U.S. Tuna Imports From Latin America, 1978-82

United States tuna imports from Latin America increased in 1982 for the first time in 3 years, even though embargoes were in place on tuna and tuna products from some of the region's major tuna fishing countries. Shipments from the region totaled 56,900 metric tons (t) of tuna in 1982, an increase of 50 percent from the 37,900 t imported in 1981, but still well below the record 76,800 t imported in 1979 (Fig. 1, Table 1). The value of tuna imported from Latin America has also increased (Table 2) and set a new all-time record of $67.1 million (before adjustments for inflation).

The overall decline in U.S. tuna imports from Latin America is surprising as several countries (Brazil, Mexico, and Venezuela) have aggressively expanded their fleets and sharply increased their tuna catches. The main reason for the reduced tuna imports has been the imposition by the United States of embargoes on tuna and tuna products from countries which seized U.S. tuna purse seiners for violation of claimed jurisdictions that the United States does not recognize. Embargoes were imposed on Costa Rica, Ecuador, Mexico, and Peru

Table 1. — Latin American tuna exports to the United States, in metric tons 1978-82.

	Exports (t)				
Source	1978	1979	1980	1981	1982
Caribbean					
Bahamas[1]	529.7				
Barbados				68.0	
Bermuda[1]	6,300.7	4,380.6		445.7	405.7
Cayman Isl.			294.8	1,908.9	7,833.5
Cuba					
Dominican Rep.				19.1	
Fr. West Indies		59.2	14.7	56.8	0.6
Grenada					
Haiti					
Jamaica					
Montserrat					
Neth. Antilles	7,670.9	11,753.9	11,837.0	2,334.5	913.5
Trinidad-Tobago		12.5	242.2	522.9	19.7
Total[2]	14,501.3	16,206.2	12,388.7	5,355.9	9,173.1
Central America					
Belize					
Costa Rica	573.2	558.0	450.0		787.6
El Salvador					201.4
Guatemala					
Honduras	4.7				
Mexico	17,853.3	10,038.1	4,730.7		
Nicaragua	2,988.4	846.0			
Panama	14,519.9	25,684.9	16,201.7	14,297.3	21,695.1
Total[2]	35,939.5	37,127.0	21,382.3	14,297.3	22,684.1
South America					
Argentina			23.9	12.2	45.8
Bolivia					
Brazil	708.2	395.0	4,743.6	6,286.4	14,122.1
Chile			3.7	25.4	39.3
Colombia					
Ecuador	12,535.5	17,134.5	11,845.2		1.8
Fr. Guiana					
Guyana					
Paraguay					
Peru	40.6	225.4	745.0	303.8	137.2
Suriname					
Uruguay	2,654.2	710.8	1,602.9	1,639.1	1,058.9
Venezuela	9,324.4	5,066.1	4,062.0	9,970.7	9,615.1
Total[2]	25,262.9	23,531.8	23,026.2	18,237.6	25,020.2
Grand Total[2]	75,703.7	76,865.0	56,797.2	37,890.8	56,877.3

[1]These islands are not physically located in the Caribbean, but are included here for organizational simplicity.
[2]Totals may not agree due to rounding.
Source: Bureau of the Census, U.S. Department of Commerce.

Table 2. — Latin American tuna exports to the United States, by value, 1978-82.

