

#### **E.6.4.3.3 International Trade**

Through imports and exports of food herring products at various market levels, the U. S. herring market and the New England herring industry are linked to the international herring market. This market has historically been characterized by a major concentration of both supply and demand in the European countries and the former U. S. S. R. In 1974, 80 percent of the world catch of herring was taken by fleets from these countries (NEFMC 1978).

World resources of herring are supplied by stocks in the North Pacific and North Atlantic. The share of world supply from the North Atlantic has increased from about 82 percent in 1986 to over 90 percent in 1995. Most Atlantic herring entering the market are caught by European countries in the northeast Atlantic. Major countries landing herring include Norway, Denmark, Sweden, the United Kingdom, Ireland, and the Russian Federation. The percentage of Atlantic herring caught from this area has ranged from 80 to 88 percent of the total Atlantic herring landings between 1986 and 1995 (Table E.37). Canada is the largest producer of herring from the northwest Atlantic, providing about 70 percent of the world catch of Atlantic herring from this area in 1995. This is only about 8 percent of the world's catch of Atlantic herring, however. In 1995, herring from the northwest Atlantic was less than 6 percent of the total world production of all herring.

Catches of herring from the northeast Atlantic are limited by TACs established by the European Community (EC). The EC also negotiates a TAC for North Sea herring with Norway. For 1998, the overall TAC for the EC was set at 2.445 million mt. This is an increase of about 400,000 mt over catches from this area in 1995. The accessibility of the European market to herring from the northwest Atlantic is determined in large measure by the status of European catches. Herring from the eastern Atlantic is generally preferred, as it has a higher fat content. During periods of low harvests in the past, herring from the U.S. and Canada has been able to penetrate this higher value market successfully.

World demand for imported herring in 1996 is illustrated by Table E.38. The five major importers of herring are Germany, the Russian Federation, Japan, Denmark, and the USA (although USA is not listed in Table E.38.). Japanese frozen herring imports are of a higher value than those to other countries because of imports of frozen roe herring from the Pacific. Not all of these markets are available to U.S. suppliers. As can be seen by comparison with Table E.44, several of the major world importers (Denmark, the Netherlands, Poland, Lithuania, Nigeria and Austria) of herring are not among the top ten that import U.S. herring. Particular countries demand that certain product qualities, such as fat content and meat consistency, meet their standards. U.S. caught herring (Atlantic and Pacific) may not be suitable for all markets. The product form groupings in Table E.38 are broad and do not identify particular market niches. Note in Table E.38 inclusion of "Prepared/Preserved Sardines". Since "sardine" is defined as any small ocean fishes in cans, the "harmonized" codes used to classify imports do not distinguish among species used in making sardines. The herring caught off the Northeast U.S. coast is *Clupea harengus*

(Atlantic Herring) which a major portion is sold as canned sardines. There are currently 22 other species sold as canned sardines including *Sardinus pilchardus* (European Pilchard), and *Sprattus sprattus* (Brisling, Sprat).

U. S. imports of all herring products (including inedible pilchard meal) reached a high of over \$40 million in 1993, declining to just over \$34 million in 1997. By far the largest value of herring imports since 1980 have come from Canada, which averaged \$26 million since 1990 (Table E.41). The major products imported from Canada in 1997 included fresh herring (6,519 mt worth \$2.8 million) and salted herring (3,137 mt worth \$2.6 million). Other major sources for imports since 1980 include Iceland, Germany, Norway, Sweden and Finland for edible products, and Chile and Peru for inedible pilchard meal.

U. S. exports of all herring products (both Pacific and Atlantic herring) peaked at \$116.8 million in 1985, and were just over \$68 million in 1997 (Table E.42 through Table E.44). By far the greatest value per metric ton in exported herring is for roe from the various West Coast roe fisheries. The largest volume of exported herring is frozen. Major markets for U. S. herring products include Japan, South Korea and Canada. Herring fillets and steaks were a substantial part of exports in the early 1980's, but declined over the next ten years with the exception of 1988. The international market for New England herring products are limited by the low fat content, averaging 5-6 percent over the course of the year (Dyer and Poggie, 1998).

Census data combines both Atlantic and Pacific herring, making it difficult to identify exports of Atlantic herring from the east coast fishery. Table E.45 lists exports of herring from all customs districts in the U.S. since herring caught in the Northeast can be exported from any district. Table E.45 is based on data supplied by U.S. Bureau of the Census. However, there appear to be some inaccuracies. It is unlikely that the large amounts of fresh herring reportedly going to Egypt, Japan, Nigeria, Russia, and the United Kingdom was fresh and not frozen. The reported amount of fresh herring exported to Canada may also be inaccurate. As in Table E.38 the category "Prepared/Preserved Sardines" is included in Table E.45. Since Maine is the major producer of canned sardines in the U.S., the export quantities and value represent what occurred in the Northeast for this product form. There may be small amounts of canned sardines produced in California included in these export numbers.

The Department of Resource Economics and Policy at the University of Maine in Orono did an economic evaluation of the Maine Sardine Industry (Reiling and Bennett, 1998). In their paper they discuss the issue of two-way trade in round herring with Canada. This issue is discussed below and the two-way trade with Canada section from the University of Maine report is included.

#### **E.6.4.3.3.1 Two-Way Trade in Round Herring with Canada**

The official Census data on imports of fresh and frozen herring from Canada to Northeast U.S. Customs districts is shown in Table E.46. Imports in 1996 and 1997 (combined) of fresh herring totaled over 8,600 mt worth approximately \$1.5 million. By contrast, imports of all other herring

products except for frozen herring totaled nearly 18,000 mt worth over \$30 million in these two years.

