thousands of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Other in the most recent year includes (thousands) California halibut ($3,165), rock crab ($1,088), white seabass ($607), bairdi tanner crab ($560), California sheephead ($280), unspecified bait shrimp ($255), and other species ($1,273).
3. Excludes aquaculture.

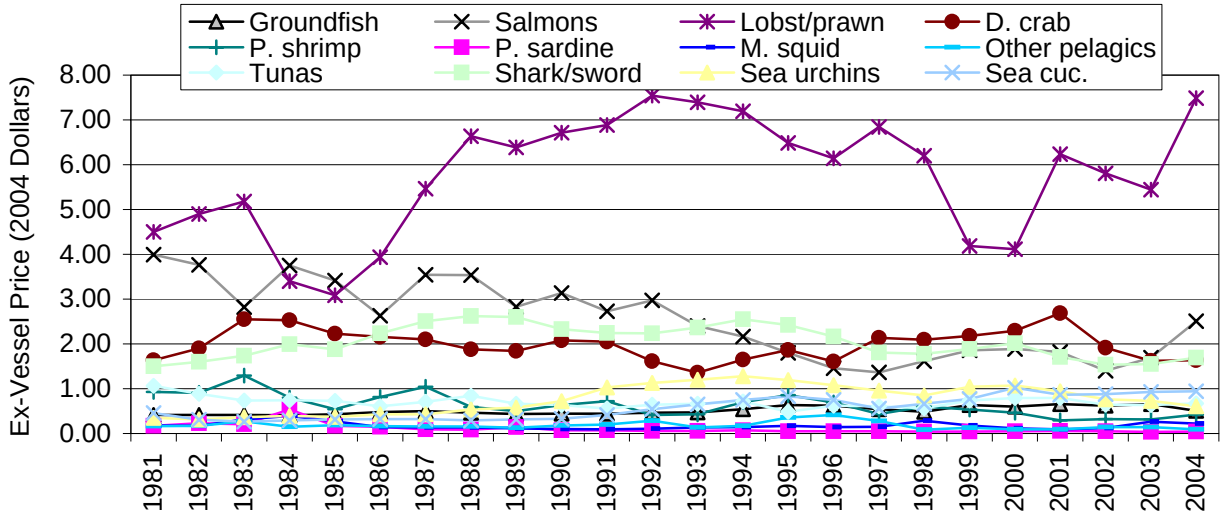
Source: PacFIN Nov. 2004, Feb. 2005, and Mar. 2005 extractions.

Figure CA-1
California Onshore Landed Value and Volume by Species Groups in 1981 to 2004



Notes: 1. Values in 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Notes and sources from volume table concerning species composition also apply to this figure.

Figure CA-2
California Species Group Annual Ex-Vessel Price Trends in 1981 to 2004



Notes: 1. Prices adjusted to real 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery.
3. Groundfish price calculation includes Pacific whiting.
4. Prices are annual and species averaged expressed in round weight. Average prices for salmon include seasonal and size considerations.
5. Excludes aquaculture.

Source: PacFIN Nov. 2004, Feb. 2005, and Mar. 2005 extractions.

Table CA-3
California Onshore Landed Prices by Species Groups in 1981 to 2004

Year	Groundfish/ Whiting	Salmons	Lobsters/ Prawns	Dungeness Crab	Pink Shrimp	Pacific Sardine	Market Squid	Other Pelagics	Tunas	Sharks/ Swordfish	Sea Urchin	Sea Cucumbers	Others	Total
1981	0.41	4.00	4.50	1.63	0.93	0.17	0.18	0.16	1.06	1.50	0.35	0.46	1.76	0.66
1982	0.41	3.76	4.90	1.90	0.90	0.23	0.17	0.17	0.88	1.60	0.31	0.31	1.60	0.58
1983	0.42	2.82	5.18	2.55	1.29	0.21	0.31	0.27	0.74	1.73	0.36	0.26	1.47	0.60
1984	0.41	3.75	3.40	2.53	0.80	0.54	0.39	0.15	0.74	2.00	0.39	0.30	1.84	0.58
1985	0.43	3.42	3.09	2.23	0.55	0.17	0.27	0.18	0.73	1.88	0.37	0.32	1.44	0.55
1986	0.48	2.63	3.94	2.16	0.81	0.15	0.15	0.16	0.61	2.23	0.43	0.32	1.69	0.51
1987	0.50	3.54	5.46	2.10	1.04	0.10	0.13	0.16	0.71	2.51	0.43	0.32	1.74	0.54
1988	0.47	3.53	6.64	1.88	0.59	0.09	0.13	0.16	0.84	2.62	0.53	0.29	1.56	0.56
1989	0.44	2.83	6.38	1.84	0.50	0.15	0.11	0.13	0.67	2.60	0.58	0.31	1.35	0.42
1990	0.44	3.13	6.71	2.08	0.64	0.07	0.10	0.18	0.64	2.33	0.72	0.33	1.15	0.49
1991	0.44	2.73	6.89	2.05	0.72	0.07	0.09	0.20	0.55	2.25	1.03	0.42	1.31	0.47
1992	0.47	2.97	7.54	1.61	0.42	0.06	0.11	0.28	0.64	2.24	1.13	0.54	1.60	0.54
1993	0.47	2.40	7.39	1.35	0.43	0.06	0.13	0.13	0.66	2.37	1.20	0.65	1.51	0.48
1994	0.54	2.16	7.20	1.65	0.70	0.07	0.14	0.17	0.72	2.55	1.28	0.75	1.62	0.52
1995	0.64	1.80	6.48	1.86	0.85	0.05	0.17	0.36	0.49	2.42	1.19	0.83	1.58	0.44
1996	0.62	1.46	6.14	1.61	0.69	0.05	0.14	0.41	0.62	2.16	1.08	0.75	1.45	0.43
1997	0.54	1.37	6.85	2.14	0.43	0.05	0.15	0.28	0.60	1.81	0.95	0.56	1.34	0.39
1998	0.49	1.61	6.20	2.09	0.60	0.04	0.29	0.09	0.56	1.78	0.85	0.66	1.43	0.42
1999	0.63	1.86	4.18	2.18	0.53	0.04	0.18	0.13	0.74	1.89	1.05	0.77	1.32	0.34
2000	0.60	1.89	4.11	2.30	0.46	0.05	0.11	0.09	0.79	2.01	1.07	1.02	1.31	0.27
2001	0.66	1.82	6.24	2.69	0.29	0.06	0.09	0.09	0.79	1.71	0.94	0.86	1.44	0.25
2002	0.62	1.40	5.81	1.92	0.32	0.05	0.12	0.14	0.64	1.53	0.76	0.88	1.52	0.28
2003	0.65	1.69	5.44	1.62	0.31	0.04	0.26	0.14	0.64	1.55	0.73	0.93	1.51	0.47
2004	0.51	2.51	7.49	1.63	0.42	0.04	0.22	0.09	0.67	1.69	0.60	0.94	1.53	0.43

Notes: 1. Prices are adjusted to 2004 dollars using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Excludes aquaculture.

Source: PacFIN Nov. 2004, Feb. 2005, and Mar. 2005 extractions.

