TUNA: CURRENT ISSUES AFFECTING THE U.S. INDUSTRY

Report to the Committee on Finance, United States Senate, on Investigation No. 332-313 Under Section 332(g) of the Tariff Act of 1930 as Amended

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PREFACE

On September 6, 1991, following receipt of a request from the Senate Committee on Finance (appendix A) and in accordance with section 332(g) of the Tariff Act of 1930,[1] the U.S. International Trade Commission instituted investigation No. 332–313, Tuna: Current Issues Affecting the U.S. Industry. The committee requested information on the following issues:

1. The dolphin-safe issue, including its background, relevant company policies and Government legislation, relevant treaty obligations of the United States, and an analysis of the effects of the dolphin-safe issue on U.S. tuna production, trade, and consumption;
2. International fishery access issues relating to tuna, including the treatment of tuna in the U.S. and foreign fishery conservation zones, fishery access treaties and negotiations, and other relevant information;
3. Recent technological developments, such as the domestic processing of imported tuna loins, including the effect of such developments on U.S. tuna production and trade; and
4. A profile of the U.S. tuna industry, including an update of U.S. industry and market data.

Copies of the notice of the investigation and public hearing were posted at the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and the notice was published in the *Federal Register*[2] (appendix B).

A public hearing was held in connection with this investigation on February 4-5, 1992, in San Pedro, California. All interested persons were given an opportunity to present views and information. (The calendar of this hearing is reproduced as appendix C.)

The committee requested that the Commission report the results of its investigation not later than July 31, 1992.

[1] 19 U.S.C. 1332(g).
[2] 56 F.R. 47226.

CONTENTS

CONTENTS—*Continued*

CONTENTS—*Continued*

CONTENTS—*Continued*

CONTENTS—*Continued*

CONTENTS—*Continued*

EXECUTIVE SUMMARY

The business environment of the U.S. tuna industry changed substantially during 1990-91. Among the most significant developments were the dolphin-safe policy instituted by U.S. tuna processors in April 1990 in response to growing pressure by consumer and environmental groups, the embargoes on imports of tuna and tuna products under the Marine Mammal Protection Act, and United Nations resolutions calling for the end of the use of large-scale driftnets on the high seas. Another policy change was the inclusion of tuna within the U.S. 200-nautical-mile fishery conservation zone (FCZ). This action implicitly recognizes other nations' claims concerning tuna within their FCZ's and affects the ability of U.S. fishermen to harvest some stocks of tuna. Finally, the increased use of imported tuna loins by existing, full-line tuna canneries in California and Puerto Rico and Bumble Bee Seafoods' landmark opening in February 1990 of a tuna processing plant in California dedicated to processing imported tuna loins signalled the start of possible structural changes in the processing sector.

Within the context of these developments, the Commission was asked to provide an updated profile of the U.S. tuna industry; a discussion and analysis of the dolphin-safe policy; information regarding fishery access issues; and a discussion and analysis of technological developments, particularly with respect to loin processing. A summary of the study findings on these issues is presented below; the time period is 1990-1991, unless otherwise noted.

U.S. Industry and Market

- **The capacity of the U.S. tuna harvesting sector continues to decline.**

  The number of U.S. tuna purse seiners declined from 63 at the end of 1989 to 57 at the end of 1991, and the fleet-wide hold capacity declined by about 5 percent due primarily to the sale of vessels to foreign-flag fleets.

- **Most of the remaining fleet has shifted from the Eastern Tropical Pacific to the Western Tropical Pacific.**

  Owing to the U.S. dolphin-safe policy, only six U.S. tuna purse seiners are reported to be currently operating in the Eastern Tropical Pacific, down from 51 in 1989. Most of the vessels that had been fishing there either were sold or moved to the Western Tropical Pacific, where the number of vessels operating increased from 35 in 1990 to 43 in late 1991 and is reportedly now approaching 50. Approximately 8 to 10 U.S. jobs and associated wages are lost per vessel that transfers to the Western Tropical Pacific.

- **The U.S. tuna harvest declined in 1990 before rebounding slightly in 1991.**

  U.S. tuna landings declined by about 5 percent from 1989 to 1990, continuing the downward trend that began in 1987. The 1989 catch was 541 million pounds, valued at $309 million. The 1990 catch was 514 million pounds, valued at $310 million. In 1991, landings rose to 520 million pounds, although the value fell to $274 million, owing mainly to a change in the species mix.

- **U.S. exports of raw tuna increased substantially during 1990-91.**

  Owing primarily to the shift of most of the fleet to the Western Tropical Pacific, the U.S. fleet's exports rose from 11 percent of its catch in 1989 to 26 percent in 1990 and further to 31 percent in 1991. In 1991, exports of raw tuna were 163 million pounds, up from 54 million pounds in 1989.

- **U.S. consumption of canned tuna dropped in 1990, but rebounded in 1991.**

  After reaching a record level of 989 million pounds in 1989, U.S. apparent consumption of canned tuna fell by 5 percent to 935 million pounds in 1990. Consumption increased in 1991 to 947 million pounds. The U.S. market still shows a preference for water-packed tuna, while oil-packed tuna held a fairly steady 15- to 18-percent share of the market over the period.

- **Production, capacity, and employment declined while labor productivity increased in the processing sector during 1990-91.**

  U.S. canned-tuna production fell by 15 percent in both quantity and value from 1989 to 1990, and although the quantity of production increased slightly in 1991, the value of the output fell further. Industry-wide annual production capacity decreased by 10 percent during 1989-91 due to cutbacks and shift reductions while employment fell by about 10 percent. Labor productivity improved, as the worker-hours required to produce a standard case of canned tuna declined from 0.61 in 1989 and 1990 to 0.57 in 1991 due to continuing improvements in technology, production flow, and product yields.

- **U.S. imports of canned tuna dipped in 1990 before reaching a new high in 1991.**

  U.S. canned tuna imports fell by 18 percent to 129,000 metric tons in 1990 before reaching a new record of 160,000 metric tons in 1991. A sluggish U.S. market, uncertainty and disruptions caused by the dolphin-safe policy, and market adjustments relating to ownership changes led to the substantial decline in 1990 imports. The share of consumption accounted for by imports fell from 35 percent in 1989 to 30 percent in 1990 before rising to 37 percent in 1991.

- **Thailand continued to lead foreign suppliers of canned tuna in U.S. market share during 1990-91.**

  Thailand's import market share was stable at 70 to 72 percent during 1990-91. Indonesia nearly doubled its market share, from 7 percent in 1989 to 13 percent in 1991, making it the second-leading import supplier in 1991. Most of Indonesia's increase was accounted for by expanded production capacity and increased marketing through U.S. subsidiary channels.

- **Tuna prices generally declined during 1990-91.**

  Prices of both raw tropical tuna and canned lightmeat tuna generally declined during 1990-91. A continued global surplus of raw tuna supplies, relatively high inventory levels for canned tuna, and a sluggish U.S. canned tuna market contributed to the decline during the period.

Dolphin-Safe Policy

- **Dolphin-safe policies have harmed U.S. canneries in Puerto Rico and California and benefited canneries in American Samoa.**

  Canneries in Puerto Rico and California have traditionally depended heavily on raw tropical tuna harvested from the Eastern Tropical Pacific, and so have suffered from the reduced tropical-tuna supply available from that region. In contrast, the canneries in American Samoa have enjoyed an increase in tropical-tuna availability, because the vessels that moved to the Western Tropical Pacific have enjoyed high catch rates. All canneries have been harmed by the reduced supply of raw albacore, however. On the consumer side, canneries have reported no detectable increase in consumer demand for canned tuna following the implementation of the dolphin-safe policy.

- **Primary and secondary embargoes on U.S. imports of yellowfin tuna products disrupted the U.S. tuna market, particularly for raw tuna.**

  The United States has imposed embargoes under the Marine Mammal Protection Act on imports of yellowfin tuna products from various countries that either produce or import such tuna using methods that result in an incidental kill of dolphins in excess of U.S. standards. These embargoes have had a substantial impact on U.S. tuna processors in terms of sourcing their inputs, as some of the embargoed countries were major suppliers of raw tuna to these processors. The embargoes have had a lesser impact on the canned tuna market, as most of the embargoed countries either were minor suppliers to the U.S. market or were subject to the embargo for a relatively short period of time.

- **The expected effects of the dolphin-safe policy on the U.S. purse seine fleet vary according to the time frame.**

  As expected, there have been declines in price and the total value of production of tropical tuna, as the vessels shift from one fishery to another. In the long term, the expected effects of the policy on raw tropical tuna prices are uncertain because they depend on whether foreign harvest increases enough to offset the likely decline in the total U.S. harvest given current constraints on access to Western Tropical Pacific fisheries.

- **The driftnet moratoria are expected to benefit U.S. albacore harvesters.**

  The reduced world catch of albacore caused by the reduction and eventual elimination of the use of driftnets is expected to benefit the U.S. albacore fleet (which does not use driftnets) in two ways. One is an increase in price, which has already been observed following the U.S. ban on imported tuna caught with driftnets. The second is a long-term increase in the U.S. harvest. This is expected because the albacore populations have been sharply reduced by the heavy fishing pressure from driftnet fleets in recent years; with the driftnets gone, the albacore populations are likely to increase, and therefore U.S. catch rates also should increase.

Fishery Access Issues

- **Recent changes in U.S. Government fishery policies have accentuated the importance of access agreements to the U.S. tuna fleet.**

  The Fishery Conservation and Management Act of 1976 provided for a 12-mile claim to tuna resources by the United States and an amendment, effective January 1, 1992, extended this jurisdiction to 200 miles and recognized the 200-mile claim to tuna-fishery jurisdiction of other nations. This change has effectively removed protection against seizure for U.S. fishermen who venture inside another nation's fishery conservation zone. Thus, the renewal of agreements such as the South Pacific Tuna Treaty of 1987 that provide U.S. tuna harvesters with expanded access to the rich tuna grounds of that region has become more critical.

Technological Developments

- **The development and implementation of the technology to process imported tuna loins displaces labor in the processing sector.**

  The proportion of domestic production of canned tuna processed from imported tuna loins has risen from about 2 percent in 1989 to about 18 percent in 1991. U.S. imports of loins, which more than doubled between 1988 and 1989, increased by nearly seven-fold in 1990. Loin imports rose another 21 percent in 1991. Because processing tuna from loins requires as little as 20 percent of the labor needed to process whole fish, increased use of imported loins will probably lead to further declines in U.S. employment in the tuna processing sector.

- **Recent efforts to avoid dolphin mortality in the Eastern Pacific through technological advances have been largely unsuccessful to date.**

  Research and development efforts have focused largely on the use of fish-aggregating devices, methods of separating the bond between tunas and dolphins, and electronic devices to locate tuna. Industry and academic sources indicate that these efforts are still experimental.

CHAPTER 1
INTRODUCTION

In this study the Commission examines some of the changes that the U.S. tuna industry and market have been undergoing in recent months and years. These developments are occurring as the industry is adapting to policy changes (with respect to commercial fishing) at company, national, and international levels. This study presents information concerning the issues of dolphin-safe harvesting of tuna, international fishery access agreements, and technological changes in both the harvesting and processing of tuna. The report also provides a profile of the industry and highlights the changes that have occurred since the Commission's last investigation in 1990.[1]

Tuna, found in waters throughout the world, are among the world's most important commercial marine fishes. World consumption of tuna has increased by an average 7 percent annually since 1960, with world landings in 1990 estimated at 2.5 million metric tons, valued at $4.5 billion,[2] making tuna second only to shrimp in value terms. The United States is the second-largest producer of tuna, behind Japan, with a total harvest in 1991 of 520 million pounds, valued at $274 million. The United States is the leading market for canned tuna, with consumption of 947 million pounds, valued at $1.2 billion, in 1991. Canned tuna accounts for approximately 25 percent of U.S. consumption of marine fish products.

The Scope of the Study

The study focuses on the two major sectors of the industry—harvesting and processing—and on the two primary categories of tuna—tropical tuna and albacore—processed for the U.S. market. Table 1-1 provides a general profile of the U.S. tuna industry. The harvesting sector, the U.S. fleet, operates primarily in the Pacific Ocean and consists of about 56 purse seiners and about 10 smaller baitboats, which fish for tropical tuna, and about 60 trollers and longliners, which fish for albacore. The processing sector currently consists of five firms that operate a total of seven canneries and employ about 9,600 workers in Puerto Rico, American Samoa, and California. These firms process tropical tuna, principally skipjack and yellowfin, which is marketed as lightmeat canned tuna. These firms also process albacore, which is the only species that can be marketed as canned whitemeat tuna in the United States.

In most instances the period covered throughout this study is 1990–91, although other data are presented and references to earlier years are made when necessary for the descriptions and analyses.[3] The investigation consisted of a combined analysis of information obtained at the public hearing; from questionnaires sent to harvesters, processors, and importers; from written submissions to the Commission; from published sources; and from staff interviews with industry representatives, Government officials, and academic researchers.

Overview of Major Issues and Events

The Dolphin-Safe Issue

Of the various issues examined in this investigation, the one stirring the greatest public interest is the killing of dolphins by tuna harvesters. This issue has significant emotional content for many people and is of concern to the tuna industry, marine biologists, fishery regulators, and others with an interest in the tuna industry and fishery.

In the Eastern Tropical Pacific (ETP)[4] (and, it is believed, in other oceans of the world[5]) schools of dolphins and yellowfin tuna frequently swim together. The reasons for this phenomenon are unclear but probably relate to a common food source. The dolphins swim on the surface of the ocean and the tuna swim directly below. Tuna harvesters have for many years taken advantage of this tuna-dolphin association by searching for dolphin schools and setting their nets around the schools in the hope of also entrapping a school of tuna. In the process of hauling the net to the vessel, some dolphins are inadvertently drowned, although most escape.

Under provisions of the Marine Mammal Protection Act (MMPA),[6] U.S. tuna harvesters are allowed an annual dolphin-kill quota of 20,500 animals, which has been reached in only 1 year (1986). Most foreign-flag tuna harvesters are under no such restrictions; however, under certain provisions of the MMPA the United States has on occasion embargoed tuna imports from countries whose fleets exceed some specified proportion of the U.S. kill rate. The most recent embargo was imposed in 1991 against Mexico.

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[1] For additional information about the industry, see U.S. International Trade Commission, *Tuna: Competitive Conditions Affecting the U.S. and European Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990; USITC, *Competitive Conditions in the U.S. Tuna Industry* (investigation No. 332-224), USITC publication 1912, Oct. 1986; and, USITC *Certain Canned Tuna Fish* (investigation No. TA-201-54), USITC publication 1558, Aug. 1984.

[2] James Joseph, "The Conservation Ethic and Its Impact on Tuna Fisheries," *Tuna 91 Bali*, Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, p. 12.

[3] For example, some of the tables contain data for earlier years and are presented for those readers interested in longer data series.

[4] This is the area bounded by 40 degrees North latitude, 40 degrees South latitude, 160 degrees West longitude, and the Pacific coastlines of the United States and Latin America.

[5] There has been increasing awareness of the possibility of the association between dolphins and tuna in areas outside the ETP. However, evidence of such association has not been well documented to date.

[6] Codified at 16 U.S.C. 1361 et seq.

Table 1-1
Tuna: Industry Profile, 1990-91

Item	Industry sector: Harvesting (raw) 1990	Harvesting (raw) 1991	Processing (canned) 1990	Processing (canned) 1991
Production:[1]				
Whitemeat	13,866	12,792	142,155	129,753
Lightmeat	513,292	525,658	450,645	493,369
Total	527,158	524,932	592,781	623,142
Consumption:[1]				
Whitemeat	189,714	155,904	(2)	(2)
Lightmeat	633,386	690,826	(2)	(2)
Total	823,100	846,730	934,680	947,252
Trade:[1]				
Imports:				
Whitemeat	175,848	143,112	(2)	(2)
Lightmeat	255,298	341,630	(2)	(2)
Total	431,146	484,742	284,592	351,744
Exports:				
Whitemeat	0	0	0	0
Lightmeat	135,204	162,944	0	0
Total	135,204	162,944	0	0
Ratio (percent) of:				
Imports to consumption:				
Whitemeat	93	92	(2)	(2)
Lightmeat	40	49	(2)	(2)
Total	52	57	30	37
Exports to production:				
Whitemeat	0	0	0	0
Lightmeat	26	31	0	0
Total	26	31	0	0
Prices:[3]				
Whitemeat	1,765	1,530	(2)	(2)
Lightmeat:				
Yellowfin	982	792	(2)	(2)
Skipjack	853	764	(2)	(2)
Average	1,206	1,053	1.68	1.41
Number of operations:				
Whitemeat	60	60	7	7
Lightmeat	63	56	7	7
Total	123	116	7	7
Employment	(2)	(2)	10,036	9,613
Wages[4]	(2)	(2)	92,905	86,916
Capacity utilization[5]	77	77	68.1	78.5
Net profit (or loss)[4]	[6](302)	[6](482)	[7](48,798)	[7]13,828
Productivity	(2)	(2)	[8].61	[8].57
Inventories[9]	(2)	(2)	186,613	214,247

[1] Thousands of pounds.
[2] Not available.
[3] Annual aggregate, all species and product forms, domestic production; raw tuna, dollars per short ton; canned tuna, dollars per pound.
[4] Thousands of dollars.
[5] Percent.
[6] Average per vessel for fleet.
[7] Aggregate for industry.
[8] Hours per standard case.
[9] As of Dec. 31; raw tuna in thousands of short tons; canned tuna in thousands of pounds.
Source: Compiled from data contained in various statistical tables throughout this report.

Mexico claimed that the U.S. trade restriction violates U.S. GATT obligations. A GATT panel preliminarily ruled in Mexico's favor, and the two sides have been attempting to work out a compromise.[7] Subsequently, several secondary embargoes were imposed following court actions brought by the environmental community (figure 1–1). The most recent court decision (January 9, 1992)[8] extended the secondary embargoes to U.S. imports of all yellowfin tuna products from countries that do not certify that they are not importing yellowfin tuna from the countries under the primary embargo (currently Mexico, Venezuela, and Colombia).[9]

In April 1990, U.S. tuna canners, following StarKist's lead, announced a dolphin–safe policy under which they would cease buying tuna harvested in ways that endangered dolphins. Many foreign canners followed suit, and today virtually all canned tuna sold in the United States is dolphin–safe.

Also, in 1991, Congress passed the Dolphin Protection Consumer Information Act,[10] which among other things requires any marketer of canned tuna in the United States to maintain sufficient records to prove any claims it makes about its tuna being dolphin–safe. In addition, the act set June 30, 1992, as a deadline after which no fish (including tuna) may be imported into the United States from countries whose nationals use large–scale driftnets. The countries using the most driftnets include Japan, Korea, and Taiwan; no driftnets are used by U.S. tuna fishermen.

International Fishery Access Agreements

Beginning in the 1970s, most coastal nations extended their fishery conservation zones (FCZs) and exclusive economic zones (EEZs) to 200 nautical miles from shore.[11] These nations have exercised unilateral jurisdiction over most of the fish resources within these zones, including (except for the United States) tuna. Tuna are highly migratory species, and they spend only a portion of each year in the waters of any one coastal nation. Therefore, until 1992, it was the position of the United States that no one nation has either the prevailing economic interest or the ability to exercise unilateral control over particular tuna resources.[12]

[7] The GATT panel decision was criticized by numerous environmental groups both for its finding on the tuna-dolphin issue and for its broader implications for national environmental and health and safety actions. See chapter 3 for more discussion.

[8] *Earth Island Institute v. Mosbacher*, (Civ. action No. C 88 1380, N.D. Cal. 1992), Jan. 9, 1992.

[9] See chapter 3 for more details regarding the primary and secondary embargoes.

[10] P.L. 101-627 (1990) codified at 16 U.S.C. § 1385.

[11] These zones are different from territorial limits, which for most coastal nations (including the United States) remain at 12 nautical miles from shore.

[12] Although there are various other highly migratory fish, such as certain species of billfish and sharks, the United States had excluded only tuna from unilateral jurisdiction.

Figure 1-1
Status of primary and secondary embargoes under the Marine Mammal Protection Act on U.S. imports of yellowfin tuna products during 1991-92

Primary embargo	*Date imposed*	*Date lifted*
Mexico	2/22/91	(1)
Venezuela	3/26/91	(1)
Vanuatu	3/26/91	1/22/92
Colombia	4/27/92	(1)
Secondary embargo	*Date imposed*	*Date lifted*
Canada	1/31/92	(1)
Colombia	1/31/92	(1)
Costa Rica	5/24/91	(1)
Ecuador	1/31/92	2/28/92
France	5/24/91	(1)
Indonesia	1/31/92	6/9/92
Italy	5/24/91	(1)
Japan	5/24/91	(1)
South Korea	1/31/92	5/7/92
Malaysia	1/31/92	(1)
Netherlands Antilles	1/31/92	2/26/92
Panama	5/24/91	4/24/92
Singapore	1/31/92	(1)
Spain	1/31/92	(1)
Taiwan	1/31/92	2/28/92
Thailand	1/31/92	3/10/92
Trinidad and Tobago	1/31/92	4/24/92
United Kingdom	1/31/92	(1)
Venezuela	1/31/92	4/24/92

[1] Still in effect as of July 8, 1992.

Source: U.S. Department of State telegram 223546, July 13, 1992.

Almost all other coastal nations disagree, and most claim unilateral jurisdiction over tuna when those resources are found within their respective EEZs. The United States for many years refused to recognize other nations' unilateral jurisdiction over tuna. This caused political problems when such nations seized U.S. tuna–harvesting vessels within their EEZs. However, in 1991, Congress passed legislation that, effective January 1992, eliminated this special treatment of tuna. Tuna is now included among the fish species that the United States claims management jurisdiction over within its EEZ and that the United States recognizes as properly falling within the 200-mile jurisdiction of other coastal nations.

Almost all tuna resources of commercial importance to U.S. harvesters are found outside the U.S. EEZ, either in other nations' EEZs or in the high seas. Bilateral or multilateral agreements are necessary to allow U.S. tuna harvesters access to tuna as they pass through various EEZs along their migratory routes.

Technological Changes

The most significant technological change affecting the U.S. tuna industry in recent years is the development of the domestic canning of imported tuna loins, the edible portions of meat taken from the sides of the fish. Previously, tuna was canned in a complete process at one location, from accepting delivery of the whole fish to cooking, cutting, and canning the meat. Improvements in processing, packaging, and transporting the loins have made it possible for firms to carry out the highly labor–intensive process of cutting the loins from the whole fish at one location (such as a foreign site with low labor costs) and then to ship the loins to the United States, where the remainder of the canning process is carried out with modern, capital–intensive technology.

