U.S. Fish Exports and Imports Set Records in 1986

Exports of edible U.S. fish rose a whopping 30 percent in 1986 to an all-time high of $1.3 billion with the sale of a record 735 million pounds of seafood to foreign buyers, NOAA's National Marine Fisheries Service has announced. The Commerce Department agency noted, however, that imports of edible fish also set a record, with the United States purchasing $4.8 billion worth of seafood from abroad, $772 million more than in 1985. The volume of these imports totalled 3 billion pounds, also a record, according to NMFS statistics.

Imports of nonedible fishery products added another $2.8 billion onto the foreign trade bill. These consisted chiefly of high-value-added items like marine-derived chemicals, jewelry using pearls or coral, and leather goods made from seals and other aquatic animals. U.S. exports of nonedible fishery products were worth only $66 million according to NMFS data.

Imports

U.S. imports of edible fishery products in 1986 were valued at a record $4.8 billion, $771.8 million higher than the previous record for value established in 1985 (Table 1). The quantity of edible imports was a record at 3.0 billion pounds, 224.9 million pounds more than the previous record quantity imported in 1985.

Shrimp, Tuna Records

The quantity of shrimp imported in 1986 established a record with 400.1 million pounds, 41.2 million pounds more than the previous record quantity imported in 1985. Valued at $1.4 billion, $281.4 million more than the 1985 value, shrimp imports accounted for 30 percent of the value of total edible imports. Imports of fresh and frozen tuna, 563.6 million pounds, increased 86.3 million pounds more than the 478.8 million pounds imported in 1985. Imports of canned tuna not in oil increased for the eighth consecutive year with a record 236.3 million pounds, an increase of 22.7 million pounds over the previous record year of 1985.

Table 1.—Summary of imports and exports of fishery products, 1935-86.

	Imports				Exports			
	Edible products		Nonedible products	Total imports	Edible products		Nonedible products	Total exports
Year	Quantity[1]	Value[2]	Value[2]	Value[2]	Quantity[1]	Value[2]	Value[2]	Value[2]
1935	324,732	$27,535	$ 8,697	$36,232	119,687	$12,875	$1,499	$14,374
1936	371,206	30,357	11,516	41,873	111,259	12,263	951	13,214
1937	364,668	33,911	16,725	50,636	119,068	13,729	838	14,567
1938	302,624	28,349	10,958	39,307	118,029	13,798	617	14,415
1939	346,240	32,404	13,595	45,999	124,974	13,580	627	14,207
1940	302,518	29,073	12,757	41,830	144,804	17,115	670	17,785
1941	305,875	28,040	12,941	40,981	215,990	21,479	529	22,008
1942	277,199	28,984	10,584	39,568	167,080	27,876	4,039	31,915
1943	324,476	43,689	23,494	67,182	239,260	43,244	5,290	48,534
1944	339,431	53,431	24,987	78,418	112,230	31,929	4,011	35,940
1945	404,768	76,434	24,820	101,254	135,979	30,855	7,655	38,510
1946	473,539	89,986	39,727	129,713	200,398	38,353	1,616	39,969
1947	407,636	83,275	26,700	109,975	207,486	49,281	3,555	52,836
1948	472,742	111,660	44,988	156,648	95,085	21,020	3,382	24,402
1949	470,517	113,753	37,861	151,614	146,660	29,212	5,838	35,050
1950	639,725	158,414	39,882	198,296	121,623	18,856	8,618	27,474
1951	646,668	158,363	54,094	212,457	164,624	27,072	8,659	35,731
1952	705,118	183,121	57,308	240,429	62,056	15,511	6,436	21,947
1953	726,195	195,869	49,611	245,480	69,308	17,084	10,794	27,878
1954	804,054	203,722	48,687	252,409	62,724	16,238	15,289	31,527
1955	780,185	208,973	49,896	258,869	109,750	24,923	15,054	39,977
1956	801,655	234,699	48,031	282,730	101,918	22,939	16,564	39,503
1957	900,227	252,788	46,487	299,275	85,221	20,549	15,403	35,952
1958	1,020,326	283,822	46,959	330,781	65,468	19,440	11,564	31,004
1959	1,141,114	314,650	55,467	370,117	80,688	26,747	17,495	44,242
1960	1,095,014	310,596	52,685	363,281	61,454	25,622	18,543	44,165
1961	1,061,662	335,757	61,301	397,058	40,137	19,594	15,116	34,710
1962	1,255,532	405,832	83,975	489,807	56,530	22,470	13,258	35,728
1963	1,196,977	399,928	100,784	500,712	64,745	30,376	26,229	56,605
1964	1,318,099	433,674	130,569	564,243	94,835	42,878	21,326	64,204
1965	1,398,778	479,412	121,492	600,904	96,444	49,308	20,175	69,483
1966	1,593,614	568,091	151,611	719,702	109,604	62,882	21,931	84,813
1967	1,470,437	538,301	169,582	707,883	107,940	67,524	14,685	82,209
1968	1,741,365	643,165	179,504	822,669	90,808	56,845	10,912	67,757
1969	1,706,571	704,809	139,484	844,293	140,646	86,474	18,059	104,533
1970	1,873,300	812,530	224,880	1,037,410	140,375	93,878	23,606	117,484
1971	1,785,470	887,070	187,131	1,074,201	171,816	113,637	25,608	139,245
1972	2,341,138	1,233,292	261,119	1,494,411	171,642	134,188	23,720	157,908
1973	2,416,193	1,398,484	184,649	1,583,133	238,942	241,866	57,302	299,168
1974	2,266,880	1,495,380	215,498	1,710,878	178,011	194,966	67,166	262,132
1975	1,913,089	1,367,180	269,919	1,637,099	218,152	267,360	37,369	304,729
1976	2,228,091	1,913,922	414,264	2,328,186	240,866	329,810	54,880	384,690
1977	2,176,189	2,078,171	555,435	2,633,606	331,059	473,375	47,121	520,496
1978	2,410,673	2,256,314	829,637	3,085,951	448,312	831,654	73,880	905,534
1979	2,358,920	2,671,860	1,136,931	3,808,791	554,294	1,022,335	62,162	1,084,497
1980	2,144,928	2,686,721	961,731	3,648,452	573,896	904,363	101,791	1,006,154
1981	2,272,474	3,034,206	1,171,805	4,206,011	667,272	1,072,765	84,230	1,156,995
1982	2,225,474	3,202,408	1,321,170	4,523,578	657,246	998,873	60,011	1,058,884
1983	2,386,771	3,626,704	1,502,668	5,129,372	601,913	907,688	[3]113,804	1,021,492
1984	2,454,287	3,742,333	2,141,060	5,883,393	574,124	842,349	106,490	948,838
1985	2,754,018	4,064,334	2,614,252	6,678,586	648,146	1,010,268	73,846	1,084,114
1986	[3]2,978,905	[3]4,813,488	[3]2,812,805	[3]7,626,293	[3]735,026	[3]1,289,807	66,289	[3]1,356,096