	Exports (US$1,000)				
Source	1978	1979	1980	1981	1982
Caribbean					
Bahamas[1]	$ 175.2				
Barbados				$ 222.2	
Bermuda[1]	1,599.4	$1,337.4		520.6	$ 448.5
Cayman Isl.			$ 277.7	2,279.2	9,197.8
Cuba					
Dominican Rep.	199.7			35.2	
Fr. West Indies		97.4	53.1	124.2	1.1
Grenada					
Haiti					
Jamaica					
Montserrat					
Neth. Antilles	7,823.9	10,072.9	14,395.1	4,576.0	1,177.4
Trinidad-Tobago		21.7	523.1	710.3	35.1
Total[2]	9,798.2	11,529.5	15,249.0	8,467.7	10,860.0
Central America					
Belize					
Costa Rica	499.9	464.4	382.7		826.8
El Salvador					181.0
Guatemala					
Honduras					
Mexico	16,221.7	9,976.6	5,111.0		
Nicaragua	1,598.4	716.0			
Panama	12,605.9	23,410.7	18,799.6	18,270.8	25,832.8
Total[2]	30,925.9	34,567.9	24,293.3	18,270.8	26,840.6
South America					
Argentina			42.6	26.8	92.1
Bolivia					
Brazil	448.3	291.8	5,206.2	7,441.1	15,709.2
Chile			4.4	35.6	65.7
Colombia					
Ecuador	7,941.9	12,186.6	11,136.4		2.3
Fr. Guiana					
Guyana					
Paraguay					
Peru	53.3	306.6	1,083.2	494.6	277.9
Suriname					
Uruguay	4,433.9	985.2	3,383.0	2,749.7	2,264.1
Venezuela	7,858.7	2,711.4	3,068.9	12,793.7	10,940.2
Total[2]	20,736.1	16,481.6	23,925.1	23,541.5	29,351.5
Grand Total[2]	61,460.2	62,579.0	63,467.4	57,061.3	67,052.1

[1]These islands are not physically located in the Caribbean, but are included here for organizational simplicity.
[2]Totals may not agree due to rounding.
Source: Bureau of the Census, U.S. Department of Commerce.

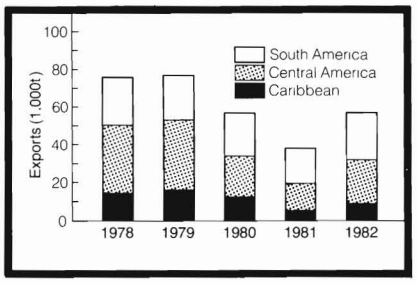

Figure 1. — Latin American tuna exports to the United States, 1978-82.

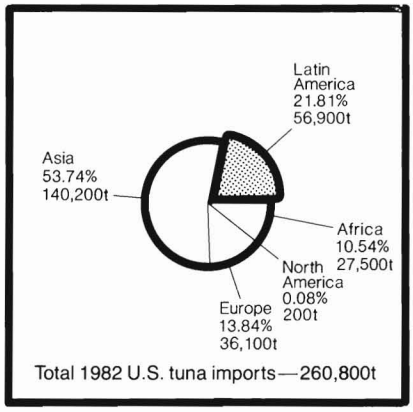

Figure 2. — U.S. tuna imports, 1982.

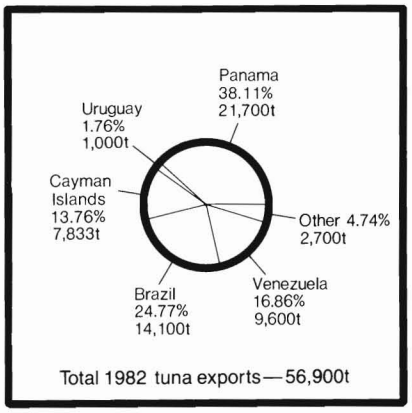

Figure 3. — Latin American tuna exports to the United States, 1982.

in 1980. The embargo on Costa Rica was removed in February 1982. The embargoes on Ecuador and Peru[1] were removed during April 1983. Two of the countries affected by these embargoes, Ecuador and Mexico, were formerly major suppliers of tuna to United States canneries.

Still, Latin America supplies only a small portion of U.S. tuna imports. The United States imported about 56,900 t from Latin America in 1982, over 20 percent of total U.S. tuna imports (Fig. 2). Most U.S. tuna imports come from Asian countries, primarily Japan, Taiwan, and the Philippines. Imports from Asia, however, fell sharply in 1982 (Table 3).

The major Latin American suppliers of tuna to the U.S. market in 1982 were Panama, Brazil, Venezuela, the Cayman Islands, and Uruguay (Fig. 3). The U.S. has imported tuna from Panama and Venezuela for several years. Brazil has recently begun to develop a tuna fishery, and as a result, the United States began to import significant quantities in 1980. The United States also imports tuna from a few Caribbean countries such as the Cayman Islands, but this tuna is mostly taken by vessels owned and operated by foreigners and only registered there for a variety of tax and legal purposes. The tuna is mostly caught in the eastern Pacific and transhipped in Panama. Uruguay has regularly exported small quantities of tuna for several years. These shipments are largely albacore caught by Asian longline operations based in Montevideo.

