

U.S. Fisheries Management and Foreign Trade Linkages: Policy Implications for Groundfish Fisheries in the North Pacific EEZ

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The groundfish resources of the U.S. Exclusive Economic Zone (EEZ) off Alaska, dominated by Alaska or walleye pollock, *Theragra chalcogramma*, Pacific cod, *Gadus macrocephalus*, and flatfishes, *Pleuronectidae*, can sustain annual commercial harvests well in excess of 2 million metric tons (t). As recently as 1979, foreign fisheries took 99 percent of the annual harvest supported by these resources. This has changed dramatically during the 1980's. The foreign fisheries have received rapidly decreasing allocations, first as joint venture fisheries expanded and, more recently, as the domestic fisheries have grown. Joint venture fisheries are fisheries in which domestic fishing vessels deliver their catch directly to foreign processing vessels in the EEZ. By 1986, the joint venture and domestic fisheries accounted for 66 percent and 8 percent, respectively, of the annual harvest. The preliminary corresponding figures for 1987 are 78 and 18 percent.

The development of the wholly domestic fisheries, which may replace both the foreign and joint venture fisheries during the next several years, has initiated an era in which fishery management and international trade issues will be much more closely linked than they have been in the past. This is due, at least in part, to the differences be-

tween the markets for groundfish and the markets for the species that the U.S. domestic fisheries off Alaska have traditionally exploited. These differences are the topic of this paper.

Alaska Fisheries Mainstays

King crab, *Paralithodes* spp., Tanner or snow crab, *Chionoecetes* spp., Pacific halibut, *Hippoglossus stenolepis*, and the five species of Pacific salmon, *Oncorhynchus* spp., have been the mainstays of the domestic fisheries off Alaska for many years, and will remain an important and perhaps the dominant part of these fisheries, even when the groundfish resources are fully utilized by the wholly domestic groundfish industry. Alaska has been the predominant source of these species in both domestic and international markets. A high degree of product differentiation has been developed for these species, and most have relatively high prices and are regarded as luxury goods. Therefore, there are often very limited alternative supplies and other species are often not perceived to be close substitutes for them.

There are several reasons why these market characteristics are desirable from the perspective of those who supply fishery products. First, the supply from other sources may not be sufficient to be a major source of uncertainty or instability regarding product price. Second, the demand for the product will tend to be less elastic with respect to its price (i.e., the price may be relatively responsive to a change in supply); therefore, reductions in catch caused by a decrease in a harvest quota

will be significantly, if not more than completely, offset by an increase in price. (Note that the stability of total revenue, with respect to changes in output, increases as the price elasticity of demand approaches unity, and then decreases as the elasticity continues to decrease beyond unity.) Third, increased costs can be passed on by increasing product price, with only a relatively small decrease in the amount that can be sold. Fourth, as the traditional supplier of the species, the Alaska seafood industry has established itself as a reliable source of product of known quality and the markets for these products are well understood by those in the industry. The result is, the Alaska seafood industry can often command a premium price for its product, while simultaneously incurring relatively low marketing costs.

Groundfish Market Characteristics

The market characteristics are quite different and relatively unfamiliar in the case of the principal Alaska groundfish species, such as Alaska pollock and Pacific cod. Alaska is an important but certainly not dominant source of supply of products derived from these species. There appear to be close substitutes in the marketplace for cod, flatfishes, and pollock from Alaska. Moreover, the Alaska seafood industry is a relative newcomer to many of these markets, and has not as yet fully established itself as a reliable source of product of known quality. These market characteristics are much less desirable from the perspective of

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those who supply fishery products.

First, the supply of these products from the rest of the world is large enough to significantly affect the prevailing market price. This source of uncertainty is much greater for groundfish than it has been for the traditional Alaska species. Second, prices may be relatively unresponsive to changes in the quantity supplied by Alaska fisheries. Therefore, when output is decreased by a reduction in a quota, revenue may decrease almost proportionally. Third, increased costs will, to a great extent, have to be absorbed by the domestic groundfish industry, because even a small price increase could result in a large decrease in the amount of groundfish that the industry can sell. Fourth, to establish itself in these new markets, the industry will often have to offer a lower price than the established suppliers, and incur higher marketing costs, at least for a period of time.