[1]Thousands of pounds
[2]Thousands of dollars
[3]Record

Fillets, Blocks Up

Imports of fresh and frozen fish fillets and steaks amounted to a record 538.5 million pounds, an increase of 1.8 million pounds over 1985. Regular and minced block imports were 363.9 million pounds, an increase of 29.8 million pounds from 1985. Edible imports consisted of 2.4 billion pounds of fresh and frozen products valued at $4.2 billion, 438.8 million pounds of canned products valued at $500.4 million, 68.1 million pounds of cured products valued at $80.0 million, and 14.0 million pounds of other products valued at $24.6 million. Analog products (surimi) amounted to 34.3 million pounds valued at $58.5 million in 1986, compared with 33.7 million pounds valued at $48.2 million in 1985.

Imports of nonedible fishery products were valued at a record $2.8 billion—$198.6 million more than the $2.6 billion imported one year earlier. Total value of edible and nonedible products resulted in a record import value of $7.6 billion in 1986—$947.7 million more than the previous record in 1985, when $6.7 billion of fishery products were imported.

Exports

U.S. exports of edible fishery products of domestic origin were a record 735.0 million pounds valued at a record $1.3 billion, compared with 648.1 million pounds valued at $1.0 billion exported in 1985. Fresh and frozen items were 615.5 million pounds valued at $1.0 billion, increases of 71.2 million pounds and $260.2 million compared with 1985. Fresh and frozen exports consisted principally of 293.5 million pounds of salmon valued at $552.3 million and 90.4 million pounds of herring valued at $70.2 million.

Canned Products Up

Canned items were 79.6 million pounds valued at $132.2 million, up 21.1 million pounds and $35.8 million from 1985 levels. Salmon was the major canned item exported, with 59.4 million pounds valued at $101.2 million. Cured items were 39.4 million pounds valued at $112.9 million, decreases of 5.4 million pounds and $16.6 million compared with 1985. Cured exports consisted mainly of salmon and herring roe, which amounted to 29.8 million pounds valued at $91.2 million. The $154.9 million received for U.S.-Flag vessel catches transferred onto foreign vessels in the U.S. EEZ in joint venture operations are not included in the export statistics.

Nonedible Products Down

Exports of nonedible products were valued at $66.3 million—$7.6 million less than the $106.5 million exported in 1985. Exports of menhaden oil amounted to 188.9 million pounds valued at $19.8 million, decreases of 89.3 million pounds and $16.2 million compared with 1985. Thus, menhaden oil exports accounted for 29.9 percent of the value of total nonedible exports in 1986. The total value of edible and nonedible exports was $1.4 billion—an increase of $272.0 million compared with 1985. (Source: CFS 8401.)

Economists with NOAA's National Marine Fisheries Service said they expect recent trade concessions by other major U.S. seafood buying countries, especially Japan, to help boost U.S. exports in 1987 (see related article below).

New Trade Concessions Could Mean Millions for U.S. Fish Exporters

The Japanese have slashed trade restrictions on U.S. fishery products in a move that could mean as much as $400 million annually in increased sales for American exporters of processed Alaska pollock and Pacific herring. The shift followed a week-long meeting in March in Tokyo between the Japanese and U.S. representatives from the Commerce Department's National Oceanic and Atmospheric Administration (NOAA) and the Office of the U.S. Trade Representative.

The settlement will mean that American producers will have virtually unrestricted access to Japanese markets for processed Alaska pollock, mostly surimi, and for Pacific herring. The U.S. exported less than $50 million worth of these products to Japan last year. NOAA estimates that the agreement should result in $35 million in new exports to Japan this year, growing to $300 million to $400 million in the early 1990's, as the U.S. industry develops its market opportunities in Japan. Fishermen and processors in Alaska and Washington will be the chief beneficiaries of these new markets, NOAA said.

Fisheries trade experts with NOAA forecast that within the next 5 years the United States will be shipping to Japan annually about 100,000 tons of surimi. Surimi, a high-value-added pollock product with a billion-dollar market in Japan, is used as an ingredient in many traditional Japanese foods. In 1986, the U.S. exported less than 500 tons of surimi to Japan. Previously, Japan had severely impeded the import of processed pollock from the United States and had required restrictive import licenses for U.S. shippers, NOAA said.

The new trade agreement provided that Japan will create a new quota category for Pacific herring, which it will set each year at a level that corresponds to total U.S. production. Half of this quota will be available on a first-come-first-served basis for any importer with a contract and a pending shipment from a U.S. supplier. According to NOAA, the settlement should establish more competitive bidding for U.S. herring supplies, resulting in higher prices for U.S. exporters.

Basic Exporting Guide

The U.S. Commerce Department has announced the publication of a new edition of "A Basic Guide to Exporting." The 130-page guide, referred to as the "exporters bible" by Alexander Good, director of the U.S. and Foreign Commercial Service, provides facts, terms, techniques, ideas, and information for successful international market strategies. A checklist of export regulations, customs, benefits, and tax incentives to aid export businesses is included. The guide is available for $8.50 (stock number: 003-009-00487-0) from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Telephone (202)783-3238, or from most GPO Bookstores.