While this data was obtained from the international trade database maintained by NMFS, the estimates in these tables for shipments of herring to Canada may be in error. Historically, there has been an extensive trade in herring between the northeastern U. S. and Canada which has benefited both countries. This trade has been used by the industry on both sides of the border to smooth out fluctuations in the supply of herring for both the sardine canneries and the bait market. From 1972 through 1976, for example, imports of Canadian herring provided over 50 percent of the raw material for Maine sardine canneries (NEFMC 1978). The trade occurs both via truck and vessel. In 1996, the M-SFMCA was amended to allow NMFS to issue permits to up to fourteen Canadian vessels to load herring from U. S. vessels and transport it to Canada. U. S. caught herring is also transported to Canada by truck. The Maine Department of Marine Resources monitors the levels of this trade. Quantities exported by both methods in recent years are provided below. There are significant discrepancies between these statistics and those contained in the international trade database maintained by NMFS, which relies on Canadian import data to estimate U.S. exports. As can be seen by comparing Table E.46 and Table E.47, there is a significant trade in fresh herring by both truck and Canadian herring carrier that is not documented in the international trade database. The following discussion of two-way trade with Canada is from the University of Maine report (used with the permission of the authors). Note that the figures for Table 4 (in the University of Maine report) differ from those provided in Table E.47 for 1995 and 1996.

#### ***Begin section of University of Maine report***

"The appearance of juvenile herring in Maine coastal waters is highly variable and unpredictable. This unpredictability has caused shortages of herring for some Maine processing plants while providing an overabundant supply to processing plants in Canada and visa-versa. The two-way trade of whole herring between Maine and Canada has helped to maximize the utilization of the herring resource by allowing herring to be transported from regions where processing capacity is insufficient to regions where processing capacity is underutilized.

The Maine and Canadian herring processing industries depend heavily on the trade of whole herring between their borders. To help ensure that fresh herring is available to sardine processors in both countries, tariffs on unprocessed herring were dropped in both countries many years ago. Maine canneries received approximately 48% of their herring supply from Canadian fishermen in 1988 and 1990 while Canadian canneries imported approximately 8% in those years and 25% in 1996. These fluctuations in the percentage of Canadian herring processed in Maine are caused by the changing availability of herring on both the Maine and Canadian fishing grounds.

The following two tables are derived from 1996 Maine Herring Fishery Statistics supplied by the Maine DMR and data supplied by Connors Bros. Ltd. Of New

Brunswick Canada (Connors, 1998). The first table depicts the metric tons of herring imported to Maine for processing while the second table depicts the metric tons of herring exported from Maine and Southern New England to Connors Bros. for processing.

Table 3, shows the amounts of herring landed in Maine, imported to Maine from other states and Canada, and the percentage of Canadian herring used to make sardines, steaks and kippers in Maine from 1987 to 1996. The table is derived from 1996 Maine DMR Herring Fishery Statistics and shows how the percentage of Canadian herring transported to Maine has varied over the period from 1987 to 1996. The percentage of Canadian herring used for processing in Maine was close to 50% in 1988, and 1990. The average percentage of Canadian herring used for processing in Maine was 28.9% over the ten-year period and nearly 11% in 1996. Our study indicated that in 1996, Maine packers imported more than 95% of the small herring used to pack sardines in 7-12 pack cans.

Table 3. Sources of Herring Processed in Maine to make sardines, steaks and kippers. (thousand metric tons)

Year	Imported From other States	Landed in Maine	Imported from Canada	Percent Imported from Canada
1987	10.6	12.2	11.3	33.2
1988	9.0	8.5	16.0	47.8
1989	5.5	5.1	4.8	31.2
1990	7.7	6.8	13.5	48.3
1991	10.2	13.9	9.2	27.8
1992	9.1	14.5	11.7	33.2
1993	5.7	17.9	8.2	25.8
1994	8.2	17.6	7.1	21.5
1995	11.2	15.8	2.8	9.4
1996	14.8	16.7	3.8	10.7
10 year average				28.9

Canadian processors also depend on the two-way herring trade. Table 4 shows the metric tons of herring imported by Connors of New Brunswick from Maine and Southern New England and the percentage of production those imports represented for Connors from 1987 to 1996. Connors imported the highest percentages of herring; 18.6% in 1995 and 25.1% in 1996. The average percentage of imported herring used over the ten year period was 11.4%.

Table 4. Sources of Herring Imported by Connors Bros. Ltd. Of Canada (thousand metric tons)

Year	Imported from Gulf of Maine	Imported from Southern New England	Percent imported from Gulf of Maine and Southern New England
1987	5.2	0	8.4
1988	6.1	0	8.5
1989	4.7	0	8.9
1990	5.2	0	7.6
1991	5.8	0.3	12.9
1992	6.6	0	10.7
1993	2.5	0	4.8
1994	3.8	0.2	8.2
1995	2.6	6.1	18.6
1996	4.6	7.2	25.1
10 Year Average			11.4

We have also quantified the importance of the Maine Canadian trade in herring with data purchased from the U.S. Department of Commerce, Bureau of the Census. The Bureau of the Census provided statistics on fresh or chilled herring imported from and exported to Canada through the customs district of Portland, Maine in the years 1989 through 1996. The census data varied widely from data supplied by the Maine DMR and Connors Bros. of New Brunswick.

The census data on imports (Table 5) from Canada appear to be similar to the import data supplied by the Maine DMR but the census data on exports to Canada appears to be consistently less than that supplied by the Maine DMR.

It is beyond the scope of this study to reconcile or explain the difference in export data to Canada provided by the two sources."