The following examples present two cases in which fishery management and international trade issues are closely linked because of the characteristics of the groundfish markets. They also demonstrate why these two aspects of public policy will be increasingly important in conjunction with one another, as the management of the U.S. EEZ evolves and matures. An important management issue, particularly in the Alaska fishing sector, is that of establishing regulatory measures that encourage and facilitate the development of shore-based processing capacity. Because the U.S. domestic groundfish industry will tend to be a price taker, rather than a price setter, two questions concerning international trade are relevant: Are the types of operations which are being encouraged economically viable, given current world prices, and will they be, given the prices expected over the next several years? Well-informed expectations will be based on an understanding of international trade issues, including tariff negotiations, temporary shortfalls or increases in world supply, and alternative sources of product.

Another fishery management issue

that requires international trade information for an informed decision is the determination of the appropriate allocation of surplus resource to the remaining foreign fisheries operating in the U.S. EEZ. The appropriate quotas depend on a variety of factors, such as the response of the resource to exploitation at the established quota levels, the rate at which the domestic fisheries are expected to develop, and the effects of the foreign quotas on that development. Both the second and third factors are affected by international trade considerations. Concern about the influence of foreign participation in directed fisheries on domestic groundfish development was, for example, an important mitigating factor when the North Pacific Fishery Management Council established the 1987 total allowable level of foreign fishing (TALFF) for Pacific cod. The paper that was prepared by the National Marine Fisheries Service for the Council, to help it make an informed decision concerning this TALFF allocation, included the following types of international trade information:

- 1) Annual foreign cod harvests from the U.S. EEZ off Alaska,
- 2) Trends in the production of cod and cod-like species from other sources,
- 3) U.S. imports of cod and cod-like products by product form,
- 4) Wholesale and import price trends for cod,
- 5) Trends in cod and cod-like imports by country for several major importing nations and,
- 6) Trends in Japanese prices for cod and cod-like products.

There was, unfortunately, insufficient data available with which to definitively determine the extent to which foreign directed allocations of Pacific cod affect the ability of U.S. domestic fishermen to market cod. However, the following preliminary findings were made.

Preliminary Findings

The foreign directed fisheries take a

large, but not dominant, share of the Pacific cod catch in the U.S. EEZ, off Alaska. Between 1982 and 1986, the annual foreign harvest ranged from 55,100 t in 1986 to 74,400 t in 1984 and averaged 64,400 t. During this same period, domestic vessels participating in domestic and joint venture fisheries had annual harvests which increased steadily from 55,100 t in 1982, to 107,800 t in 1986 and averaged 76,200 t. For this 5-year period, as a whole, the foreign fisheries accounted for 45.8 percent of the total cod catch. By 1986, they accounted for only 33.8 percent of the catch of Pacific cod in the U.S. EEZ off Alaska.

Similarly, the U.S. EEZ is an important, but not predominant, source of Pacific cod in the world marketplace. Food and Agriculture Organization of the United Nations (FAO) statistics for 1982 through 1985, indicate that the total world catch of Pacific cod increased steadily from 239,200 t in 1982 to 409,600 t in 1985, with most of the growth occurring outside the U.S. EEZ. By 1985, only 38.7 percent of the total world catch of Pacific cod was taken in the U.S. EEZ.

The development of the U.S. domestic Pacific cod fishery, to a significant extent, has depended upon the ability of the domestic factory trawl fleet to market Pacific cod as a substitute for Atlantic cod. This suggests that, in determining the impact of a change in the foreign allocation of Pacific cod in the North Pacific EEZ, it is appropriate to consider the world supply of the Atlantic cod as well as the Pacific cod. Although Pacific cod has become relatively more important as the result of increasing harvests of Pacific cod and decreasing harvests of Atlantic cod in the last few years, Atlantic cod remains the dominant species. As a percentage of Atlantic and Pacific cod catch, Pacific cod increased steadily from 9.6 percent in 1982 to 17.4 percent in 1985. During this period, the total world production of these two species varied from 2.4 to 2.5 million t.