Americans Eat More Seafood Than Ever

In 1986, and for the third consecutive year, Americans ate a record amount of seafood, as they consumed 14.7 pounds per person and beat the 1985 record amount of 14.4 pounds per person, according to the National Oceanic and Atmospheric Administration (NOAA). Record consumption of shrimp and the highest consumption of canned fish, primarily tuna, in 50 years helped boost the per capita figure, the Commerce Department agency said. NOAA estimates that recreational fishermen added another 3-4 pounds of seafood to the American diet in 1986.

According to marketing experts with NOAA's National Marine Fisheries Service (NMFS), the record per capita figure reflects a trend of steadily increasing fish and shellfish consumption that began in the late 1970's when the typical American ate only about 11 pounds of seafoods each year. The NMFS added that Americans are also taking advantage of increased availability of seafoods at restaurants and supermarkets, and the appearance of nontraditional species, such as Alaska pollock and amberjack. In addition, the agency reported, news that eating fish may help prevent heart disease and other ailments has helped seafood consumption. The figures reflect the consumption of edible meat, rather than the weight of the whole fish, the NMFS added.

Leading U.S. Fishing Ports for 1986 Listed

New Bedford, Mass., and Cameron, La., were the leading fishing ports in the United States in 1986, the National Oceanic and Atmospheric Administration (NOAA) has announced. For the fourth consecutive year New Bedford topped all other cities in the value of the fish landed, the Commerce Department agency said. There, fish and shellfish worth $106 million were landed in 1986, up slightly from the $103 million figure in 1985. The Louisiana port of Dulac-Chauvin was second in value with $71 million worth of fish landed.

Cameron, La., led other cities in terms of volume with 617 million pounds, down from 674 million pounds in 1985. Most of the landings were the lower valued but industrially important menhaden. Two Texas ports saw dramatic shifts in landed value in 1986. Brownsville-Port Isabel's landings went from $50 million in 1985 to $69 million last year, and Aransas Pass-Rockport's landings jumped from $43 million to $60 million in value during the same period. The 10 leading U.S. ports in volume (millions of pounds) and value (millions of dollars) of fish and shellfish landed in 1986, with 1985 figures for comparison, are shown in Tables 1 and 2, respectively.

Table 1.—The 10 leading U.S. ports in volume (millions of pounds) of fish and shellfish during 1985 and 1986.

	Volume of landings	
Port	1985	1986
Cameron, La.	673.6	616.8
Pascagoula-Moss Point, Miss.	423.2	365.5
Empire-Venice, La.	224.5	317.6
Intercoastal City, La.	N/A[1]	298.9
Dulac-Chauvin, La.	398.6	294.6
Los Angeles, Calif.	150.3	187.4
Kodiak, Alaska	96.1	124.0
Gloucester, Mass.	116.5	110.0
Beaufort-Morehead City, N.C.	133.2	98.9
Dutch Harbor-Unalaska, Alaska	106.3	88.3

[1]Data not available.

Table 2.—The 10 leading U.S. ports in value (millions of dollars) of fish and shellfish during 1985 and 1986.

	Value of landings	
Port	1985	1986
New Bedford, Mass.	103.2	106.0
Dulac-Chauvin, La.	59.9	71.0
Kodiak, Alaska	65.8	70.2
Brownsville-Port Isabel, Tex.	49.6	69.3
Aransas Pass-Rockport, Tex.	43.0	60.3
Empire-Venice, La.	34.3	47.1
Bayou La Batre, Ala.	30.4	43.3
Golden Meadow-Leeville, La.	23.5	40.0
Petersburg, Alaska	N/A[1]	38.1
Gloucester, Mass.	37.1	37.8

[1]Data not available.

Fish Catch Noted for New England, Middle Atlantic

Preliminary figures for 1986 commercial landings of fish and shellfish in the Mid-Atlantic States of New York, New Jersey, Pennsylvania, Delaware, Virginia, and Maryland were 775 million pounds, valued at $245 million, according to Allen E. Peterson, Jr., Director of the National Marine Fisheries Service's Northeast Fisheries Center in Woods Hole, Mass. These 1986 figures are down 203 million pounds and up $6 million from the 1985 figures (Tables 1-3).

Table 1.—Weights (millions of pounds) and values (millions of dollars) of Mid-Atlantic fish and shellfish landings,[1] state-by-state, for 1985 and 1986.

	1985		1986	
State	Weight	Value	Weight	Value
Virginia	725	80	530	80
New Jersey	108	61	108	67
Maryland	101	56	89	51
New York	39	40	43	45
Delaware	5	2	5	2
Pennsylvania	<0.5	<0.5	<0.5	<0.5
Total	978	239	775	245

[1]Landings of fish in live weight; landings of most shellfish in meat weight; preliminary data.

Table 2.—Weights (millions of pounds) and values (millions of dollars) of Mid-Atlantic fish and shellfish landings,[1] port-by-port, for 1985 and 1986.

	1985		1986	
Port	Weight	Value	Weight	Value
Cape May-Wildwood, NJ	48	25	53	28
Ocean City, MD	25	11	29	12
Hampton Roads area, VA	24	25	25	24
Atlantic City, NJ	22	12	22	13
Point Pleasant, NJ	17	6	15	6
Chincoteague, VA	12	7	14	8
C. Charles-Oyster, VA	11	5	11	4
Montauk, NY	8	9	11	13
Hampton Bays, NY	9	6	8	6
Mattituck, NY	<5	<3	5	3
Greenport, NY	<5	<3	4	4

[1]Landings of fish in live weight; landings of most shellfish in meat weight. Also, because of the Federal Privacy Act, landings at major ports are not included if there are less than three processors at those ports (e.g., Reedville, Va.). Preliminary data.

Table 3.—Weights (millions of pounds) and values (millions of dollars) of Mid-Atlantic fish and shellfish landings,[1] species-by-species, for 1985 and 1986.