Other important technological changes affecting the U.S. tuna industry include the development of harvesting techniques to reduce or eliminate dolphin injury and mortality, innovations in vessel and gear designs, and innovations in the tuna canning process.

Organization and Approach of This Report

Chapter 2 provides an updated profile of the U.S. tuna industry and market. The chapter focuses on the harvesting and processing sectors and presents information on production, imports, exports, and prices for each sector. It also examines the structure, capacity, employment, and financial experience of each sector. Chapter 3 discusses the background of the dolphin–safe issue, including significant events and government actions. It also provides a qualitative analysis of the impact of the various dolphin–safe policies on the U.S. industry and market. Since the policies of the companies have been in place just slightly more than 2 years, and given that adjustments and other policy changes are still taking place, a quantitative analysis with a high degree of reliability was not feasible. Chapter 4 describes fishery access issues and agreements that affect the U.S. tuna fleet. Chapter 5 addresses technological changes in both the harvesting and processing sectors of the industry. It includes developments intended to reduce both dolphin injury and mortality. The chapter also qualitatively assesses the effects of the growing utilization of imported loins by U.S. canneries.

CHAPTER 2
U.S. INDUSTRY AND MARKET HIGHLIGHTS, 1990-91

The U.S. tuna industry and market experienced a series of dramatic events during 1990-91. This chapter profiles the U.S. industry and market and focuses on changes that have occurred since the previous Commission tuna study.[1] The first section profiles the current U.S. industry, including both the harvesting and processing sectors, and discusses the structure and the performance of these sectors. The second section provides a similar profile of the U.S. market for raw and canned tuna and covers levels and trends in apparent consumption, prices, and trade.

The U.S. Industry

The U.S. Harvesting Sector

In 1990, the dolphin-safe policy initiated by U.S. tuna canners effectively curtailed most U.S. harvesting activity in the lucrative Eastern Tropical Pacific, and the change in the 200-mile-limit recognition for tuna effectively eliminated U.S. Government protection of U.S. tuna vessels from seizures by foreign Governments under certain conditions. These developments had a substantial impact on the structure and performance of the U.S. tuna fleet during the period under review.

Structure of the U.S. harvesting sector

Number and location of producers

The number of U.S.-flag tuna purse seiners fell to 57 as of January 1, 1992, down from 63 as of January 1, 1990 (table D-1). This decline occurred as vessels were sold, mainly as a result of the dolphin-safe policy that forced the U.S. tuna fleet to abandon the ETP (table D-2). Since January 1990, 13 tuna vessels were sold to foreign fleets, 3 were operated by firms that went bankrupt, and 2 sank. During the same period, 5 vessels have been added to the fleet. There was a marked shift in the location of the U.S. tuna purse seine fleet during 1990-91 from the ETP to the Western Tropical Pacific (table D-3). Industry sources report that about six U.S. vessels currently remain in the ETP.[2] Of these, approximately two vessels fish on "school fish" (small yellowfin) or skipjack, which are not caught in association with dolphin. Approximately four vessels are reportedly continuing to set on dolphin and export their catch, mainly to Italy.

Approximately 60 U.S. trollers make up the distant water albacore fleet and account for virtually the entire U.S. catch of albacore. These vessels trolled primarily in the Northern Pacific until depletion of the albacore stock there forced much of the U.S. fleet to the South Pacific. Industry sources contend that albacore stocks were depleted through overfishing by the high-seas drift gill net fisheries, as well as through large catches of albacore by both the U.S. troll fleet and the Japanese pole and line fleet.[3]

Employment and wages

Precise data are not available on employment in the U.S. tuna harvesting sector. However, based on Commission questionnaire responses, the average crew size for the U.S. purse seine fleet was about 18 or 19 during 1990-91. Given a fleet size of about 56 vessels in 1991, employment was approximately 1,000 people that year. Data for the albacore fleet are not available.

The average annual wage for a fisherman on three U.S. flag seiners represented by the Fishermen's Union of America (FUA) for 1989 was $39,691. According to the Seafarers International Union of North America, the amount of money received as a share on a certain FUA-contracted vessel fishing in the ETP was $35,723 for 7 months at sea in 1988; $46,200 per share for 8 months at sea in 1989; and $21,718 per share for 4.2 months at sea in 1990.[4]

Capacity and capacity utilization

The carrying capacity of the fleet totaled 68,890 short tons as of January 1, 1992, 5 percent lower than the capacity of January 1, 1990, as shown in table D-1. The decline in capacity resulted primarily from the sales of vessels to foreign fleets and sinkings. Estimated capacity utilization for 1990-91 was 77 percent of fleet capacity (table D-4).

Harvesting sector performance

Production

Production of raw tuna is measured in a number of ways; each measure contributes important information on the tuna harvest. By all of these measures, U.S. production of raw tuna during 1990-91 was less than during earlier years.

U.S. landings by species and distance from U.S. shores

U.S. tuna landings[5] declined in 1990, but rose slightly in 1991, to 520 million pounds (figure 2-1 and

[1] The data referred to in this section generally are taken from the statistical tables in appendix D. Most of these tables were included in the previous Commission tuna report and generally present data for the period covered by the last report as well as updated data for the period 1990-91.

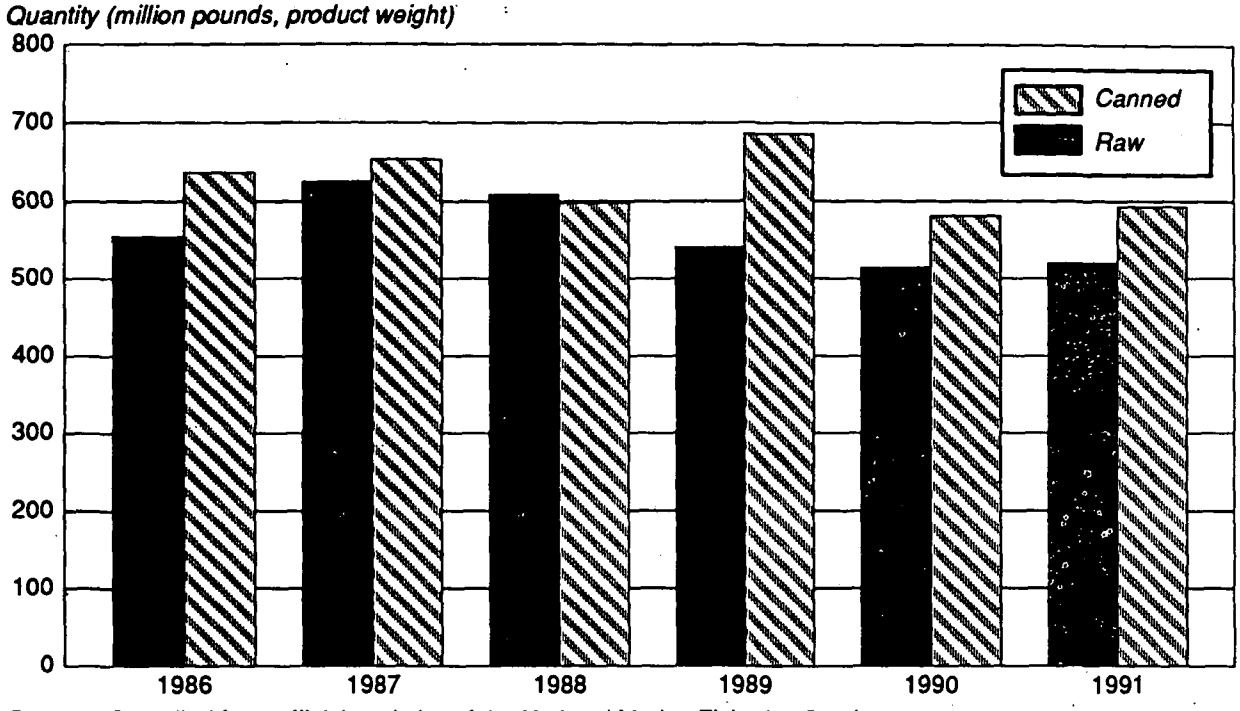
[2] As of June 1992.

[3] William Perkins, President, Western Fishboat Owners Association, transcript of the hearing, San Pedro, CA, Feb. 4, 1992, pp. 162-183.

[4] United Industrial Workers and the Fishermen's Union of America, affiliated with the Seafarers Union of North America, posthearing submission, Apr. 15, 1992, pp. 8-15.

[5] Landings are the quantities (live-weight basis) brought ashore and sold.

Figure 2-1
Tuna: U.S. landings of raw tuna and U.S. production of canned tuna, 1986-91



Source: Compiled from official statistics of the National Marine Fisheries Service.

table D-5). The value of such landings totaled $274 million in 1991, down by 12 percent from 1990. The general decline in the value of U.S. landings reflects the increase in skipjack landings (which command a lower price than yellowfin) and the decrease in yellowfin landings. In 1991 skipjack and yellowfin accounted for 75 and 20 percent, respectively, of the total U.S. tuna catch. The remaining tuna catch consisted primarily of albacore (3 percent) and bigeye (1 percent). Nearly all of U.S.-landed tuna is harvested in international waters[6] (average of 94 percent of the landings during 1986-91).

U.S. commercial landings in U.S. ports

The following tabulation shows U.S. commercial tuna landings, by ports, for 1986-91 as reported by the National Marine Fisheries Service (NMFS) (in short tons, round weight):

Year	Atlantic, Gulf, and Pacific Coast States and Hawaii	Puerto Rico and American Samoa	Total
1986	43,906	234,517	278,423
1987	50,029	263,093	313,122
1988	55,675	248,988	304,662
1989	44,707	226,025	270,732
1990	31,197	225,705	256,902
1991	17,848	242,084	259,932

[6] Outside of national 200-mile-limit boundary claims.

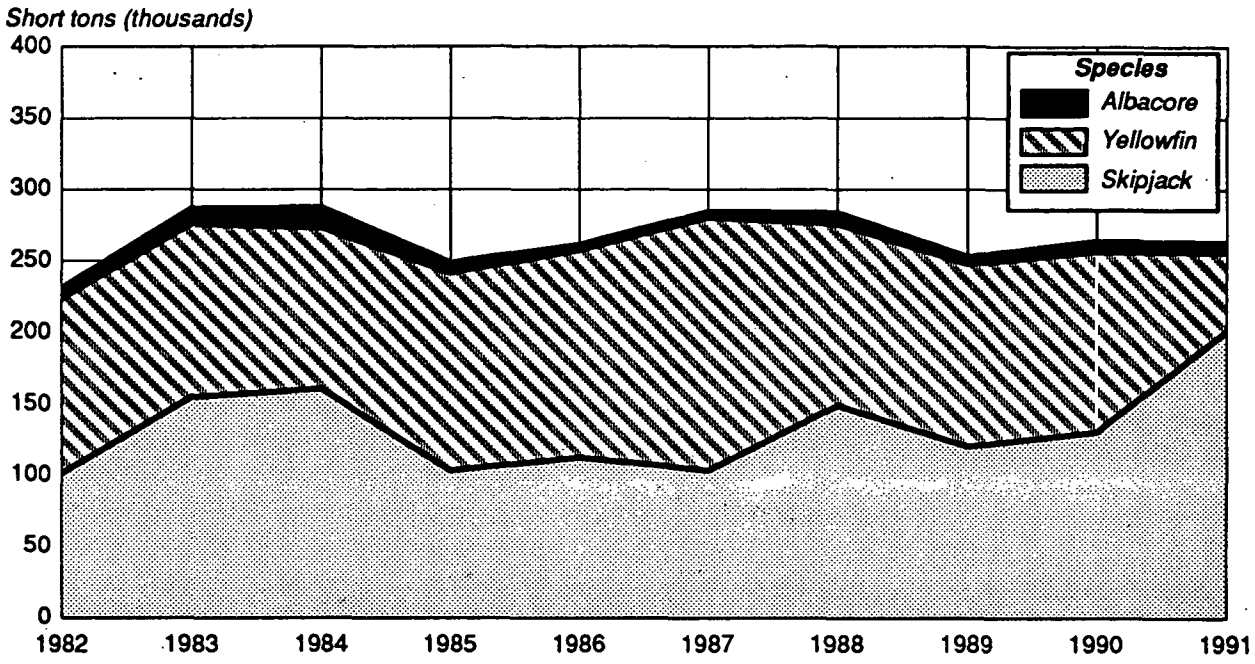
In 1991 U.S. tuna landings totaled 259,932 tons, down 4 percent from 1989. Puerto Rico and American Samoa accounted for 93 percent of total U.S. commercial tuna landings in 1991. Landings in Puerto Rico and American Samoa rose by 7 percent from 1989. However, landings in the continental United States declined by 60 percent, a reflection of Pan Pacific's production cutbacks of canned tuna owing to the dolphin-safe policy (see chapter 3). In addition, the current embargo on Mexico (see chapter 3) resulted in U.S. baitboat owners' losing their licensing agreement with Mexico, thus forcing many U.S. baitboats that land their catch in California out of the tuna fishery. Also, the decline of albacore stocks in the Northern Pacific contributed to the shift of the U.S. albacore fleet to the South Pacific and consequently to increased landings of tuna in locations other than the continental United States (e.g., American Samoa).

U.S. cannery receipts

During 1990-91, the share of cannery receipts accounted for by domestically landed skipjack continued to increase, whereas the share of receipts of domestically landed yellowfin continued to decrease (table D-6 and figures 2-2 through 2-5).[7] The catch in the Western Pacific (primarily skipjack) increased during the period while the catch in the Eastern Pacific (primarily yellowfin) declined. Only a small

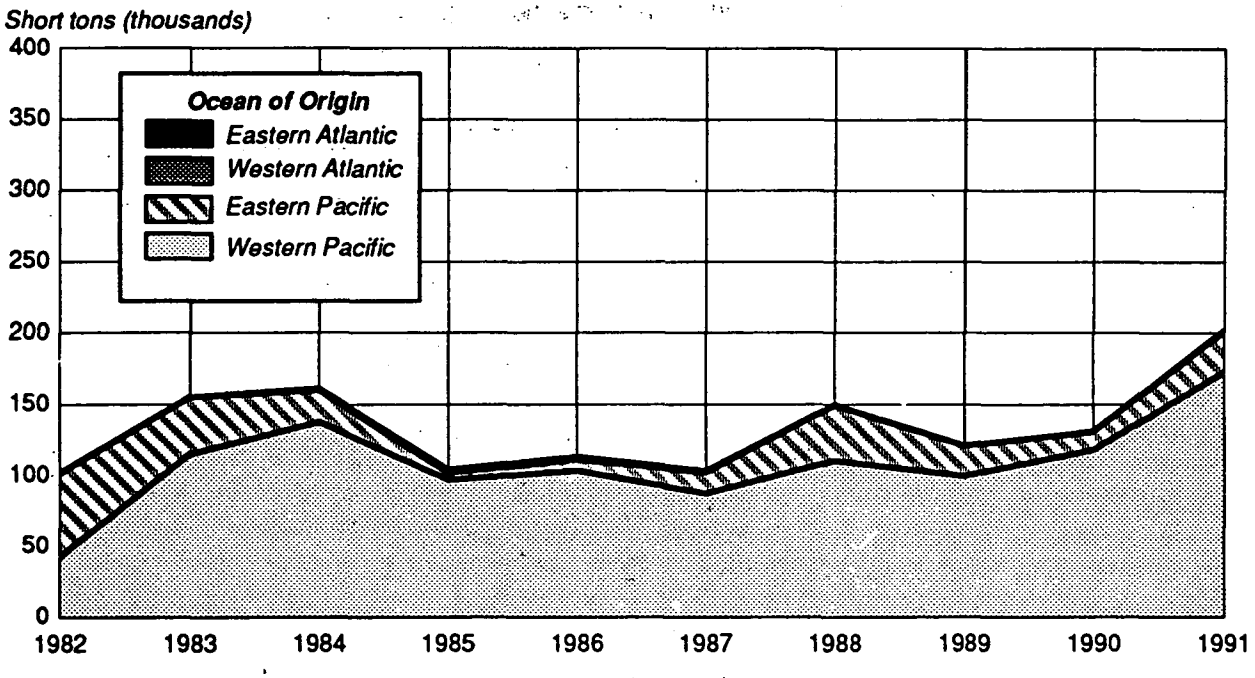
[7] The data also include tuna that was exported by the U.S. fleet. Such exports are discussed later in this chapter in the section on trade.

Figure 2-2
Raw tuna: U.S. cannery receipts of domestic-caught tuna, by species, 1982-91



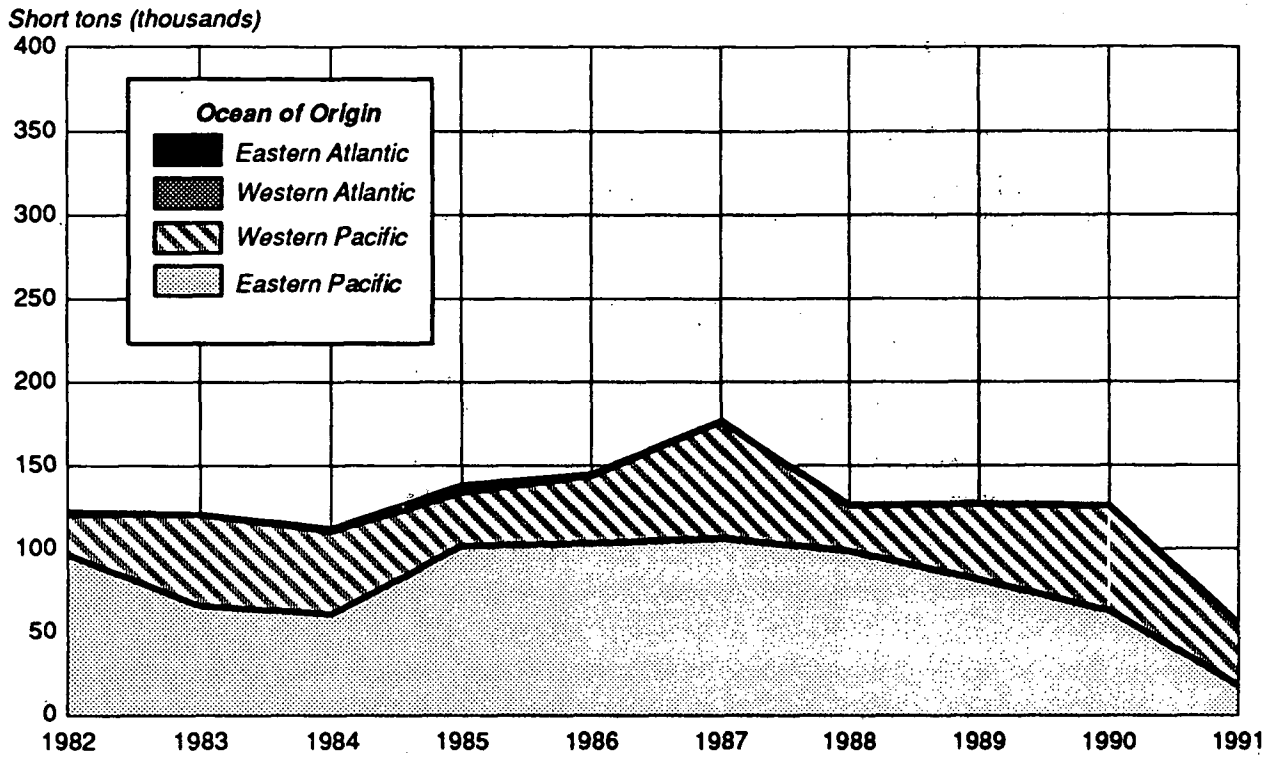
Source: National Marine Fisheries Service, Southwest Region.

Figure 2-3
Raw skipjack tuna: U.S. tuna cannery receipts of domestic-caught tuna, by ocean of origin, 1982-91



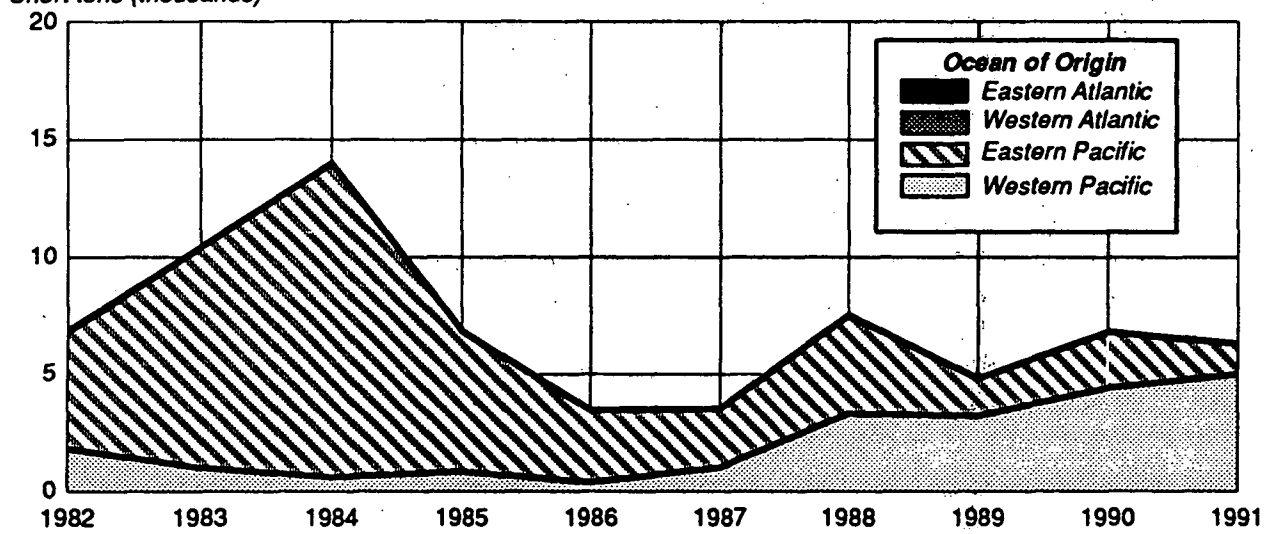
Source: National Marine Fisheries Service, Southwest Region.

Figure 2-4
Raw yellowfin tuna: U.S. tuna cannery receipts of domestic-caught tuna, by ocean of origin, 1982-91



Source: National Marine Fisheries Service, Southwest Region.

Figure 2-5
Raw albacore tuna: U.S. tuna cannery receipts of domestic-caught tuna, by ocean of origin, 1982-91



Source: National Marine Fisheries Service, Southwest Region.

share of the catch was accounted for by the Western Atlantic area.