Table 5. Comparison of Herring Import and Export Data (thousand metric tons)

Year	Imported from Canada		Exported to Canada	
	Maine (DMR) Data	U.S. Census Data	Connors of New Brunswick Data	U.S. Census Data
1989	4.8	10.7	4.7	0.24
1990	13.5	11.9	5.2	0.01
1991	9.2	8.2	5.8	0.03
1992	11.7	7.2	6.6	0.01
1993	8.2	7.1	2.5	0.01
1994	7.1	6.2	3.8	0.02
1995	2.8	2.9	2.6	0.03
1996	3.8	3.7	4.6	0.20

### ***End section of University of Maine report***

In addition to the trade in fresh/frozen/preserved herring products, exports and value of canned sardine exports are listed in Table E.48. Exports have remained relatively constant since 1991, in the range of 10-12 million pounds worth approximately \$10 million. This is a significant increase from the 1.8 million pounds in exports in 1980 (Hu et al. 1983). The major markets for these sardines are in Canada and the Caribbean (Reiling and Bennett, 1998). Sardine imports (Table E.49) have declined in recent years from a high of over 65 million pounds in 1987 to 41 million pounds in 1996.

### **E.6.4.3.3.2 International Markets for Various Product Types**

#### ***Canned Sardines***

Prior to 1988 exports of canned sardine products from the US were relatively small compared to the levels of activity from 1988 to 1997 (Table E.48). Table E.44 shows the variety of countries that were importing canned sardines from the U.S. in 1996 and 1997. The largest importer is Canada because favorable tariffs/duties induce processors to export product to consuming countries through Canada. There were 40 countries importing U.S. canned sardines in 1996 and 1997 largely in countries of the Caribbean, Central America, and Pacific Rim. Much of the demand is for an inexpensive source of protein in protein poor equatorial countries.

The European market for canned sardines is essentially closed to northeast U.S. canned product because of restrictions placed on the species that can be imported as sardines. Many European countries only allow *Sardinus Pilchardus* (European Pilchard) to be imported as sardines. The U.S. is lobbying European governments to remove this restriction.

Approximately 40% of what enters the canning plants is eventually sold to the bait market. Product sold in the bait market is generally cuttings or sizes of fish not suitable for canning. The

other 60% is canned as either sardines (two-thirds) or steaks (one-third). The canned steaks are mostly for the U.S. market but some goes to Australia.

#### *Whole Frozen*

The frozen herring figures in Table E.45 are exports from both East Coast and West Coast fisheries. The large quantities going to Japan are mostly frozen Pacific roe herring. It is difficult to distinguish exactly which of the other countries are importing Northeast U.S. herring. China, Egypt, Russia, South Korea, and Malaysia were probably importing mostly northeast U.S. herring. As mentioned above, the fresh product listed as exports to Egypt, Japan, Nigeria, Russia, and the United Kingdom was most likely frozen.

The market for whole frozen herring is serviced by both domestic freezers (onshore and offshore) and JVP/IWP operations. Prior to the 1990's onboard canning and packing of herring into barrels was done by Soviet processor vessels through JVP/IWP agreements. After the fall of communism, these operations ceased in U.S. waters. Since that time the focus has been on freezing whole herring at sea. Currently there are International Fisheries Agreements, which is a prerequisite for establishing a JVP or IWP, with Russia, Estonia, Lithuania, Latvia, and Poland. Prior to 1998 the only recent JVP activity in which herring was transferred was in 1990. In 1998 three vessels from Estonia (1) and Lithuania (2) came to U.S waters primarily for mackerel but also processed a small amount of herring over a three month period (quantities cannot be reported due to confidentiality concerns). Table E.35 shows what has been allocated to JVP's and IWP's since 1989 and Table E.36 shows the amount of herring taken by just the IWP operations since 1985. There are also domestic shore based and at-sea processors competing for the whole frozen market.

The market for whole frozen herring is determined by size, grade, and fat content. The major countries consuming this product are in the Middle East, West Africa, Asia (primarily China), and to a lesser extent the Baltic States. Nearly all the product, which is usually frozen in 20 kilogram blocks, is for human consumption where the blocks are thawed and sold in shops. It is felt that there are potentially large markets in these areas. Both domestic freezers and companies that arrange for JVP's and IWP's feel there is significant demand for whole frozen herring and plan to further pursue these markets given adequate supply.

Atlantic herring					Pacific herring				Grand Total
Year	NE Atlantic	NW Atlantic	Canada	Total	NE Pacific	E. Pacific	NW Pacific	Total	
1986	1,308,912	223,305	186,730	1,532,217	68,255	7,551	248,928	324,734	1,856,951
1987	1,306,700	287,195	248,744	1,593,895	85,064	8,355	255,098	348,517	1,942,412
1988	1,403,165	321,002	278,896	1,724,167	84,291	6,927	213,433	304,651	2,028,818
1989	1,365,764	283,865	229,239	1,649,629	85,944	9,199	118,009	213,152	1,862,781
1990	1,226,670	314,920	260,449	1,541,590	82,978	7,345	109,165	199,488	1,741,078
1991	1,124,925	279,292	216,743	1,404,217	88,636	7,250	119,636	215,522	1,619,739
1992	1,270,332	267,134	215,750	1,546,466	101,787	5,226	120,421	227,434	1,773,900
1993	1,378,642	254,330	197,597	1,632,972	85,813	3,849	121,607	211,269	1,844,241
1994	1,641,351	255,445	206,777	1,896,796	89,120	2,972	92,559	184,650	2,081,446
1995	2,083,731	270,246	193,260	2,325,977	75,702	4,623	131,607	211,873	2,537,654
1996	2,039,305	291,223	187,022	2,330,528	71,447	5,328	181,021	257,796	2,588,324