	1985		1986	
Species	Weight	Value	Weight	Value
Hard blue crabs	102	29	86	28
Surf clams	67	33	69	37
Ocean quahogs	42	13	43	13
Squids	9	13	13	4
American oysters	14	25	12	24
Summer flounder (fluke)	14	13	11	13
Silver hake (whiting)	14	3	8	2
Scup (porgy)	5	3	7	4
Sea scallops	5	22	7	29
Atlantic mackerel	3	0.3	6	1

[1]Landings of fish, squid, and blue crab in live weight; landings of other shellfish in meat weight; preliminary data.

Table 4.—Weights (millions of pounds) and values (millions of dollars) of fish and invertebrate landings[1] in New England, state-by-state, for 1985 and 1986.

State	1985		1986	
	Weight	Value	Weight	Value
Massachusetts	296.2	231.5	271.3	243.6
Maine	175.5	100.9	168.2	108.4
Rhode Island	103.8	69.9	101.6	75.1
New Hampshire	7.6	5.3	7.9	6.2
Connecticut	6.7	11.9	6.7	15.6
Total	589.8	419.5	555.7	448.9

[1]Landings of fishes in live weight; landings of invertebrates in meat weight; preliminary data.

Table 5.—Weights (millions of pounds) and values (millions of dollars) of fish and invertebrate landings in New England, port-by-port, for 1985 and 1986.

Port	1985		1986	
	Weight	Value	Weight	Value
Gloucester, MA	116.5	37.1	109.6	37.8
New Bedford, MA	90.6	103.2	65.8	106.0
Pt. Judith, RI	56.8	28.0	52.1	28.5
Rockland, ME	58.6	11.1	42.7	9.1
Portland, ME	36.1	17.2	34.3	22.4
Boston, MA	19.8	12.1	30.7	19.0
Newport, RI	16.8	13.7	11.6	12.8

[1]Preliminary data.

Table 6.—Weights (millions of pounds) and values (millions of dollars) of fish and invertebrate landings[1] in New England, species-by-species, for 1985 and 1986.

Species	1985		1986	
	Weight	Value	Weight	Value
Atlantic herring	57.0	2.9	70.4	3.8
Atlantic cod	82.3	34.7	60.8	35.6
American lobster	43.7	107.4	42.7	112.1
Pollock	43.5	6.8	32.1	14.0
Silver hake (whiting)	31.0	5.4	31.5	5.9
Yellowtail flounder	23.6	19.6	22.2	20.5
Winter flounder	21.5	18.5	16.3	16.8
White hake	16.2	3.4	11.9	4.8
Sea scallop	10.2	50.0	11.5	61.2
Haddock	14.4	13.5	10.9	10.9
Northern shrimp	9.3	4.0	10.3	6.6
Summer flounder (fluke)	9.9	10.5	10.0	13.1
Scup	8.8	5.0	8.0	4.3
Swordfish	2.6	7.0	2.2	7.4

[1]Landings of fishes in live weight; landings of invertebrates in meat weight; preliminary data.

Table 7.—Weights (millions of pounds) and values (millions of dollars) of American lobster landings[1] in New England, state-by-state, for 1985 and 1986.

State	1985		1986	
	Weight	Value	Weight	Value
Maine	20.1	45.0	19.7	46.2
Massachusetts	15.6	40.1	15.0	41.0
Rhode Island	5.1	14.6	5.1	16.7
Connecticut	1.7	5.0	1.8	5.4
New Hampshire	1.2	2.7	1.1	2.8
Total	43.7	107.4	42.7	112.1

[1]Preliminary data.

Meanwhile, preliminary 1986 figures for commercial landings of New England fishes and invertebrates were 555.7 million pounds, valued at $448.9 million. These figures are down 34.1 million pounds and up $29.4 million from the 1985 totals, Peterson noted, for the States of Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island.

Landings of such traditionally important groundfishes as cod, haddock, and yellowtail flounder decreased by 26.4 million pounds in 1986 compared with 1985, accounting for most of the overall decrease last year. Tables 4-6 compare the weights and values of New England landings in 1985 and 1986 on a state, port, and species basis, while Table 7 provides data on landings of American lobsters in each of the New England states. Overall, the 1986 landings of lobster were 42.7 million pounds (vs. 43.7 million pounds in 1985), valued at $112.1 million (vs. $107.4 million in 1985).

Federal Procurement Fact Sheets Available

A packet of fact sheets has been prepared by NMFS to aid U.S. seafood companies interested in selling seafood to Federal agencies. The fact sheets include basic information of Federal purchasing requirements for: The Department of Defense, Department of Justice Bureau of Prisons, Health and Human Services, Veterans Administration, and the Department of Agriculture. There are also specific contacts identified within each agency if more detailed information is needed. U.S. firms interested in copies should write to: Federal Procurement Fact Sheets, NMFS, Utilization and Development Branch, P.O. Box 1109, Gloucester, MA 01931.

Storm Impacts on Fish Studied by NOAA Agencies

Scientists from the National Oceanic and Atmospheric Administration (NOAA) have been flying through severe storms over Alaskan waters to measure their effect on the transport of fish eggs and larvae from their spawning grounds, the Commerce Department agency reports. Starting about 15 February, a NOAA research aircraft operating from Anchorage began flying patterns through severe storms on successive days, according to Bernard A. Walter of NOAA's Pacific Marine Environmental Laboratory in Seattle.

The scientists are trying to predict fast-developing storms over the Bering Sea and Gulf of Alaska, and then document their effect on area waters and marine life. Data are being collected aboard the aircraft and from instrument packages dropped into the ocean, which describe water temperature, depth of its mixed layer, vertical current profiles, and other factors. Meteorological analyses are made just before and after the flights, according to Melvyn Shapiro of NOAA's Environmental Research Laboratories in Boulder, Colo. NOAA weather satellites, and ocean buoys moored in the area will also provide information.

The project is part of a larger, multiyear Fisheries-Oceanography Coordinated Investigations program involving the Environmental Research Laboratories and the National Marine Fisheries Service. The program, one with significant economic implications, is designed ultimately to identify environmental factors which can be monitored and from which the size of fisheries can be forecast. That capability would substantially aid operational planning by the fishing industry.