Financial experience of the U.S. purse seine fleet

Usable profit-and-loss data for 1990 were received from 27 tuna purse seine vessels, accounting for approximately 43 percent of the total number of U.S. vessels and 29 percent of the value of the catch in that year, and from 25 vessels, accounting for about 45 percent of the vessels and 29 percent of the catch in 1991. In general, the fleet experienced a decline in average net sales of tuna per vessel and a decline in average vessel net income during 1990-91 (table D-7). After considering depreciation and amortization expense, an average vessel suffered losses throughout the period. The loss margin before taxes and other income or expense averaged 8.9 percent of net sales in 1990 and 15.1 percent of net sales in 1991.

The profit and loss experience of U.S. tuna purse seiners varied substantially by location of the vessels during 1990-91 (table D-8). In general, net sales of tuna and total expenses were significantly greater for vessels fishing mainly in the WTP. However, net losses were also much greater for WTP vessels. Costs for the average vessel in the WTP were significantly greater for almost every item.

The cost structure of the U.S. tuna purse seine fleet remained relatively stable during 1990-91 (table D-9). However, the cost structure differed according to the location during the period (table D-10). In general, repairs, interest, and transshipment fees accounted for a significantly higher share while insurance accounted for a smaller share of the total cost for WTP vessels.

A comparison of data for 1984-85, 1986-89, and 1990-91 from Commission questionnaire responses reveals that average capital expenditures per vessel during 1990-91 more than doubled from the 1986-89 study and tripled from the 1984-85 study (table D-11). Vessels that transferred to the WTP required major modifications (see chapter 5), adding debt and contributing to the increase in capital expenditures. Other major expenditures included mortgages, drydocking, and repair fees. The average age of the fleet for respondents increased from 11.9 years per vessel during 1984-85 to 15.6 years during 1986-89 and to 17.5 years during 1990-91.

The U.S. Processing Sector

The operating environment of the U.S. tuna processing sector changed radically during 1990-91. The following issues most prominently affected the U.S. canned tuna industry during this period:

1. The dolphin-safe policy;
2. The change in the 200-mile limit recognition for tuna;
3. The rise in the use of tuna loins;
4. Plant rationalizations and employment cutbacks;
5. Primary embargoes against Mexico, Venezuela, Vanuatu, and Colombia, and secondary embargoes against numerous other countries;
6. Sluggish U.S. demand for canned tuna; and
7. Adverse publicity regarding seafood quality in general and canned tuna in particular.

This section of the report profiles the U.S. tuna processing sector during 1990-91 and uses data obtained primarily from Commission questionnaires.

Structure of the U.S. processing sector

Since the Commission's last report, the U.S. tuna processing sector underwent further restructuring. However, the nature and extent of industry restructuring during 1990-91 was more subtle and less comprehensive than in the previous several years. In general, the restructuring activities capped longer term trends that were initiated by earlier events, such as changes in ownership and responses to competitive pressures.

Number and location of operations

Five firms accounted for the majority of U.S. tuna production during 1990-91. These firms and the location of their processing plants are shown in the following tabulation:

Firm	*U.S. processing plants*
StarKist Foods, Inc. (H.J. Heinz)	Mayaguez, PR Pago Pago, American Samoa Terminal Island, CA (inactive)
Bumble Bee Seafoods, Inc. (Unicord)	Mayaguez, PR Santa Fe Springs, CA
Van Camp Seafood (P.T. Mantrust)	Pago Pago, American Samoa Ponce, PR (inactive)
Caribe Tuna, Inc. (Mitsubishi)	Ponce, PR
Neptune Packing Corp. (Mitsui)	Mayaguez, PR (inactive)
Pan Pacific Fisheries, Inc. (Marifarms, Inc.)	Terminal Island, CA

StarKist, Bumble Bee, and Van Camp are the largest firms and together accounted for approximately 80 percent of domestic production of canned tuna.[8] The number of U.S. tuna canneries declined from 20 in 1980 to 8 in 1985 and remained at 8 throughout

[8] For a brief description of these three firms, see USITC, *Tuna: Competitive Conditions Affecting the U.S. and European Tuna Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990, pp. 2-13, 2-15 to 2-17.

1985-89 (table D-12). During 1990, Bumble Bee opened a tuna loin canning facility in California,[9] and two U.S. processing facilities in Puerto Rico closed during that year, leaving seven U.S. tuna canneries. The Van Camp plant in Ponce closed in June 1990, and Neptune Packing Corp. (a subsidiary of Mitsui, U.S.A.) closed its plant in Mayaguez in August 1990.

Employment and wages

The average employment for production and related workers producing canned tuna dropped by 12 percent from 1989 to 1991 (table D-13 and figure 2-6). Employment effects varied significantly by location, as employment in American Samoa and California remained relatively constant during 1990-91 but employment in Puerto Rico declined substantially.

Employment in the tuna processing industry in American Samoa totaled 4,137 production workers as of November 1991.[10] After declining during 1985-89 as U.S. processors shifted production offshore, employment in California (currently about 800) increased during 1990-91 with the opening of the Bumble Bee loin-canning plant.

Employment in Puerto Rico declined substantially during 1990-91, as U.S. processors ceased production (Van Camp in 1990 and Neptune in 1991) or shifted a significant share of their production to loin processing, which requires less labor than full-scale canning (StarKist, Bumble Bee, and Caribe). According to the Government Development Bank for Puerto Rico, 7,652 workers were employed in the tuna processing industry in 1989. This number declined to 5,400 by the end of 1991.[11]

Sources of raw material used by the processing sector

Recent events in the tuna industry have led to a significant shift in the sourcing of raw material inputs by the U.S. tuna processing sector. First, the dolphin-safe policy and the primary and secondary embargoes contributed to a shift in sourcing with respect to suppliers and species. For example, the share of raw tuna from domestic sources rose from 46 percent in 1989 to 54 percent in 1990 before declining to 47 percent in 1991 (tables D-14 through D-16 and figure 2-7). Second, the development of loining technology shifted, to some degree, the input source from raw, whole tuna to cooked loins. The following tabulation shows the share of U.S. tuna processors' raw material input accounted for by whole tuna and tuna loins during 1989-91 (calculated from data from the National Marine Fisheries Service and the U.S. Bureau of Census, converted to whole fish basis, in percent):[12]

Input	*1989*	*1990*	*1991*
Whole	98	84	82
Loins	2	16	18
Total	100	100	100

The largest gain in input share accounted for by loins occurred in 1990 after Bumble Bee opened its loin processing tuna cannery in California (as mentioned above). This share likely will moderate in 1992, as Bumble Bee cuts back production and as imports begin to level off.[13]

Raw tuna

The dolphin-safe policy of U.S. canners and the recent primary and secondary embargoes on tuna imports from certain countries[14] have drastically reduced tuna from the ETP as a source for U.S. processors. In general, U.S. processors are using more skipjack tuna, mainly from increasing U.S. vessel catches in the WTP, and are importing raw tuna from a wider variety of sources, with increases most evident in imports from Ghana and Ecuador (where U.S. processors have developed ownership and other investment links). Also, there was an increase in nontraditional import sources such as Spain and France; however, the secondary embargo eliminated these sources by the end of 1991. The bulk of the shift occurred in order to supply U.S. canneries in Puerto Rico, the location most affected by the dolphin-safe policy and the embargoes.

Loins

U.S. processors' purchases of tuna loins during 1990-91 increased from 17 million pounds to 171 million pounds (table D-17). Skipjack accounted for the bulk of loin purchases, accounting for about 70 percent of the total quantity each year. Albacore loins, which were not purchased in 1990, accounted for 13 percent of total purchases in 1991. Virtually all of the supply of loins is imported.

Processing sector performance

Production

In 1990 U.S. canned tuna production (as reported by the National Marine Fisheries Service) totaled 581 million pounds, valued at $902.0 million, down 15 percent in both quantity and value terms from 1989 (table D-18 and figure 2-1). In 1991 production rebounded to 593 million pounds; however, the value of production declined further, to $877 million. Lightmeat tuna, primarily chunk form, accounted for

[9] However, Bumble Bee eliminated one shift at the loin cannery in February 1992, citing cost factors.

[10] Unpublished data from the U.S. Department of Labor, Employment and Standards Administration.

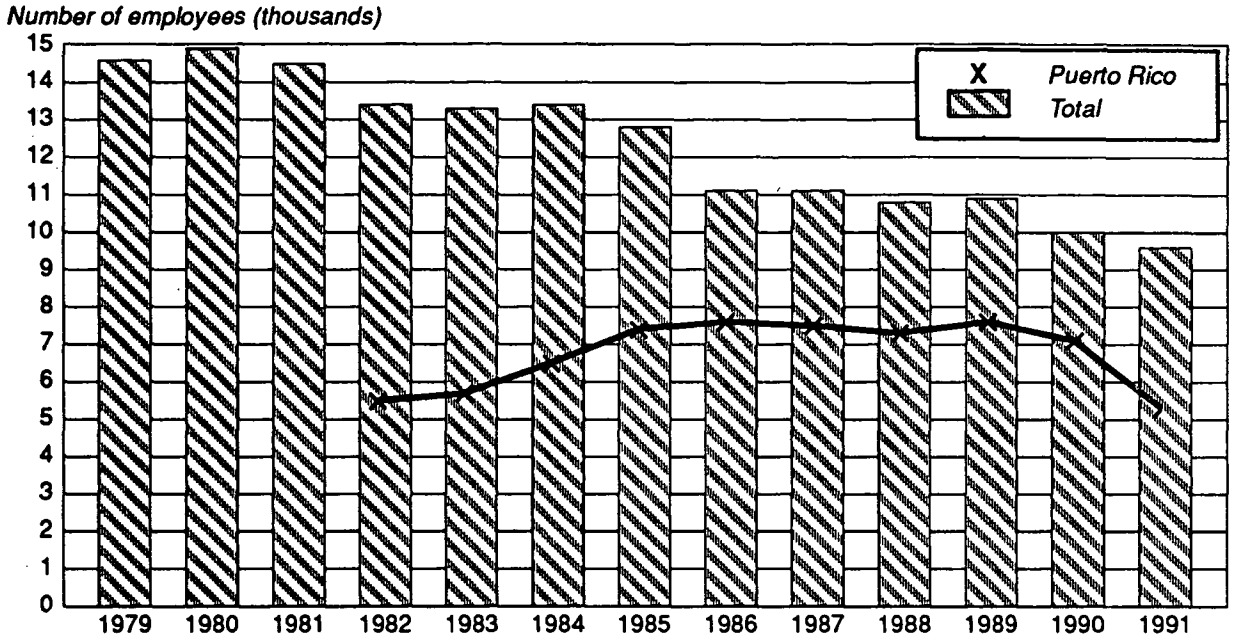
[11] Government Development Bank for Puerto Rico, prehearing submission, Nov. 8, 1991, table 1.

[12] Tuna loins converted to whole tuna using a factor of 2.5.

[13] Imports are discussed in greater detail in the section on the U.S. market further in the report.

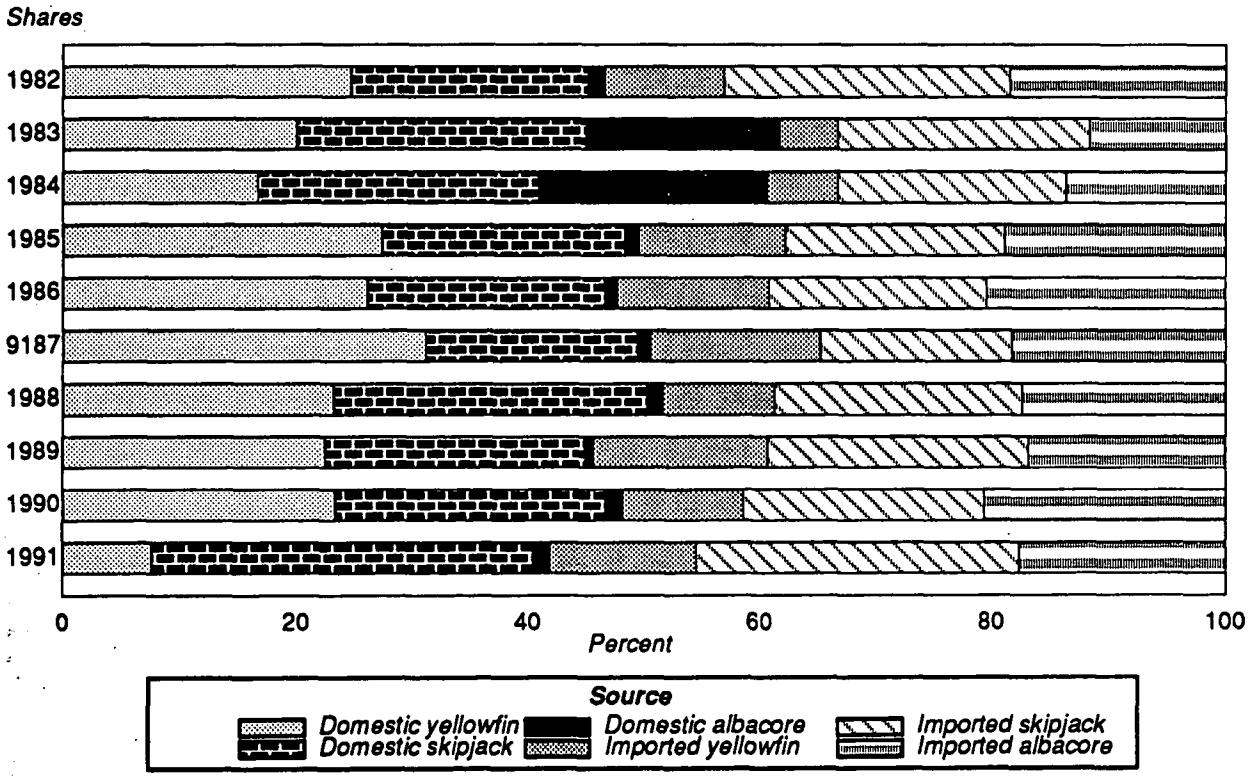
[14] The primary embargo currently affects imports from Mexico, Venezuela, and Colombia. The secondary embargo involves numerous intermediary countries.

Figure 2-6
Canned tuna: U.S. employment, 1979-91



Source: Total compiled from data submitted in response to questionnaires of the U.S. International Trade Commission; Puerto Rico compiled from data submitted by the Government Development Bank for Puerto Rico.

Figure 2-7
Raw tuna: U.S. tuna cannery receipts, by species and by source, 1982-91



Source: National Marine Fisheries Services, Southwest Region.

77 and 79 percent of U.S. canned tuna production during 1990 and 1991, respectively.

According to data obtained from Commission questionnaires, water-packed tuna accounted for 76 percent of the total packed tuna in 1991 (table D-19) compared to 67 percent in 1986. Oil-packed tuna accounted for the remaining 24 percent of production in 1991.

Shipments

Total shipments of canned tuna by U.S. processors declined by 10 percent in 1990 from the previous year and declined by 3 percent in 1991 (table D-20). Shipments declined for every type of pack except whitemeat packed in water.

Shipments by market segment remained relatively constant during 1990-91, with a slight decline in U.S. shipments (including imports) of advertised brands in retail-size containers (table D-21). However, shipments of canned tuna by U.S. processors generally lost market share to shipments by importers during 1990-91 (tables D-22 and D-23).

Inventories

Year end inventories of canned tuna held by U.S. processors were relatively constant during 1990-91 after falling from an unusually high level in 1989 (table D-24). However, importers' inventories increased by 58 percent from the end of 1990 to the end of 1991 (table D-25). This increase resulted mainly from generally increased import levels in 1991, a sluggish U.S. market, and uncertainty regarding U.S. embargoes against various countries with respect to yellowfin tuna products. Two major U.S. tuna companies procure a substantial amount of their supplies from Thailand and Indonesia, countries that were subject to an intermediate embargo in early 1992.[15] It is believed that importers, including these U.S. firms, increased imports during late 1991 and early 1992 as a hedge against the possibility of the embargo.

Capacity and capacity utilization

After rising during 1986-89, U.S. canned tuna production capacity declined in both 1990 and 1991 to a level of 40.7 million standard cases,[16] or 794 million pounds (table D-26). The decline in capacity resulted from the closure of two plants in Puerto Rico and the scaling back of production in other plants in Puerto Rico and California. Capacity utilization fell from about 77 percent in 1989 to 68 percent in 1990 before recovering to 79 percent in 1991.

[15] Thailand and Indonesia have been removed from the embargo list.

[16] A standard case comprises 48 cans, each with a net weight of 6.5 ounces of tuna, with a total net weight of 19.5 pounds.

Productivity

The following tabulation shows productivity during 1986-91 (calculated based on data submitted in response to questionnaires of the U.S. International Trade Commission, in hours per standard case):

1986	*1987*	*1988*	*1989*	*1990*	*1991*
.65	.61	.66	.61	.61	.57

The number of labor hours required to produce a case of canned tuna declined by 7 percent in 1991. This improvement resulted mainly from technology adopted by the industry, including the use of automated fish weighing and sorting devices, improvements in cooking and cooling technology, and the use of tuna loins. In addition, processors are increasing the yield from raw tuna by using more of the fish.[17]

Financial experience of U.S. tuna processors

This section of the report provides information on the financial experience of U.S. tuna processors for fiscal years 1990 and 1991.[18] Six companies accounted for virtually all U.S. production of canned tuna during the period. All six companies produced tuna for human consumption while four produced tuna for tuna-based pet food.[19]

As indicated by a comparison of tables D-27 through D-30, sales of canned tuna for human consumption and for tuna-based pet food accounted for virtually all of sales revenue of the establishments within which tuna was produced during 1990 and 1991. During the period, sales of tuna for human consumption and tuna-based pet food accounted for about 95 percent and 3 percent, respectively, of establishment revenue. The remainder was accounted for mainly by fish meal and oil.

Overall establishment operations

Although net sales increased minimally in the aggregate from 1990 to 1991 (table D-27), results for the individual companies were quite mixed, as increases in net sales by three of the producers more than offset decreased sales by the other three. The modest increase in overall net sales coupled with a modest decrease in cost of goods sold resulted in an increase in gross profits of about $25 million, or 15.6 percent. Cost of goods sold decreased from 1990 to 1991 principally because of a one-time restructuring charge in 1990 by one producer, which temporarily increased costs in that year.

[17] For example, processors have increased the proportion of tuna flakes in their packs in recent years.

[18] Since only one of the six companies has a fiscal year ending December 31, data was aggregated on a fiscal year basis. Portions of this analysis include data from previous years.

[19] Tuna-based pet food is produced from the portion of raw tuna not used for canned tuna for human consumption.

Since selling, general, and administrative (SG&A) expenses[20] remained largely unchanged, most of the increase in gross profits flowed through to operating income. This in turn halted a four-year slide in operating profits, which had decreased from about $114.6 million in 1986 to $45.3 million in 1990. Net income, which had been decreasing since 1986, improved by an even greater margin in 1991. The $62.6 million increase, from a $48.8 million net loss in 1990 to a $13.8 million net income in 1991, was attributable to increases in operating income and decreases in interest and other expenses. The decrease in interest expenses was mostly the result of producers' disposal of some operations and assets (and the attendant debt), and debt restructuring. Depreciation expense also decreased somewhat during 1990 and then again in 1991 as a direct result of this restructuring and partial and full shut-down of operations.

Income from the production of canned tuna for human consumption

This segment accounts for the vast majority of overall establishment net sales, and, recently, an even larger proportion of operating and net profits. Thus, the financial trends for this segment are virtually the same as those discussed above for overall establishment operations (table D-28).

Unlike the trend for overall establishment operations, increased net sales by three producers for this segment of their operations were more than offset by slightly larger decreases by the other three producers. Net sales have been decreasing, albeit minimally, every year since 1988. Mitigating this trend, cost of goods sold decreased faster than sales from 1990 to 1991, resulting in increased gross profits. As with overall operations, three of the six producers had net losses in 1991, down from five in 1989 and 1990.

Income from the production of tuna-based pet food

The pet food segment of U.S. tuna processors' operations generally have been unprofitable for several years (table D-29). Sales of this product are only about three percent of overall establishment sales, down from about 10 percent in the mid 1980's. Before a 10 percent increase in 1991, sales decreased steadily every year from 1984 to 1990. This decrease, coupled with restructuring efforts on the part of the producers, has led to increasingly diminished profits for this segment. Operating and net incomes, for example, have been steadily decreasing since 1986, and there have been operating and net losses in each of the last three years. In addition, there have been losses at the gross profit level in each of the last two years. An increasingly competitive U.S. market for pet food, particularly with respect to imports, was the primary cause of the erosion of profits in this sector. The trend toward increased use of precooked tuna loins by U.S. processors likely will lead to their decreased output of tuna-based pet food, as there is no byproduct to process from loins.

Cost structure of U.S. tuna processors

Raw tuna is the single largest cost for U.S. tuna processors, accounting for 72.3 percent of the total cost in 1991 (table D-30). Other raw materials (consisting of cans, labels, and packaging material) represented about 12 percent of the total in 1990 and 1991, down from about 16 percent the previous year, while the share of total costs attributable to direct labor continued to decline. The increased use of pre-cooked loins is at least partly responsible for these general trends. Use of loins leads to reduced labor costs, reduced freight and packaging costs, and a relative increase in raw tuna costs.

Capital expenditures

The following tabulation shows capital expenditures by U.S. tuna processors during 1990 and 1991 (data submitted in response to questionnaires of the U.S. International Trade Commission, in thousands of dollars):

Item	*1990*	*1991*
Machinery and equipment	13,690	11,065
Building or leasehold improvements	4,801	2,137
Land or land improvements	0	0
Tuna fishing vessels	0	0
Total	18,491	13,202

Capital expenditures for upgrading production facilities dropped each year during 1990-91 after rising substantially during the prior several years.[21] The previously discussed contraction of industry production capacity during the period led to the decline in capital expenditures.

The U.S. Market

The U.S. tuna market was sluggish during 1990-91, owing to the effects of the recession, pricing practices, and confusion regarding the dolphin-safe issue. Most of these effects were felt in 1990. The market firmed somewhat in 1991.

[20] Although not indicated in table D-27, SG&A expense is the difference between operating and net income.

[21] See U.S. International Trade Commission, *Tuna: Competitive Conditions Affecting the U.S. and European Industries in Domestic and Foreign Markets*, (Investigation No. 332-291), USITC publication 2339, Dec. 1990, p. 2-28.

Apparent Consumption

Raw tuna

U.S. apparent consumption of raw tuna declined in 1990 to 411,550 short tons, which was 23 percent lower than in 1989 (table D-31). Such consumption remained at a relatively low 423,365 short tons in 1991. Contributing to the substantial decline in consumption were reduced purchases by U.S. processors, owing mainly to plant closures, and increased exports, as U.S. vessel owners sought alternative markets. Consumption generally declined for albacore and yellowfin, and consumption of skipjack increased during 1990-91 (tables D-32-D-35).