Like the Pacific cod fishery, the development of the U.S. domestic

Alaska pollock fishery has, at least in part, been dependent upon the ability of harvesters to market Alaska pollock as a substitute for cod. This suggests that, within the cod family, there are a number of substitutes for Pacific cod. FAO statistics indicate that the world catch of cods, hakes, and haddocks increased almost without interruption from 10.6 million t in 1982 to 12.4 million t in 1985. Although there are several reasons why all of this catch does not compete in world markets with Pacific cod harvested from the U.S. EEZ, a large enough part of it does that changes in Pacific cod quotas or foreign allocations in the EEZ are not expected to have a significant effect on the ability of U.S. producers to compete in most markets, including the large U.S. domestic market.

The U.S. Market

With respect to the domestic market, the United States is the world's largest importer of frozen processed groundfish product. U.S. groundfish imports, for all species, account for about 70 percent of the total world volume of trade in these commodities. Clearly, the United States is a major market for cod and cod-like products. Between 1982 and 1986, U.S. imports of groundfish products, including fillets, steaks, blocks, and both dressed and whole fish, consisting primarily of cod and cod-like products, ranged from 732 to 837 million pounds, product weight (Tables 1, 2). The average annual imports of 793 million pounds, or 360,000 t, had a live weight equivalence of approximately 1.1 million t.

A second measure of the size of the U.S. market, especially for cod and cod-like products, is provided by estimates of U.S. consumption of fish fillets, steaks, sticks, and portions. The consumption of these products, which are dominated by cod and cod-like species, increased from 988 million pounds in 1980, to 1,211 million pounds in 1986 (Table 3). The live weight equivalence for 1986 would have exceeded 3.1 billion pounds, or 1.4 million t.

A third indication of the current

Table 1.—U.S. imports¹ of groundfish fillets, steaks, and blocks, 1976-86.

Year	Fillets and steaks		Blocks		Total	
	Amt. ²	Value ³	Amt. ²	Value ³	Amt. ²	Value ³
1976	337	273	379	211	716	484
1977	321	305	385	292	706	597
1978	333	341	406	325	739	666
1979	340	385	408	337	748	722
1980	297	341	336	289	633	630
1981	346	415	344	301	690	716
1982	371	458	319	274	690	732
1983	355	449	384	339	739	788
1984	373	459	316	263	689	722
1985	388	500	334	275	722	775
1986	366	542	364	380	730	922

¹Sources: U.S. Dep. Commer. Bur. Census, Wash., D.C., and Natl. Mar. Fish. Serv. database avail. from Northwest Alaska Fish. Cent., 7600 Sand Point Way N.E., Bin C15700, Seattle, WA 98115-0070.

²Quantity (Amt.) in millions of pounds, product weight.

³Value in millions of dollars.

Table 3.—U.S. consumption¹ of all fillets and steaks, and fish sticks and portions, 1980-86.

Year	Fillets and steaks		Fish sticks and portions	
	Total ²	Per capita ³	Total ²	Per capita ³
1980	545,347	2.40	442,892	1.95
1981	564,844	2.46	414,149	1.80
1982	582,630	2.51	400,455	1.73
1983	649,828	2.77	413,858	1.77
1984	713,159	3.02	430,895	1.82
1985	776,093	3.25	419,547	1.76
1986	780,201	3.24	431,266	1.79

¹Source: Computed from data from U.S. Dep. Commer. Bur. Census, and Natl. Mar. Fish. Serv. "Fisheries of the United States," var. iss.

²Total in thousands of pounds, product weight.

³Per capita in pounds ("Total" divided by total U.S. resident population).

strength of the U.S. cod market is provided by price trends (Table 4). Wholesale prices for most cod products have been characterized by increases in annual averages since the early 1980s, and by monthly prices for 1987 typically above their counterparts for 1986 (Table 5). However, some cod prices decreased after reaching record highs in early 1987.