NOAA Wins Its First Marine Sanctuary Case

The National Oceanic and Atmospheric Administration (NOAA) announced early this year an out-of-court settlement in which the United States will receive $6,275,000 over the next 15 years from attorneys for the 400-foot freighter MV *Wellwood*, which ran aground on Molasses Reef in the Key Largo National Marine Sanctuary off the Florida Keys on 4 August 1984. The U.S. Department of Justice had filed suit

alleging damage to nature resources. It also sought civil penalties, and recovery of U.S. Coast Guard salvage costs. The case had been scheduled to go to trial in U.S. District Court in Miami in early 1987.

Commenting on NOAA's first court action over damages to natural resources in a national marine sanctuary, Peter Tweedt, Director of NOAA's Office of Ocean and Coastal Resource Management in Washington, D.C., said, "Boaters and ship operators should be aware of the damage that can be done to fragile marine resources when marine sanctuary regulations are violated. This settlement should demonstrate that this administration will take whatever legal steps are necessary to ensure that these nationally significant marine areas are protected."

The grounding of the M/V *Wellwood* resulted in extensive, long-term damage to large areas of slow growing coral formations in the Key Largo sanctuary. Despite round-the-clock efforts by the Coast Guard and private salvage firms, the vessel remained aground for 12 days. NOAA research scientists assessing damages to the reef, expect it will be many years before there is any significant recovery by the reef. The Justice Department has also filed a $500,000 claim against a Panamanian-registered freighter, the MV *Mini Laurel*, its owner, and captain for striking Molasses Reef on 11 December 1986. Initial studies by NOAA indicate that the 215-foot vessel caused less damage than the *Wellwood*.

NOAA, Massachusetts Make Monetary Settlement in Superfund Law Case

The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) and the state of Massachusetts agreed earlier this year to a $2 million settlement with AVX Corporation of Great Neck, N.Y., to resolve any liability for damages to coastal resources and damage assessment costs in New Bedford, Mass., caused by the company's alleged disposal of polychlorinated biphenyls (PCB's). The settlement, filed 4 March 1987 with the U.S. District Court in Boston, must be approved by Judge William D. Young. If approved, it would be the first Federal monetary recovery for damages to natural resources under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, commonly known as the Superfund Law. NOAA and Massachusetts would use the money to restore the damaged resources for public use and recoup assessment costs.

A 30-day period of public comment is provided by the Justice Department before the settlement can be approved. Acting as public trustees, NOAA filed suit in Federal district court in Boston in 1983, joined by Massachusetts, alleging that over a 25-year period AVX Corporation disposed of toxic industrial wastes—PCB's—in the Acushnet River estuary, which empties into New Bedford harbor. They alleged that the contamination hurt commercial and recreational fishing, public beaches, and other harbor amenities. NOAA and Massachusetts claim the damages continue because the chemicals persist in the environment and accumulate in living organisms.

The Environmental Protection Agency (EPA), which is conducting an investigation of the contamination, also joined the suit in 1984 to recover its costs to study and clean up the polluted area. Recovery of EPA's costs will be resolved in subsequent proceedings. The trial of a former owner of the electrical capacitor manufacturing plant that is alleged in the suit to be one of the sources of the PCB pollution, Belleville Industries of New Bedford, Mass., was scheduled before Judge Young for late March or in early April. The current owner of the plant, Aerovox, Inc., of New Bedford, will also participate in the proceedings. In the same case, Federal Pacific Electric Company and Cornell-Dubilier Electronics Company, both of Newark, N.J., are scheduled to go to trial in 1988 for alleged PCB damage from a similar manufacturing facility in New Bedford.

Clam and Spiny Lobster Poaching Arrests Made

A combined State-Federal covert investigation into the illegal sale and interstate transport of South Carolina clams prompted arrest warrants for 25 people in South Carolina, late last year, according to the Southeast Regional Directorate for the National Marine Fisheries Service. Law enforcement officials from the South Carolina Wildlife and Marine Resources Department, the South Carolina Department of Health and Environmental Control and the National Marine Fisheries Service, announced the results of the undercover investigation into the illegal trade in clams, code named Operation SOCKO.

"This year-long undercover investigation by our three agencies netted receipts for $775,147.72 worth of clams," said W. K. Chastain, Director of the State Wildlife Department's Law Enforcement Division. "These receipts reflect the sale—90% out-of-state—of 5,242,905 clams in 250-count bags between December 1983 and August 1986. All were harvested from South Carolina coastal waters.

"This figure of more than three quarters of a million dollars is very conservative, reflecting only a small part of the total black market in hard clams," Chastain said, "since no records were kept for many additional shipments bootlegged out of the state." The investigation began as a result of cases made by Wildlife Conservation Officers and Department of Health and Environmental Control Shellfish Officers, and information obtained by the National Marine Fisheries Service, plus numerous complaints by private citizens.

"The size and nature of the problem led us to believe that the investigation could not be handled through regular law enforcement means, but through a cooperative covert operation," said Jack Brawner, then director of the NMFS Southeast Regional Office. State and federal officials cautioned, however, that all charges listed in the indictments, as in any indictment, are merely accusations. All defendants are presumed innocent unless and until proven guilty.

The ongoing investigation indicated that these 25 individuals may be responsible for 707 counts of violations of state wildlife codes, 200 counts of state health codes, and 300 counts of the Federal Lacey Act, which forbids the interstate sale of fish and wildlife taken in violation of state law. Maximum criminal penalties against individuals for Lacey Act violations are $250,000 and 5 years in prison.

"The combined force of state and federal officers, working undercover, was able to enter the world of these black market clam dealers and thoroughly document most of their operation," Chastain said. Most of the clams shipped out of the state were being dug at night using hand tools. A productive night could easily yield $1,000 worth of clams destined for distant markets.

The arrests were timed to take place during a morning high tide when most of the suspects would be at home. Conservation officers were also posted at several landings known to be used by the suspects in the event that arrests would need to be made on the water. "The investigation is continuing and additional arrests and charges are expected," Chastain said.