The United States imports primarily frozen tuna which is then packed at canneries in southern California and in Puerto Rico. Almost all of the 56,900 t of tuna imported from Latin America in 1982 was shipped frozen (Table 4). The United States imported only negligible quantities of canned tuna from Latin America in 1982, primarily because embargoes were in place on the major Latin American tuna canning countries, Mexico and Ecuador. Several other Latin American countries (Brazil, Costa Rica, and Venezuela) also can tuna, but did not export to the United States in 1982. Brazilian companies, however, are planning a major expansion of their canned tuna production and may in the future enter the U.S. market. Panama and Trinidad are reportedly studying the possibility of building tuna canneries. Frozen tuna enters the United States duty free, while tariff duties, especially the 35 percent duty on tuna canned in oil, have tended to limit imports of canned tuna from Latin America as well as from other exporting countries. Canned tuna exports to the United States, especially from Asian countries, however, have increased in recent years. (Source: IFR-83/51.)

Table 3. — U.S. tuna imports by continent, 1978-82.

	Imports (1,000 t)				
Continent	1978	1979	1980	1981	1982
Asia[1]	205.7	198.4	201.5	205.3	140.2
Lat. America	75.7	76.7	56.8	37.9	56.9
Europe[2]	17.9	11.3	17.7	36.6	36.1
Africa	33.3	27.0	23.2	27.4	27.5
N. America	0.1	0.1	0.1	0.2	0.2
Total[3]	332.7	313.5	299.3	307.4	260.8

[1]Includes Oceania.
[2]Includes eastern and western Europe.
[3]Totals may not agree due to rounding. Totals may also not agree with tuna import data published in "Fisheries of the United States" as Bureau of the Census data does not include shipments from American Samoa.
Source: Bureau of the Census, U.S. Department of Commerce.

Table 4. — Latin America's tuna exports to the United States, 1978-82.

	Exports (1,000 t)				
Type of product	1978	1979	1980	1981	1982
Fresh/frozen	75.4	76.6	56.0	37.6	56.9
Canned	0.3	0.1	0.5	negl.	negl.
Total	75.7	76.7	56.5	37.6	56.9

Source: Bureau of the Census, U.S. Department of Commerce.

[1]The Peruvian Government has not certified that its fishermen are taking measures to limit the incidental kill of porpoises associated with the yellowfin tuna purse seine fishery. Until the Government submits that certification, exports of yellowfin tuna to the United States continue to be embargoed under the terms of the Marine Mammal Protection Act of 1972.

The Effect of El Niño on Ecuadorean Fisheries

Ecuador is one of the countries most severely impacted by the 1982-83 El Niño phenomenon in the eastern Pacific Ocean. Sea surface temperature anomalies have been particularly severe off its coast. An Ecuadorean Naval Oceanographic Institute (INOCAR) report, describing the genesis and impact of the current El Niño, indicates that the 1982-83 El Niño has not followed the previously established pattern. INOCAR maintains that it has been the most catastrophic visitation of any El Niño on record and the most prolonged. Ecuador's commercial marine fish catches have diminished sharply while on shore, heavy rains have caused widespread flooding and crop damage.

INOCAR believes that the 1982-83 El Niño apparently has developed as a result of an east-west atmospheric imbalance over the entire south Pacific. A high pressure area over Darwin, Australia, in early 1982 began moving eastward to fill a low pressure area over the Tahiti-Easter Islands region. After about 4 months, the first manifestations of El Niño appeared off the northwest coast of South America, especially southern Ecuador and northern Peru. By early January 1983, the sub-oceanic isotherm of 25°C had sunk to a depth of 70-100 m between the Ecuadorean coast and the Galapagos Islands. Surface water temperatures reached 29.5°C. Indigenous fish stocks accustomed to the colder waters of the Humboldt Current dispersed or migrated south and their normal reproductive cycle has been greatly disrupted.