Japan was the principal alternative market for Pacific cod from the U.S. EEZ and became the focus of much of the public debate concerning the impact on domestic fisheries of foreign allocations of Pacific cod in the EEZ

Table 2.—U.S. imports¹ of whole or dressed groundfish, 1976-86.

Year	Canada		Other		Total	
	Amt. ²	Value ³	Amt. ²	Value ³	Amt. ²	Value ³
1976	13,935	4,932	4,526	6,216	18,461	11,148
1977	11,701	4,330	4,294	5,598	15,995	9,928
1978	10,659	4,115	4,248	5,838	14,907	9,953
1979	15,682	6,175	5,965	8,902	21,647	15,077
1980	16,402	6,617	2,668	5,243	19,070	11,860
1981	28,908	12,090	3,577	7,107	32,485	19,197
1982	38,342	14,215	3,487	7,006	41,829	21,221
1983	48,941	18,117	4,183	7,072	53,124	25,189
1984	80,882	30,029	4,773	7,334	85,655	37,363
1985	99,174	37,538	5,214	8,793	104,388	46,331
1986	99,521	47,703	7,886	12,499	107,407	60,202

¹Sources: U.S. Dep. Commer. Bur. Census, Wash., D.C., and Natl. Mar. Fish. Serv. database avail. from Northwest Alaska Fish. Cent., 7600 Sand Point Way N.E., Bin C15700, Seattle, WA 98115-0070.

²Quantity (Amt.) in thousands of pounds, product weight.

³Value in thousands of dollars.

Table 4.—Annual wholesale prices¹ of selected frozen fish blocks and fillets, f.o.b. east coast, 1976-86, in cents per pound.

Year	Cod	Blocks		Cod fillets		
		Minced cod	Alaska pollock	Bone-in, Canada	Bone-less, Canada	Bone-less, Iceland
1976	74.1	31.1	43.0	71.7		111.2
1977	97.8	36.1	60.7	91.1		126.7
1978	100.0	37.7	68.6	90.5		130.0
1979	103.9	50.4	68.8	88.5		155.0
1980	105.6	51.8	69.5	89.4		160.0
1981	109.2	51.1	80.5	108.0		172.3
1982	110.9	51.3	72.4	103.6		180.0
1983	116.9	39.9	65.6	100.9	127.5	180.0
1984	104.0	30.4	67.9	98.0	130.0	180.0
1985	110.6	45.9	58.0	104.9	125.6	180.0
1986	141.7	60.5	78.9		165.0	196.4

¹Source: Fishery Market News Report, Natl. Mar. Fish. Serv. 408 Atlantic Ave., Boston, MA 02210-2203.

off Alaska. The dollar price of cod in Japan has displayed a trend similar to those, described above, in the U.S. market. Japanese monthly prices in 1987 were typically above the 1986 monthly levels, and a near record high price was recorded in early 1987 before prices fell (Table 6). The yen price of cod did not display the same trend because of the drop in the exchange rate during 1987.

The similarities in price trends indicate that there is a linkage between U.S. and Japanese prices. That linkage does not, however, demonstrate that the price relationship is causal, as

Table 5.—Monthly wholesale prices¹ of selected frozen fish blocks and fillets, f.o.b. east coast, 1985-87, in cents per pound.