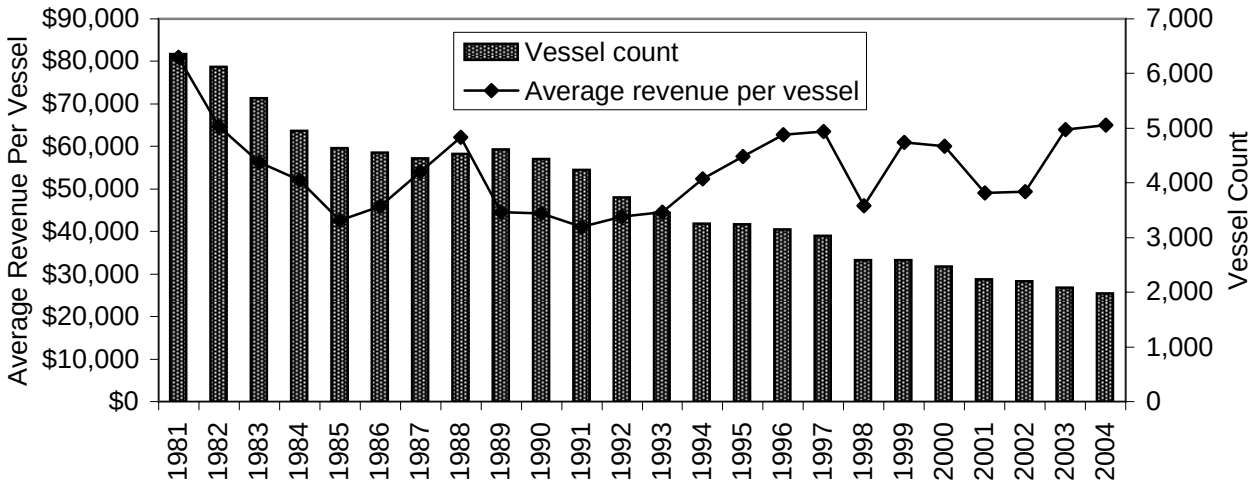
Table CA-4
California Port Group Share of Onshore Landings and Home-Port Vessels in 2001 to 2004

		2001			2002			2003			2004		
	Local/	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port
Port Group/Communities	Regional	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels
Crescent City		3%	6%	5%	2%	5%	5%	4%	13%	6%	6%	15%	6%
Eureka		2%	6%	5%	4%	7%	6%	7%	12%	6%	7%	12%	6%
Fort Bragg		2%	7%	8%	3%	8%	8%	4%	9%	10%	2%	6%	8%
Bodega Bay		1%	4%	9%	1%	5%	8%	1%	4%	9%	1%	5%	9%
San Francisco		3%	11%	18%	5%	14%	20%	7%	11%	16%	5%	15%	18%
Monterey		14%	8%	12%	24%	13%	13%	20%	10%	12%	20%	8%	13%
Morro Bay		1%	5%	9%	1%	4%	8%	2%	3%	7%	2%	3%	5%
Santa Barbara		25%	17%	12%	16%	16%	12%	22%	18%	13%	25%	18%	13%
Los Angeles		49%	30%	15%	43%	22%	14%	32%	15%	14%	31%	14%	15%
San Diego		1%	5%	6%	1%	5%	7%	1%	4%	7%	1%	4%	6%
Unidentified California		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Total		447.7 million pounds	$110.4 million ex-vessel	2,237 vessels	394.9 million pounds	$109.4 million ex-vessel	2,203 vessels	277.1 million pounds	$131.3 million ex-vessel	2,084 vessels	302.1 million pounds	$130.3 million ex-vessel	1,980 vessels

Notes:
1. Declaration of local or regional considers presence of vessel repair businesses, fishing equipment suppliers, ice services, cold storage, delivery services from buyers and processors, moorage and landing facilities, etc.
2. Value is in millions of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
3. Excludes aquaculture.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Figure CA-3
California Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2004



Notes:
1. Revenues adjusted to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes vessels with identifier codes "NONE" or "ZZ…," which are generally attributable to deliveries made in tribal fisheries.
3. Includes only vessels with home-port group in California. Home-port group is defined as the port group where a vessel made the most landings by value.
4. Average revenue per vessel is for onshore landings; distant water fisheries revenue and aquaculture are not included.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table CA-5
California Vessel Counts and Revenue Shares by Revenue Categories in 1981 to 2004

	<$500				$500 to $4,999				$5,000 to $49,999				>=$50,000				Total	
	Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average
Years	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue
1981	1,725	348	27.1%	0.1%	2,196	3,510	34.6%	1.5%	1,781	36,116	28.0%	12.5%	654	676,531	10.3%	85.9%	6,356	81,039
1982	1,423	332	23.3%	0.1%	2,042	3,439	33.4%	1.8%	2,001	33,187	32.7%	16.8%	651	494,664	10.6%	81.3%	6,117	64,726
1983	1,809	276	32.6%	0.2%	1,640	3,168	29.6%	1.7%	1,521	33,445	27.4%	16.3%	579	441,231	10.4%	81.9%	5,549	56,233
1984	1,298	300	26.2%	0.2%	1,620	3,171	32.7%	2.0%	1,493	29,057	30.1%	16.8%	542	385,021	10.9%	81.0%	4,953	52,007
1985	1,012	299	21.9%	0.2%	1,450	3,194	31.3%	2.4%	1,585	30,034	34.2%	24.2%	583	247,696	12.6%	73.3%	4,630	42,537
1986	906	289	19.9%	0.1%	1,408	3,303	30.9%	2.2%	1,599	29,891	35.1%	22.8%	642	243,993	14.1%	74.8%	4,555	45,961
1987	638	289	14.4%	0.1%	1,243	3,266	28.0%	1.7%	1,818	28,918	40.9%	21.9%	744	246,690	16.7%	76.4%	4,443	54,097
1988	476	280	10.5%	0.0%	1,080	3,088	23.8%	1.2%	2,061	28,536	45.5%	20.9%	913	240,114	20.2%	77.9%	4,530	62,143
1989	714	278	15.5%	0.1%	1,494	2,956	32.4%	2.1%	1,747	24,883	37.8%	21.1%	661	238,739	14.3%	76.6%	4,616	44,604
1990	719	268	16.2%	0.1%	1,348	2,779	30.4%	1.9%	1,588	25,344	35.8%	20.5%	777	195,328	17.5%	77.5%	4,432	44,214
1991	735	252	17.4%	0.1%	1,267	2,727	29.9%	2.0%	1,502	24,828	35.5%	21.5%	731	181,812	17.3%	76.5%	4,235	41,048
1992	667	247	17.9%	0.1%	1,021	2,633	27.4%	1.7%	1,290	25,714	34.6%	20.4%	751	168,245	20.1%	77.8%	3,729	43,544
1993	520	244	15.1%	0.1%	944	2,577	27.3%	1.6%	1,330	23,758	38.5%	20.6%	661	180,895	19.1%	77.8%	3,455	44,495
1994	464	239	14.3%	0.1%	802	2,630	24.7%	1.2%	1,290	24,043	39.7%	18.2%	693	197,776	21.3%	80.5%	3,249	52,414
1995	352	250	10.9%	0.0%	718	2,566	22.2%	1.0%	1,396	24,304	43.1%	18.2%	775	194,545	23.9%	80.8%	3,241	57,585
1996	398	253	12.6%	0.1%	757	2,531	24.0%	1.0%	1,137	24,120	36.0%	13.9%	862	195,407	27.3%	85.1%	3,154	62,740
1997	315	241	10.4%	0.0%	705	2,509	23.3%	0.9%	1,180	23,955	38.9%	14.7%	832	195,206	27.4%	84.4%	3,032	63,497
1998	304	245	11.7%	0.1%	753	2,472	29.1%	1.6%	990	23,031	38.3%	19.2%	541	174,267	20.9%	79.2%	2,588	45,987
1999	250	246	9.7%	0.0%	587	2,385	22.7%	0.9%	1,055	23,004	40.9%	15.4%	690	190,709	26.7%	83.6%	2,582	60,929
2000	213	242	8.6%	0.0%	545	2,532	22.1%	0.9%	1,029	21,911	41.7%	15.2%	681	182,382	27.6%	83.8%	2,468	60,040
2001	214	245	9.6%	0.0%	526	2,316	23.5%	1.1%	955	21,821	42.7%	19.0%	542	161,667	24.2%	79.9%	2,237	49,054
2002	175	237	7.9%	0.0%	514	2,361	23.3%	1.1%	960	21,149	43.6%	18.7%	554	157,368	25.1%	80.2%	2,203	49,360
2003	174	243	8.3%	0.0%	476	2,375	22.8%	0.8%	822	20,532	39.4%	12.7%	612	188,104	29.4%	86.4%	2,084	63,901
2004	166	243	8.4%	0.0%	387	2,267	19.5%	0.7%	833	20,694	42.1%	13.4%	594	185,997	30.0%	85.9%	1,980	64,969

Notes: 1. Revenue in 2004 dollars adjusted using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Includes only vessels with home-port group in California. Home-port group is defined as the port group where a vessel made the most landings by value.
3. Revenue excludes deliveries to offshore processors, revenues returned from distant water fisheries, and aquaculture.
4. Excludes vessel identification codes "NONE" and "ZZ..." which are usually used to identify vessels within tribal commercial fisheries.

Source: PacFIN November 2004, February 2005, and March 2005 extractions.