Canned tuna

U.S. apparent consumption of canned tuna declined by 5 percent in 1990, to 935 million pounds, before rebounding slightly to 947 million pounds in 1991 (table D-36). However, annual consumption levels were higher during these 2 years than during 1986-88. U.S. per capita consumption of canned tuna, which reached a record 3.9 pounds in 1989, returned to earlier levels of 3.6 pounds by 1991.[22] Such consumption has been relatively flat during the past several years.

The shift in U.S. tuna consumption from oil-packed to water-packed continued during 1990-91 (table D-37). The share of apparent consumption held by water-packed increased to 85 percent during the period, up from 74 percent in 1986. However, this trend has leveled off during the past 2 years, indicating a probable core demand for oil-packed canned tuna.

Distribution

There was little change in the distribution of shipments of U.S.-processed canned tuna by market segment[23] during 1990-91 (table D-38). In general there was a slight increase in the share of total shipments held by processors' own (advertised) brands, both for the retail and institutional packs. However, this share remained below that during previous years.

Prices

Frozen tuna

The following tabulation provides the average unit value of albacore, skipjack, and yellowfin tuna delivered by U.S. fishing boats to U.S. processors (data from the National Marine Fisheries Service, in dollars per short ton):

Year	Albacore	Yellowfin	Skipjack
1979	1,286	863	728
1980	1,659	1,180	1,063
1981	1,880	1,170	1,040
1982	1,393	1,123	967
1983	1,268	1,032	791
1984	1,252	982	760
1985	1,080	860	640
1986	1,189	903	723
1987	1,697	865	853
1988	1,883	1,433	1,095
1989	1,914	1,270	912
1990	1,765	982	792
1991	1,530	853	764

After peaking during 1988-89, the average ex-vessel price for all three species fell each year during 1990-91. A general increase in the global tuna catch coupled with a drop in demand for albacore and yellowfin caught using methods harmful to dolphins led to the general drop in prices during the period.

Prices paid to some U.S. fishermen are negotiated by the American Tuna Sales Association (ATSA) and U.S. tuna canners (table D-39 and figure 2-8). The categories most affected by the dolphin-safe policy are yellowfin over 20 pounds[24] and skipjack between 4 and 7.5 pounds.[25] The supply of this category of yellowfin declined, but demand declined even more; thus, the price dropped by 18 percent immediately after the dolphin-safe announcement in April 1990. The supply of skipjack rose, as more vessels moved to the WTP as a result of the dolphin-safe policy. Supply rose more rapidly than demand,[26] and prices generally fell. Negotiated prices generally began to increase in 1992, largely because of the U.S. embargo on imports of yellowfin tuna from several major foreign suppliers.

The price of imported albacore generally trended downward during 1990-91 until the fourth quarter of 1991, when albacore prices rose sharply (table D-40 and figure 2-9). The sharp rise occurred as world albacore supplies declined owing to cyclical resource fluctuations and the effects of the UN ban on large-scale driftnets. The price of domestic albacore, which was lower than the import price during 1990-91, followed the same pattern, although the U.S. fleet does not employ driftnets (table D-41 and figure 2-10). The domestic price for albacore exhibits greater fluctuations than the import price mainly owing to the relatively small share of albacore supplied by the U.S. fleet and the greater variation in annual catch levels compared with the world supply.

The price of imported yellowfin dropped precipitously during the second quarter of 1990 after the U.S. canners announced their dolphin-safe policy. The price then recovered the following quarter but

[22] National Marine Fisheries Service, *Fisheries of the United States, 1991*, Current Fisheries Statistics no. 9100, May 1992, p. 70.

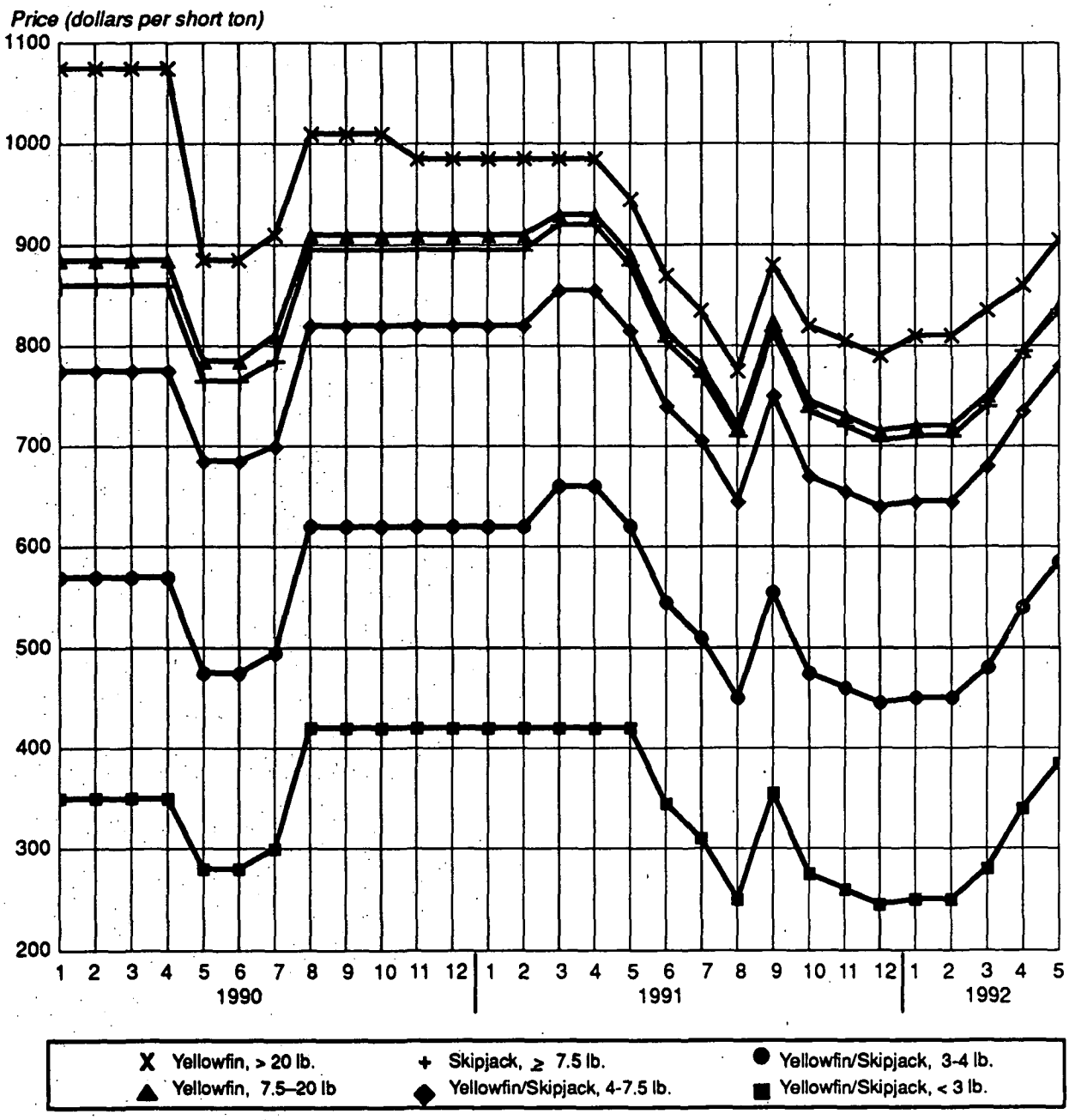
[23] Retail versus institutional pack; advertised brand versus private label pack.

[24] This category is most commonly caught in the ETP in association with dolphins.

[25] This category is most commonly caught in the WTP and has become subject to substantially increased fishing effort since the dolphin-safe policy went into effect.

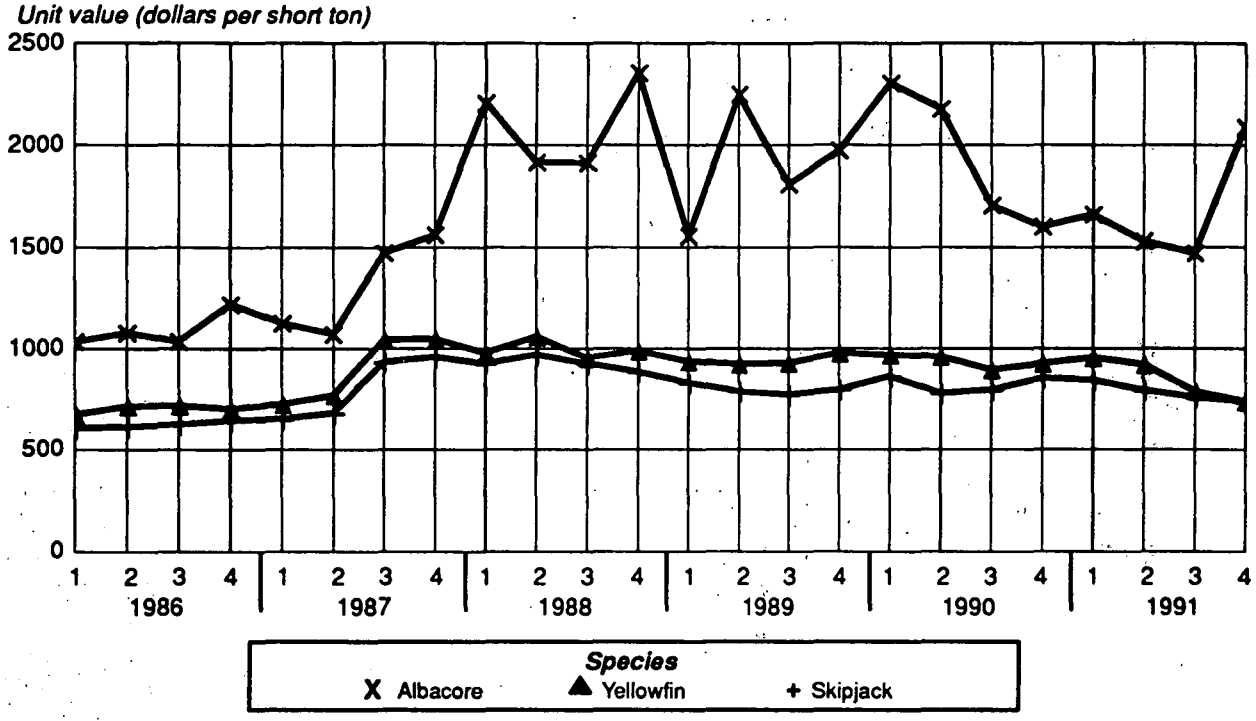
[26] For U.S.-harvested fish. U.S. processors increasingly utilized imported raw tuna during the period.

Figure 2-8
Tuna: U.S. exvessel prices, by species and size, 1990-92



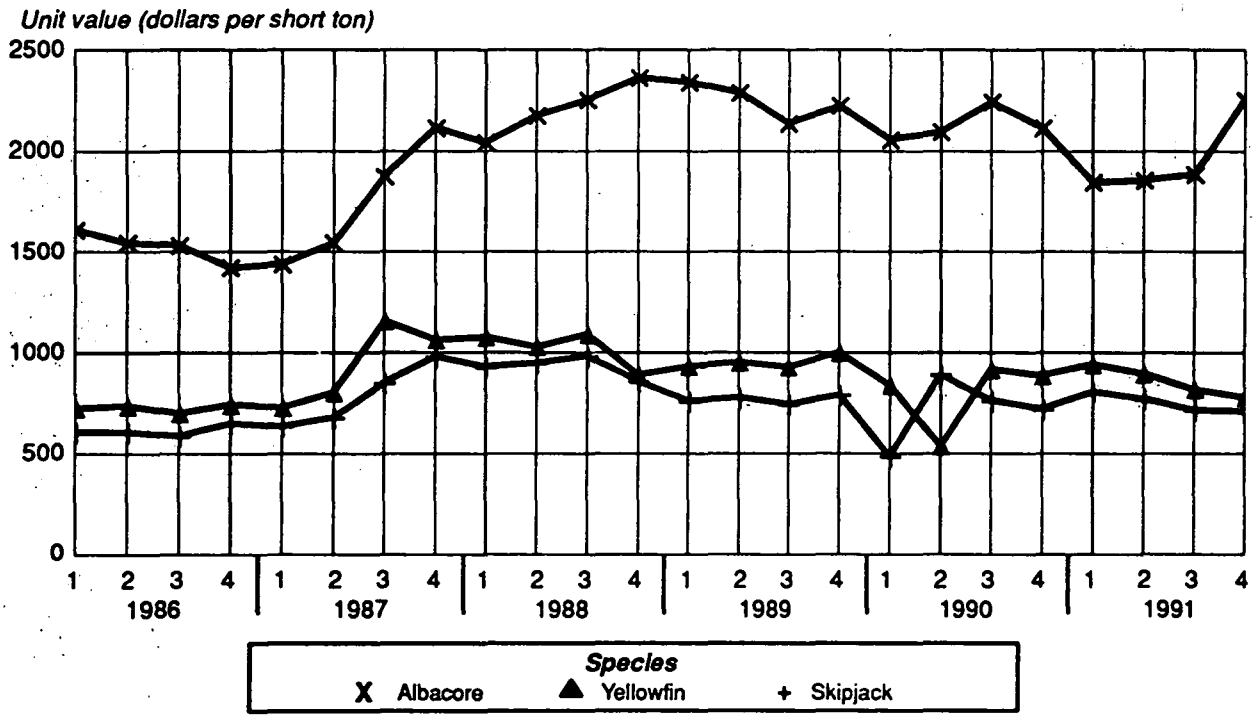
Source: American Tuna Sales Association.

Figure 2-9
Raw tuna: Quarterly unit values of U.S. processors' purchases of domestically-caught raw tuna, by species, 1986-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade.

Figure 2-10
Raw tuna: Quarterly unit values of U.S. processors' purchases of imported raw tuna, by species, 1986-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

generally declined through the end of 1991. The price of domestic yellowfin gradually trended downward during 1990-91 and did not fall sharply during the second quarter of 1990, as did the price of imported yellowfin.

The price of imported skipjack rose substantially during the second quarter of 1990. The price then generally followed the trend set by the yellowfin price during the remainder of 1990-91. The price of domestic skipjack was generally stable during 1990 before declining during 1991, as supplies from the WTP were ample in the latter year.

In general, domestic prices for yellowfin and skipjack fluctuate less than import prices do. This is because U.S. tuna processors purchase imported tropical tuna mostly on the spot market, where prices usually vary with each purchase depending on global supply and demand conditions. In contrast, most domestic tropical tuna is purchased under contract based on ATSA-negotiated prices, which traditionally held firm for relatively longer periods of time. However, the period covered by ATSA prices is becoming shorter (table D-39). Variations in domestic tropical tuna prices likely will widen in the future. Also, an increasing share of domestic tropical tuna is being traded on the world market, largely because of the shift of the U.S. fleet to the WTP region, where unloading delays have been a problem in American Samoa and where alternate markets are more accessible.

Canned tuna

Wholesale prices of retail-size containers of chunk-light tuna packed in water, the most common type in the U.S. market, generally trended downward slightly during 1990-91 (table D-44 and figure 2-11). Prices for imported tuna of this type, both private label and branded, generally were lower than prices for domestic tuna during the period. Prices of solid-white tuna packed in water, the principle albacore pack in the U.S. market, fluctuated considerably during the period and showed no discernable trend. Whitemeat tuna is a higher-priced luxury item than is lightmeat tuna, and demand for the former is believed to be more price inelastic. Thus, it is likely that the greater fluctuations in raw albacore prices discussed above may be more readily passed on to the consumer market for canned albacore.

Wholesale prices of institutional-size containers of canned tuna generally followed the same pattern as prices for retail-size containers discussed above (table D-45 and figure 2-12). However, one notable difference is that prices for chunk-light tuna packed in water were higher for imported tuna than for domestic tuna, particularly beginning in the latter part of 1990. Also, prices for all types of tuna in institutional-size containers were generally more volatile and exhibited more pronounced spreads than those for retail-size containers, particularly during the period immediately following the dolphin-safe announcement by U.S. canners.

Trade

Exports

Raw tuna

U.S. exports of raw tuna increased substantially during 1990-91. After ranging from 54 to 80 million pounds annually during 1986-89, exports escalated to 135 million pounds in 1990 and 163 million pounds in 1991 (table D-31). Most of the increase in 1990 was accounted for by exports of yellowfin, as U.S. harvesters diverted their catch to foreign canners following the announcement of the dolphin-safe policy. Most of the increase in 1991 was accounted for by skipjack, as U.S. fishing activity in the WTP (which targets mainly skipjack) increased, as did efforts by U.S. tuna harvesters to market their catch to alternative markets, such as Thailand and Indonesia. One factor cited by industry members as contributing to increased export efforts is unloading delays at U.S. tuna canneries in American Samoa caused mainly by the shift of several U.S. vessels to the WTP but also by increasing numbers of foreign vessels fishing in the region. Foreign vessels are allowed to directly unload their catch at canneries in American Samoa, which is not within the customs territory of the United States.

Canned tuna

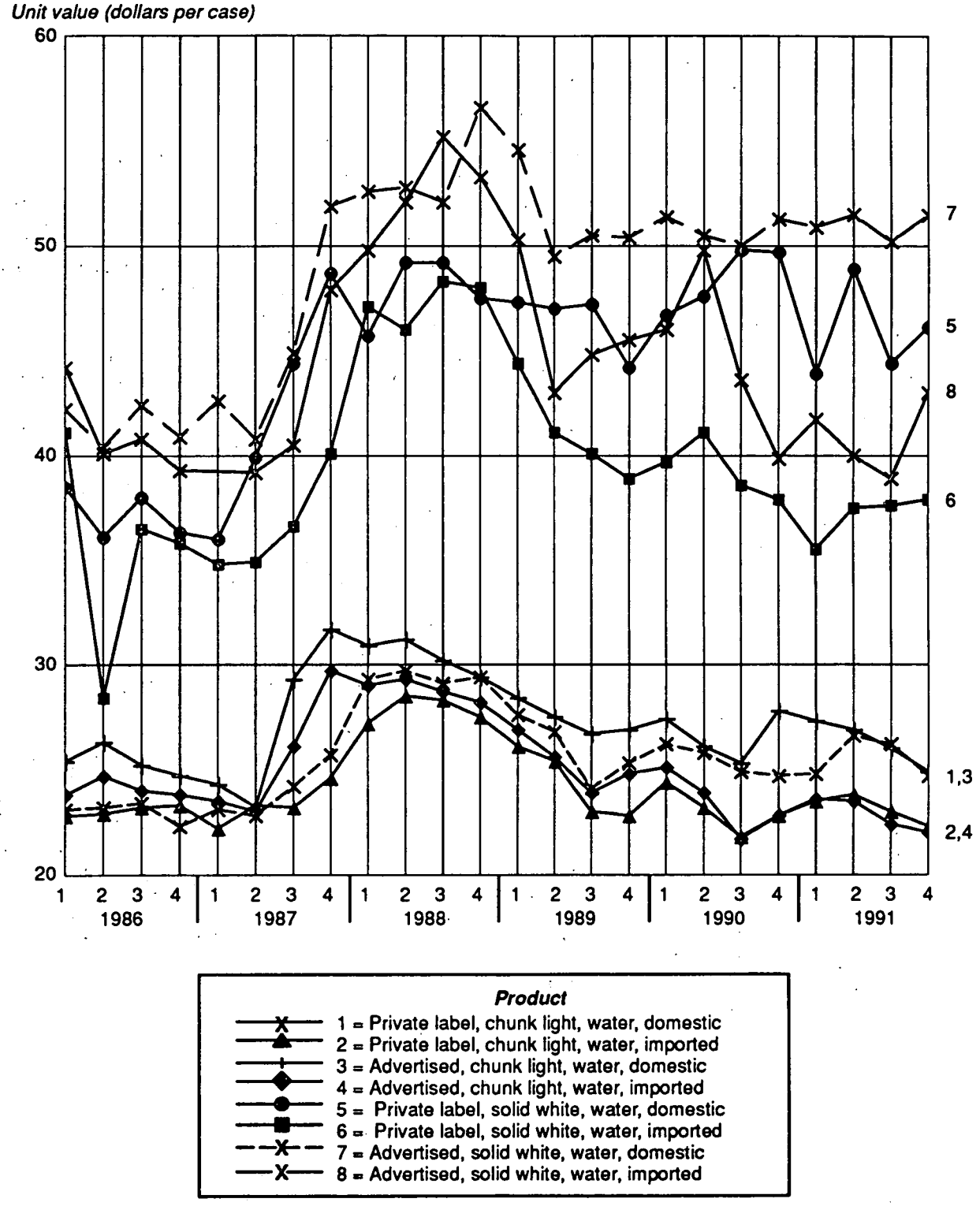
U.S. trade data from the Census Bureau do not separately report exports of canned tuna. However, industry sources indicate that there are virtually no U.S. exports of canned tuna, largely because U.S. tuna processors are not competitive in the major export markets of Japan and the European Community (EC). The potential for U.S. exports of canned tuna is limited by relatively high import duties in those markets, disadvantage with respect to distance, more demanding product specifications, and competition from lower cost producers in Asia and former EC colonies in the African, Caribbean, and Pacific regions (who benefit from preferential tariff treatment by the EC).