Table E.37 - World nominal catches of herring, 1986-1996 (FAO Yearbook , Fishery Statistics, Catches and Landings, Volume 82, 1996 and Volume 80, 1995)

		PRODUCTS						
		Fresh/ Chilled Herring	Frozen Herring	Prepared/ Preserved Herring	Salted/ Brine Herring	Smoked Herring	Prepared/ Preserved “Sardines”	Total
<b>Germany</b>	mt	12,311	15,484	45,793	8,758	234	10,034	92,614
	\$ ('000's)	11,606	12,021	83,320	17,192	743	35,131	160,013
<b>Russian Federation</b>	mt		146,261	15,519	7,102		44,986	213,868
	\$ ('000's)		79,640	10,777	5,468		39,580	135,465
<b>Japan</b>	mt	4,771	64,162	1,139			359	70,431
	\$ ('000's)	4,172	117,278	3,226			2,781	127,457
<b>Denmark</b>	mt	90,012	4,787	6,906		222	1,178	103,105
	\$ ('000's)	41,961	4,257	19,697		481	2,066	68,462
<b>Netherland</b>	mt	3,328	31,561	3,195	4,083	136	3,628	45,931
	\$ ('000's)	2,768	22,490	5,592	6,488	396	8,945	46,679
<b>France</b>	mt	889	1,970	1,501		261	10,154	14,775
	\$ ('000's)	1,002	1,495	4,449		988	29,567	37,501
<b>UK</b>	Mt	518	4,326	1,646			12,618	19,108
	\$ ('000's)	216	3,169	6,202			27,705	37,292
<b>Colombia</b>	Mt			34		1	27,250	27,285
	\$ ('000's)			126		8	35,085	35,219
<b>Poland</b>	Mt	2,145	33,015	8,649	3,346		173	47,328
	\$ ('000's)	1,150	19,804	11,066	2,509		404	34,933
<b>Lithuania</b>	Mt	375	46,720	1,876	897	37		49,905
	\$ ('000's)	215	29,243	2,923	656	46		33,083

Table E.38 - Top 10 non-USA herring importing countries (from all sources), 1996, based on value (Source: FAO, Time Series of Production and Trade of Fisheries Commodities)

Product	1980	1981	1982	1983	1984	1985	1986	1987	1988
<b>Fresh</b>	6,370 \$1,104,293	3,411 \$628,252	8,576 \$1,911,309	9,685 \$1,728,901	7,659 \$1,194,865	14,676 \$2,335,063	9,590 \$1,706,656	10,483 \$1,911,102	15,282 \$3,173,761
<b>Pilchard Meal, Inedible</b>									
<b>Salted</b>	7,587 \$10,388,250	9,108 \$11,522,563	9,603 \$10,641,556	9,207 \$9,830,600	9,165 \$9,898,511	8,948 \$8,641,489	9,884 \$9,269,353	10,075 \$9,592,212	9,223 \$8,617,516
<b>Oil/Fractions</b>	3,686 \$1,365,720	4,542 \$1,661,758	2,581 \$824,626	4,352 \$1,416,070	3,577 \$1,374,689	4,230 \$1,647,702	5,581 \$1,457,855	6,661 \$1,682,177	4,792 \$1,535,379
<b>Frozen</b>	1,998 \$1,394,497	2,582 \$1,665,382	2,044 \$1,453,918	1,683 \$1,659,804	3,402 \$1,735,736	1,604 \$1,257,277	3,135 \$1,869,314	5,211 \$3,216,878	3,723 \$2,196,051
<b>Fillet/Dried/ Salted/Brine</b>									
<b>Canned, Not In Oil</b>	2,517 \$8,574,895	2,790 \$9,760,774	2,436 \$8,251,706	2,495 \$8,991,403	1,913 \$6,358,974	2,506 \$8,217,538	2,566 \$9,327,545	2,487 \$8,611,566	2,949 \$10,229,089
<b>Kipperd</b>									
<b>Smoked/Fillet</b>									
<b>Prepared/ Preserved</b>									
<b>Smoked, Whole or Beheaded</b>	249 \$523,897	302 \$522,862	349 \$652,391	269 \$456,657	343 \$600,163	394 \$689,093	260 \$466,813	339 \$592,190	398 \$710,545
<b>Smoked, Otherwise</b>	324 \$902,079	377 \$1,042,650	543 \$1,123,651	457 \$962,070	487 \$912,229	617 \$1,132,705	500 \$1,157,531	393 \$992,794	576 \$1,286,454
<b>Pickled</b>									
<b>Smoked/Fillet/ Boneless</b>									
<b>Canned, In Oil</b>	57 \$173,609	70 \$216,783	42 \$113,674	114 \$307,967	116 \$295,365	133 \$291,190	86 \$224,540	109 \$253,485	144 \$349,593
<b>Pickled/Fillet</b>									
<b>Smoked</b>	209 \$399,154	168 \$302,646	107 \$202,235	122 \$243,085	119 \$203,706	145 \$236,658	46 \$85,325	206 \$286,598	152 \$242,796
<b>Tomato Sauce/ Smoked/</b>									
<b>Roe/Dried/ Salted/</b>									

Table E.39 – U.S. herring imports, by product 1980-1988 (NMFS, Fisheries Statistics and Economics Division, pers. comm.)