The warm waters off Ecuador caused drastic reductions in the abundance of phytoplankton and diatoms, food sources for the various commercial fish stocks harvested by Ecuadorean fishermen. The country's principal fishery is for thread herring, but catches of that species are well below 1982 levels. Catches of other species, such as mackerel, have also declined. Ecuadorean officials are particularly concerned about mackerel stocks. As a result of the warmer water temperatures associated with El Niño, the mackerel schooled closer to the coast than usual, making them more vulnerable to fishing effort. As a result, Ecuadorean fishermen who were having difficulty locating the thread herring and sardines they usually catch, intensified their effort on mackerel. Mackerel catches began to drop precipitously in December 1982. The fishery is now limited to a few localized areas in the Gulf of Guayaquil, but fishing is reportedly intense in those areas.

INOCAR is concerned not only with the increased fishing effort, but also with the possible impact of the warmer water on the 1983 mackerel spawning season (normally February), which they believe has been disrupted. INOCAR also reports that the reduced quantities of phytoplankton and diatoms, on which the larval fish feed, has increased cannibalistic behavior. INOCAR has detected a substantially reduced abundance of eggs and larvae of most small pelagics (thread herring, sardine, and mackerel) off Ecuador, compared with observations made by INOCAR in 1981. INOCAR biologists believe that this could mean substantially reduced catches for the next several years.

Only oceanic dinoflagellates common to warm waters and shrimp have apparently benefited from the El Niño phenomenon. Due to extremely high rainfalls since September 1982, the increased run-off of the rivers emptying into the Gulf of Guayaquil has provided a great abundance of nutrients. Shrimp fishermen believe that the resulting abundant crop of shrimp larvae will result in a record 1983 shrimp season. The impact on Ecuador's important shrimp culture industry is less clear. The abundant supply of post larvae will help many growers. The widespread flooding, however, has damaged some ponds and made others inaccessible as roads

Ecuador: El Niño Update

Ecuadorean officials are concerned that the 1982-83 El Niño event may continue off their coast for some time. Some observers had predicted in late July and August that the El Niño was beginning to wind down. Weather specialists in Ecuador, however, have reported some indications that the abnormal weather patterns were continuing.

Several factors normally associated with El Niño events reappeared or intensified in early September. Abnormally high tides were reported and the southeasterly trade winds were reasserting themselves somewhat erratically. Heavy rains had also begun again. Unseasonably heavy rains occurred in early September and reportedly intensified by mid-month. James Aycant, Director of Guayas Province Civil Defense, was especially concerned that the onset of the rainy season could accelerate the return of the intertropical covergence zone which caused the heavy rains while hovering over Ecuador early in 1983.

NOAA also reports that, as of mid-August 1983, sea surface temperature anomalies off Ecuador and northern Peru had stabilized at 3°-5° C above normal. Preliminary reports suggest that the area of cooler water west of the Galapagos has not expanded significantly in August. Some observers thought that the projected expansion of this area might gradually reduce the temperature anomalies off the coast of Ecuador and Peru. (Source: IFR-83/105.)

have been washed out. One report suggests that over $10 million in damage has been done to the ponds.

Precipitation during the El Niño phenomenon has greatly exceeded the normal rainfall for the rainy season. In Salinas, January and February rainfall is usually 48.7 mm. In 1983, however, January and February rainfall amounted to a record 589.4 mm. In Guayaquil, March 1983 rainfall was a record of 779.6 mm, the highest rainfall ever registered there for a single month. For the period November 1982-April 1983, total precipitation was 2,636.0 mm compared with the previous record of 1,669.8 mm for the same period during the last severe El Niño of 1972-73. Average air and water temperature, tides, sea level and wave heights, and relative humidity have all registered much higher values than normal.