Imports

Raw tuna

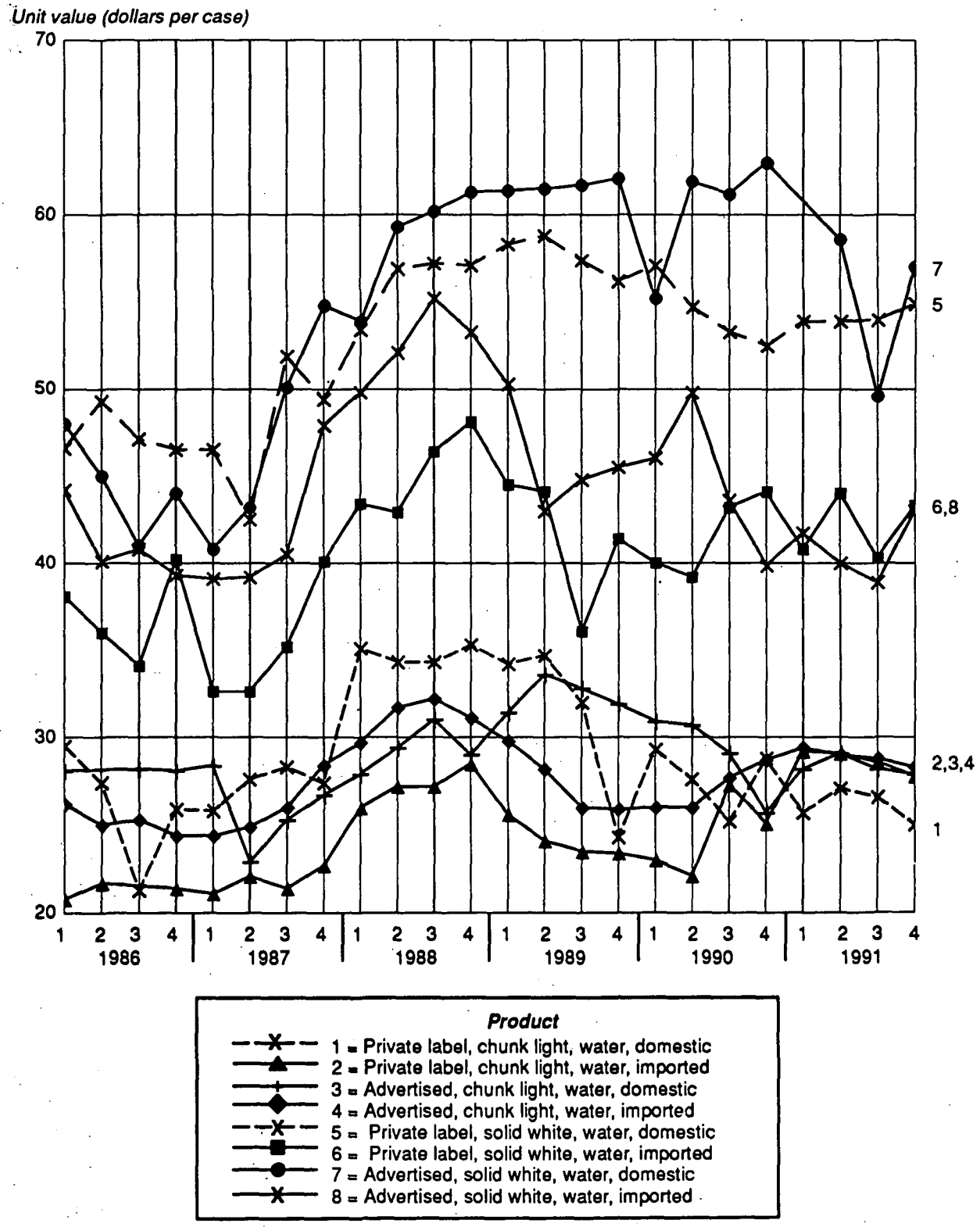
U.S. imports of raw tuna fluctuate annually, depending on a number of factors such as the supply from the U.S. fleet, world supply conditions, and environmental and trade policies such as gear restrictions and embargoes. The decline in albacore imports occurred as global restrictions on drift nets affected supplies, particularly from suppliers whose fleets traditionally used drift nets (mainly Taiwan and Japan). Also, a cyclical decline in world supplies may also have contributed to the falloff in U.S. albacore imports. U.S. imports of raw yellowfin tuna were

Figure 2-11
Canned tuna: Quarterly weighted average prices for retail-size containers, by product, 1st quarter 1986–4th quarter 1991



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 2-12
Canned tuna: Quarterly weighted average prices for institutional-size containers, by product, 1st quarter 1986–4th quarter 1991



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

constrained mainly by the dolphin-safe policy and by an embargo against certain Latin American nations under the Marine Mammal Protection Act.[27]

U.S. imports of raw tuna (fresh, chilled, or frozen) totaled 138,338 metric tons, valued at $207 million, in 1990 (table D-46 and figure 2-13). This level represented a decline of 37 percent in quantity and 30 percent in value from the previous year. Declines were registered both in imports of raw albacore, which fell by 34 percent in quantity (table D-47), and in imports of raw tropical tuna (mainly yellowfin and skipjack), which fell by 38 percent in quantity in 1990 (tables D-48 through D-50). U.S. imports of raw tuna recovered to 147,796 metric tons, valued at $194 million in 1991. This level was well below import levels during several years prior to 1990.

The share of U.S. raw tuna consumption accounted for by imports varies substantially by species. In total, imports accounted for 57 percent of consumption in 1991 (table D-31). This share is highest for albacore, for which imports supplied 92 percent of consumption in 1991 (table D-33). Imports of skipjack accounted for 46 percent of consumption in 1991 (table D-34) whereas imports of yellowfin accounted for 59 percent in that year (table D-35). The share for yellowfin nearly doubled over the previous year's level.

Loins

U.S. imports of tuna loins have increased substantially during recent years. Prior to 1987 such imports were sporadic and negligible. Then, in 1987, U.S. loin imports increased ten-fold over the level during previous years, to 1,194 metric tons, valued at $2.7 million, as U.S. processors began to expand experimental loin processing in Puerto Rico. Such imports then nearly trebled in 1989, to 3,616 metric tons, valued at $6.0 million, primarily the result of U.S. processors' committing to the commercial utilization of loins in Puerto Rican plants (table D-51). In 1990 loin imports increased seven-fold, to 28,317 metric tons, valued at $74.3 million.

The growth in U.S. loin imports stabilized in 1991. Imports may increase in the future, however, as tuna processors continue efforts to improve loin-canning technology and invest in tuna-loining facilities worldwide.[28] There remains substantial capacity in existing plants to allow for the substitution of loins for raw fish, and processors are continuously evaluating their options with respect to processing methods and facilities.[29]

Imports account for virtually all of U.S. loin consumption, and U.S. processors are importing loins from a variety of sources. Imports from these sources were somewhat sporadic during the early to mid-1980s, as U.S. processors experimented with different suppliers, particularly in Latin America. Currently the sources of loin imports are more stable, as most U.S. processors have committed to procuring loins from particular facilities. The main sources of U.S. loin imports are Thailand, Ecuador, Colombia,[30] and Ghana (table D-51). Thailand, by far the largest supplier, provides loins mainly to Bumble Bee and Pan Pacific plants in California. Ecuador supplies loins to each plant in Puerto Rico. Ghana supplies loins to StarKist's plant in Puerto Rico. Prior to an embargo, Colombia supplied loins to plants in Puerto Rico. Data for the first quarter of 1992 show U.S. loin imports increasing from Thailand, Ecuador, and Ghana, and falling from Colombia and Costa Rica (as a result of an embargo).

Canned tuna

U.S. imports of canned tuna reached a record 159,550 metric tons, valued at $359 million, in 1991 (figure 2-14 and table D-52). Imports accounted for 37 percent of U.S. canned tuna consumption in 1991, up from 30 percent in 1990 (table D-36). Imports of canned tuna fell in 1990 following a substantial increase in 1989; the surge in imports in 1989 may have been affected by then recent ownership changes in the industry that resulted in foreign firms purchasing the second and third largest U.S. tuna processors. These foreign owners had been significant exporters of canned tuna to the U.S. market in the past, and their ownership position in the U.S. market likely contributed to increased U.S. imports in 1989. Imports in 1990 totaled 129,090 metric tons, valued at $294 million, down 18 percent in quantity and 22 percent in value from 1989. Thailand, which supplied 70 percent of the total quantity in 1991, and Indonesia, which provided 13 percent that year, remained the major suppliers. However, Indonesia more than doubled its exports in 1991 compared with recent previous years, and first quarter data for 1992 indicate a continued increase in Indonesia's supply of canned tuna to the U.S. market. Industry sources indicate that Indonesian tuna processors are currently facing difficulty obtaining working capital, which may result in a significant decline in their exports to the United States during the remainder of 1992.

U.S. imports of canned tuna are dominated by water-packed tuna, owing mainly to a market preference for water versus oil as a packing medium, as well as to the tariff structure.[31] U.S. imports of water-packed canned tuna mirrored the overall trend (table D-53), whereas U.S. imports of canned tuna in oil generally remained stable in 1990-91 (table D-54). Oil-packed tuna accounted for less than

[27] See the discussion in chapter 3 regarding the dolphin-safe policy and the embargo.

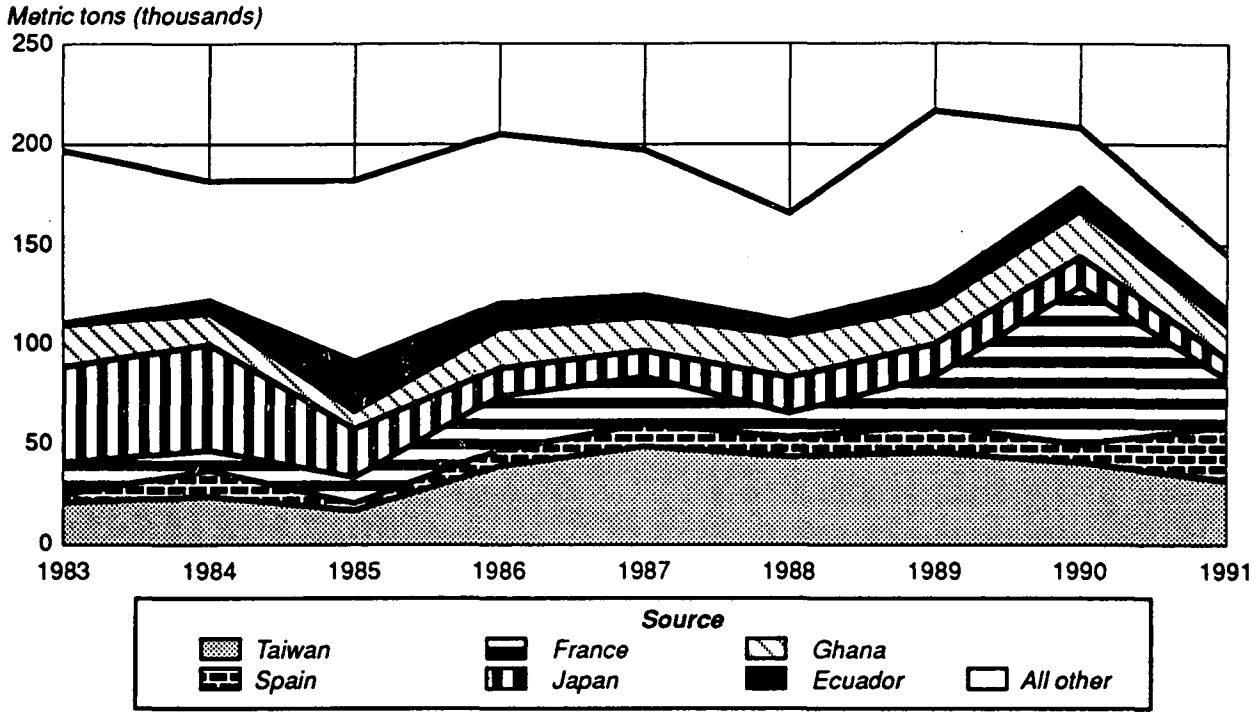
[28] See the discussion in chapter 5 of loining technology.

[29] One of these options is the establishment of dedicated loin processing canneries similar to the Bumble Bee plant in California.

[30] Colombia currently is subject to the U.S. embargo on imports of yellowfin tuna products.

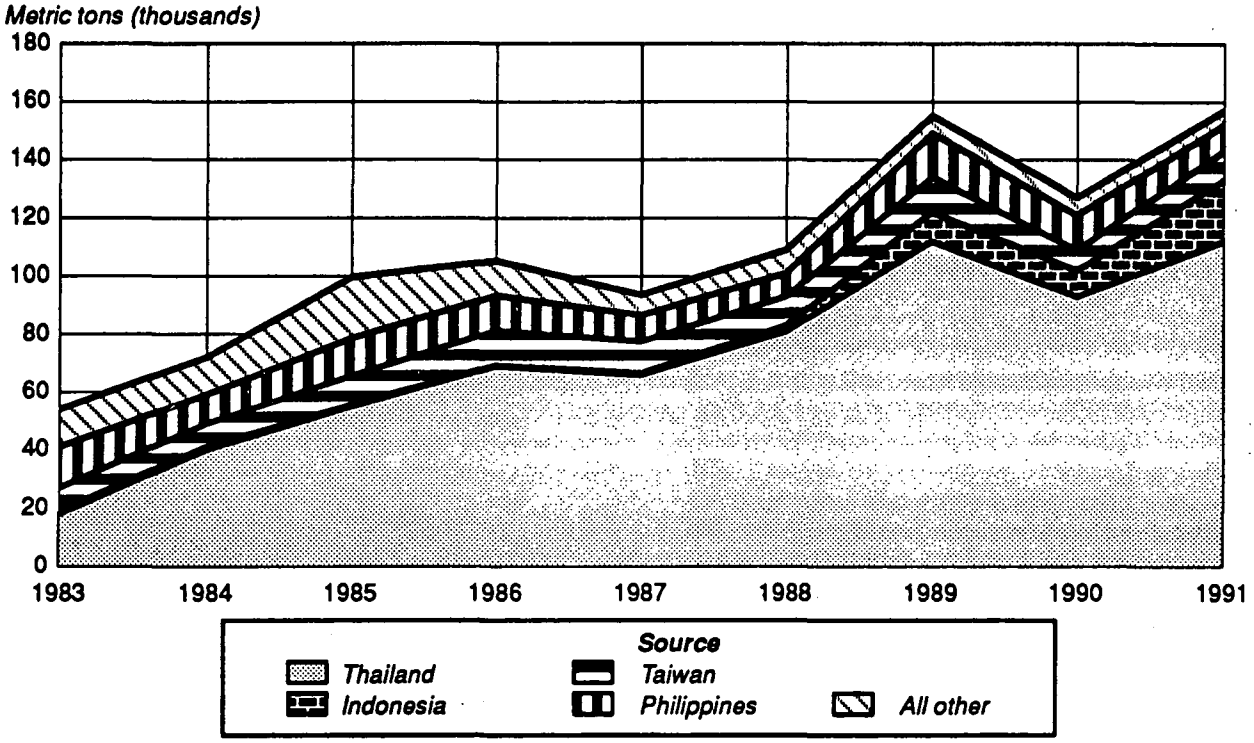
[31] Canned tuna, not in oil (water-packed) is subject to a tariff rate quota with a below-quota duty rate of 6 percent ad valorem and an over-quota duty rate of 12.5 percent ad valorem. Canned tuna in oil is subject to a duty rate of 35 percent ad valorem.

Figure 2-13
Raw tuna: U.S. imports, by principal sources, 1983-91



Source: U.S. Department of Commerce.

Figure 2-14
Canned tuna: U.S. imports, by leading suppliers, 1983-91



Source: U.S. Department of Commerce.

0.1 percent of the quantity of U.S. canned tuna imports in 1991.

U.S. imports of canned tuna not in oil are subject to a tariff rate quota.[32] The following tabulation shows the quota level for such imports, the level of imports that entered at the under-quota rate of duty, and the level of imports that entered at the over-quota duty rate during 1986-92 (data from the U.S. Customs Service, in thousands of pounds):

Year	Quota	Imports under quota	Imports over quota
1986	81,092	81,092	153,057
1987	91,539	91,539	123.364
1988	85,185	85,185	193,784
1989	76,734	76,734	234,323
1990	87,158	87,158	171,472
1991	75,092	75,092	237,236
1992	73,724	[1]73,724	([2])

[1] This level was entered by Jan. 2, 1992.
[2] Not available.

[32] USITC, *Competitive Conditions in the U.S Tuna Industry* (investigation No. 332-224), USITC publication 1912, Oct. 1986, pp. 51-52.

The quota level, which is based on the previous year's U.S. production level, rose in 1990 but fell both in 1991 and 1992. The 1992 quota was the lowest since 1981. Furthermore the quota has been filled more quickly each year. In 1991, the quota was filled by January 17; in 1992, the quota was filled in 3 minutes (on January 2).[33]

[33] *FOODNEWS*, May 22, 1992, p. 4.

CHAPTER 3
THE DOLPHIN-SAFE ISSUE

Background of the Issue

No issue affecting the tuna industry has stirred more public interest than the killing of dolphins by tuna harvesters. This controversial practice has generated consumer boycotts of canned tuna,[1] has led to Federal legislative efforts, has resulted in trade embargoes that in turn have led to complaints to the General Agreement on Tariffs and Trade (GATT), and has even influenced the course of the ongoing North American free-trade negotiations.

This chapter presents information on several aspects of the dolphin-safe issue, including a background discussion on the types of harvesting vessels that are primarily affected by the dolphin-safe policy, the association between tunas and dolphin, and the affected species of tuna and dolphins.[2] Following the background discussion is a detailed description of the various company policies and government legislation concerning dolphin protection. The last section presents an analysis of the economic effects of the dolphin-safe policy on U.S. production, consumption, and trade in both raw and canned tuna.

Purse Seining and the Yellowfin Market

The two principal tuna fisheries that endanger dolphins are the purse-seine fishery for yellowfin and the driftnet fishery for albacore. The yellowfin purse-seine fishery is carried out mainly by harvesters from the United States and Latin America. Yellowfin tuna, which are marketed in canned form as lightmeat tuna, commonly associate with dolphins in the Eastern Tropical Pacific. Tuna fishermen will intentionally seek and encircle a dolphin school because of the high probability of a school of yellowfin swimming below it. The economic effects of so-called "dolphin-safe" policies, which are examined in detail later in this chapter, mainly center on a reduction in the supply of yellowfin tuna on the market, because the policies restrict the ability of tuna fishermen to use dolphin schools as guides to yellowfin schools.

[1] A principal supporter of dolphin protection is the Dolphin Coalition, an umbrella group of 37 organizations, claiming a membership of over 4 million persons. U.S. House of Representatives, Committee on Merchant Marine and Fisheries, Subcommittee on Fisheries, Wildlife Conservation, and the Environment, testimony of John M. Fitzgerald, counsel for wildlife policy, Defenders of Wildlife, 101st Cong., 2d sess., May 3, 1990, p. 2.

[2] Throughout this chapter, except where otherwise noted, the term "dolphin-safe policy" will be meant to include not only the canners' own dolphin-safe policies, but also the national and international laws restricting trade in and labeling of tuna products.

Driftnets and the Albacore Market

The other major tuna fishery endangering dolphins is the large-scale driftnet fishery for North Pacific albacore. This fishery is carried out mainly by Japan, Korea, and Taiwan, although several other nations participate to much smaller degrees. No large-scale driftnets are used by U.S. harvesters.[3] Driftnets hang in the water and catch anything in their way, including dolphins and other marine mammals in addition to the targeted species (such as albacore tuna). U.S. dolphin-safe policies cover tuna caught by driftnets, as do recent United Nations resolutions that seek a global moratorium on driftnet use. These policies may affect up to 30 percent of the world supply of albacore.

The Association Between Tunas and Dolphins

Dolphins are marine mammals found in warm waters around the world.[4] The dolphins of concern in this investigation are those found in the ETP, the main species being the common dolphin (Delphinus delphis), the spotted dolphin (Stenella attenuata), the spinner dolphin (S. longirostris), and the striped dolphin (S. coeruleoalba).[5] Biologists believe that for each of these species there are from two to five morphologically and/or geographically separate stocks in the ETP.[6]

For reasons that are not completely clear to marine biologists, dolphins frequently associate with tuna in the ETP and, although it is much less well documented, in other parts of the world's oceans as well. The similarity in diets of certain dolphins and yellowfin suggests that the association is related to feeding. Since dolphins have the ability to use sonar to detect

[3] A large-scale driftnet extends for many miles (sometimes 30 to 50 miles) and is used on the high seas. In contrast, smaller scale driftnets (and related harvesting gear such as gillnets), which are often only a few meters long, are used by U.S. and other harvesters in inshore fisheries that are unconnected with tuna or dolphins.

[4] The dolphin species discussed here, also referred to as porpoises, are mammals and should not be confused with certain species of fish in the family Coryphaenidae that are also called dolphins (or their Hawaiian name, mahi-mahi). Such fish have no connection with tuna or the tuna industry.

[5] Another species, the bottle-nosed dolphin, Tursiops truncatus, is probably what most people picture when they think of a dolphin; it is depicted in "dolphin safe" labels on some brands of canned tuna. However, this species is native to North Atlantic and Mediterranean waters and is not known to associate with tuna.

[6] Inter-American Tropical Tuna Commission (IATTC), *1983 Annual Report of the Inter-American Tropical Tuna Commission*, 1985, pp. 59-60. A stock of dolphins is a distinct population that does not significantly interact with other stocks or populations of the same species. One stock may contain multiple schools (also called pods or herds); each school usually has 100 to 500 individuals, although some schools may have 2,000 or more individuals. IATTC, *1984 Annual Report of the Inter-American Tropical Tuna Commission*, 1986, fig. 29, p. 226.

schools of foodfish at a distance, the yellowfin may follow the dolphins to foodfish that otherwise might be missed by the tuna alone. Individual dolphins, and the herd as well, may realize little disadvantage from this arrangement.[7] This tuna-dolphin association leads tuna purse seiners (harvesters) to use dolphin schools to locate tuna schools. As the harvesters attempt to catch the tuna swimming under the dolphins, many of the dolphins are also enclosed in the purse seine. Although most of the dolphins are able to escape by jumping over the top of the seine, some become entangled in the seine and drown. In addition some that escape from their entanglement may die later from their injuries. Dolphins are widely believed to be intelligent animals; indeed, there seems to be some evidence that dolphins learn about purse seine nets:[8]

> In areas of fishing involving dolphins where there is a history of using the backdown procedure [in which the vessel reverses direction and relaxes the top of the net] to release them, it is said that after capture the dolphins await release passively. In areas where there have been fewer sets made upon dolphins they are more active and generally appear more nervous. This difference in behavior may lead to a difference in the mortality induced by the purse-seine operation.

For many years the evaluation of dolphin mortality has been the responsibility of the Inter-American Tropical Tuna Commission (IATTC), which in 1976 was directed by its member nations to "(1) . . . strive to maintain a high level of tuna production and (2) also to maintain porpoise stocks at or above levels that assure their survival in perpetuity, (3) with every reasonable effort being made to avoid needless or careless killing of porpoise."[9]

Trends in International Dolphin Mortality

The incidental catch of dolphins in the ETP first reached significant proportions in the late 1950s, when the number of (mostly U.S.-flag) tuna purse seiners grew rapidly.[10] Trends in dolphin mortality since that time are indicated by the data presented in table 3-1, which covers the various stocks of spotted, spinner, and common dolphins in the ETP. From a peak of 707,295 animals in 1967, the total annual mortality declined over the next 24 years by 96 percent, to 27,300 animals in 1991.[11] Both the absolute and proportionate decline in mortality during this period was greatest for the spotted dolphin.