Year/ mo.	Blocks				Fillets			
	Cod	Cod, minced	Alaska pollock	Whiting	Cod, Canada	Cod, Iceland	Flounder	Ocean perch
1985								
Jan.	104.0	36.2	66.9	63.0	125.0	180.0	177.5	102.5
Feb.	104.0	40.0	67.0	63.0	125.0	180.0	177.5	NQ ²
Mar.	104.0	41.5	67.0	63.0	125.0	180.0	177.5	105.0
Apr.	104.0	42.5	NQ	62.5	125.0	180.0	177.5	107.5
May	104.0	43.5	65.5	63.0	127.5	180.0	177.5	107.5
June	103.0	43.5	65.5	62.5	122.5	180.0	180.0	107.5
July	107.0	45.0	63.0	62.5	120.0	180.0	177.5	107.5
Aug.	110.0	45.5	NQ	62.5	120.0	180.0	180.0	107.5
Sept.	112.0	49.0	61.0	62.5	122.5	180.0	182.5	107.5
Oct.	119.0	52.0	61.5	62.5	125.0	180.0	182.5	107.5
Nov.	125.0	54.0	61.5	63.0	135.0	180.0	180.0	NQ
Dec.	130.0	57.0	62.5	63.0	140.0	180.0	185.0	122.5
1986								
Jan.	132.5	57.0	62.5	62.5	140.0	180.0	185.0	122.5
Feb.	135.0	59.0	64.0	62.5	145.0	180.0	185.0	122.5
Mar.	135.0	60.0	65.0	62.5	145.0	180.0	185.0	NQ
Apr.	135.0	61.0	67.0	62.5	150.0	185.0	185.0	NQ
May	135.0	61.0	67.0	62.5	147.5	185.0	185.0	135.0
June	135.0	61.0	70.0	63.5	142.5	190.0	185.0	137.5
July	140.0	61.0	NQ	66.5	150.0	190.0	185.0	137.5
Aug.	145.0	61.0	84.0	69.0	165.0	197.0	185.0	137.5
Sept.	150.0	61.0	91.0	73.0	175.0	205.0	185.0	150.0
Oct.	150.0	61.0	95.0	75.0	192.5	205.0	187.5	155.0
Nov.	150.0	61.0	98.0	81.0	207.5	230.0	187.5	152.5
Dec.	157.5	61.0	104.0	81.0	222.5	230.0	192.5	160.0
1987								
Jan.	160.0	61.0	105.0	87.5	225.0	230.0	190.0	157.5
Feb.	170.0	57.0	109.0	93.5	227.5	245.0	197.5	157.5
Mar.	172.5	54.0	107.0	97.5	227.5	245.0	197.5	152.5
Apr.	175.0	51.0	104.0	95.0	222.5	245.0	197.5	152.5
May	180.0	49.0	103.0	96.5	200.0	245.0	197.5	150.0
June	187.5	NQ	103.0	96.0	212.5	247.5	197.5	NQ
July	195.0	53.5	105.0	97.5	212.5	247.5	195.0	162.5
Aug.	200.0	55.0	105.0	100.0	212.5	247.5	200.0	NQ
Sept.	200.0	55.0	105.0	100.0	215.0	247.5	200.0	162.5
Oct.	200.0	55.0	105.0	100.0	212.5	247.5	207.5	NQ
Nov.	200.0	58.0	103.0	99.0	195.0	247.5	207.5	147.5
Dec.	200.0	59.0	99.5	99.0	187.5	247.5	207.5	147.5

¹Source: Fishery Market News Report, Natl. Mar. Fish. Serv., 408 Atlantic Ave., Boston, MA 02210-2203.

²NQ - No quote.

Table 6.—Monthly Tokyo wholesale prices¹ of frozen cod, 1982-87, in yen per kilogram, and dollars per pound.

Year	Wholesale price											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>Yen per kilogram</i>												
1982	292	363	267	287	302	370	334	327	347	421	367	325
1983	304	329	391	443	391	382	322	355	400	397	415	443
1984	477	410	404	349	416	377	378	452	470	458	434	429
1985	433	483	344	340	374	318	444	386	413	351	416	423
1986	431	434	404	382	371	402	376	395	432	466	436	518
1987	486	384	365	404	398	352	444	433	464	552	557	418
<i>Dollars per pound</i>												
1982	0.59	0.70	0.50	0.53	0.58	0.67	0.59	0.57	0.60	0.70	0.63	0.61
1983	0.59	0.63	0.75	0.85	0.76	0.72	0.61	0.66	0.75	0.77	0.80	0.86
1984	0.92	0.80	0.81	0.70	0.82	0.73	0.71	0.85	0.87	0.84	0.81	0.78
1985	0.77	0.84	0.60	0.61	0.67	0.58	0.83	0.74	0.79	0.74	0.93	0.95
1986	0.98	1.07	1.02	0.99	1.01	1.09	1.08	1.16	1.27	1.36	1.22	1.45
1987	1.43	1.13	1.09	1.28	1.28	1.10	1.34	1.33	1.47	1.74	1.87	1.47