Product	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>Fresh</b>	11.005 \$2,065,255	12.890 \$3,151,446	8.607 \$2,062,637	8.166 \$2,486,796	8.674 \$3,126,841	8.703 \$2,734,155	3.854 \$1,583,977	4.138 \$1,357,935	6.519 \$2,839,227
<b>Pilchard Meal. Inedible</b>		23.974 \$9,490,734	15.370 \$6,963,587	18.594 \$9,572,059	34.892 \$11,675,85	21.851 \$7,276,998	6.586 \$3,869,867	7.800 \$5,594,817	6.757 \$4,831,220
<b>Salted</b>	2.838 \$2,804,198	2.263 \$2,255,311	2.135 \$2,079,324	2.169 \$2,101,203	3.003 \$2,799,727	3.121 \$2,676,725	3.771 \$3,174,825	2.397 \$2,229,426	3.180 \$2,756,259
<b>Oil/Fractions</b>	5.338 \$1,866,193	4.470 \$1,535,833	4.195 \$1,445,427	4.424 \$1,771,783	7.588 \$3,038,287	4.804 \$2,401,174	4.528 \$2,330,772	7.847 \$3,869,769	6.273 \$3,331,653
<b>Frozen</b>	2.388 \$2,028,032	3.247 \$1,986,081	7.430 \$4,029,958	5.797 \$3,074,124	5.476 \$3,266,683	5.194 \$2,938,277	3.775 \$2,513,857	3.122 \$2,102,557	3.778 \$2,525,881
<b>Fillet/Dried/Salted/ Brine</b>	69 \$78,447	5.717 \$5,161,875	6.299 \$5,812,715	6.172 \$6,227,834	5.226 \$4,940,664	5.205 \$4,845,235	4.175 \$3,667,764	4.403 \$3,901,731	4.338 \$4,172,016
<b>Canned. Not in Oil</b>									
<b>Kippered</b>		2.043 \$7,821,970	1.664 \$7,222,288	1.757 \$7,215,598	1.769 \$7,402,726	1.685 \$7,229,355	1.652 \$6,623,191	1.475 \$6,241,743	2.004 \$7,353,940
<b>Smoked/Fillet</b>	3.116 \$9,204,126	528 \$1,050,367	339 \$857,038	594 \$1,371,765	384 \$933,206	604 \$1,410,363	718 \$1,529,887	519 \$1,222,120	516 \$1,232,117
<b>Prepared/ Preserved</b>		1.371 \$2,403,713	1.352 \$2,425,893	731 \$1,746,593	580 \$1,505,127	424 \$1,334,366	476 \$1,639,100	533 \$1,939,167	501 \$1,565,935
<b>Smoked. Whole or Beheaded</b>	312 \$468,169	124 \$234,093	243 \$415,970	162 \$225,164	129 \$199,309	191 \$346,802	177 \$257,333	40 \$68,545	204 \$278,917
<b>Smoked.Otherwise Processed</b>									
<b>Pickled</b>	2.128 \$2,181,294	44 \$145,367	39 \$124,575	58 \$129,307	99 \$190,761	113 \$273,139	74 \$275,698	59 \$269,361	153 \$519,973
<b>Smoked/Fillet/ Boneless</b>		245 \$695,864	258 \$737,452	295 \$823,189	284 \$706,562	245 \$566,557	278 \$599,611	298 \$719,624	501 \$1,159,529
<b>Canned. In Oil</b>	184 \$285,792	144 \$379,487	124 \$289,953	113 \$347,919	129 \$399,729	189 \$499,044	175 \$496,966	171 \$505,636	190 \$571,163
<b>Pickled/Fillet</b>		386 \$398,254	46 \$91,552	85 \$179,193	117 \$260,344	144 \$392,026	117 \$293,166	204 \$576,149	304 \$623,941
<b>Smoked</b>									
<b>Tomato Sauce/Smoked/ Kippered</b>	63 \$106,741	15 \$46,146	33 \$92,667	18 \$59,565	34 \$80,757	25 \$80,138	101 \$170,047	4 \$13,036	3 \$6,050
<b>Roe/Dried/Smoked /Salted/Brine</b>	15 \$332,010	17 \$371,676	62 \$613,758	66 \$977,590	20 \$313,658	29 \$383,871	14 \$353,436	38 \$471,636	22 \$290,850

Table E.40 U.S. herring imports, by product, 1989 – 1997 (Source: NMFS Fisheries Statistics and Economics Division, pers. com.)