INOCAR concludes that about the only benefit from the 1982-83 El Niño is that since it has lasted so much longer than previous El Niños, it has afforded the scientific community much more time to study the phenomenon. Also, the fact that this El Niño was not generated in the normal four-phase fashion attributed to other El Niños has raised new questions about the phenomenon's formation. If atmospheric circulation in the southeast Pacific responds in the normal pattern, the southeast air currents should begin pushing the warm inter-tropical zonal air mass further north and the warm waters of El Niño to the west. This will allow the Humboldt Current to resume its normal flow and precipitation to diminish considerably. However, if the southeast winds cannot displace the warm waters of El Niño before those winds lose their force by the end of the year, another serious episode of El Niño could be in the making and once again bring heavy rainfall. INOCAR believes that the great socioeconomic impact which this El Niño has had, not only on Ecuador, but on other eastern Pacific countries, should prompt a more intense study of the phenomena to better understand its generation and predictability. (Source: IFR-83/69.)

El Niño Effects Less Pronounced off Chile

The 1982-83 occurrence of the El Niño phenomenon has had a pronounced effect on weather patterns and fishing conditions along the entire western coast of Latin America. Unlike neighboring Peru, initial reports from Chile in 1983 suggest that Chilean fishermen have so far benefited from the phenomenon. El Niño events are usually characterized by an increase in water temperature, a deepening of the thermocline, changes in wind trends, and abnormal precipitation. Off northern Peru and Ecuador, where the climatic anomalies were most severe, the event was prolonged and has had a significant impact on the local fishing industry.

Off Chile the effects have been less pronounced. One of the primary effects of the warmer water has been on the schooling behavior of the South Pacific sardine[1]. Local observers report that the sardines have formed unusually large schools which enabled fishermen to catch them more easily and to sharply increase landings. During the first half of 1983, sardine landings amounted to 1.6 million metric tons (t), equal to the total Chilean catch of South Pacific sardine in 1981 and only slightly below the total catch in 1982. Although this has been of immediate benefit to the fishermen along Chile's northern coast, the yield is so high that Government officials were concerned about sardine stocks. The full impact of the 1982-83 El Niño thus may not be realized for 3 or 4 years. The long term impact on Chile could be negative if larval or juvenile fish have been affected or if the current large catches reduce the spawning biomass measurably. An immediate adverse impact, however, has been the greater quantity of sardine needed to produce each ton of fishmeal and fish oil. The decline in fish oil yields have been especially sharp, normally 1 t of sardine will produce 0.25 t of fishmeal and 0.06-0.07 t of fish oil, but this year only 0.01-0.02 t of fish oil was being extracted.

The Undersecretariat of Fishing (SERNAP) has taken measures to protect sardine stocks, such as limiting the number of fishing days, establishing a complete prohibition of sardine fishing during spawning, and enforcing various management restrictions. Nevertheless, the government was not willing to institute a complete ban on sardine fishing, and it now appears that the total landings of South Pacific sardine, which reached 1.8 million t in 1982, will exceed 2.0 million t in 1983. Chile's total 1983 catch will probably remain relatively unchanged, however, because during the first half of 1983 there was a drastic drop in the landings of jack mackerel, Chile's second most important fish species. Mackerel stocks apparently migrated north in response to the unusual water and weather conditions.

Biologists participating in research cruises along Chile's northern coast have reported taking tropical species not normally found off Chile, such as ophas, *Lampris reqius*; and Spanish mackerel, *Scomberomorus maculatus*. Some of the fish normally found off northern Chile, such as jack mackerel and black ruff were rarely taken when the effects of the El Niño were most pronounced. Some shellfish species

[1] Sardine has replaced anchovy as Chile's most important species. This trend began in 1971 when another El Niño drastically reduced anchovy stocks.

such as locos and sea urchins also declined. Biologists and fishermen also reported other effects such as large numbers of dead sea lions. Large quantities of seaweed were also reported washed up along the beaches.

Chilean scientists began to report an attenuation of the El Niño event in early 1983, while off Peru, the 1982-83 event did not begin to attenuate significantly until late July. Off Chile, however, temperature anomalies and other climatic abnormalities began to attenuate in February. Biologists at Chile's Instituto Profesional de Iquique in northern Chile, for example, reported that by June, the species normally found off Iquique had begun to return and that it was no longer possible to find large numbers of dead sea lions and seaweed along the beach. (Source: IFR-83/93.)