Table CA-6
California Economic Contributions by Species Group in 1981 to 2004

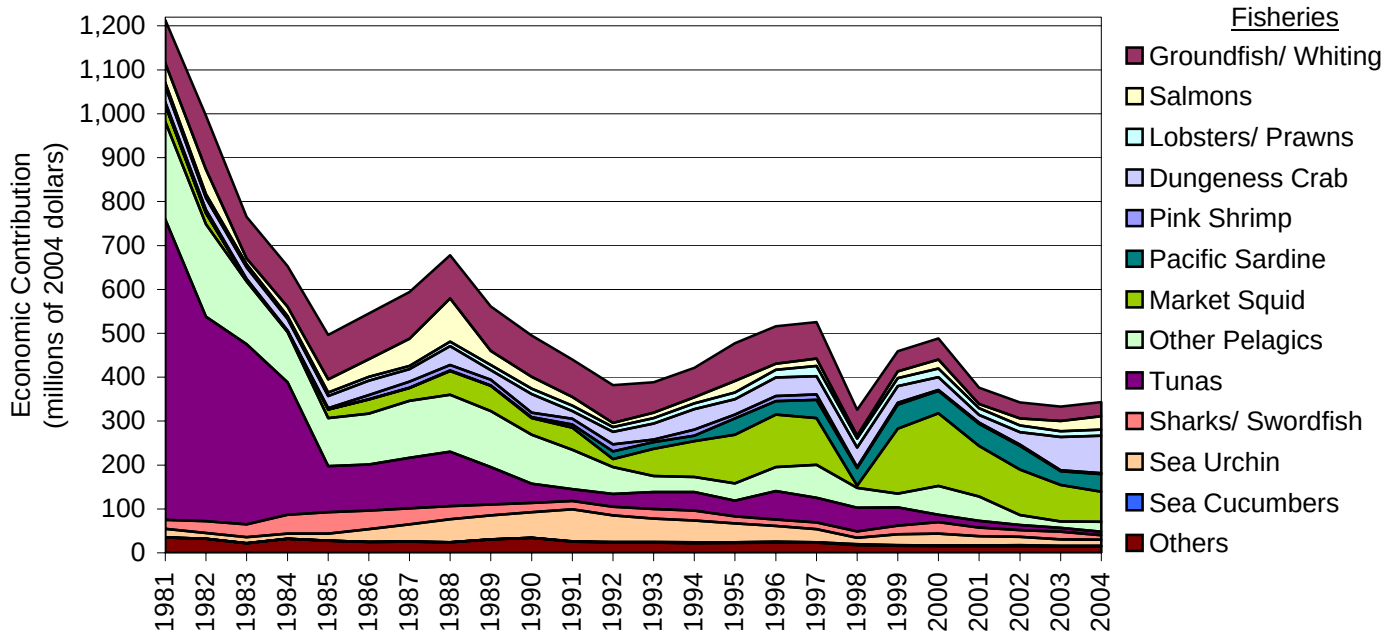
Onshore Landings

Years	Groundfish/ Whiting	Salmons	Lobsters/ Prawns	Dungeness Crab	Pink Shrimp	Pacific Sardine	Market Squid	Other Pelagics	Tunas	Sharks/ Swordfish	Sea Urchin	Sea Cucumbers	Others	Total Landed Fish
1981	98.6	44.8	8.3	36.0	6.6	0.0	37.7	222.6	683.9	20.9	19.6	0.0	34.8	1,213.8
1982	122.1	56.3	8.7	26.8	7.0	0.0	25.8	210.7	465.3	27.1	13.4	0.2	31.8	995.2
1983	94.5	13.3	7.2	25.7	2.4	0.0	3.7	143.0	410.1	29.2	13.5	0.3	21.9	764.9
1984	93.1	20.9	6.8	25.8	2.3	0.0	1.3	115.0	301.6	42.7	12.0	0.1	31.9	653.3
1985	101.3	30.1	8.1	27.1	3.5	0.0	19.5	109.1	105.4	48.8	15.6	0.1	27.7	496.4
1986	104.4	39.6	8.8	33.0	9.6	0.5	31.9	116.1	105.1	42.0	29.1	0.1	24.8	545.1
1987	106.6	62.2	7.2	28.5	13.8	0.5	29.1	129.6	115.6	36.1	39.3	0.2	25.5	594.2
1988	98.2	98.4	10.2	43.2	12.5	1.3	54.2	129.6	123.8	29.9	52.3	0.3	23.9	677.7
1989	101.3	32.2	11.6	21.5	13.2	1.0	57.3	127.3	85.6	24.9	54.6	0.3	30.3	561.2
1990	94.1	26.8	12.3	42.8	10.2	1.7	38.5	110.9	43.8	21.5	58.1	0.2	34.1	494.9
1991	85.7	19.9	11.9	17.4	13.4	7.6	50.0	89.7	27.1	18.8	72.6	1.1	25.5	440.5
1992	86.0	9.5	11.0	28.4	16.4	17.4	18.0	61.1	29.0	19.5	60.8	1.1	23.6	381.9
1993	69.6	12.3	12.0	36.3	6.4	14.7	62.4	36.5	38.5	22.0	53.1	1.4	23.3	388.5
1994	67.0	13.9	12.8	46.8	14.1	11.7	82.1	33.9	42.4	22.9	49.7	1.5	22.2	420.9
1995	86.6	25.8	15.5	35.1	8.5	37.5	110.4	39.7	35.7	15.6	43.5	1.4	22.4	477.6
1996	85.1	13.7	18.1	42.0	11.7	30.7	119.7	54.5	64.4	14.6	35.9	1.9	23.6	516.0
1997	82.8	16.9	23.4	41.8	12.6	41.1	106.5	75.1	56.1	15.6	29.2	0.9	23.5	525.5
1998	59.1	6.6	20.7	44.4	2.1	39.8	5.6	45.3	53.5	14.5	15.2	1.7	17.7	326.0
1999	46.2	15.3	18.4	37.3	4.4	54.8	148.2	31.0	42.0	19.3	24.7	1.4	16.3	459.3
2000	47.9	20.7	19.7	28.9	2.3	50.6	165.6	65.9	16.9	25.7	27.0	1.7	15.2	488.2
2001	36.9	9.4	15.5	17.9	2.5	50.2	115.1	55.4	15.6	19.7	20.9	1.8	15.2	376.1
2002	36.2	16.0	15.4	28.3	3.1	54.5	102.8	22.6	12.3	15.0	18.9	2.4	15.3	342.6
2003	32.6	23.7	12.7	76.4	1.6	31.4	83.6	14.1	9.1	17.6	14.2	1.9	14.1	333.1
2004	31.8	30.7	13.6	85.3	1.9	40.6	68.4	22.9	8.0	10.2	13.2	1.5	14.9	342.9

Notes:
1. Economic contributions are expressed as personal income in millions of 2004 dollars. Adjustments to 2004 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes aquaculture.
3. Distant water fisheries economic contribution for California is not included.

Source: Study.

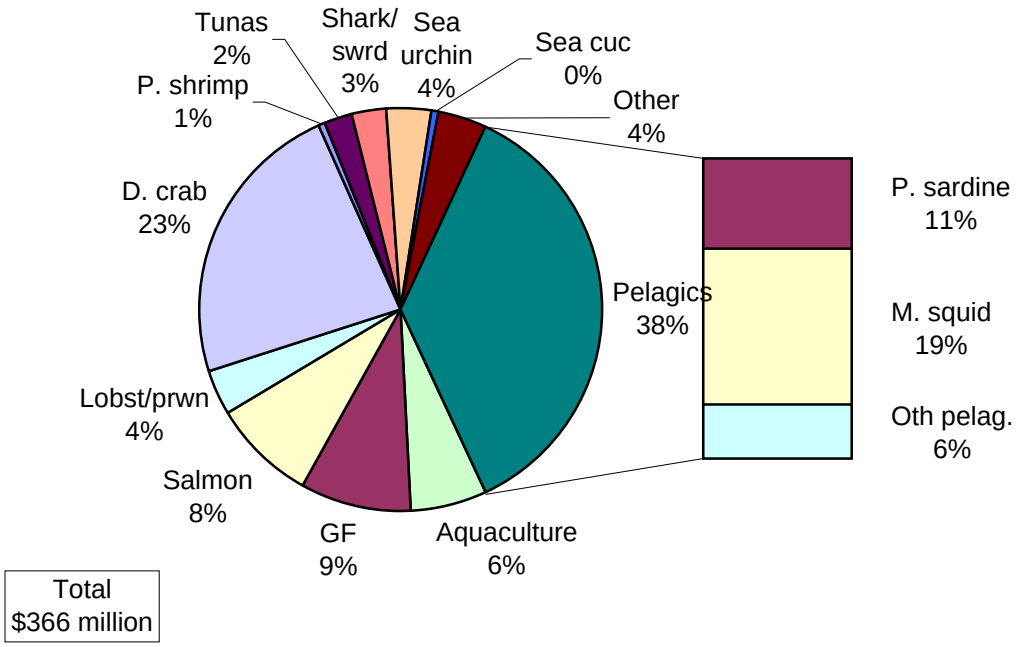
Figure CA-4
California Economic Contributions From Onshore Landings in 1981 to 2004



Notes:
1. Economic contributions are expressed as total personal income in millions of 2004 dollars. Dollar adjustment uses the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Excludes aquaculture.
3. Distant water fisheries economic contribution for California is not included.