The Extent to Which the Dolphin Populations Have Been Depleted

Since the United States is a major market for tuna taken in the ETP, and since four of the species of dolphins (spotted, Eastern spinner, common, and striped) that are incidentally taken in the ETP are also found in U.S. waters, NMFS has assessed dolphin populations. Some stocks of spotted, spinner, and common dolphins have shown significant declines over the past 15 years.[12] However, according to these assessments, the stocks of dolphins that interact with tunas in the ETP have been more or less stable since 1985.

The rate of dolphin mortality varies by species. NMFS has estimated that the average annual mortality for Eastern spinner dolphins and northern spotted dolphins has been greater than 2 percent of the stock, while the average annual mortality rate for all other stocks was less than 2 percent. NMFS also notes that the current levels of incidental take are likely to be sustainable because mortality rates for specific stocks have been declining since 1986.[13]

Relevant Domestic Company Policies and Government Legislation

The Marine Mammal Protection Act of 1972

Congress enacted the Marine Mammal Protection Act of 1972[14] in response to public concern that certain marine mammal populations, including but not limited to dolphins, were being harvested in excessive numbers or in harmful ways.[15] The MMPA prohibits the outright taking and importation of mammals such as

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[7] IATTC, *1983 Annual Report of the Inter-American Tropical Tuna Commission*, 1985, p. 61.

[8] IATTC, *1984 Annual Report of the Inter-American Tropical Tuna Commission*, 1986, p. 53.

[9] IATTC, *1979 Annual Report of the Inter-American Tropical Tuna Commission*, 1981, p. 51.

[10] Prior to this period, indeed as far back as 1930, tuna baitboats utilized dolphins to locate tuna. August Felando, "Harmony Between Tuna Fishing and the Environment of the Eastern Pacific Ocean," paper presented to the World Conference of Tuna Fishing Countries, Tokyo, Dec. 3-6, 1991, p. 3.

[11] The lowest mortality level during this period actually occurred earlier, during the 1982-83 "El Niño" that drove many tuna fishermen to the western tropical Pacific. The extremely low dolphin mortality during this period (bottoming out at 13,493 animals in 1983) may therefore be considered an aberration caused by the effects of El Niño.

[12] National Marine Fisheries Service, NOAA/Commerce, *Our Living Oceans: The First Annual Report on the Status of U.S. Living Marine Resources*, NOAA Technical Memo NMFS-F/SPO-1 (Nov. 1991), p. 103.

[13] D.P. DeMaster and others, "Status of Dolphin Stocks in the Eastern Tropical Pacific," draft papers (Nov. 8, 1991), Southwest Fisheries Science Center, NMFS/NOAA, p. 9.

[14] Marine Mammal Protection Act (MMPA), Public Law 92-522, 86 Stat. 1027 (1972), as amended by Public Law 100-711, 102 Stat. 4755 (1988) and Public Law 101-627, 104 Stat. 4467 (1990), codified in pertinent part at 16 U.S.C. 1361 et seq.

[15] The primary impetus to the passage of the MMPA was the then-annual (and now all but ceased) baby harp seal hunt carried out in the waters off eastern Canada. H.R. Rept. No. 707, 92d Cong., 2d sess.; reprinted in U.S. Code Cong. & Admin. News, pp. 4148-4149.

Table 3-1
Dolphin mortality in the eastern tropical Pacific, 1960-91

Year	Spotted			Spinner		Common			Other	Total
	N	S	E	N	S	N	C	S		
	(Thousands of animals)									
1960	375.0	([1])	133.0	0.0	([1])	([1])	([1])	([1])	74.5	582.5
1961	402.0	([1])	150.0	0.0	([1])	([1])	([1])	([1])	101.8	653.8
1962	167.0	([1])	62.0	0.0	([1])	([1])	([1])	([1])	40.3	269.3
1963	183.0	([1])	69.0	0.0	([1])	([1])	([1])	([1])	38.4	290.4
1964	306.0	([1])	115.0	0.0	([1])	([1])	([1])	([1])	51.7	472.7
1965	337.0	([1])	126.0	0.0	([1])	([1])	([1])	([1])	50.1	513.1
1966	326.0	([1])	115.0	0.0	([1])	([1])	([1])	([1])	19.7	460.7
1967	206.0	([1])	77.0	0.0	([1])	([1])	([1])	([1])	24.3	707.3
1968	178.0	([1])	67.0	0.0	([1])	([1])	([1])	([1])	21.6	266.6
1969	305.0	([1])	122.0	15.0	([1])	([1])	([1])	([1])	102.2	544.0
1970	355.0	([1])	118.0	14.0	([1])	([1])	([1])	([1])	40.7	527.7
1971	176.0	([1])	59.0	7.0	([1])	([1])	([1])	([1])	19.9	261.9
1972	288.0	([1])	96.0	12.0	([1])	([1])	([1])	([1])	29.7	423.7
1973	131.0	([1])	32.0	33.0	([1])	([1])	([1])	([1])	69.0	265.0
1974	95.0	([1])	26.0	47.0	([1])	([1])	([1])	([1])	6.7	174.7
1975	105.0	([1])	45.0	34.0	([1])	([1])	([1])	([1])	10.5	194.5
1976	47.0	([1])	9.0	20.0	([1])	([1])	([1])	([1])	52.2	128.2
1977	22.0	([1])	5.0	5.0	([1])	([1])	([1])	([1])	19.4	51.4
1978	19.0	([1])	2.0	4.0	([1])	([1])	([1])	([1])	5.5	30.5
1979	8.9	2.3	1.5	0.7	0.6	4.2	2.3	0.1	0.9	21.4
1980	13.1	6.8	1.1	1.4	6.7	1.1	1.0	0.2	0.6	32.0
1981	16.3	6.4	2.3	1.8	4.6	2.6	0.4	0.3	0.4	35.1
1982	15.4	4.5	2.6	1.8	1.9	1.0	0.5	0.0	1.3	29.1
1983	3.4	3.6	0.7	1.6	2.7	0.8	0.2	0.0	0.4	13.5
1984	15.9	4.0	6.0	1.5	5.6	0.0	7.4	0.0	0.2	40.7
1985	31.3	2.8	8.9	2.6	4.3	0.0	6.8	0.3	1.8	58.8
1986	68.0	5.1	19.5	6.8	4.2	13.2	10.9	0.1	5.2	133.2
1987	51.7	3.3	10.4	3.6	2.4	8.2	9.7	6.8	3.2	99.2
1988	36.1	2.2	18.8	1.8	1.7	4.8	7.1	4.2	2.1	78.9
1989	52.1	3.9	15.2	6.4	1.9	1.1	12.7	0.6	3.1	97.0
1990	32.3	1.6	5.3	5.8	1.0	.7	4.1	.3	1.6	52.5
1991	[2]14.0	([3])	5.9	[3]2.9	([3])	.1	3.2	.1	1.0	27.3

[1] Not available.
[2] Preliminary.
[3] Represents total for species; data not available for individual stocks.

Note.—N = Northern; S = Southern; E = Eastern; C = Central. Total represents the sum of available data.

Source: National Marine Fisheries Service, U.S. Department of Commerce.

dolphin.[16] The MMPA is also designed to reduce the incidental taking[17] of marine mammals in the course of commercial fishing operations with the goal of reducing the mortality and serious injury rate of marine mammals to a level approaching zero. The act recognizes that with respect to the incidental taking of marine mammals in the course of purse seine fishing for yellowfin tuna, the goal of reducing the mortality and serious injury rate will be deemed to be satisfied by application of the best marine mammal safety techniques and equipment that are economically and technologically practicable.[18]

The MMPA generally operates by providing the Secretary of Commerce with authority to issue permits to U.S.-registered tunaboats for the incidental taking of marine mammals. The permits, in turn, are accompanied by regulations on fishing procedures and specify a numerical limit for incidental taking.[19] In practical terms, the act and regulations operate to affect the production and processing of yellowfin tuna so as to limit the total incidental killing of dolphin by all U.S.-registered vessels.[20] When tuna harvesting

[16] A "taking" of a marine mammal is defined as an act or an attempt to harass, hunt, capture, or kill a marine mammal. 16 U.S.C. 1362(12).

[17] An incidental taking is defined in the applicable regulations as "the taking of a marine mammal (1) because it is directly interfering with commercial operations, or (2) *as a consequence of the steps used to secure the fish in connection with commercial fishing operations* . . ." 50 CFR 216.3 (emphasis added).

[18] 16 U.S.C. 1371(a)(2).

[19] 16 U.S.C. 1373 and 1374, 50 CFR 216.

[20] 1990 amendments to the MMPA (16 U.S.C. 1371 (a)(2)(E)) expanded restrictions to cover fish from countries that use driftnets as discussed below.

activity associated with dolphins results in a bycatch of dolphins exceeding the annual quota, the MMPA authorizes the Administrator of the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce to close the ETP tuna fishery to U.S.-flag vessels.

Beginning in 1977 the Administrator of NOAA authorized an annual dolphin quota of 20,500 animals.[21] The U.S. industry first approached this quota in 1986, when for the first time the Administrator ordered the closure of the fishery beginning October 21, 1986, and continuing through the remainder of that year.[22]

Trends in U.S. dolphin catches

Since the implementation of the 20,500-animal annual quota, the U.S. tuna fleet has cut its dolphin kill dramatically, rarely exceeding (although, as in 1986, occasionally closely approaching) the MMPA quota. Of additional interest are two per-unit measures of the U.S. fleet's performance: the dolphin kill per set (a "set" being the attempt by a seiner to set its net around a school of tuna) and kill per ton of tuna harvested. During 1976-91, dolphin kills by the U.S. fleet ranged from 108,740 in 1976 to 1,004 in 1991 (figure 3-1). Over the same period, the kill per set generally decreased, amidst extremely wide variability, from a low of about 3 dolphins killed per set in 1991 to a peak of about 12 dolphins in 1976. The kill per ton also generally decreased during 1976-91, amidst much lower variability than kill per set, from a peak of about 0.75 dolphin killed per ton in 1976 (one dolphin for every 1.3 tons of tuna harvested) to a low of about 0.14 dolphin (one dolphin for every 7.1 tons of tuna harvested) in 1991.

The U.S. observer program under the MMPA

Voluntarily since 1971, and mandatorily since the implementation of the MMPA, the National Marine Fisheries Service, which is part of NOAA, has collected information on the biology of dolphins that associate with tuna in the ETP.[23] Such information, which includes data on mortality, life history, distribution, and abundance of dolphins, is collected by observers, who are trained biologists employed by NMFS, on board every U.S.-flag tuna purse seiner licensed to operate in the ETP. Each such vessel is required to carry an NMFS observer, who, in addition to collecting the above biological data, helps ensure that the U.S. tuna purse seine fleet does not exceed the annual quota of dolphin kills established by the MMPA.

Embargoes under the MMPA

The MMPA provides for the imposition of trade restrictions (e.g., import embargoes) on imported tuna that was harvested by means of fishing methods that result in an incidental kill of dolphins exceeding U.S. standards.[24] The statute originally provided the Secretary of Commerce with wide discretion in enforcing the provision for an embargo. However, such discretion has largely been curtailed by amendments to the MMPA and court action initiated by certain environmental organizations.

During the 1970s and early 1980s, the embargo provision of the MMPA was periodically invoked to prevent the importation of products from Peru, Senegal, Congo, Mexico, and the former Soviet Union. Litigation initiated by environmental organizations sought strict enforcement of its terms but was largely unsuccessful.

Amendments to the MMPA in 1984 required the Secretary of Commerce to gather specific information from nations that exported to the United States yellowfin tuna harvested with purse seines in the ETP. This information was to be used to determine comparability with U.S. standards and the stricter imposition of import bans.[25] In particular, exporting nations were required to provide the Secretary with documentary evidence that the government of the harvesting nation had adopted a regulatory program governing the incidental taking of marine mammals comparable to that of the United States and that the average rate of incidental taking by their tuna harvesters' vessels was comparable with that of U.S. vessels.

Regulations to enforce the 1984 MMPA amendments pertaining to import restrictions were not adopted until April of 1988. Between 1984 and 1988, embargoes were only imposed or in force against the former Soviet Union, El Salvador, and Mexico, and the embargoes relating to Mexico related to a dispute over the seizure of vessels.[26] In October of 1988 new

[21] The MMPA specifically limits the incidental kill rate of coastal spotted dolphin to 250 per year and eastern spinner dolphin to 2,750 per year. These limits are to be treated as within, and not in addition to, the overall limit imposed pursuant to a general permit issued by the Secretary of Commerce. 16 U.S.C. 1374(2)(B)(iii)(III) and (C).

[22] This move was considered controversial because the U.S. industry alleged that the estimated dolphin count had been statistically biased (by a reduction in the staffing of NOAA observers whose job it is to report on each vessel's dolphin catch).

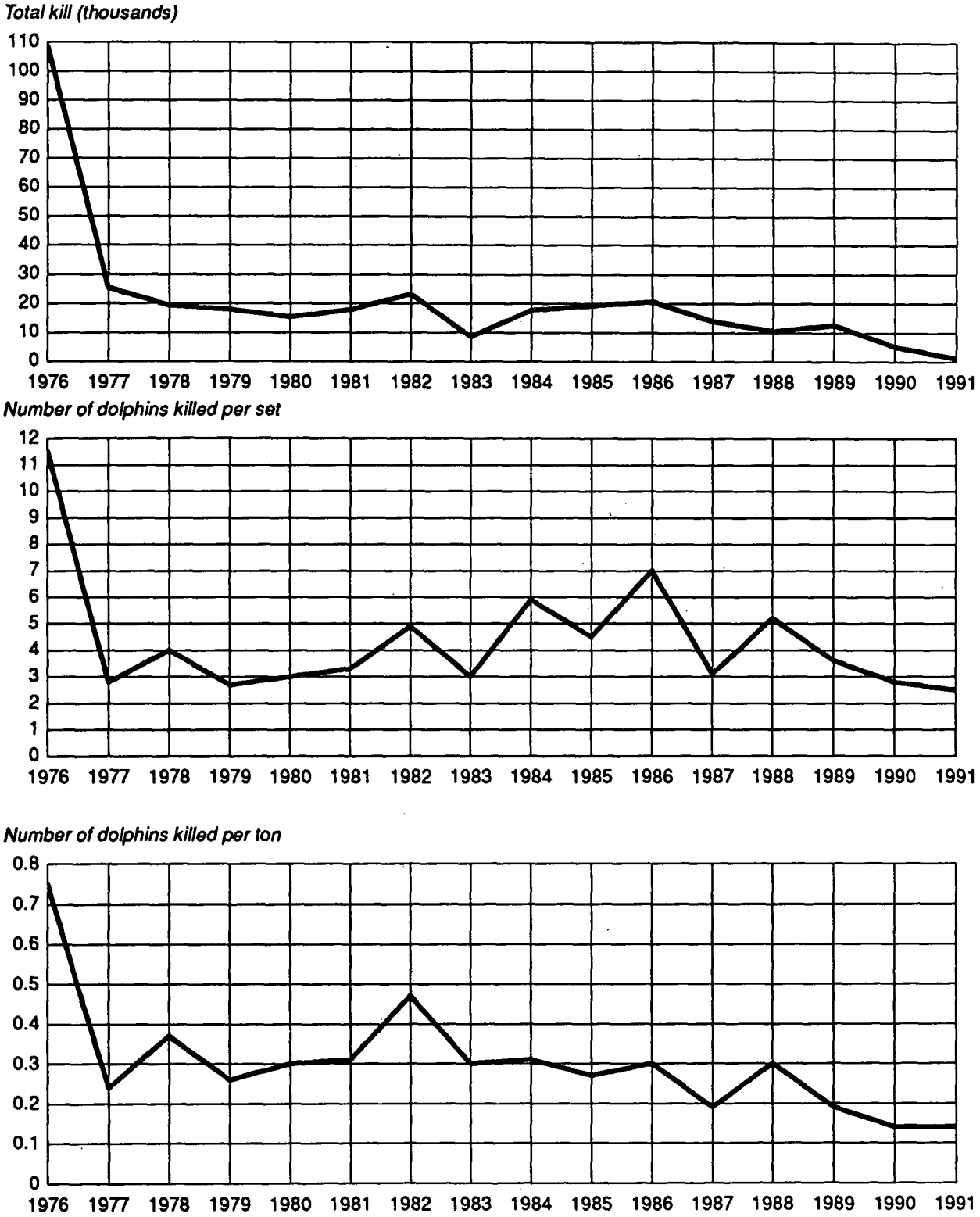
[23] *Summary of the U.S. Tuna/Porpoise Observer data* (annual since 1987), published by the Southwest Fisheries Center of NMFS.

[24] 16 U.S.C. 1371(a)(2).

[25] H.R. Rept. No. 758, 98th Cong., 2d sess. (1984), pp. 6-8; *Congressional Record* (June 27, 1984), daily ed., p. H7223 .

[26] *The Reauthorization of the Marine Mammal Protection Act: Hearings Before the National Ocean Policy Study of the Senate Committee on Commerce, Science, and Transportation*, 100th Cong., 2d sess. 9, 78-89 (1988) (statement of Charles Fullerton, Director, Southwest Region, NMFS).

Figure 3-1
The total dolphin kill, dolphin kill-per-set rates, and kill-per-ton rates for observed U.S. tuna purse seiners in the eastern tropical Pacific Ocean from 1976 to 1991



Source: National Marine Fisheries Service, Southwest Region.

embargoes were imposed against tuna imported from Venezuela, Vanuatu, Panama, and Ecuador. These embargoes were lifted in November of 1988.

The 1988 amendments to the MMPA provided specific criteria for determining whether the regulatory program of a foreign harvesting nation is comparable with that of the United States, as well as for determining whether the average incidental take of the foreign harvesting nation is comparable with that of the United States. Harvesting nations whose regulatory programs did not contain proscriptions against the encircling of marine mammals, conducting sundown sets, and certain other activities applicable to U.S. vessels could not be certified as having a comparable regulatory program, thereby triggering the statutory ban on tuna imports from that nation. Likewise, harvesting nations whose average rate of incidental taking is more than 1.25 times that of U.S. vessels trigger the statutory ban.[27]

Significantly the 1988 amendments also provided statutory authority to embargo yellowfin tuna from intermediary nations to prevent circumvention of a primary embargo by transshipment.[28] By virtue of these amendments the MMPA now requires the governments of intermediary nations to certify and provide reasonable proof that they prohibit the importation of tuna that is directly banned from the United States. These nations otherwise face a ban on tuna exports to the United States themselves.[29]

The 1988 amendments to the MMPA did not trigger an immediate series of import bans as some in the industry had foreseen.[30] Indeed, Ecuador, Mexico, Panama, Vanuatu, and Venezuela—countries having purse seine vessels of greater than 400 tons carrying capacity in the ETP—submitted their regulatory programs to the U.S. Department of Commerce and secured a determination that their dolphin protection programs were comparable to the U.S. programs, thereby allowing their continued yellowfin exportation to the United States.

In 1990 two environmental organizations in the United States[31] filed suit to enforce the embargo provisions of the MMPA as amended.[32] The two organizations sought a ban on the importation of tuna until such time as the governments of foreign tuna harvesting nations had provided the Secretary of Commerce with sufficient information as defined in the amended MMPA. On August 28, 1990, the District Court ordered an embargo on the importation of yellowfin tuna and tuna products from all countries fishing in the ETP in the absence of, and until, an affirmative finding by the Secretary of Commerce that the foreign governments had comparable regulatory regimes and comparable incidental-taking rates (figure 3-2). Affirmative findings with respect to Vanuatu, Venezuela, and Mexico were announced by Commerce on September 7, 1990, and an affirmative finding with respect to Ecuador was announced on September 17, 1990, thus terminating the court ordered embargo against all of the countries except Panama.[33]

On October 4, 1990, the District Court found that the Secretary of Commerce had not calculated the allowable range of incidental takings according to the formula set forth in the MMPA in making affirmative findings and reinstated the embargo on tuna imported from Mexico. An appellate court temporarily stayed the embargo, but the stay was later lifted and the embargo against tuna from Mexico went into effect on February 22, 1991. Pursuant to another court order of March 26, 1991, the embargo was extended to cover tuna from Venezuela and Vanuatu, and importers were thereafter required to certify to the U.S. Customs Service that the tuna and lightmeat tuna products imported were not harvested with purse seines in the ETP by vessels from Mexico, Venezuela, or Vanuatu.

In May and June of 1991, the Department of Commerce identified five "intermediary nations" from whom tuna was also embargoed: Costa Rica, France, Italy, Japan, and Panama. The ban on imports from intermediary nations was reinforced and expanded by District Court orders in January and February 1992. These orders imposed an injunction prohibiting the importation of all yellowfin tuna and tuna products from any intermediary nation until the U.S. Departments of Commerce and Treasury obtain certification and proof that the intermediary nation has banned the importation of tuna subject to the U.S. primary embargo (figure 3-2).[34]

In January of 1992, the primary embargo on tuna from Vanuatu was lifted. In addition, legislation is pending to remove the embargo on tuna from Mexico and Venezuela[35] in exchange for a commitment to cease dolphin encirclement fishing techniques.[36]

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[27] 16 U.S.C. 1371(a)(2)(B)(ii)(II). In providing a comparable rate of incidental taking, Congress allowed a comparable rate of 2.0 times the U.S. rate during a grace year after the provision was inserted into the statute in 1988.

[28] An "intermediary nation" is a nation that exports yellowfin tuna or tuna products to the United States and that imports yellowfin tuna or tuna products.

[29] 16 U.S.C. 1371(a)(2)(C).

[30] An embargo on tuna from Spain was issued shortly after the 1988 amendments to the MMPA and continued in force until February 1989.

[31] The Earth Island Institute and the Marine Mammal Fund.

[32] *Earth Island Institute v. Mosbacher*, 746 F. Supp. 964 (N.D. Cal. 1990) *aff'd* 929 F.2d 1449 (9th Cir. 1991). This action was a part of a continuing litigation effort by environmental organizations seeking strict enforcement of the MMPA.

[33] The embargo against tuna from Panama was imposed later, on November 16, 1990.

[34] *Earth Island Institute v. Mosbacher*, (Civ. action No. C 88 1380, N.D. Cal. 1992), Jan. 9, 1992.

[35] Venezuela has threatened to bring the tuna embargo before the GATT but has not taken such action.

[36] H.R. 5419, introduced June 17, 1992, by Rep. Studds (D-MA).