Potential of Mexican Shrimp Culture High

Mexico is one of the Latin American countries with the greatest potential for shrimp aquaculture. The country already has Latin America's second most important shrimp trawl fishery, after Brazil. Most of the shrimp catch is exported to the United States. In 1982, such shipments totaled over 36,000 metric tons (product weight), worth nearly $375 million. The development of a shrimp culture industry could significantly increase Mexico's shrimp production and export earnings.

Mexico has lagged behind other Latin American countries in developing a shrimp culture industry, however. Shrimp culture in Ecuador, Brazil, Panama, and other countries has been undertaken by private investors, often with technical and financial assistance from United States and other foreign investors. Mexican law, however, reserves several particularly valuable species, such as shrimp, to cooperative fishermen. Private individuals in Mexico have thus been unable to culture shrimp or invest in shrimp culture projects. As a result, the industry in Mexico has lagged behind developments elsewhere in Latin America. Mexico's fishery cooperatives generally lack the technical and financial capabilities to enter the industry without extensive government assistance.

The Mexican Government has assigned a special priority to aquaculture in its fishery development program. As part of this program, the Government has done some research on shrimp culture and has been working with several cooperatives to promote commercial shrimp culture.

The U.S. Consulate in Mazatlan reports that the Mexican Government is currently sponsoring six shrimp culture projects with cooperatives in the Pacific coast State of Sinaloa. The Japanese had previously done some work on shrimp culture during the late 1960's, before the 1972 Fisheries Development Law reserved shrimp exclusively for the cooperatives. The Japanese-owned ponds (about 300 hectares each) were located near Villa Union in southern Sinaloa. Mexican experts believe that these ponds were too large and have recommended building smaller ponds of about 100 hectares each which they believe will be more productive. The projects are being financed by the Mexican Government's Banco Nacional Portuario y Pesquero (Banpesca) and were expected to be completed by October 1983.

One of Banpesca's new shrimp culture projects is located at Marmol and is similar to the other five projects. The Marmol project will cost about 30 million pesos[1] and will provide employment for about 30-35 cooperative members who will repay Banpesca from their earnings. Banpesca believes that the project will produce about 0.5 t of shrimp per hectare of pond, or about 50 t of shrimp per year. The project also includes plans for oyster and fish culture.

Banpesca believes that shrimp culture investments compare favorably with investments in the shrimp trawl fishery. Mexico's Pacific shrimp grounds already are heavily fished. A new trawler costs about 18-30 million pesos, has a useful life of about 10 years, and is crewed by about 5 fishermen who will catch about 10-12 t of shrimp per year. Banpesca believes that its shrimp ponds will employ more people, have longer useful lives, and produce more shrimp per peso invested than equivalent investments in shrimp trawlers.

The Government views the shrimp culture projects as part of its general rural development program. Each of these projects will help create a new rural center. Besides the jobs for the pond workers, transportation and processing facilities for each project will have to be built. The State of Sinaloa is also contributing to the projects by upgrading the roads and by building more schools for the children of the pond workers. New houses and stores will be built to supply not only the pond workers, but the teachers and other employees that the development will produce. Thus each project will provide far more jobs than those of just the pond workers. In addition, each of the projects is in an area away from the major population centers in Sinaloa. Thus, the projects will help to alleviate one of Mexico's major problems, the movement of the rural population to the major urban centers. (Source: IFR-83/76.)

[1]The Mexican peso has fluctuated widely on foreign currency markets since January 1982, but traded at about 150 pesos to the U.S. dollar on the free market in mid-year.

Note: Unless otherwise credited, articles in this section are from either the Foreign Fishery Information Releases (FFIR) compiled by Sunee C. Sonu, Foreign Reporting Branch, Fishery Development Division, Southwest Region, National Marine Fisheries Service, NOAA, Terminal Island, CA 90731, or the International Fishery Releases (IFR), Language Services Biweekly (LSB) reports, or Language Services News Briefs (LSNB) produced by the Office of International Fisheries Affairs, National Marine Fisheries Service, NOAA, Washington, DC 20235.