In other law enforcement action, a fish dealer in Big Pine Key, Fla., was indicted by a Federal grand jury on charges of possession and sale of undersized spiny lobsters. As a result of the Federal indictment, the dealer was arrested by Federal agents on 25 November 1986 for alleged violation of the Lacey Act.

Information for the indictment came from an investigation by special agents of the National Marine Fisheries Service and officers of the Florida Marine Patrol. Numerous purchases, sales, and interstate shipments of illegal lobsters were alleged. Florida law prohibits the possession of spiny lobsters with a tail length of less than 5½ inches.

According to State and Federal officials, the minimum size limitation is a key element in the conservation and management of spiny lobsters. Harvesting spiny lobsters before they have an opportunity to grow to sexual maturity seriously endangers the future of Florida's spiny lobster fishery and denies legitimate commercial and recreational fishermen the opportunity to harvest lobsters at the legal size. Again, Federal officials caution that all charges listed in the indictment, as in any indictment, are merely accusations.

Commerce Department Medals Are Awarded

In ceremonies late last year, the U.S. Department of Commerce awarded its highest honorary award, the gold medal, to 28 individuals, including five NOAA employees for lifesaving acts: Douglas P. Anderson, Mark H. Bushnell, Daniel J. Parry, Robert J. Roddy, and Dean L. Smehil. Earning a gold medal for studies of dynamics and chemistry of the middle atmosphere was Jerry D. Mahlman, and Charles J. Neumann earned the gold medal for achievement in statistical/dynamic tropical cyclone track prediction modeling.

The Department's second highest honorary award, the silver medal was granted to 69 individuals and 5 offices for outstanding work. Twenty-four NOAA employees were presented with the silver medal: Michael D. Abell, William E. Carter, John Ross MacKay, Douglas S. Robertson, Arthur C. O'Shaughnessy, Michael D. Cox, Stephen M. Billcheck, Paul M. Gilkerson, Leo R. Harrison, Jr., Marvin O. Hill, David A. Keller, Kenneth S. Mack, Elnora G. Markle, Alfred L. Purdy, Jr., Robert M. Tibi, Russell Koffler, Richard M. Davis, William Propest, David E. McGuirk, Robert O. Brines, Jr., Roger W. Bissinger, Rober C. Elvander, Robert E. Saffle, and Francis D. Moran.

Research Scientists Earn Excellence Award

Each year the American Oil Chemists' Society presents an award for the most outstanding poster session at its annual meeting. The award is based on scientific content and communication. At the Society's 1986 meeting in Honolulu, Hawaii, the award was won by the paper, "The Use of Supercritical Fluid Cardon Dioxide to Fractionate Fatty Acid Esters Derived from Menhaden Oil." The text and visual materials were written and compiled by William Nilsson, Virginia Stout, Erich Gauglitz, Jr., Joanne Hudson, and John Spinelli of the NMFS Northwest and Alaska Fisheries Center's Utilization Research Division.

Polyphosphate Use in Canned Salmon

In May 1986, the Utilization Research Division (URD) of the NMFS Northwest and Alaska Fisheries Center sponsored an Industry Workshop demonstrating the use of sodium polyphosphate (or condensed phosphates) in canned salmon in reducing curd formation and improving texture, color, and flavor. The workshop was attended by members of the salmon canning industry, process chemical and equipment manufacturers, and the trade press. Workshop panelists were John E. Wekell (URD), Lee Patton (Alaska Seafood Marketing Institute, ASMI), and Al Duzenback (Food and Drug Administration, FDA). Wekell discussed the polyphosphate treatment developed in the Utilization Research Division, while Duzenback discussed the FDA regulations on standards of identity and procedures for amending these regulations, and Patton discussed ASMI marketing studies showing changes in consumer attitudes toward canned salmon.

The ASMI studies described by Patton dramatically illustrated the new forces facing the canned salmon industry. Changing attitudes of consumers has led to the demand for more fresh/frozen salmon than for the canned product. For the past several years, the salmon industry in Alaska has begun freezing more salmon than it cans. The canning of samon places a large burden on process lines because of the very large landings that occur in very short spaces of time. Therefore capacity to handle such input is necessarily large but is used for only very short periods of time, e.g., 3-4 months. The industry would like to smooth out production of canned salmon throughout the year in place of a highly concentrated season. If frozen fish could be canned, production could be easily spread out through the year.

Unfortunately, the use of frozen fish in canning leads to a product having large amounts of surface curd and relatively dry texture. URD work has shown that the use of polyphosphate dips or sprays can effectively reduce the formation of unsightly curd in canned salmon when frozen pink or sockeye salmon are thawed and then processed for canning.

Curd formation is a visual defect commonly observed in the cooking of frozen meats, such as beef, poultry, and fish. The curd is caused by heat coagulation of protein in the drip that is present in all thawed frozen products. In addition, frozen edible tissue, when it is cooked, usually displays some loss of texture quality, e.g., loss of juiciness, a dry or "cardboard" feeling in the mouth during chewing. Careful attention to the processing of the tissue prior to freezing and control of the freezing rate can help to reduce the quality loss observed in the finished cooked product; however, some tissues, particularly from fish appear to be more susceptible to freeze-thaw damage than either poultry of beef. For example, salmon held under the best of cold storage conditions (on ice) for prolonged periods (1 week), when canned, will produce significant amounts of curd in the finished product.

URD work has shown that frozen salmon could be thawed and successfully processed into a canned product with significant reduction in curd and an improvement of both texture and flavor. The application of polyphosphates to canned salmon was demonstrated on three different styles of salmon pack: Traditional steak pack, a boneless-skinless steak pack, and a boneless-skinless small chunked pack. It was found that dipping or soaking the cut pieces of salmon in a solution of 10-15 percent polyphosphate and 2 percent salt for periods ranging from a very brief "in and out" to 2 minutes could effect the curd reduction. In the case of the smaller chunks, a spray of polyphosphate/salt could be used in place of the dip.