Source: Study.

Figure CA-5
California Economic Contributions by Species Group and Shellfish Aquaculture in 2004

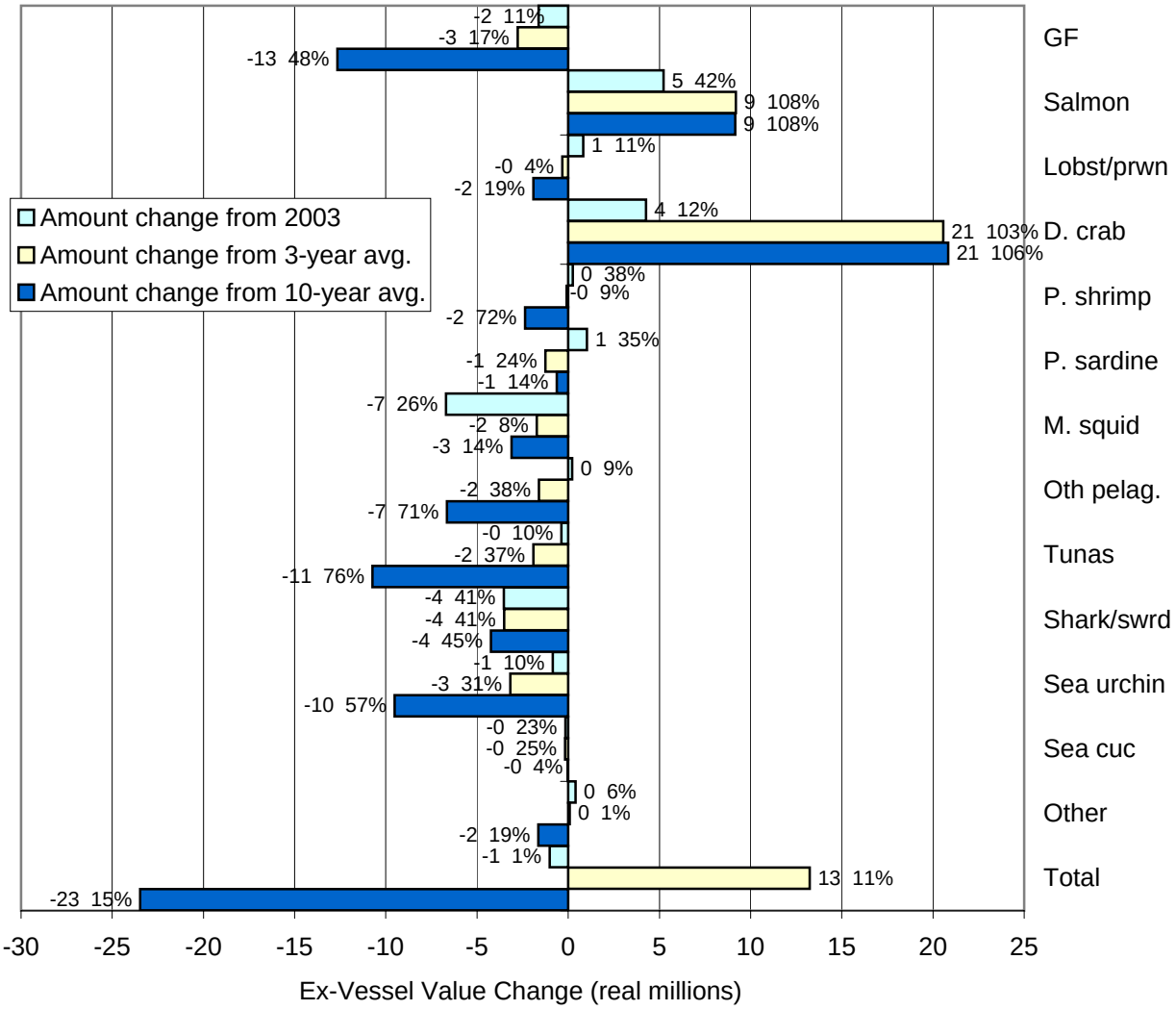


Aquaculture economic contributions by species (millions of dollars):	
Abalone	11.6
Clams	0.1
Oysters	11.1
Total	22.8

Notes: 1. Economic contributions are expressed as total personal income in millions of 2004 dollars. Dollar adjustment uses the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Distant water fisheries economic contribution for California is not included.

Source: Study.

Figure CA-6
California Change Between Year 2004 Ex-Vessel Value and 2003, Three Year Average (2001-2003), and 10 Year Average (1994-2003)



Notes: 1. Ex-vessel value is in millions of 2004 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Shellfish aquaculture is not included.

Source: PacFIN Nov. 2004, Feb. 2005, and Mar. 2005 extractions.

Table CA-7
California Fishery Vessel Participation in 2004

GROUNDFISH FISHERY INC. WHITING		
Year 2004		
Volume (thousands pounds)		26,849
Price		$0.51
Ex-vessel value (thousands)		$13,702
Change from 2003		-11%
3 year average		-17%
10 year average		-48%
Economic contribution (millions)		$31.77
Share onshore total		9%
	Count	Share
Vessels >$500	471	69%
Vessels 50% value	31	5%
Vessels 90% value	182	27%
Type: Limited Entry, Trawl and Fixed Gear		
Landing volume (million lbs)	25.2	--
Landing value (million)	$10.3	--
Vessels >$500	119	98%
Average LE GF revenue	$86,941	
LE GF share		56%
Vessels 50% value	20	17%
Vessels 90% value	71	59%
Top 10 vessels	10	8%
Average GF revenue	$303,089	
GF share		80%
Type: Open Access		
Landing volume (million lbs)	1.7	--
Landing value (million)	$3.4	--
Vessels >$500	355	63%
Average OA GF revenue	$9,364	
OA GF share		26%
Vessels 50% value	57	10%
Vessels 90% value	190	34%
Top 10 vessels	10	2%
Average GF revenue	$46,248	
GF share		70%

Note: Vessel counts include home-port vessels as well as out-of-state vessels making California landings.

SALMON FISHERY		
Year 2004		
Volume (thousands pounds)		7,040
Troll Chinook price		$2.51
Ex-vessel value (thousands)		$17,656
Change from 2003		42%
3 year average		108%
10 year average		108%
Economic contribution (millions)		$30.73
Share onshore total		9%
	Count	Share
Vessels >$500	682	91%
Average salmon revenue	$25,864	
Salmon share		46%
Vessels 50% value	105	14%
Vessels 90% value	346	46%
Top 10 vessels	10	1%
Average salmon revenue	$152,322	
Salmon share		65%
Permits authorized		
Permits active		

LOBSTER AND PRAWN FISHERY		
Year 2004		
Volume (thousands pounds)		1,108
Price		$7.49
Ex-vessel value (thousands)		$8,294
Change from 2003		11%
3 year average		-4%
10 year average		-19%
Economic contribution (millions)		$13.60
Share onshore total		4%
	Count	Share
Vessels >$500	170	92%
Average lobst/prn revenue	$48,776	
Lobster/prawn share		79%
Vessels 50% value	25	14%
Vessels 90% value	90	49%
Top 10 vessels	10	5%
Average lobst/prn revenue	$233,745	
Lobster/prawn share		95%