Figure 3-2
U.S. and International Dolphin-Safe Activities

Events	Date	Provisions
Marine Mammal Protection Act	1972	• Prohibits the outright taking and importation of dolphins • Designed to reduce the incidental-taking of dolphins
Amendment to MMPA	1976	• In 1977, set annual dolphin quota of 20,500 animals • Provides for the imposition of trade restrictions on imported tuna harvested in a manner that resulted in an incidental kill of dolphins exceeding U.S. standards
Amendment to MMPA	1984	• Secretary of Commerce must gather specific information from nations who export to the U.S. tuna harvested with purse seines in the ETP
Amendment to MMPA	1988	• Adopted regulations to enforce the 1984 amendments • Provides specific criteria for assessing the dolphin-safe policies of foreign countries • May embargo yellowfin tuna from intermediary nations
Embargoes imposed under the MMPA	1988-Feb. 1989	• Embargo on tuna from Spain
	Oct. 1988	• Embargo on tuna from Venezuela, Vanuatu, Panama, and Ecuador
	Nov. 1988	• Embargo lifted from Venezuela, Vanuatu, Panama, and Ecuador
	Aug. 1990	• Embargo on tuna from all countries fishing in the ETP as a result of Earth Island Institute v. Mosbacher
	Sep. 1990	• Embargo lifted on tuna from Vanuatu, Venezuela, Mexico, and Ecuador
	Oct. 1990	• Embargo on tuna from Mexico reinstated and stayed
	Feb. 1991	• Embargo on tuna from Mexico went into effect
	Mar. 1991	• Embargo on tuna from Venezuela and Vanuatu

Figure 3-2—Continued
U.S. and International Dolphin-Safe Activities

Events	Date	Provisions
Embargoes imposed under the MMPA	May 1991	• Embargo imposed on tuna from five "intermediary nations"
	Sep. 1991	• Embargo on tuna from Ecuador lifted
	Jan. 1992	• Embargo on all yellow-fin tuna from all intermediary nations: Canada, Colombia, Eduador, Indonesia, Korea, Malaysia, Marshall Islands, Netherlands Antilles, Singapore, Spain, Taiwan, Thailand, Trinidad and Tobago, United Kingdom and Venezuela
	Jan. 1992	• Embargo on tuna from Vanuatu lifted
	Feb. 1992	• Embargo on tuna from Ecuador, Marshall Islands, and Taiwan lifted
	Mar. 1992	• Embargo on tuna from Thailand lifted
	Apr. 1992	• Primary embargo on tuna from Columbia
	Apr. 1992	• Embargo on tuna from Panama, Venezuela, and Trinidad and Tobago lifted
	May 1992	• Embargo on tuna from Korea lifted
	June 1992	• Embargo on tuna from Indonesia lifted
"Dolphin-safe" policies	Apr. 1990	• U.S. tuna canneries announce they will no longer buy tuna from suppliers who refuse to certify that the tuna is dolphin-safe
Dolphin Protection Consumer Information Act ("Boxer bill")	1990	• Established requirements for products labeled "Dolphin-Safe" • The harvesting of tuna by purse seiners in the ETP cannot be labeled "Dolphin-Safe"
Mexican Complaint to GATT	Jan. 1991	• Prohibits the importation of tuna caught in driftnets • Mexico requests the establishment of GATT panel to consider whether U.S. restrictions on Mexican tuna were consistent with U.S. obligations under the GATT

Figure 3-2—Continued
U.S. and International Dolphin-Safe Activities

Events	Date	Provisions
GATT panel report	Aug. 1991	• Concluded that the ban on Mexican tuna was inconsistent with U.S. obligations under GATT
Inter-American Tropical Tuna Commission	1950 1976 1987 1990 1991 1992	• Commission established to maintain and increase tuna populations in the ETP • Must maintain and protect dolphins in the ETP • Commission issued regulations concerning tuna fishing practices that were designed to reduce dolphin mortality • Participating governments to establish an international program designed to reduce dolphin mortality to levels approaching zero • Implement international observer program, research programs, and plans to reduce dolphin mortality • Participating governments agreed to specific annual limits on total dolphin mortality
Driftnet Impact Monitoring, Assessment, and Control Act and Driftnet Acts and Amendments	1987 1990	• Helps the U.S. negotiate bilateral agreements for limiting the area of driftnet fishing on the high seas and monitoring driftnet fishing practices.
The Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Wellington Convention) and Protocols	Nov. 1989 and Oct. 1990	• U.S. must prohibit driftnet fishing in its EEZ within the South Pacific
U.N. Resolutions	Dec. 1991	• U.N. has called for a ban on the use of large-scale driftnets on the high seas by December 31, 1992

Events Surrounding the Canners' Dolphin-Safe Announcements

For several years prior to the dolphin safe announcements, environmental groups and other dolphin advocates organized consumer boycotts of canned tuna. These boycotts occurred mainly in the United States, although some attempts were made and are still being made, to boycott canned tuna in Europe. The U.S. boycotts were sporadic and—according to U.S. canners—unsuccessful in terms of actual losses in sales,[37] but they created a significant public relations problem for the industry.

In 1989, Congressional consideration of the so-called "Boxer bill" exerted a new source of pressure on the canners. The bill sought to require canners to purchase only tuna that was caught in a manner that did not endanger dolphins. The measure sought to eliminate U.S. production or importation not only of tuna caught by purse seiners in the ETP, but also of tuna caught with driftnets by (exclusively foreign) fleets in the Northern Pacific. U.S. canners saw this proposed legislation as excessively strict because it would have required them to ensure that tuna that they had no hand in harvesting was dolphin safe, a requirement that no tuna canner at the time had the capability of carrying out.

Partly to assuage consumers' fears that dolphins were being endangered,[38] partly to ward off the impending Boxer bill, and—some in the industry believe—partly as a strategic competitive move,[39] the U.S. canners, led by StarKist, announced in April 1990 that they would no longer buy tuna from domestic or foreign suppliers who refused to certify that the tuna was "dolphin-safe." While it took several months for the old "dolphin-unsafe"[40] inventory to work its way through the marketing chain, by the end of the summer of 1990, virtually all U.S.-produced canned tuna on U.S. supermarket shelves carried a dolphin safe message of some form or another. By 1991, virtually all U.S.-marketed canned tuna, nationally advertised and local (or "house") brands alike, carried the dolphin-safe guarantee. (See figure 3-3 for some examples.)

[37] U.S. consumption of canned tuna grew steadily from 2.8 pounds per person in 1982 to 3.9 pounds in 1989, or about 5 percent annually, before falling to 3.6 pounds in 1991. National Marine Fisheries Service, *Fisheries of the United States, 1991*, May 1992, p. 70.

[38] And also, according to industry sources, to counter the fear among some consumers that dolphin meat was in the can of tuna itself, which has never been the case; dolphins have never been accepted by tuna canneries.

[39] Felando, "Harmony Between Tuna Fishing and the Environment of the Eastern Pacific Ocean," Dec. 3-6, 1991, pp. 34-35.

[40] "Dolphin-unsafe" refers to tuna that is not defined as dolphin-safe under the Dolphin Protection Consumer Information Act (see following section).

The Dolphin Protection Consumer Information Act and Other Proposed Legislation

In July 1989, Congresswoman Boxer of California introduced H.R. 2926, the first major piece of legislation concerning dolphins and tuna since the 1976 amendment of the MMPA that restricted the number of dolphin kills. However, the bill differed from earlier legislation in that it sought to address the issue from the consumer side, not the harvesting side.

The Boxer bill was enacted into law as the Dolphin Protection Consumer Information Act (DPCIA),[41] title IX of the Fishery Conservation Amendments Act of 1990.[42] Among the parts relevant to tuna canners (which are also affected by the parts discussed in the following section on driftnets) and purse seiners are the following excerpts:

> Section (d)(1)—It is a violation of section 5 of the Federal Trade Commission Act for any producer, importer, exporter, distributor, or seller of any tuna product that is exported from, or offered for sale in the United States to include on the label of that product the term "Dolphin Safe" or any other term or symbol that falsely claims or suggests that the tuna contained in the product was harvested using a method of fishing that is not harmful to dolphins if the product contains—
>
> (A) tuna harvested on the high seas by a vessel engaged in driftnet fishing; or
>
> (B) tuna harvested in the eastern tropical Pacific Ocean using purse seine nets which do not meet the requirements for being considered dolphin safe under paragraph (2).
>
> Section (d)(2)—For purposes of paragraph (1)(B), a tuna product that contains tuna harvested in the eastern tropical Pacific Ocean by a fishing vessel using purse seine nets is dolphin safe if—
>
> (A) the vessel is of a type and size that the Secretary has determined is not capable of deploying its purse seine nets on or to encircle dolphin; or
>
> (B)(i) the product is accompanied by a written statement executed by the captain of the vessel which harvested the tuna certifying that no tuna were caught on the trip in which such tuna were harvested using a purse seine net intentionally deployed on or to encircle dolphin;
>
> (ii) the product is accompanied by a written statement executed by—

[41] Public Law 101-627 (1990) codified at 16 U.S.C. 1385.

[42] 16 U.S.C. 1801.

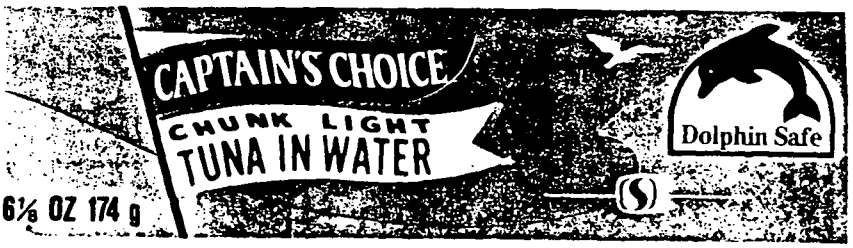
Figure 3-3
Examples of "dolphin safe" canned tuna labels

StarKist Seafood Company
(product of U.S.A.)

Bumble Bee Seafoods
(product of U.S.A.)

Van Camp Seafood Company
(product of U.S.A.)

Private (Safeway) label
(product of Thailand)



(I) the Secretary or the Secretary's designee, or

(II) a representative of the Inter-American Tropical Tuna Commission,

which states that there was an approved observer on board the vessel during the entire trip and that purse seine nets were not intentionally deployed during the trip on or to encircle dolphin; and

(iii) the statements referred to in clauses (i) and (ii) are endorsed in writing by each exporter, importer, and processor of the product.

The DPCIA also prohibits imports of tuna and other fish caught with driftnets. They are commonly used in the Pacific fisheries for squid and other less controversial species, but they catch and kill much more than their target species, including marine mammals (such as whales, seals, and dolphins), seabirds, and important fish species (such as salmon).

Concerning driftnets, section (g)(3) of the DPCIA amends the MMPA by adding the following:

(E)(i) except as provided in clause (ii), in the case of fish or products containing fish harvested by a nation whose fishing vessels engage in high seas driftnet fishing, shall require that the government of the exporting nation provide documentary evidence that the fish or fish product was not harvested with a large-scale driftnet in the South Pacific Ocean after July 1, 1991, or in any other water of the high seas after July 1, 1992, and

(ii) in the case of tuna or a product containing tuna harvested by a nation whose fishing vessels engage in high seas driftnet fishing, shall require that the government of the exporting nation provide documentary evidence that the tuna or tuna product was not harvested with a large-scale driftnet anywhere on the high seas after July 1, 1991.

U.S. International Treaty Obligations and Conflicts

Trade measures taken pursuant to the MMPA have resulted in a number of complaints through diplomatic channels by adversely affected countries and in the filing of a complaint by Mexico against the United States with the General Agreement on Tariffs and Trade. The European Community has also indicated an interest in bringing the MMPA trade measures before the GATT. In late 1991, a GATT panel ruled primarily in favor of Mexico and against the United States. The following section describes relevant obligations under international agreements with respect to the dolphin-safe issue and describes the GATT panel ruling.

Obligations under the General Agreement on Tariffs and Trade

The GATT is the principal multinational agreement that sets forth rules concerning trade in goods between member states. In general, the GATT requires member states to conform to the principle of nondiscrimination in their trade measures. Under article III of the GATT, member states must accord treatment to the imported products of other GATT signatories that is "no less favorable than that accorded to like products of domestic origin." Member states are also obligated under GATT article XI to refrain from prohibiting or restricting the entry of products from GATT signatories by means of quotas, import or export licenses, or other measures. A pertinent exception to the general rule against quantitative restrictions exists to allow import restrictions that are necessary to enforce a government program that restricts the quantities of like domestic product permitted to be marketed or produced. (GATT Article XI(2)(c)(i)).[43] This exception to the general rule, however, applies to "restrictions" on products and not to "prohibitions" on the entry of products. Other exceptions allow for trade measures "necessary to protect human, animal or plant life or health . . ." (article XX(b)). This exception allows for trade measures to protect marine mammals so long as the measure is (a) necessary,[44] (b) not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination, and (c) not a disguised restriction on trade. This exception has not been the subject of many interpretive rulings, and questions remain as to whether it may be invoked to protect migratory animal life. Some commentators have expressed the view that widespread usage of this exception would have destructive effects on the GATT insofar as almost any trade measure could be justified as a measure to protect human, animal, or plant life.[45]

---

[43] Article XI(1)(c)(i) further provides that any country invoking the exception relating to import restrictions on fishery products must—

> give public notice of the total quantity or value of the product permitted to be imported during a specified future period and of any change in such quantity or value. Moreover, any restrictions applied under [this provision] shall not be such as will reduce the total of imports relative to the total of domestic production, as compared with the proportion which might reasonably be expected to rule between the two in the absence of restrictions. In determining this proportion, the contracting party shall pay due regard to the proportion prevailing during a previous representative period and to any special factors . . . which may have affected or may be affecting the trade in the product concerned.

[44] Recent GATT panel decisions (of no binding force but of substantial practical force) in other contexts have indicated that the "necessary" element requires substantial proof.

[45] See, for example, Organization of American States, CECON, "Tuna Trade Dispute: Omen of Debate on Trade and Environment," *Trade News*, vol. XVI, No. 9 (Sept. 1991), p. 1.

A second pertinent exception to the GATT general obligations allows for measures relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption. Again, trade measures under this exception may not be applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination and may not constitute a disguised restriction on international trade.

The Mexican complaint to the GATT

On January 25, 1991, Mexico requested the establishment of a GATT panel to consider whether U.S. restrictions on the entry of tuna harvested by Mexican-registered vessels were consistent with U.S. obligations under the GATT. The Mexican complaint was directed to an enforcement action of the United States imposed pursuant to the MMPA against Mexican-harvested tuna because Mexico's fleet exceeded U.S. standards on the incidental taking of marine mammals.

Mexico's complaint to the GATT alleged that the U.S. ban on Mexican-harvested tuna was inconsistent with U.S. obligations under a variety of provisions of the GATT. On February 6, 1991, the GATT Council agreed to establish a panel to consider Mexico's allegations. GATT panels such as the one established to consider the Mexican complaint are convened to provide advice to the GATT Council. Panel reports are of no legal force or effect until they are considered and adopted by the entire GATT Council. The panel conducted meetings with the United States and Mexico during May and June of 1991. After having received written submissions from certain other GATT contracting parties,[46] the panel issued a written report in August 1991 to the GATT Council on the Mexican complaint, as outlined below.[47]

Article XI vs. Article III

The panel's consideration of the matter involved a threshold determination as to whether the MMPA measures with regard to Mexican tuna were subject to the provisions of GATT article XI or article III. Mexico argued that the measures amounted to a quantitative restriction on importation proscribed by article XI. The United States maintained that the MMPA was an internal regulatory matter—enforced in the case of imported products at the time and point of entry—and therefore subject to the standards of nondiscrimination set forth in article III (per Note Ad Article III) rather than the general provisions of article XI pertaining to quantitative restrictions. In asserting the measures' consistency with article III, the United States noted that the measures were not applied to protect domestic production, but rather, consistent with article III:4, the measures treated the imported products no less favorably than like products of domestic origin. The United States argued that the MMPA operated to treat the product of foreign-registered tunaboats more favorably than the product of U.S.-registered tunaboats.

In considering the arguments put forward by the United States and Mexico, the panel focused on the language of article III and in particular on the following language of Note Ad article III:

> Any internal tax or other internal charge, or any law, regulation or requirement of the kind referred to in [Article III:1] *which applies to an imported product and the like domestic product* and is collected or enforced in the case of the imported product at the time or point of importation, is nevertheless to be regarded as an internal tax or other internal charge, or a law, regulation or requirement of the kind referred to in [Article III:1], and is accordingly subject to the provisions of Article III.

In the view of the panel, the phrase "which applies to an imported product and the like domestic product" qualifies the provision to eliminate from its scope those internal regulations that do not apply to a product. The panel then asserted that the MMPA did not regulate tuna as a product because the MMPA fishing proscriptions did not directly regulate the sale of tuna and could not possibly affect tuna as a product. The panel further opined that even if the MMPA could be regarded as a regulation which applies to an imported product and the like domestic product, the standards of article III call for a comparison between the treatment of the imported tuna product with that of domestic tuna product. Since the MMPA was focused on the methods of harvesting the products—both imported and domestic tuna—rather than on the products themselves, the panel found that the United States was obligated to accord treatment to Mexican tuna no less favorable than that accorded to United States tuna, whether or not the incidental taking of dolphins by Mexican vessels corresponds to that of United States vessels.

Having found article III not pertinent to the regulatory regime of the MMPA, the panel turned its attention to the proscription in article XI on quantitative restrictions.[48] Noting that article XI:1 proscribed "prohibitions or restrictions . . . on the importation of any product of the territory of any contracting party," and noting that the MMPA operated as a "direct import prohibition" on yellowfin tuna and yellowfin tuna products from Mexico, the panel

[46] Australia, the European Community, Indonesia, Japan, Korea, the Philippines, Senegal, Thailand, Venezuela, Canada, and Norway each submitted a position to the panel.

[47] The text of the panel report is reprinted at 30 I.L.M. 1598 (Nov. 1991).

[48] Article XI(1) provides that—

> No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.

concluded that the ban on the importation of Mexican harvested tuna was inconsistent with the U.S. obligations under article XI.[49] In light of such a finding, the panel was left with the most significant issues of the case, namely, the applicability of one or more of the following explicit exceptions to article XI as asserted by the United States.

Article XX(b)

The United States argued that the contested ban on Mexican tuna was explicitly excepted from the general proscription on quantitative restrictions by virtue of article XX(b). Article XX contains a list of trade measures related to such matters as national security, health and safety, and so forth, that might otherwise be proscribed by the GATT but are nonetheless recognized by the contracting parties as acceptable measures insofar as they are not adopted and enforced "in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions apply, or a disguised restriction on international trade . . . ." Subsection (b) of article XX specifically lists measures that are "necessary to protect human, animal or plant life or health." The U.S. position was that the sole purpose of the MMPA was the protection of dolphin life and health. The United States further maintained that the regime of the MMPA was necessary because there was no alternative measure reasonably available to the United States to achieve this objective.

The panel disagreed with the position of the United States. According to the panel, the United States failed to meet the "necessity" requirement inasmuch as the United States had apparently failed to exhaust the option of negotiating international cooperative agreements.

Article XX(g)

The United States also argued that the MMPA regime fell squarely within the article XX(g) exception as a measure—

> relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption . . .

Again, in the opinion of the panel, the measure was found to be outside the scope of the text. The panel noted that a measure would only qualify under article XX(b) if it were taken "in conjunction with" domestic measures. This suggested to the panel that article XX(g) was limited to trade measures directed to the conservation of exhaustible natural resources that were within the United States. Efforts to conserve exhaustible natural resources outside the jurisdiction of a contracting party by means of trade restrictions were viewed by the panel as outside the scope of article XX(g).[50]

The panel further stated that even if the exception of article XX(g) did allow for trade measures relating to the conservation of an exhaustible natural resource outside the jurisdiction of the United States, in the view of panel, the ban on Mexican tuna could not be regarded as being primarily aimed at the conservation of dolphins as required for exemption under article XX(g).[51] This observation was apparently based on the U.S. methodology used to compare the incidental kill rate of Mexican vessels with the kill rate of U.S. vessels to support the ban of Mexican harvested tuna. The MMPA rate for incidental kills that triggered the ban of Mexican harvested tuna was determined according to the actual incidental-kill rate by U.S. tuna harvesters during the same period. This method was viewed as an unpredictable condition by the panel. The panel's opinions on these matters, like its opinion on the applicability of article XX(b), have been subject to considerable criticism, particularly from environmental groups and tuna exporting nations.[52]

The Mexican complaint to the GATT also alleged that the so-called "dolphin-safe" labeling provision of the Dolphin Protection Consumer Information Act[53] was inconsistent with the "marking" provisions of GATT articles IX:1 and the nondiscrimination provisions of article I. The panel rejected these arguments, noting that article IX:1 dealt with country-of-origin markings rather than the markings of products generally. With respect to the discrimination allegations, the panel noted that the dolphin-safe labeling provisions were not a condition for placing tuna in the commerce of the United States, did not confer any government advantage affecting the sale of tuna, nor were applied in a discriminatory fashion against the tuna of any particular harvesting country. In short, the panel flatly rejected the allegations against the dolphin-safe labeling provisions of the DPCIA.

Following the issuance of the GATT panel report, the executive branch developed an understanding with

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[49] The panel report notes that the United States did not present any arguments to support a different legal conclusion regarding article XI.

[50] This view had been expressed by other commentators prior to the panel opinion. For a more complete discussion of this view, see T.L. McDorman, "The GATT Consistency of U.S. Fish Import Embargoes to Stop Driftnet Fishing and Save Whales, Dolphins and Turtles" *George Washington Journal of Int'l & Econ.*, vol. 24, No. 477 (1991), p. 516 citing J. Jackson, *The World Trading System* (1989), pp. 208-209.

[51] For an interpretation of the legislative purpose of the MMPA, see *American Tunaboat Association v. Baldridge*, 738 F.2d 1013, 1014 (9th Cir. 1984); *Committee for Humane Legislation, Inc. v. Richardson*, 414 F. Supp. 297, 306 (D.D.C. 1976) *aff'd in pertinent part*, 540 F.2d 1141, 1144 (D.C. Cir. 1976); *British Columbia Environmental Affairs Law Review*, vol. 14, (1987), pp. 257, 267 fn. 64.

[52] See, for example, Organization of American States, CECON, "Tuna Trade Dispute: Omen of Debate on Trade and Environment," p. 3; "Ban on Tuna Imports Held to Violate Treaty," *The Washington Post*, Aug. 24, 1991, p. A7.

[53] Public Law 101-627 (1990) codified at 16 U.S.C. 1385.