¹Sources: Monthly Stat. Agric., Forestry, Fish., Stat. Info. Dep., Minist. Agric., Forestry, Fish., Gov. Jpn.; Foreign Fish. Inf. Release, Natl. Mar. Fish. Serv., 300 S. Ferry St., Terminal Isl., CA 90731

²Weighted average price.

argued by some opposed to foreign allocations. Rather, the linkage is better explained by the observation that both countries appear to be price takers in the much larger, integrated world market for cod and cod-like products. That is, prices in both countries are principally determined by events and policies which neither country controls.

This analysis does not suggest that opportunities for U.S. producers to export cod to Japan are independent of allocations of Pacific cod to Japanese fishing fleets. What it does suggest is that the opportunities to sell cod in general are not adversely impacted.

This conclusion, which at first may appear to be inconsistent, is easily explained. At a given price, which is determined by the world market for cod and cod-like products, there will be a fixed amount of cod that can be marketed in Japan. Due to actual or perceived differences in quality, or for other reasons, there will be a tendency for imports to equal that amount, minus the catch from Japanese vessels. That is, imports will be used to meet whatever demand is not met by Japanese producers. Therefore, everything else being equal, Japanese imports would be expected to decrease as Japanese catch increases. However, since Japanese catch is not expected to affect world prices (nor U.S. domestic prices), unchanged opportunities to market cod domestically at comparable prices remain. This being the case, those who only have access to the Japanese market would be adversely affected by allocations of surplus (unutilized) Pacific cod to Japan. It is possible that, in the short run, vessels equipped only to produce headed-and-gutted product may be in this category. In the longer run, one would expect adjustments to be made within this segment of the domestic industry to ameliorate this situation.

Profitability

There are a number of factors which make the cod fishery more profitable than it has been in the past, or perhaps than it will be in the not too distant future. First, Pacific cod stocks in the

EEZ off Alaska are in a state of abnormally high abundance, resulting in higher levels of catch per unit of effort, than can be expected on average. Second, the exchange rates between the U.S. dollar and many foreign currencies are at low levels, making U.S. cod products more competitive in both domestic and international markets. Third, there is at least a short-term reduction in the productivity of Atlantic cod stocks, which has tended to hold prices above normal levels. Fourth, the continued growth of the U.S. economy increases the demand for cod and other fishery products. When that growth ends and the economy enters the next recession, consumers will pay more attention to the prices of fish relative to poultry and red meat, and less attention to the perceived health benefits associated with consumption of fishery products. The

demand for, and the price of, fishery products like cod will decrease, or at least increase less rapidly than they have in recent years. A similar scenario can be expected in the other major markets for cod and cod-like species as, for example, the western European and Japanese economies follow this same economic trend. Finally, as the U.S. domestic harvesting and processing sectors of the Pacific cod fishery become overcapitalized, as they undoubtedly will in response to the open access nature of this fishery, resources used in these fisheries will not be able to be fully and efficiently employed, and cost per unit of product will increase.

These factors, taken together, suggest that within the next few years a reasonable expectation is that decreases in price, and increases in production costs, will reduce the profita-

bility of the domestic Pacific cod fishery, perhaps significantly. In light of this expectation, it seems appropriate to counsel caution in regard to the initiation of economic activities and capital investments that are marginally profitable under the present extraordinarily favorable economic circumstances.

Clearly, many of the hypotheses put forth in this analysis await rigorous empirical evaluation. The U.S. trade database and the foreign country trade database, maintained by NMFS, provide much of the information needed for such research. Enhancement of these databases, as well as acquisition of other sources of world groundfish production, trade, and market data, will be required to improve our understanding of the linkages between foreign trade and fishery management issues.