DUNGENESS CRAB FISHERY		
Year 2004		
Volume (thousands pounds)		24,781
Price		$1.63
Ex-vessel value (thousands)		$40,467
Change from 2003		12%
3 year average		103%
10 year average		106%
Economic contribution (millions)		$85.28
Share onshore total		25%
	Count	Share
Vessels >$500	432	94%
Average D. crab revenue	$93,661	
D. crab share		73%
Vessels 50% value	58	13%
Vessels 90% value	210	46%
Top 10 vessels	10	2%
Average D. crab revenue	$634,799	
D. crab share		96%

PINK SHRIMP FISHERY		
Year 2004		
Volume (thousands pounds)		2,191
Price		$0.42
Ex-vessel value (thousands)		$925
Change from 2003		38%
3 year average		-9%
10 year average		-72%
Economic contribution (millions)		$1.94
Share onshore total		1%
	Count	Share
Vessels >$500	7	88%
Average p. shrimp revenue	$132,157	
P. shrimp share		46%
Vessels 50% value	2	25%
Vessels 90% value	4	50%
Top 10 vessels	8	100%
Average p. shrimp revenue	$115,642	
P. shrimp share		46%

PACIFIC SARDINE FISHERY		
Year 2004		
Volume (thousands pounds)		98,242
Price		$0.04
Ex-vessel value (thousands)		$3,960
Change from 2003		35%
3 year average		-24%
10 year average		-14%
Economic contribution (millions)		$40.61
Share onshore total		12%
	Count	Share
Vessels >$500	54	87%
Average P. sard. revenue	$73,322	
P. sardine share		20%
Vessels 50% value	9	15%
Vessels 90% value	26	42%
Top 10 vessels	10	16%
Average P. sard. revenue	$210,784	
P. sardine share		27%

MARKET SQUID FISHERY		
Year 2004		
Volume (thousands pounds)		86,981
Price		$0.22
Ex-vessel value (thousands)		$19,192
Change from 2003		-26%
3 year average		-8%
10 year average		-14%
Economic contribution (millions)		$68.36
Share onshore total		20%
	Count	Share
Vessels >$500	101	87%
Average m. squid revenue	$189,914	
M. squid share		75%
Vessels 50% value	13	11%
Vessels 90% value	41	35%
Top 10 vessels	10	9%
Average m. squid revenue	$785,961	
M. squid share		83%

OTHER PELAGIC FISHERY		
Year 2004		
Volume (thousands pounds)		29,723
Price		$0.09
Ex-vessel value (thousands)		$2,660
Change from 2003		9%
3 year average		-38%
10 year average		-71%
Economic contribution (millions)		$22.86
Share onshore total		7%
	Count	Share
Vessels >$500	121	62%
Average oth. pel. revenue	$21,936	
Other pelagic share		13%
Vessels 50% value	12	6%
Vessels 90% value	65	33%
Top 10 vessels	10	5%
Average oth. pel. revenue	$118,991	
Other pelagic share		19%

TUNA FISHERY		
Year 2004		
Volume (thousands pounds)		4,919
Price		$0.67
Ex-vessel value (thousands)		$3,301
Change from 2003		-10%
3 year average		-37%
10 year average		-76%
Economic contribution (millions)		$7.95
Share onshore total		2%
	Count	Share
Vessels >$500	203	74%
Average tuna revenue	$16,193	
Tuna share		12%
Vessels 50% value	18	7%
Vessels 90% value	88	32%
Top 10 vessels	10	4%
Average tuna revenue	$123,539	
Tuna share		68%

SHARK AND SWORDFISH FISHERY		
Year 2004		
Volume (thousands pounds)		3,031
Price		$1.69
Ex-vessel value (thousands)		$5,126
Change from 2003		-41%
3 year average		-41%
10 year average		-45%
Economic contribution (millions)		$10.19
Share onshore total		3%
	Count	Share
Vessels >$500	113	58%
Average shark/sw revenue	$45,251	
Shark/sword share		57%
Vessels 50% value	11	6%
Vessels 90% value	40	21%
Top 10 vessels	10	5%
Average shark/sw revenue	$235,870	
Shark/sword share		97%

SEA URCHIN FISHERY		
Year 2004		
Volume (thousands pounds)		11,933
Price		$0.60
Ex-vessel value (thousands)		$7,214
Change from 2003		-10%
3 year average		-31%
10 year average		-57%
Economic contribution (millions)		$13.22
Share onshore total		4%
	Count	Share
Vessels >$500	149	90%
Average sea urch. revenue	$48,383	
Sea urchin share		92%
Vessels 50% value	25	15%
Vessels 90% value	81	49%
Top 10 vessels	10	6%
Average sea urch. revenue	$183,767	
Sea urchin share		99%

SEA CUCUMBER FISHERY		
Year 2004		
Volume (thousands pounds)		572
Price		$0.94
Ex-vessel value (thousands)		$540
Change from 2003		-23%
3 year average		-25%
10 year average		-4%
Economic contribution (millions)		$1.49
Share onshore total		0.4%
	Count	Share
Vessels >$500	38	72%
Average sea cuc. revenue	$14,125	
Sea cucumber share		23%
Vessels 50% value	5	9%
Vessels 90% value	18	34%
Top 10 vessels	10	19%
Average sea cuc. revenue	$40,827	
Sea cucumber share		49%

Notes: Some vessels land outside California, but only California landings are included.

APPENDIX C

SPECIES, GEAR, AND PORT MAPPING TO GROUPS

APPENDIX C
SPECIES, GEAR, AND PORT MAPPING TO GROUPS

Project: West Cost Commercial Fishing Industry in 2004
Date: May 22, 2006
Extraction: PacFIN annual vessel summary, Nov. 2004, Feb. 2005, and Mar. 2005
Subject: Species Code Mapping

SPID	Common Name	Summary1	Summary2	Summary4	California group
ARR1	NOM. AURORA ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BCC1	NOM. BOCACCIO	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BGL1	NOM. BLACKGILL ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BLK1	NOM. BLACK ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BLU1	NOM. BLUE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BNK1	NOM. BANK ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BRW1	NOM. BROWN ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BRZ1	NOM. BRONZESPOTTED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
BYL1	NOM. BLACK-AND-YELLOW ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CBZ1	NOM. CABEZON	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CBZN	CABEZON	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CHN1	NOM. CHINA ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CLP1	NOM. CHILIPEPPER	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CML1	NOM. CHAMELEON ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CNR1	NOM. CANARY ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
COP1	NOM. COPPER ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
CWC1	NOM. COWCOD ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
DBR1	NOM. DARKBLOTCHED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
FLG1	NOM. FLAG ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GBL1	NOM. GREENBLOTCHED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GPH1	NOM. GOPHER ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GRDR	UNSP. GRENADIERS	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GRS1	NOM. GRASS ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GSP1	NOM. GREENSPOTTED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
GSR1	NOM. GREENSTRIPED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
HNY1	NOM. HONEYCOMB ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
KGL1	NOM. KELP GREENLING	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
KLP1	NOM. KELP ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
LCOD	LINGCOD	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
LSP1	NOM. LONGSPINE THORNYHEAD	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
MXR1	NOM. MEXICAN ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
NUSF	NOR. UNSP. SHELF ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
NUSP	NOR. UNSP. SLOPE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
NUSR	NOR. UNSP. NEAR-SHORE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
OGRN	OTHER GROUNDFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
OLV1	NOM. OLIVE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
ORCK	OTHER ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
PCOD	PACIFIC COD	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
PNK1	NOM. PINK ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
POP	PACIFIC OCEAN PERCH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
POP1	GEN. SHELF/SLOPE RF	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
POP2	NOMINAL POP	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
PRR1	NOM. PINKROSE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
QLB1	NOM. QUILLBACK ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RATF	SPOTTED RATFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK1	BOCACCIO+CHILIPEPPER RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK2	UNSP. BOLINA RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK3	UNSP. DPWTR REDS RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK4	UNSP. REDS RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK5	UNSP. SMALL REDS RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK6	UNSP. ROSEFISH RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK7	UNSP. GOPHER RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RCK8	CANARY+VERMILION RCKFSH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting

SPID	Common Name	Summary1	Summary2	Summary4	California group
RCK9	BLACK+BLUE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RDB1	NOM. REDBANDED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
ROS1	NOM. ROSY ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
RST1	NOM. ROSETHORN ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SBL1	NOM. SHORTBELLY ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SCR1	NOM. CALIF. SCORPIONFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SNS1	NOM. SPLITNOSE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SPK1	NOM. SPECKLED ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SQR1	NOM. SQUARESPOT	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SSP1	NOM. SHORTSPINE THORNYHEAD	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
STL1	NOM. STRIPETAIL ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
STR1	NOM. STARRY ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
SWS1	NOM. SWORDSPINE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
TGR1	NOM. TIGER ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
THDS	THORNYHEADS (MIXED)	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
TRE1	NOM. TREEFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
UDNR	UNSP. DEEP NEAR-SHORE RF	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
UPOP	UNSP. POP GROUP	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
URCK	UNSP. ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
USHR	UNSP. NEAR-SHORE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
USLF	UNSP. SHELF ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
USLP	UNSP. SLOPE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
VRM1	NOM. VERMILLION ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
WDW1	NOM. WIDOW ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
YEY1	NOM. YELLOWEYE ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
YTR1	NOM. YELLOWTAIL ROCKFISH	1 Groundfish	Cod/rockfish	5 Groundfish	Groundfish incl. P. whiting
PLCK	WALLEYE POLLOCK	1 Groundfish	Cod/rockfish	8 Other	Groundfish incl. P. whiting
SABL	SABLEFISH	1 Groundfish	Sablefish	5 Groundfish	Groundfish incl. P. whiting
DSRK	SPINY DOGFISH	1 Groundfish	Sharks (PFMC)	5 Groundfish	Groundfish incl. P. whiting
LSRK	LEOPARD SHARK	1 Groundfish	Sharks (PFMC)	5 Groundfish	Groundfish incl. P. whiting
SSRK	SOUPFIN SHARK	1 Groundfish	Sharks (PFMC)	5 Groundfish	Groundfish incl. P. whiting
BSKT	BIG SKATE	1 Groundfish	Skates	5 Groundfish	Groundfish incl. P. whiting
CSKT	CALIFORNIA SKATE	1 Groundfish	Skates	5 Groundfish	Groundfish incl. P. whiting
USKT	UNSP. SKATE	1 Groundfish	Skates	5 Groundfish	Groundfish incl. P. whiting
ARTH	ARROWTOOTH FLOUNDER	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
BSOL	BUTTER SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
CSOL	CURLFIN SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
DOVR	DOVER SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
EGLS	ENGLISH SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
FSOL	FLATHEAD SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
LDB1	NOM. LONGFIN SANDDAB	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
OFLT	OTHER FLATFISH	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
PDAB	PACIFIC SANDDAB	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
PDB1	NOM. PACIFIC SANDDAB	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
PTRL	PETRALE SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
REX	REX SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
RSOL	ROCK SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
SDB1	NOM. SPECKLED SANDDAB	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
SSOL	SAND SOLE	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
STRY	STARRY FLOUNDER	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
UDAB	UNSP. SANDDABS	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
UFLT	UNSP. FLATFISH	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
UTRB	UNSP. TURBOTS	1 Groundfish	Sole/flounder	5 Groundfish	Groundfish incl. P. whiting
PWHT	PACIFIC WHITING	2 Pacific whiting	Pacific whiting	7 Pacific whiting	Groundfish incl. P. whiting
CHNK	CHINOOK SALMON	3 Salmon	Chinook	1 Salmon	Salmons
CHUM	CHUM SALMON	3 Salmon	Chum	1 Salmon	Salmons
COHO	COHO SALMON	3 Salmon	Coho	1 Salmon	Salmons
PINK	PINK SALMON	3 Salmon	Pink	1 Salmon	Salmons

SPID	Common Name	Summary1	Summary2	Summary4	California group
SOCK	SOCKEYE SALMON	3 Salmon	Sockeye	1 Salmon	Salmons
STLH	STEELHEAD	3 Salmon	Steelhead	1 Salmon	Salmons
USMN	UNSP. SALMON	3 Salmon	Unspecified	1 Salmon	Salmons
LOBS	CALIF. SPINY LOBSTER	4 Crab/lobster	California spiny lobster	8 Other	Lobsters and prawns
DCRB	DUNGENESS CRAB	4 Crab/lobster	Dungeness crab	2 D. crab	D. crab
BTCR	BAIRDI TANNER CRAB	4 Crab/lobster	Other crab	8 Other	Others
OCRB	OTHER CRAB	4 Crab/lobster	Other crab	8 Other	Others
RCRB	ROCK CRAB	4 Crab/lobster	Other crab	8 Other	Others
SKCR	SCARLET KING CRAB	4 Crab/lobster	Other crab	8 Other	Others
UCRB	UNSPECIFIED CRAB	4 Crab/lobster	Other crab	8 Other	Others
UKCR	UNSP. KING CRAB	4 Crab/lobster	Other crab	8 Other	Others
UTCR	UNSP. TANNER CRAB	4 Crab/lobster	Other crab	8 Other	Others
BSRM	UNSP. BAIT SHRIMP	5 Shrimp	Other shrimp	8 Other	Others
GSRM	GHOST SHRIMP	5 Shrimp	Other shrimp	8 Other	Others
MSRM	MUD SHRIMP	5 Shrimp	Other shrimp	8 Other	Others
OSRM	OTHER SHRIMP	5 Shrimp	Other shrimp	8 Other	Others
USRM	UNSP. OCEAN SHRIMP	5 Shrimp	Other shrimp	8 Other	Others
PSHP	PINK SHRIMP	5 Shrimp	Pink shrimp	3 P. shrimp	P. shrimp
GPRW	GOLDEN PRAWN	5 Shrimp	Prawns	8 Other	Lobsters and prawns
RPRW	RIDGEBACK PRAWN	5 Shrimp	Prawns	8 Other	Lobsters and prawns
SPRW	SPOTTED PRAWN	5 Shrimp	Prawns	8 Other	Lobsters and prawns
NANC	NORTHERN ANCHOVY	6 Pelagic	Anchovy	8 Other	Other pelagics
OANC	OTHER ANCHOVY	6 Pelagic	Anchovy	8 Other	Other pelagics
CMCK	CHUB MACKEREL	6 Pelagic	Mackerel	8 Other	Other pelagics
UMCK	UNSP. MACKEREL	6 Pelagic	Other mackerel	5 Groundfish	Other pelagics
JMCK	JACK MACKEREL	6 Pelagic	Other mackerel	8 Other	Other pelagics
PBNT	PACIFIC BONITO	6 Pelagic	Other pelagic	8 Other	Other pelagics
PHRG	PACIFIC HERRING	6 Pelagic	Other pelagic	8 Other	Other pelagics
RHRG	ROUND HERRING	6 Pelagic	Other pelagic	8 Other	Other pelagics
PSDN	PACIFIC SARDINE	6 Pelagic	Pacific Sardine	8 Other	P. sardine
MSQD	MARKET SQUID	6 Pelagic	Squid	8 Other	M. squid
SQID	UNSP. SQUID	6 Pelagic	Squid	8 Other	Other pelagics
ALBC	ALBACORE	8 Highly migratory	Albacore tuna	4 Tuna	Tunas
BSRK	BLUE SHARK	8 Highly migratory	Other sharks	5 Groundfish	Sharks and swordfish
ISRK	BIGEYE THRESHER SHARK	8 Highly migratory	Other sharks	5 Groundfish	Sharks and swordfish
PSRK	PELAGIC THRESHER SHARK	8 Highly migratory	Other sharks	5 Groundfish	Sharks and swordfish
TSRK	COMMON THRESHER SHARK	8 Highly migratory	Other sharks	5 Groundfish	Sharks and swordfish
MAKO	SHORTFIN MAKO SHARK	8 Highly migratory	Other sharks	8 Other	Sharks and swordfish
MRLN	STRIPED MARLIN	8 Highly migratory	Swordfish	8 Other	Sharks and swordfish
SWRD	SWORDFISH	8 Highly migratory	Swordfish	8 Other	Sharks and swordfish
BTNA	BLUEFIN TUNA	8 Highly migratory	Tunas not albacore	8 Other	Tunas
DRDO	DORADO	8 Highly migratory	Tunas not albacore	8 Other	Tunas
ETNA	BIGEYE TUNA	8 Highly migratory	Tunas not albacore	8 Other	Tunas
STNA	SKIPJACK TUNA	8 Highly migratory	Tunas not albacore	8 Other	Tunas
UTNA	UNSPECIFIED TUNA	8 Highly migratory	Tunas not albacore	8 Other	Tunas
YTNA	YELLOWFIN TUNA	8 Highly migratory	Tunas not albacore	8 Other	Tunas
PHLB	PACIFIC HALIBUT	9 Halibut	Halibut (PFMC)	8 Other	Others
OURC	OTHER SEA URCHINS	10 Sea urchins	Sea urchins	8 Other	Sea urchin
RURC	RED SEA URCHIN	10 Sea urchins	Sea urchins	8 Other	Sea urchin
UURC	UNSP. SEA URCHINS	10 Sea urchins	Sea urchins	8 Other	Sea urchin
OCRK	OTHER CROAKER	11 Other	Croakers	8 Other	Others
WCRK	WHITE CROAKER	11 Other	Croakers	8 Other	Others
BABL	BLACK ABALONE	11 Other	Mollusks	8 Other	Others
BCLM	BUTTER CLAM	11 Other	Mollusks	8 Other	Others
BMSL	BLUE OR BAY MUSSEL	11 Other	Mollusks	8 Other	Others
CKLE	BASKET COCKLE	11 Other	Mollusks	8 Other	Others
CMSL	CALIFORNIA MUSSEL	11 Other	Mollusks	8 Other	Others
ESTR	EASTERN OYSTER	11 Other	Mollusks	8 Other	Others