Year	Data	Canada	Iceland	Germany	Chile	Peru	Norway	Sweden	Denmark	Nether.	Finland
1980	mt	21.962	340	176		27	131	90	37	64	63
	Dollars	\$21,013,905	\$1,410,252	\$559,721		\$15,600	\$544,348	\$450,924	\$132,163	\$181,566	\$313,293
1981	mt	22.231	241	187		165	123	117	21	74	37
	Dollars	\$23,875,201	\$970,593	\$513,217		\$278,150	\$447,274	\$520,217	\$68,962	\$200,231	\$216,093
1982	mt	25.179	364	175		48	62	92	10	73	39
	Dollars	\$21,513,723	\$1,536,523	\$443,573		\$18,721	\$194,234	\$523,427	\$30,948	\$188,543	\$216,134
1983	mt	26.781	471	186			170	167	112	63	47
	Dollars	\$21,002,593	\$1,871,091	\$481,870			\$285,654	\$774,772	\$344,917	\$164,169	\$219,505
1984	mt	22.953	399	236			456	126	135	66	36
	Dollars	\$17,447,764	\$1,534,237	\$517,735			\$885,879	\$513,670	\$430,595	\$141,301	\$189,000
1985	mt	29.759	455	564			693	88	450	339	61
	Dollars	\$18,029,190	\$1,867,334	\$1,117,943			\$1,252,898	\$307,189	\$598,858	\$305,769	\$281,000
1986	mt	24.807	619	379	3	1	883	131	147	143	51
	Dollars	\$17,892,158	\$2,105,463	\$951,049	\$6,623	\$1,100	\$1,586,784	\$456,755	\$384,229	\$193,299	\$253,063
1987	mt	30.433	540	377	3	122	561	108	71	58	41
	Dollars	\$19,966,898	\$1,891,778	\$1,070,236	\$3,795	\$159,552	\$1,467,202	\$391,559	\$266,184	\$136,880	\$217,943
1988	mt	33.432	336	878	0	353	979	142	38	68	59
	Dollars	\$21,778,086	\$1,330,489	\$1,201,107	\$3,087	\$475,592	\$1,529,194	\$520,073	\$162,578	\$185,965	\$293,000
1989	mt	25.714	442	350		4	261	118	3	53	35
	Dollars	\$16,670,834	\$1,584,937	\$798,705		\$4,123	\$666,801	\$385,804	\$10,764	\$175,327	\$174,000
1990	mt	37.605	548	324	12.272	5.500	123	94	22	353	59
	Dollars	\$25,865,871	\$2,669,044	\$950,412	\$4,197,374	\$1,553,500	\$379,457	\$436,687	\$43,365	\$240,905	\$234,000
1991	mt	35.864	421	364	10.774		51	110	8	55	83
	Dollars	\$26,304,568	\$1,792,508	\$1,112,352	\$4,145,251		\$139,041	\$338,937	\$28,360	\$140,546	\$313,200
1992	mt	35.168	3.008	340	10.196		32	167	128	36	31
	Dollars	\$28,833,177	\$2,358,771	\$1,097,821	\$4,676,222		\$101,180	\$423,892	\$117,135	\$109,142	\$179,000
1993	mt	32.388	1.593	254	8.010	22.745	140	108	1.844	1.086	29
	Dollars	\$27,367,672	\$788,407	\$834,467	\$3,052,796	\$6,309,571	\$211,887	\$489,293	\$704,546	\$505,539	\$158,200
1994	mt	28.013	3.805	335		16.099	367	215	1.449	927	61
	Dollars	\$24,856,384	\$1,754,080	\$1,115,229		\$4,440,819	\$375,915	\$367,065	\$685,076	\$789,351	\$307,008
1995	mt	25.631	213	372		41	283	78	1.989	1.320	55
	Dollars	\$24,523,808	\$318,559	\$1,364,603		\$52,920	\$297,133	\$537,979	\$1,129,287	\$542,929	\$256,250
1996	mt	24.537	2.139	367	35		6	71	3.152	1.626	60
	Dollars	\$23,979,984	\$1,262,650	\$1,412,749	\$27,358		\$47,936	\$441,134	\$2,271,687	\$808,172	\$334,978
1997	mt	29.276	2.449	323			1.733	5	4	51	69
	Dollars	\$28,624,839	\$1,691,039	\$1,067,876			\$1,112,841	\$25,836	\$18,684	\$150,030	\$394,804
<b>Total MT Tons</b>		511.733	18.383	6.188	41.293	45.104	7.053	2.027	9.621	6.454	914
<b>Total Dollars</b>		\$409.5M	\$28.7M	\$16..6M	\$16.1M	\$13.3M	\$11.5M	\$7.9M	\$7.4M	\$5.2M	\$4.6M

Table E.41 - U. S. herring imports, top 10 countries by value (NMFS, Fisheries Statistics and Economics Division, pers. comm.)

Product	Data	1981	1982	1983	1984	1985	1986	1987	1988
<b>Fillet/Steak/Portion</b>	mt	9 011	5 162	7 133	778	853	7 474	1 748	8 795
<b>Fresh/Frozen</b>	Dollar	\$11,544,142	\$6,668,318	\$3,666,305	\$536,991	\$1,722,393	\$4,044,590	\$2,511,715	\$18,392,966
<b>Fresh</b>	mt								
	Dollar								
<b>Fresh/Frozen</b>	mt	36 446	38 581	45 157	35 736	43 307	38 545	41 851	33 836
	Dollar	\$39,766,121	\$46,518,488	\$65,508,349	\$49,804,255	\$70,560,512	\$66,177,329	\$81,516,803	\$76,551,462
<b>Frozen</b>	mt								
	Dollar								
<b>Prepared/Preserved</b>	mt								
	Dollar								
<b>Roe</b>	mt	3 010	3 803	1 777	5 615	6 017	1 800	3 080	8 380
	Dollar	\$20,011,566	\$24,798,207	\$16,507,993	\$16,662,717	\$44,559,082	\$19,148,078	\$23,125,001	\$34,478,682
<b>Roe/Dried/Smoked/ Salted/Brine</b>	mt								
	Dollar								
<b>Roe/Frozen</b>	mt								
	Dollar								
<b>Salted</b>	mt								
	Dollar								
<b>Smoked</b>	mt								
	Dollar								
<b>Total Metric Tons</b>		49,376	47,546	51,512	41,129	51,157	45,820	46,188	51,020
<b>Total Dollars</b>		\$71,321,829	\$77,985,013	\$85,682,647	\$67,003,963	\$116,841,987	\$89,369,997	\$107,153,519	\$129,423,110

Table E.42 - U. S. herring exports, by product, 1981-1988 (NMFS, Fisheries Statistics and Economics Division, pers. comm.)