The use of polyphosphate/salt dips was particularly effective on the boneless/skinless product. Not only was there a substantial reduction in curd formation, but a very significant improvement in the texture and flavor of salmon. For example, usually the dark meat associated with the lateral line in canned salmon has a very pronounced strong flavor (sometimes rancid). However, in the polyphosphate-treated fish, this dark meat was indistinguishable from the other meat. In the small chunked product, treated with polyphosphate and canned with salt, texture had a pronounced moist, soft texture compared with the untreated controls. In both boneless/skinless products (steak and small chunk), some slight improvement in the color appearance of the product was also observed.

Application of this process in the salmon industry is now dependent on two factors:

1) Adaptation of these techniques by the industry to their process lines.

2) Change in the Standard of Identity for Canned Salmon.

In the URD study, it was found that, for the polyphosphate to be effective in reducing curd, it had to be applied to the cut pieces before they were put into the can. Because of this requirement, it will probably be necessary to make some modification to existing process lines producing the traditional steak pack. Since the boneless/skinless products are relatively new and processing lines are just being developed, it should be a relatively easy matter to introduce a polyphosphate dip or spray into such a line.

The current Standard of Identity for Canned Salmon permits only the use of salt and edible salmon oil to be added to salmon. It will be necessary for the salmon canning industry to petition the Food and Drug Administration (FDA) to get a change in this standard. In the interim, the industry can get a temporary variance to the standard to allow a polyphosphated canned salmon product to be marketed for test purposes. For such a variance, the product will have to disclose to the FDA how much polyphosphate will be added to the product, what changes the polyphosphate undergoes during processing, and what benefits the additive confers on the finished product. Source: John C. Wekell, Utilization Research Division, NWAFC, Seattle, Wash.

NMFS Will Produce Fish Oil for U.S. Health Researchers

Scientists studying the health benefits of fish oil in the human diet will for the first time have a source of standardized test materials of guaranteed quality and composition according to the National Oceanic and Atmospheric Administration (NOAA). Until now, there has been no consistent and reliable source of test materials from fish oil or its derivatives. This has hampered research and made results between experiments difficult to compare, the Commerce Department agency said.

The test materials, consisting primarily of refined menhaden oil and concentrates of certain of its active chemical components will be produced by NOAA's National Marine Fisheries Service Charleston, S.C., laboratory in an agreement with the National Institutes of Health and the Alcohol, Drug Abuse, and Mental Health Administration. The materials will be available this year and will be used in investigations approved, and in some cases sponsored, by the two organizations.

Evidence has been accumulating over the past several years that the oil found in fish and shellfish, in particular components known as omega-3 polyunsaturated fatty acids, can have a beneficial effect on human health, especially regarding heart disease and stroke. "I'm excited about this program, and optimistic about the significance of its results," said William E. Evans, head of the National Marine Fisheries Service. "This agreement will open the way for controlled research into the role that fish oil plays in our diets, especially in prevention and treatment of cardiovascular disease, cancer, asthma, and certain kinds of arthritis."

Pacific Salmon Quality Studied

A cooperative project to document the quality changes in fresh and frozen coho salmon, *Oncorhynchus kisutch*, and pink salmon, *O. gorbuscha*, has been initiated by the NMFS Northwest and Alaska Fisheries Center's Utilization

Research Division and the Alaska Seafood Marketing Institute. The first phase of the study involved sensory and chemical measurements of quality changes during iced storage of the two species. Preliminary results showed that pink salmon can be stored in ice about 8 days without significant quality loss. However, after 10 days of iced storage the quality is affected by abnormal odor and flavor.

Coho salmon remained highly acceptable through 10 days of iced storage and showed slight changes in odor and flavor after 13 days. Significant quality change was evident after 15 days of iced storage. Samples from both species were frozen after various iced storage periods and will be thawed at 3-month intervals and compared with control samples frozen at the beginning of the study.

Five-Year Marine Mammal Cruise Program Begins

Twelve scientific observers returned to San Diego, Calif., late last year after 120 days at sea searching for schools of dolphins aboard the NOAA research vessel *David Starr Jordan* and *McArthur*. The cruises were the first in a 5-year program to monitor the abundance of stocks of dolphins in the eastern tropical Pacific, and the monitoring program is a result of an amendment to the Marine Mammal Protection Act which directed the National Marine Fisheries Service to design and carry out such a program.

The NMFS' Southwest Fisheries Center in La Jolla is responsible for carrying out the program. Ultimately, the information obtained will be used to determine if the tuna purse seine fishery in the eastern tropical Pacific has adversely affected one or more of the dolphin stocks which are associated with the schools of tuna being fished. The Secretary of Commerce is then empowered under this law to take action to modify the existing dolphin quotas for the U.S. tuna fishery to ensure that the dolphin populations are able to recover.

Cruise chief scientist Rennie S. Holt of the SWFC said that on an average day three schools of 200 dolphins each were seen from each vessel. The observers recorded how many animals they saw, the species of the animals, and where the animals were sighted. At the completion of the cruise, the scientists begin entering the data on a data base. By the end of the 5-year program when the sixth cruise is completed, scientists will have a comprehensive data base from which to determine whether the population of dolphins in the eastern tropical Pacific is increasing or decreasing.

Along with the counts of dolphins, the scientists also collected oceanographic information, such as measurements of surface temperature, salinity, and fluorescence. The scientists will use this information to determine whether the presence of dolphins is associated with a certain oceanographic environment. The oceanographic information is also being collected as part of a major NOAA ecosystem study. Scientists in this study are looking for evidence of the warm-water oscillation known widely as "El Niño."

NEFC Studying Recovery of 12-Mile Dumpsite

The NMFS Northeast Fisheries Center has completed its plans for the study of the recovery of the New York Bight's "12-Mile Dumpsite," a major site for sewage sludge disposal from New York City. Disposal of the sludge there since 1924 has altered adversely the area's benthic habitats, and has affected its shellfish, finfish, and other marine resources. Gradual phaseout of the dumpsite began in April 1986 and will cease by December 1987.

To document changes in chemistry and biota resulting from the closure, the Center is sampling 27 sites, covering all habitat types, each month until at least a year after the dumping stops. Data will be gathered on distribution, abundance, food habits, gross disease, small and medium-sized bottom-dwelling animals, organic contaminant levels in various animals, water movements, water chemistry, and sediment chemistry.