SPID	Common Name	Summary1	Summary2	Summary4	California group
EURO	EUROPEAN OYSTER	11 Other	Mollusks	8 Other	Others
GABL	GREEN ABALONE	11 Other	Mollusks	8 Other	Others
GCLM	GAPER CLAM	11 Other	Mollusks	8 Other	Others
GDUK	GEODUCK	11 Other	Mollusks	8 Other	Others
HCLM	HORSE CLAMS	11 Other	Mollusks	8 Other	Others
JCLM	CALIFORNIA JACKKNIFE CLAM	11 Other	Mollusks	8 Other	Others
KSTR	KUMAMOTO OYSTER	11 Other	Mollusks	8 Other	Others
LCLM	NATIVE LITTLENECK	11 Other	Mollusks	8 Other	Others
LSTR	OLYMPIA OYSTER	11 Other	Mollusks	8 Other	Others
MACL	MUD CLAMS	11 Other	Mollusks	8 Other	Others
MCLM	MANILA CLAM	11 Other	Mollusks	8 Other	Others
OABL	OTHER ABALONE	11 Other	Mollusks	8 Other	Others
OMSK	OTHER MOLLUSKS	11 Other	Mollusks	8 Other	Others
OSCL	OTHER SCALLOP	11 Other	Mollusks	8 Other	Others
PABL	PINK ABALONE	11 Other	Mollusks	8 Other	Others
PCLM	PISMO CLAM	11 Other	Mollusks	8 Other	Others
PRCL	PURPLE CLAM	11 Other	Mollusks	8 Other	Others
PSTR	PACIFIC OYSTER	11 Other	Mollusks	8 Other	Others
QCLM	NORTHERN QUAHOG CLAM	11 Other	Mollusks	8 Other	Others
RABL	RED ABALONE	11 Other	Mollusks	8 Other	Others
RCLM	RAZOR CLAM	11 Other	Mollusks	8 Other	Others
RZCL	ROSY RAZOR CLAM	11 Other	Mollusks	8 Other	Others
SCLM	SOFT-SHELLED CLAM	11 Other	Mollusks	8 Other	Others
UABL	UNSPECIFIED ABALONE	11 Other	Mollusks	8 Other	Others
UCLM	UNSPECIFIED CLAM	11 Other	Mollusks	8 Other	Others
UMSK	UNSPECIFIED MOLLUSKS	11 Other	Mollusks	8 Other	Others
USCL	UNSPECIFIED SCALLOP	11 Other	Mollusks	8 Other	Others
USTR	UNSPECIFIED OYSTER	11 Other	Mollusks	8 Other	Others
WABL	WHITE ABALONE	11 Other	Mollusks	8 Other	Others
WCLM	WASHINGTON CLAM	11 Other	Mollusks	8 Other	Others
BTRY	BAT RAY	11 Other	Other	5 Groundfish	Others
MSC2	MISCELLANEOUS FISH	11 Other	Other	5 Groundfish	Others
OSKT	OTHER SKATES	11 Other	Other	5 Groundfish	Others
SRFP	SURFPERCH SPP.	11 Other	Other	5 Groundfish	Others
UHLB	UNSPECIFIED HALIBUT	11 Other	Other	5 Groundfish	Others
CEEL	SPOTTED CUSK-EEL	11 Other	Other	8 Other	Others
CHLB	CALIFORNIA HALIBUT	11 Other	Other	8 Other	Others
EELS	UNSPECIFIED EELS	11 Other	Other	8 Other	Others
EULC	EULACHON	11 Other	Other	8 Other	Others
KFSH	GIANT KELPFISH	11 Other	Other	8 Other	Others
MEEL	MONKEYFACE EEL	11 Other	Other	8 Other	Others
MISC	MISC. FISH/ANIMALS	11 Other	Other	8 Other	Others
MSHP	PLAINFIN MIDSHIPMAN	11 Other	Other	8 Other	Others
PROW	PROWFISH	11 Other	Other	8 Other	Others
QFSH	QUEENFISH	11 Other	Other	8 Other	Others
SCLP	UNSP. SCULPIN	11 Other	Other	8 Other	Others
SHPD	CALIFORNIA SHEEPHEAD	11 Other	Other	8 Other	Others
TCOD	PACIFIC TOMCOD	11 Other	Other	8 Other	Others
UHAG	UNSPECIFIED HAGFISH	11 Other	Other	8 Other	Others
WEEL	WOLF EEL	11 Other	Other	8 Other	Others
UECH	UNSPECIFIED ECHINODERM	11 Other	Other echinoderms	8 Other	Others
USCU	UNSP. SEA CUCUMBERS	11 Other	Other echinoderms	8 Other	Sea cucumbers
ASRK	PACIFIC ANGEL SHARK	11 Other	Other sharks	5 Groundfish	Sharks and swordfish
OSRK	OTHER SHARK	11 Other	Other sharks	5 Groundfish	Sharks and swordfish
USRK	UNSP. SHARK	11 Other	Other sharks	5 Groundfish	Sharks and swordfish
CUDA	PACIFIC BARRACUDA	11 Other	Pacific barracuda	8 Other	Others
GBAS	GIANT SEA BASS	11 Other	Sea bass	8 Other	Others
OBAS	OTHER BASS	11 Other	Sea bass	8 Other	Others

SPID	Common Name	Summary1	Summary2	Summary4	California group
WBAS	WHITE SEABASS	11 Other	Sea bass	8 Other	Others
YLTL	YELLOWTAIL	11 Other	Sea bass	8 Other	Tunas
GSTG	GREEN STURGEON	11 Other	Sturgeon	8 Other	Others
USTG	UNSP. STURGEON	11 Other	Sturgeon	8 Other	Others
WSTG	WHITE STURGEON	11 Other	Sturgeon	8 Other	Others
BSJK	BLACK SKIPJACK	11 Other	Tunas not albacore	8 Other	Tunas
OTNA	OTHER TUNA	11 Other	Tunas not albacore	8 Other	Tunas
OCTP	UNSP. OCTOPUS	11 Other	Unspecified octopi	8 Other	Others
SHAD	UNSPECIFIED SHAD	11 Other	Unspecified shad	8 Other	Others
SMLT	UNSP. SMELT	11 Other	Unspecified smelt	8 Other	Others

Project: West Cost Commercial Fishing Industry in 2004
Date: May 22, 2006
Extraction: PacFIN annual vessel summary, Nov. 2004, Feb. 2005, and Mar. 2005
Subject: Gear Code Mapping