<b>Product</b>	<b>Year</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
<b>Filet/Steak/Portion</b>	mt									
<b>Fresh/Frozen</b>	\$									
<b>Fresh</b>	mt	7 426	7 003	6 021	9 637	12 363	7 356	11 012	13 102	14 152
	\$	\$8,511,677	\$1,660,390	\$2,149,111	\$6,546,972	\$3,129,280	\$2,514,485	\$3,235,869	\$11,959,359	\$4,845,084
<b>Fresh/Frozen</b>	mt									
	\$									
<b>Frozen</b>	mt	29 328	35 027	36 118	17 032	32 820	33 670	32 061	23 034	35 100
	\$	\$34,455,229	\$57,529,838	\$60,474,977	\$65,038,943	\$45,014,622	\$51,155,161	\$66,414,847	\$41,171,155	\$43,001,886
<b>Prepared/</b>	mt	567	546	508	510	932	1 119	911	1 043	350
<b>Preserved</b>	\$	\$1,030,462	\$1,002,749	\$1,101,070	\$949,073	\$1,692,435	\$1,981,502	\$1,671,465	\$2,001,122	\$594,093
<b>Roe</b>	mt									
	\$									
<b>Roe/Dried/Smoke</b>	mt	4 096	1 674	500	1 131	1 061	1 334	2 299	5 668	982
<b>Salted/Brine</b>	\$	\$7,614,813	\$5,747,993	\$4,451,988	\$9,183,424	\$12,569,343	\$14,933,111	\$13,441,114	\$17,582,439	\$6,743,749
<b>Roe/Frozen</b>	mt	8 251	4 055	8 048	1 880	4 419	4 708	10 591	10 118	7 401
	\$	\$22,941,372	\$16,031,148	\$18,069,781	\$14,713,118	\$17,188,789	\$9,109,002	\$24,931,500	\$34,034,405	\$13,011,696
<b>Salted</b>	mt	1 256	72	22	29	16	17	24	276	7
	\$	\$1,715,680	\$251,759	\$102,977	\$178,642	\$39,576	\$50,202	\$135,474	\$687,840	\$12,777
<b>Smoked</b>	mt	502	6	7	5	6	4	4	95	5
	\$	\$951,168	\$24,186	\$63,494	\$55,017	\$26,201	\$17,014	\$34,988	\$242,480	\$10,871
<b>Total Metric Tons</b>		51,426	49,283	51,315	60,225	51,617	48,209	56,902	53,427	48,096
<b>Total Dollars</b>		\$77,220,401	\$82,248,063	\$86,413,398	\$96,665,189	\$79,660,246	\$79,760,477	\$109,865,257	\$107,678,800	\$68,220,156

Table E.43 - U. S. herring export products, 1989-1997 (NMFS, Fisheries Statistics and Economics Division, pers. comm.)

Year	Data	Japan	South Korea	Canada	China	Sweden	USSR	Russia	Germany	Taiwan	Finland	Grand Total
1981	mt	28,534	8,700	8,618		33			3,298	25		49,208
	\$	\$50,094,205	\$14,261,359	\$3,465,971		\$536,140			\$2,383,735	\$123,910		\$70,865,320
1982	mt	35,832	7,690	3,142	226	41			397			47,327
	\$	\$60,759,648	\$14,380,183	\$1,460,576	\$436,265	\$433,642			\$210,791			\$77,681,105
1983	mt	41,296	6,067	1,112	2,691	25			185			51,376
	\$	\$66,490,354	\$13,265,022	\$1,396,918	\$4,011,335	\$243,250			\$101,920			\$85,508,799
1984	mt	34,939	5,178	437	456	25			1	16		41,052
	\$	\$58,127,789	\$7,173,502	\$609,558	\$684,207	\$279,583			\$4,193	\$14,490		\$66,893,322
1985	mt	37,890	8,605	2,578	1,127	26			82	392		50,701
	\$	\$89,376,010	\$20,457,351	\$3,788,206	\$1,839,867	\$261,722			\$134,000	\$647,955		\$116,505,111
1986	mt	33,730	5,866	3,717	1,980	48			13			45,353
	\$	\$64,008,244	\$12,908,618	\$6,918,221	\$3,598,961	\$818,592			\$10,750			\$88,263,386
1987	mt	33,855	6,627	5,135	408	24	37					46,086
	\$	\$81,121,998	\$15,411,615	\$8,988,162	\$973,260	\$499,571	\$3,681					\$106,998,287
1988	mt	44,049	3,609	3,259		25						50,942
	\$	\$116,213,834	\$8,181,788	\$4,610,957		\$307,352						\$129,313,931
1989	mt	31,181	7,076	2,530		35	10,487					51,310
	\$	\$57,830,489	\$10,987,525	\$3,993,820		\$712,238	\$3,365,269					\$76,889,341
1990	mt	35,192	3,997	3,361	211	34	6,275			42		49,113
	\$	\$70,989,294	\$4,478,535	\$4,668,334	\$483,577	\$668,726	\$685,351			\$24,000		\$81,997,817
1991	mt	40,153	2,689	3,607	291	18	4,247		2			51,007
	\$	\$76,768,224	\$3,483,139	\$4,188,648	\$506,672	\$358,644	\$465,140		\$12,714			\$85,783,181
1992	mt	47,790	633	5,040	1,309	32		5,263		15		60,082
	\$	\$85,411,158	\$1,040,762	\$6,890,372	\$1,347,124	\$621,311		\$516,389		\$253,720		\$96,080,836
1993	mt	35,183	1,153	3,217	1,565	40		10,431				51,590
	\$	\$69,810,038	\$2,276,019	\$4,053,058	\$1,712,792	\$676,726		\$1,018,602				\$79,547,235
1994	mt	37,422	1	4,396	395			5,789	2	20		48,027
	\$	\$72,764,141	\$3,400	\$4,900,319	\$922,800			\$733,119	\$4,329	\$28,099		\$79,356,207
1995	mt	37,583	137	5,055	10,763	38		782				54,358
	\$	\$90,397,022	\$229,201	\$7,153,589	\$11,003,063	\$160,325		\$442,726				\$109,385,926
1996	mt	27,414	400	12,047	3,390	264		4,095		64	163	47,836
	\$	\$75,791,585	\$623,325	\$19,174,509	\$7,459,198	\$502,717		\$774,890		\$352,800	\$780,840	\$105,459,864
1997	mt	33,362	78	9,681	3,902			278		175	175	47,651
	\$	\$49,862,387	\$248,567	\$11,615,009	\$4,749,998			\$144,760		\$509,350	\$605,831	\$67,735,902
Total mt		615,406	68,508	76,932	28,714	708	21,046	26,639	3,980	748	338	843,018
Total \$s		\$1,235,816,420	\$129,409,911	\$97,876,227	\$39,729,119	\$7,080,539	\$4,519,441	\$3,630,486	\$2,862,432	\$1,954,324	\$1,386,671	\$1,524,265,570