Fish samples have been examined for size and biomass estimates. Subsamples of winter flounder, red hake, and American lobsters have been examined for dietary items, and winter flounder were tagged and released. In general, invertebrates, mainly rock crabs, have dominated the catches. Groundfish (flounder and hake) were in low abundance, and, as expected, spotty catches were made of squid and butterfish.

The multidisciplinary study will monitor microbial contamination in shellfish (with FDA support) to determine changes in areas acceptable for harvesting. Rates of change in chemical burdens and changes in community structure will be used to develop a model of resource recovery.

Collaborating groups include Brookhaven National Laboratory, U.S. Environvironmental Protection Agency, University of Delaware, Food and Drug Administration, and other elements of the National Marine Fisheries Service, NOAA.

NOAA Hydrolab Goes to the Smithsonian

NOAA Hydrolab, formerly an underwater home and base of operations for marine research divers, has become a permanent exhibit at the Smithsonian Institution in Washington, D.C. Until 1985, the facility was operated by the West Indies Laboratory of Fairleigh Dickinson University in 50 feet of water off St. Croix in the Virgin Islands.

During its nearly 8 years of use, NOAA Hydrolab served as a base for nearly 200 scientific missions involving 400 scientists from 10 nations. Areas of research included studies of marine fisheries, pollution, and pharmaceuticals, as well as diving medicine, underwater instruments, etc. Resembling a huge, squat bottle, the cylindrical Hydrolab is 16 feet long and 8 feet in diameter. For

the Smithsonian exhibit, one side has been cut away to reveal the interior, with replicas of three diver-scientists depicted at work in the furnished chamber.

Aquanaut-scientists were able to live in Hydrolab and work in the surrounding waters for 7 days without returning to the surface because their body tissues were saturated with oxygen and nitrogen at the same pressure as the surrounding waters. NOAA Hydrolab divers could work full 8-9 hour days as opposed to 25-minute bottom time for scuba divers working from the surface. Cold temperatures was also less of a problem since divers could return periodically to the Hydrolab to warm up in its 75-degree chamber. A surface buoy connected by an umbilical line supplied fresh air, power, and a communications link to the surface.

Reports Elliott Finkle, director of NOAA's Underseas Research Program, "There have been larger and more luxurious subsea bases, but Hydrolab has been the real workhorse of underwater diving habitats. More hours of saturation dives were made out of Hydrolab than from all other underwater habitats combined to date."

Continued Great Lakes Flood Levels Predicted

Record high water levels in the Great Lakes coupled with warm winter in the area could result in further severe flooding of Chicago's Lake Michigan shoreline, NOAA scientists report. Frank H. Quinn, head of NOAA's Lake Hydrology Group at the Great Lakes Environmental Research Laboratory in Ann Arbor, Mich. said, "Water levels, generally, in the Great Lakes are setting records, and will through the summer. Lakes Michigan, Huron, St. Clair, and Erie are at record levels, while Ontario looks as if it will reach a record height this spring. Only Superior is below its record level."

Thus, such lakefront cities as Chicago, Milwaukee, Traverse City, Toledo, Cleveland, and Buffalo face possible flooding under certain weather conditions. "The potential for problems is much greater than it ever has been during the years we have been keeping water level records," the Commerce Department agency official said. "This is partly because there isn't much ice on the lakes this winter." He said that most of the flooding, erosion, and other damage occurs when lake water is driven against the shoreline during storms, an effect minimized when the lakes are covered with ice.

A high water level possibility was noted more than a year ago by the NOAA laboratory, and this has allowed many lakefront communities to activate flooding preparedness plans, some assisted by the Army Corps of Engineers. "The problem will not go away at the end of the stormy season in April or May," Quinn added. "Our research indicates we are likely to have high lake levels for at least the next several years."

The Great Lakes system, he noted, would take 6-10 years to return to normal levels even if precipitation, runoff, and other factors during that time were normal. "Even if we had a drought it would take Huron and Michigan three and a half years to return to the usual levels, and Lake Erie would take four years." NOAA's National Ocean Survey operates a network of water level gauges throughout the Great Lakes, while its National Weather Service provides marine forcasts for the lakes.

Winter Flounder Tagged, Studied

The National Marine Fisheries Service (NMFS) has begun tagging winter flounder (blackbacks) early this year in the New York Bight, the Northeast Fisheries Center reports. Winter flounder caught by the NMFS's research vessel *Kyma* from a 100-square-mile area centered about 10 miles offshore, as well as from the Sandy Hook-Raritan Bay complex, are being tagged. The tag is a half-inch diameter yellow plastic disc imprinted with an identification number and the return address: Sandy Hook Laboratory, Highlands, New Jersey 07732.

Data from the study will provide information on local movements, seasonal migrations, and growth rates of the species. Fishermen catching tagged winter flounder are requested to return the tag along with information on the date and location that the fish was caught, and on its length. The cooperation of fishermen will greatly aid the scientists at the NMFS's Sandy Hook Laboratory in learning more about winter flounder. For additional information contact Beth Valdes at (201)872-0200.

Stone Crab Divided Into Two Species

The stone crab, known until recently as *Menippe mercenaria* in the Caribbean and Carolinian provinces of the western North Atlantic Ocean, is divisible into two morphologically distinct populations with almost separate, narrowly overlapping ranges, NMFS researchers report. These populations have now been recognized as distinct species by A. B. Williams and D. L. Felder.

The species differ in color, carapace morphometry, and stidulatory patches on chelae of the chelipeds. *Menippe mercenaria*, the Florida stone crab, ranges from Cape Lookout, N.C., through peninsular Florida, the Bahamas, and the Greater Antilles, to the Yucatan Peninsula of Mexico, and Belize. *Menippe adina*, the Gulf stone crab, ranges from northwestern Florida around the Gulf of Mexico to Tamaulipas State, Mexico. The two species hybridize in the Apalachee Bay region of northwestern Florida.