GRID	Description	Summary1	Summary2	Salmon
LGL	LONGLINE OR SETLINE	Hook and line	Longline or setline	Other
STL	SETLINE	Hook and line	Longline or setline	Other
JIG	JIG	Hook and line	Other hook and line	Other
OHL	OTHER HOOK AND LINE GEAR	Hook and line	Other hook and line	Other
POL	POLE (COMMERCIAL)	Hook and line	Other hook and line	Other
VHL	VERTICAL HOOK AND LINE GEAR	Hook and line	Other hook and line	Other
GLN	GILL NET	Net	Gillnet	Net
DPN	DIP NET	Net	Other net	Net
ONT	OTHER NET GEAR	Net	Other net	Net
STN	SET NET	Net	Other net	Net
SEN	SEINE	Net	Seine	Net
DVG	DIVING GEAR	Other	Diving	Other
OTH	OTHER KNOWN GEAR	Other	Other known gear	Other
ODG	OTHER DREDGE GEAR	Other	Other trawl	Other
USP	UNKNOWN OR UNSPECIFIED GEAR	Other	Unknown or unspecified gear	Other
CLP	CRAB AND LOBSTER POT	Pot	Crab pot	Other
CPT	CRAB POT	Pot	Crab pot	Other
FPT	FISH POT	Pot	Fish pot	Other
OPT	OTHER POT GEAR	Pot	Other pot	Other
PRW	PRAWN TRAP	Pot	Other pot	Other
DNT	DANISH/SCOTTISH SEINE (TRAWL)	Trawl	Groundfish trawl	Other
FFT	FLATFISH TRAWL	Trawl	Groundfish trawl	Other
GFL	GROUNDFISH TRAWL, FOOTROPE > 8 in.	Trawl	Groundfish trawl	Other
GFS	GROUNDFISH TRAWL, FOOTROPE < 8 in.	Trawl	Groundfish trawl	Other
GFT	GROUNDFISH TRAWL (OTTER)	Trawl	Groundfish trawl	Other
MDT	MIDWATER TRAWL	Trawl	Groundfish trawl	Other
PRT	PAIR TRAWL	Trawl	Groundfish trawl	Other
RLT	ROLLER TRAWL	Trawl	Groundfish trawl	Other
BMT	BEAM TRAWL	Trawl	Other trawl	Other
OTW	OTHER TRAWL GEAR	Trawl	Other trawl	Other
RVT	RIVER TRAWL	Trawl	Other trawl	Other
DGN	DRIFT GILL NET	Trawl	Pelagic trawl	Other
DST	SHRIMP TRAWL, DOUBLE RIGGED	Trawl	Shrimp trawl	Other
SHT	SHRIMP TRAWL, SINGLE OR DOUBLE RIG	Trawl	Shrimp trawl	Other
SST	SHRIMP TRAWL, SINGLE RIGGED	Trawl	Shrimp trawl	Other
BTR	BOTTOMFISH TROLL	Troll	Troll	Other
TRL	TROLL	Troll	Troll	Troll

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Subject: Port Code Mapping

PCID	Name	AGID	Port Group
ANA	ANACORTES	W	Northern Puget Sound
BLL	BELLINGHAM BAY	W	Northern Puget Sound
BLN	BLAINE	W	Northern Puget Sound
FRI	FRIDAY HARBOR	W	Northern Puget Sound
LAC	LA CONNER	W	Northern Puget Sound
ONP	OTHER NORTH PUGET SOUND PORTS	W	Northern Puget Sound
EVR	EVERETT	W	Southern Puget Sound
OLY	OLYMPIA	W	Southern Puget Sound
OSP	OTHER SOUTH PUGET SOUND PORTS	W	Southern Puget Sound
SEA	SEATTLE	W	Southern Puget Sound
SHL	SHELTON	W	Southern Puget Sound
TAC	TACOMA	W	Southern Puget Sound
CPL	COPALIS BEACH	W	Coastal Washington North
LAP	LA PUSH	W	Coastal Washington North
NEA	NEAH BAY	W	Coastal Washington North
PAG	PORT ANGELES	W	Coastal Washington North
SEQ	SEQUIM	W	Coastal Washington North
TNS	PORT TOWNSEND	W	Coastal Washington North
GRH	GRAYS HARBOR	W	Coastal Washington South and Central
LWC	ILWACO/CHINOOK	W	Coastal Washington South and Central
OCR	OTHER COLUMBIA RIVER PORTS	W	Coastal Washington South and Central
WLB	WILLAPA BAY	W	Coastal Washington South and Central
WPT	WESTPORT	W	Coastal Washington South and Central
OWA	OTHER OR UNKNOWN WASHINGTON PORTS	W	Unidentified Washington
OWC	OTHER WASHINGTION COASTAL PORTS	W	Unidentified Washington
AST	ASTORIA	O	Astoria
CNB	CANNON BEACH	O	Astoria
CRV	PSUEDO PORT CODE FOR COLUMBIA RIVER	O	Astoria
GSS	GEARHART - SEASIDE	O	Astoria
WAL	LANDED IN WASHINGTON; TRANSPORTED TO OREGON	O	Astoria
NHL	NEHALEM BAY	O	Tillamook
NTR	NETARTS BAY	O	Tillamook
PCC	PACIFIC CITY	O	Tillamook
SRV	SALMON RIVER	O	Tillamook
TLL	TILLAMOOK/GARIBALDI	O	Tillamook
DPO	DEPOE BAY	O	Newport
NEW	NEWPORT	O	Newport
SLZ	SILETZ BAY	O	Newport
WLD	WALDPORT	O	Newport
YAC	YACHATS	O	Newport
BDN	BANDON	O	Coos Bay
COS	COOS BAY	O	Coos Bay
FLR	FLORENCE	O	Coos Bay
WIN	WINCHESTER BAY	O	Coos Bay
ORF	PORT ORFORD	O	Port Orford
BRK	BROOKINGS	O	Brookings
GLD	GOLD BEACH	O	Brookings

PCID	Name	AGID	Port Group
CRS	CRESCENT CITY	C	Crescent City
ODN	OTHER DEL NORTE COUNTY PORTS	C	Crescent City
ERK	EUREKA	C	Eureka
FLN	FIELDS LANDING	C	Eureka
OHB	OTHER HUMBOLDT COUNTY PORTS	C	Eureka
TRN	TRINIDAD	C	Eureka
ALB	ALBION	C	Fort Bragg
ARE	POINT ARENA	C	Fort Bragg
BRG	FORT BRAGG	C	Fort Bragg
OMD	OTHER MENDOCINO COUNTY PORTS	C	Fort Bragg
BDG	BODEGA BAY	C	Bodega Bay
OSM	OTHER SONOMA AND MARIN COUNTY OUTER COAST PORTS	C	Bodega Bay
RYS	POINT REYES	C	Bodega Bay
TML	TOMALES BAY	C	Bodega Bay
ALM	ALAMEDA	C	San Francisco
BKL	BERKELEY	C	San Francisco
OAK	OAKLAND	C	San Francisco
OSF	OTHER S. F. BAY AND SAN MATEO COUNTY PORTS	C	San Francisco
PRN	PRINCETON / HALF MOON BAY	C	San Francisco
RCH	RICHMOND	C	San Francisco
SF	SAN FRANCISCO	C	San Francisco
SLT	SAUSALITO	C	San Francisco
CRZ	SANTA CRUZ	C	Monterey
MNT	MONTEREY	C	Monterey
MOS	MOSS LANDING	C	Monterey
OCM	OTHER SANTA CRUZ AND MONTEREY COUNTY PORTS	C	Monterey
AVL	AVILA	C	Morro Bay
MRO	MORRO BAY	C	Morro Bay
OSL	OTHER SAN LUIS OBISPO COUNTY PORTS	C	Morro Bay
HNM	PORT HUENEME	C	Santa Barbara
OBV	OTHER SANTA BARBARA AND VENTURA COUNTY PORTS	C	Santa Barbara
OXN	OXNARD	C	Santa Barbara
SB	SANTA BARBARA	C	Santa Barbara
VEN	VENTURA	C	Santa Barbara
DNA	DANA POINT	C	Los Angeles
LGB	LONG BEACH	C	Los Angeles
NWB	NEWPORT BEACH	C	Los Angeles
OLA	OTHER LOS ANGELES AND ORANGE COUNTY PORTS	C	Los Angeles
SP	SAN PEDRO	C	Los Angeles
TRM	TERMINAL ISLAND	C	Los Angeles
WLM	WILLMINGTON	C	Los Angeles
OCN	OCEANSIDE	C	San Diego
OSD	OTHER SAN DIEGO COUNTY PORTS	C	San Diego
SD	SAN DIEGO	C	San Diego
OCA	OTHER OR UNKNOWN CALIFORNIA PORTS	C	Unidentified California