Table E.44 - U. S. herring exports, top 10 countries, by value (NMFS, Fisheries Statistics and Economics Division, pers. comm.)

Product	Destination	1996		1997	
		Metric Tons	Dollars ('000)	Metric Tons	Dollars ('000)
Fresh Herring	Canada	5,098	7,322	3,017	3,051
	Costa Rica <sup>1</sup>	-	-	66	44
	Egypt <sup>1</sup>	282	267	-	-
	Japan <sup>1</sup>	1,323	3,293	988	1,718
	Nigeria <sup>1</sup>	1,811	478	-	-
	Russia <sup>1</sup>	3,664	487	81	32
	Mexico	3	16	-	-
	United Kingdom <sup>1</sup>	1 011	96	-	-
Frozen Herring	Canada	4,318	6,308	5,028	6,154
	China	2,751	5,642	3,782	4,455
	Egypt	2,393	910	-	-
	Japan	12,519	27,072	25,902	32,065
	Other	1,053	1,239	487	328
Prepared/ Preserved Herring	Canada	997	1,763	350	594
	Netherlands	26	194	-	-
	Russia	20	45	-	-
Salted	Canada	-	-	7	13
	Japan	258	602	-	-
	Israel	11	38	-	-
	Mexico	8	48	-	-
Smoked	Canada	84	207	2	7
	China	11	32	-	-
	St. Lucia	1	3	-	-
	Guyana	-	-	3	4

Table E.45 - U.S. Exports of herring by product form and country for 1996 and 1997  
(Source: NMFS International Trade Database) (Note 1: probably frozen, not fresh)

Prepared/ Preserved “Sardines”	Australia	39	105	50	142
	Bahamas	34	146	56	240
	Canada	3,859	6,848	2,479	4,578
	Dominican	393	746	508	1,065
	French Polynesia	-		20	16
	Guyana	19	39	47	75
	Israel	7	14	36	65
	Japan	143	104	37	58
	Malaysia	372	225	73	49
	Mexico	4	10	76	107
	New Zealand	58	70	20	19
	Panama	67	136	199	368
	Papua New Guinea	93	102	19	19
	Philippines	91	137	41	78
	Trinidad &	36	75	31	67
	Western Samoa	57	57	75	78
	Other	195	838	311	761

Table E.45 – (cont.) U.S. Exports of herring by product form and country for 1996 and 1997 (Source: NMFS International Trade Database)

Product	Destination	1996		1997	
		Metric Tons	Dollars (in thousands)	Metric Tons	Dollars (in thousands)
Fresh	Northeast	3,714	616	4,940	914
	Entire U.S.	4,135	1,333	6,519	2,839
Frozen	Northeast	2,011	933	2,551	1,115
	Entire U.S.	3,101	2,038	3,218	1,946
Other (prepared, preserved, salted, smoked, kippered, pickled, roe, and meal)	Northeast	9,065	14,893	8,964	16,262
	Entire U.S.	12,731	20,610	13,378	22,207

Table E.46 - Imports of Herring to Northeast U.S. Customs Districts and the Entire U.S. from Canada

<b>Year</b>	<b>U. S. GOM Catches Processed in Canada</b>		<b>Reported Herring Catches in SNE Processed in Canada (mt)</b>
Year	Truck	Boat	Truck
1987	4438	791	
1988	5933	186	
1989	4549	118	
1990	5180	42	
1991	5413	723	
1992	5042	1537	167
1993	1534	976	0
1994	2273	1547	183
1995	3280	2117	3316
1996	4489	3690	6359
1997	102	1280	5546

Table E.47 – Northeast U.S. Atlantic herring exports to Canada (Source: Maine DMR)

<b>Year</b>	<b>Amount ('000 lbs)</b>	<b>Value ('000 dollars)</b>
1986	271	321
1987	999	688
1988	8,555	7,902
1989	8,951	7,823
1990	8,977	9,155
1991	10,434	9,394
1992	12,690	10,786
1993	12,275	10,457
1994	11,010	9,413
1995	11,775	8,915
1996	12,209	9,623
1997	9,321	8,115

Table E.48 - Canned sardine exports, 1986-1997 (Source: Fisheries of the United States (series))

<b>Year</b>	<b>Imports ('000 pounds)</b>
1986	53,264
1987	65,022
1988	53,359
1989	56,379
1990	56,963
1991	48,515
1992	36,511
1993	39,111
1994	43,942
1995	42,280
1996	40,926
1997	42,771

Table E.49 - U. S. Imports of canned sardines, 1986-1997 (Source: Fisheries of the United States (series))