Mexican officials whereby Mexico would defer submission of the matter to the GATT Council in return for efforts by the executive branch to seek congressional modification of the MMPA.[54] Mexico has subsequently submitted letters to the administration committing itself to cease the practice of setting nets on dolphins by 1994.[55] As discussed above, legislation is pending to remove the embargoes on Mexico in view of its pledge to cease setting nets on dolphins by 1994, and Mexico has accordingly deferred a request for a GATT Council ruling on the panel report.

European Community expression of concerns to the GATT

In February 1992, the EC expressed an interest in bringing the Mexican-U.S. GATT panel report before the entire GATT Council, initiating proceedings for a separate panel report, or both. Consultations between the EC and the United States commenced in March 1992. As of June, 1992, no further requests had been made by the EC for GATT consideration of the dispute.

Other International Agreements Relating to Dolphin-Safe Issues

The Inter-American Tropical Tuna Convention established in 1950 a joint intergovernmental commission, the Inter-American Tropical Tuna Commission, to investigate the abundance and biology of yellowfin and skipjack tuna in the waters of the Eastern Pacific Ocean. The United States was a signatory to the original convention and is a continuing participant in the activities of the IATTC.

The IATTC is responsible for collecting information for maintaining and increasing the population of tuna and for recommending conservation measures to sustain the population of yellowfin and skipjack tuna at a level so as to permit the maximum sustained catch. In 1976, the IATTC was further charged with the responsibility of maintaining and protecting dolphin in the ETP. Pursuant to these objectives, the IATTC and the participating governments agreed in April 1992 to the following annual limits on total dolphin mortality in the ETP:

Year	*Limit*	*Percentage of best estimate of current populations of spotted, spinner, and common dolphins*
1993	19,500	0.30
1994	15,500	0.24
1995	12,000	0.19
1996	9,000	0.14
1997	7,500	0.11
1998	6,500	0.10
1999	<5,000	<0.08

[54] See *Journal of Commerce*, "U.S., Mexico Defuse Tuna Trade Dispute," Sept. 13, 1991, p. 3A.

[55] Testimony of Curtis Bohlen, Assistant Secretary of State for Oceans, International Environmental, and Scientific Affairs before the House Merchant Marine and Fisheries Committee, Mar. 18, 1992; see also 138 Cong.

Bilateral driftnet agreements

The Driftnet Impact Monitoring, Assessment, and Control Act of 1987 provides authority for the President to negotiate bilateral agreements for limiting the area of driftnet fishing on the high seas (by season) and for monitoring driftnet fishing practices.[56] Bilateral agreements were negotiated with Japan, the Republic of Korea, and Taiwan and generally provide for operating procedures, data collection, and the deployment of observers. The bilateral agreements relating to driftnet fishing expired on June 30, 1992, but efforts are under way to extend the agreements through December 31, 1992.

Multilateral driftnet agreements

The Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific was recently signed by the United States. Under this convention, the United States is obligated to prohibit driftnet fishing in all areas of its exclusive economic zone within the South Pacific.

The United Nations has also addressed the increasing incidental catch of marine mammals, seabirds, and other marine life. In a series of resolutions, the United Nations has called for a ban on the use of large-scale driftnets on the high seas by December 31, 1992.[57] The most recent resolution, on December 20, 1991, calls upon member countries to take the following actions:

1. Beginning on 1 January 1992, reduce fishing effort in existing large-scale pelagic high seas drift-net fisheries by, *inter alia*, reducing the number of vessels involved, the length of the nets and the area of operation, so as to achieve, by 30 June 1992, a 50 per cent reduction in fishing effort;

2. Continue to ensure that the areas of operation of large-scale pelagic high seas drift-net fishing are not expanded and, beginning on 1 January 1992, are further reduced . . .;

3. Ensure that a global moratorium on all large-scale pelagic drift-net fishing is fully implemented on the high seas of the world's oceans and seas, including enclosed seas and semi-enclosed seas, by 31 December 1992.

55—Continued

Rec. H4764-65 daily ed. June 17, 1992 (statement of Rep. Studds).

[56] Authority to enforce these agreements with trade measures is provided by the mechanism of the Pelly amendment to the Fisherman's Protective Act of 1967. The Pelly amendment authorizes the President to prohibit the importation of fish or fish products from a country that has been certified by the Secretary of Commerce as nullifying a fishery conservation agreement.

[57] U.S. fishermen are currently prohibited from using large-scale driftnets by operation of the Fishery Conservation Amendments of 1990.

Both the executive and legislative branches support the U.N. moratorium as well as the South Pacific Convention and have published regulations banning the importation of fish caught on the high seas by driftnets in the South Pacific. The ban will be extended on December 31, 1992, to fish caught anywhere on the high seas.[58]

Economic Analysis of the Dolphin-Safe Issue

In the Senate Finance Committee's request for this investigation, the Commission was asked to include in its discussion of the dolphin-safe issue "an analysis of the effects of the dolphin-safe issue on U.S. tuna production, trade, and consumption." The dolphin-safe policies examined include the implementation of the U.S. canners' dolphin-safe policies and the national and international laws restricting trade in and labeling of tuna products.

The economic effects of these policies differ by sector (harvesting vs. processing)[59] and, especially on the supply side, by time horizon (the short vs. the long term). The long term is a period, probably of several years, sufficient for the adjustment both of harvesting and cannery capital (including possible relocation abroad) and of tuna populations in the oceans. The economic effects are also different for albacore (whitemeat) and tropical (lightmeat) tuna.

Figure 3-4 summarizes the various effects of the dolphin-safe policies on U.S. production, consumption, and trade in both raw and canned tuna. It is difficult to provide numerical estimates of the effect of these policies for two reasons: first, the time period since the policy implementation is too short to allow sufficient statistical evaluation of the policy effects on prices and other variables; second, a number of events unrelated to dolphins have occurred simultaneously with the dolphin-safe policy implementation, such as the increase in loining and continued cannery cutbacks. The effects of these events on prices and other variables cannot easily be distinguished from the effects caused by the policies. As a result, the characterization of effects as, for example, "higher" or "lower" in the following discussion should be interpreted to mean not an absolute increase or decrease in the variable but that the variable is expected to be higher or lower than would have been the case if the policies had not been implemented.

The order of the discussion is as follows. First, the short-term effects in the markets for raw and canned tuna are examined, followed by an examination of the long-term effects in the raw- and canned-tuna markets.

Short-Term Effects in the Market for Raw Tuna

Prices for albacore

Albacore prices have risen and, although they probably will fall back slightly in the next few years as new entrants replace the eliminated driftnet fleet, prices are expected to remain higher than they would have without the U.N. driftnet moratoria and the U.S. dolphin-safe policies. This price increase is attributable to the global elimination of driftnets affecting 25 to 30 percent of the albacore supply available to foreign and domestic canneries. This lost supply cannot be as efficiently produced with current available alternative methods (e.g., trollers) as with the highly efficient driftnets.

In anticipation of a sharp drop in supply, the spot price of raw albacore increased significantly by the latter half of 1991 (even though the driftnet moratoria were not yet fully in effect). The price paid by U.S. canners for imported albacore, which approximates the spot price on the world market, increased suddenly in the fourth quarter of 1991 (during which the U.N. approved its most recent driftnet resolution), to $2,253 per short ton, or more than 20 percent over the average price of $1,863 during the preceding three quarters of 1991 (table D-40). The price paid for domestically harvested albacore also rose sharply in late 1991. The fourth-quarter price of $2,090 per short ton was 35 percent higher than the average price of $1,553 during the preceding three quarters of 1991 (table D-41).

Production of albacore

Because the U.S. albacore-harvesting sector is completely dolphin-safe,[60] there has been and probably will continue to be no loss of domestic albacore harvest caused by the U.N. driftnet moratoria and U.S. dolphin-safe policies. In fact, production is expected to increase, given the increase in prices paid in foreign and U.S. markets for raw albacore tuna. The higher prices combined with the expected increase in albacore stocks likely will attract new U.S. fishermen. The increase in the U.S. fleet size probably will result in an increase in harvested albacore: however, the U.S.

[58] Section 107 of the FCA addresses the issue of large-scale driftnet fishing and declares that the United States will implement the moratorium called for by the United Nations General Assembly in Resolution 44-225. Section 107 also "supports the Tarawa Declaration and the Wellington Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific." U.S. Code Congressional and Administrative News, 101st Cong., 2d sess., vol. 4. (1990), pp. 4438-4447.

[59] Except where noted otherwise, this analysis excludes the effects that the future expansion of U.S. processing of imported loins may have on the industry. These effects, although potentially significant for the industry and market, are unrelated to the dolphin-safe policy.

[60] William Perkins, president, Western Fishboat Owners Association, transcript of the hearing, Feb. 4, 1992, p. 164.

Figure 3-4
Expected economic effects of dolphin-safe policies on U.S. tuna prices, production, and trade

Time horizon/ Type of tuna	Price	Production	Trade	
			Imports	Exports
Short term				
Raw Tuna				
Albacore	Higher	Higher	Lower	Higher
Tropical tuna	Lower	Lower	Uncertain	Higher
Canned tuna				
Albacore (whitemeat)	Higher	Lower	Lower	n/a
Tropical tuna (lightmeat)	Lower	Uncertain	Uncertain	n/a
Long term				
Raw Tuna				
Albacore	Higher	Higher	Lower	Higher
Tropical tuna	Uncertain	Lower	Higher	Higher
Canned tuna				
Albacore (whitemeat)	Higher	Lower	Uncertain	n/a
Tropical tuna (lightmeat)	Uncertain	Lower	Higher	n/a

Code:
Higher = Higher than would have been the case without the dolphin-safe policies.
Lower = Lower than would have been the case without the dolphin-safe policies.
Uncertain = not clear if effect would be higher or lower.
n/a = Not applicable

Source: United States International Trade Commission.

share of the Pacific harvesting effort is small[61] and so an increase in U.S. fleet size is not likely to dramatically affect the resource.

Prices for tropical tuna

In the short term, prices for tropical tuna have declined and are expected to remain lower for the next few years than they would have without the dolphin-safe policies. The policies have forced vessels to move to the WTP, where tuna are more abundant and require lower variable costs of harvesting. A reduction in variable costs, in turn, tends to reduce raw-tuna prices as well.[62] As discussed below, in the long term, tropical-tuna prices are expected to increase again as resource depletion increases variable harvesting costs.

The reduction in raw-tuna prices occurred quickly. May 1, 1990, was the effective date of the price contract between U.S. canners and the American Tuna Sales Association (the fishermen's marketing organization) that immediately followed the canners' implementation of their April 1990 dolphin-safe policy. On that date, contracted prices fell by 11 to 20

[61] This is indicated by the fact that U.S. harvesters supply 5 to 7 percent of the albacore consumed in the U.S. market. William Perkins, transcript of the hearing, pp. 168-169.

[62] The reason the vessels did not move to this more abundant fishery before the policy implementation is that the move from the ETP to the WTP requires substantial fixed investment in specialized gear and equipment; the dolphin-safe policies essentially forced vessels to incur those costs, and once fixed costs are incurred, only the variable costs of harvesting are important in short term price determination.

percent (depending on species and size) (table D-39). Thereafter, contracted prices rose through late 1990 but fell again in 1991, generally below the prices set in May 1990.

From the tuna fisherman's viewpoint, the price of a particular size of fish is less important than the average unit value of a vessel-load of fish. Thus, a more accurate measure of harvesting vessels' receipts is the average unit value (weighted by fish size) paid by the canners for each species (table D-41). The average unit value for yellowfin, the species most affected by the canners' policy, fell from a first-quarter-1990 level of $968 per short ton to a low of $740 in the last quarter of 1991. The average unit value in 1991 of $852 was 12 percent below the level prevailing before the policy implementation. As for skipjack, its unit-value decline from the prepolicy level of $864 to $785 in 1991 was significant but somewhat smaller than that for yellowfin. Skipjack is dolphin-safe and, unlike yellowfin, is much more abundant in the WTP than in the ETP (table D-34).

The conclusion that dolphin-safe policies are at least partly responsible for the depressed short-term prices and average unit values for raw tropical tuna is based on the effects of the fishermen's shifts between tuna fisheries. As noted above, the shift by some foreign and most U.S. fishermen from the large-yellowfin fishery to the fisheries for skipjack and small yellowfin entails an effective decline in average unit value received by the fishermen, even if canner-contracted prices by fish category do not change. That is, small tuna of any one species receive a lower price from the canner than do large tuna of the same species because the processing costs for the former exceed those for the latter. Thus, although the average unit value for a vessel's delivery of tuna from the ETP will probably be lower because of the policies, the total cost of a unit of canned tuna processed from that delivery (and therefore the wholesale price of canned tuna) probably will not be lower for all canners.

In the WTP, where many U.S. vessels have shifted their harvesting operations, the relatively high abundance of tuna enables fishermen to fill their vessel holds more quickly than was the case in the ETP. More vessels, each filling their holds faster, increase the supply of raw tuna available to canners. The increase in the WTP has been so great that the waiting period for a vessel to unload at the canneries in American Samoa has lengthened significantly, according to industry sources. This situation, as long as it exists, is expected to lead to continued depressed prices.

Production of tropical tuna

The dolphin-safe policies have had little overall short-term effect (although perhaps a slight negative effect) on total U.S. harvests of tropical tuna.[63] However, regional and species-specific implications are significant, even in the short term. The expected regional effects occur in the ETP and the WTP and are apparent in the statistics on U.S. cannery receipts from domestic vessels (tables D-34 and D-35), which reflect a rapid rise in WTP skipjack harvests and a decline in ETP yellowfin harvests. U.S. tuna harvests in the ETP, where most known dolphin-unsafe tuna are found, declined immediately after the canners' policy announcement. U.S. harvesting activity is concentrated in offshore waters where large yellowfin are found in their greatest concentrations; small yellowfin, on the other hand, are found closer to shore, where local fleets are more common. Thus, U.S. fishermen, particularly those with the larger offshore vessels, moved to the WTP, where dolphin-unsafe tuna are not problematic. Those U.S. fishermen that remained in the ETP—accounting for about six vessels in 1992—sold most of their harvest to foreign buyers, partly because much of the harvest was dolphin-unsafe and partly because of favorable prices.[64] The U.S. harvest in the ETP is expected to remain at low levels.

In the WTP, the U.S. harvest has increased as vessels have moved from the ETP and because of resource abundance and availability. This increase has not offset the decline in the ETP harvest, as the data on total U.S. cannery receipts of tropical tuna from domestic vessels indicate (table D-32). When the foreign-vessel harvest is included, the total harvest did rise in 1991 over 1990, enabling a greater supply to be made available to the canners and contributing to the decline in prices in 1991. The higher WTP harvest rate is expected to continue into the foreseeable future.

Trade

In the raw albacore market, imports are expected to be lower and exports higher in the short term than without the dolphin-safe policies. The increase in domestic harvests serves both to reduce import demand by canners and to raise exports, particularly by those U.S. albacore fishermen operating in the South Pacific. The decline in consumption that is expected as the higher prices for raw albacore are passed on to the consumer in the form of higher retail prices for canned whitemeat tuna will also reduce import demand for raw albacore.

The expected effects of the dolphin-safe policies on U.S. trade in raw tropical tuna follow directly from the expected effects on prices and production in both the raw- and canned-tuna sectors. Domestic supply probably will be smaller than without the policies—a decline in domestic production that may be aggravated by an increase in exports as U.S. purse seiners are turned away from oversupplied Samoan canneries. Yet domestic demand for raw tuna is expected to fall because the expected cutback in cannery capacity in Puerto Rico and, perhaps, California will reduce domestic production of canned tuna. The combined effects of a decline in U.S. harvests and a decline in

[63] As explained below, the policies are expected to have a negative effect on long-term harvests.

[64] Richard C. Atchison, executive director, American Tunaboat Association, transcript of the hearing, Feb. 4, 1992, p. 19.

U.S. cannery capacity may offset each other. Thus, the short-term effects on imports of raw tropical tuna are uncertain.

Short-Term Effects in the Market for Canned Tuna

The dolphin-safe policies appear to have had both beneficial and detrimental effects on the marketing of canned tuna, according to some of the industry's marketing research. One would expect that some significant effects of the policies would occur on the demand side, if the marketing of dolphin-safe tuna altered the overall demand for canned tuna. Some consumers appear to have returned to tuna after boycotting it while it was dolphin unsafe, but others, who were unaware of the problem until the canners' announcement, appear paradoxically to have cut back or ceased their tuna consumption. The canners have been unable to fully pass on to the consumer the various costs caused by the policies.[65] The net effect of the policies on canned-tuna marketing is unclear but may be negative in view of the fact that between 1990 and 1991 retail sales of canned tuna fell by 2.5 percent.[66]

Another potentially significant demand-side effect of the policies relates to product quality. It is widely acknowledged that yellowfin produces a higher quality lightmeat than does skipjack.[67] However, the large reduction in supply of raw tuna from the ETP (which is predominantly yellowfin) and the associated increase in supply from the WTP (which is predominantly skipjack) have reduced the proportion of yellowfin to skipjack in U.S.-produced canned tuna. This reduction in turn has also caused a reduction in the perceived quality of the product. As a result, it may be more difficult for U.S. canners to maintain traditional price levels in the canned-tuna market and to pass on any possible price increases.

There also are supply-side effects in the canned-tuna market, including administrative costs associated with documenting the dolphin-safe product,[68] the above-noted loss of imported raw albacore harvested with driftnets, and the geographic disadvantage imposed by the policies on canneries in Puerto Rico and California, which depend much more heavily on ETP tuna than do the canneries in American Samoa.

Prices

The wholesale price of domestic canned lightmeat (tropical) tuna declined immediately following the dolphin-safe policy implementation (table D-44). For example, from a per-case price of $27.45 in the first quarter of 1990, the price of advertised-brand, water-packed lightmeat tuna fell by 8 percent, to $25.31 by the third quarter of that year. After rising at yearend, the price had again fallen to $24.99 by the last quarter of 1991. This trend closely matches that set by prices in the raw-tuna market.

The wholesale price of canned whitemeat (albacore) tuna followed a similar pattern in 1990 but failed to match the decline experienced in the canned lightmeat market in 1991. From a per-case price of $51.40 in the first quarter of 1990, the price of advertised-brand, solid water-packed whitemeat tuna fell by 3 percent, to $50.05 by the third quarter of 1990 but subsequently followed no particular trend. According to industry sources, the rise in the price of raw albacore noted above can be more easily passed on to consumers than in the lightmeat market.[69]

The decline in prices in mid-1990 appears to be largely attributable to the canners' policy announcement, for according to industry sources it reflects the attempt by U.S. canneries to move the old dolphin-unsafe inventory to make room for the new dolphin-safe product. Having generated considerable publicity with their dolphin-safe policy, the canneries were compelled to get the tuna labeled "dolphin-safe" on retail shelves as fast as possible. Another contributing factor to lower prices in 1990, unrelated to the dolphin-safe policies, was the heavy inventory overhang existing at the year's end in 1989, which canners became aware of in 1990 (table D-36). The 1989 ending-inventory level of nearly 244 million pounds far exceeded previous years' inventories (despite a record level of apparent consumption) and so appears to have been dealt with in 1990 by moving the product with lower prices.

In the immediate future, canned-lightmeat prices are expected to be slightly lower than they would have been without the policies, as long as harvest rates in the WTP continue to be unusually high. Prices of canned whitemeat tuna are expected to remain higher than they would have been without the driftnet moratoria because continued tight supplies of raw albacore will maintain high prices of the raw product.

Production

Taken as a whole, U.S. production has not been significantly affected by the dolphin-safe policies; other factors, such as the inventory overhang, cannery closings, and cutbacks (which so far have not been tied to dolphin-safe policies), largely explain the observed trend in production. On a regional basis, however, recent and projected production trends (some of which offset each other) appear to be affected more significantly by the policies.

In California, for example, the only remaining full-scale cannery, Pan Pacific, has suffered increased costs of procuring raw tuna. Its tuna now must be obtained from the WTP instead of the formerly more

[65] Michael McGowan, vice president, Bumble Bee Seafoods, transcript of the hearing, Feb. 4, 1992, p. 134.

[66] Richard C. Atchison, transcript of the hearing, p. 13. However, as Mr. Atchison later testified (transcript, p. 16), this drop in sales could be explained by the effects of the U.S. recession.

[67] Ibid., p. 17.

[68] Michael McGowan, transcript of the hearing, p. 134.

[69] Ibid., p. 138.

important ETP and so incurs greater transportation costs. The labor cost of processing those fish has also risen because the fish are smaller.[70] Because the dolphin-safe policies have caused these costs to increase, there is pressure on Pan Pacific to reduce canned-tuna production. Pan Pacific is more adversely affected by the policies than are the canners in Samoa.[71]

In Puerto Rico all but one of the five canneries had either closed, cut back to a single shift, or made plans to do so by the time the canners' policy had been implemented. These production decisions were made prior to the policy announcement and were largely unrelated to it, according to cannery representatives interviewed by Commission staff.[72] However, future production decisions will be affected by dolphin-safe policies. The Mitsubishi cannery, for example, relies on Ecuador as its sole source of tropical tuna.[73] Ecuador was temporarily subject to the so-called secondary embargo on U.S. imports of yellowfin tuna, a prospect that if continued would have, in the words of the firm's management, "a very grave effect" on the cannery's operation.[74]

According to industry representatives interviewed by Commission staff, canners have been harmed by the supply uncertainty created by the risks of future embargoes and extensions of existing ones. Puerto Rican canneries in general have been forced to rely more heavily on imported supplies; however, imported dolphin-safe tuna from the ETP has been nearly as severely affected by the policies as has been domestic tuna from that region.

The main alternative to the ETP for Puerto Rico is the Atlantic tuna fisheries, where only a handful of U.S. vessels compete with hundreds of European, African, and other foreign vessels. These fisheries, particularly yellowfin and bigeye, have undergone a reduction in harvesting effort as many foreign vessels have transferred to the Indian Ocean. Partly as a result, the stocks of yellowfin and bigeye are improving.[75] This rebound in turn is expected to raise Atlantic catch rates and thereby reduce harvesting costs per unit of harvested fish. Nevertheless, in procuring tuna from the Atlantic fisheries, Puerto Rican canneries come into direct competition with the large and growing European tuna market, which depends almost entirely on tuna from the Atlantic and Indian Oceans. To the extent that such transatlantic competition is problematic, the increased Puerto Rican reliance on imported raw material reinforces competition that was not as relevant to the U.S. industry before the dolphin-safe policies came into effect.

In the near term, production of canned lightmeat tuna in Puerto Rico and California probably will continue to remain below the levels that would have been feasible without the dolphin-safe policies, because of the diminished supplies of tropical tuna from the ETP. Imported tuna loins may offset some of this decline, but unless the quality-control problems can be overcome, this alternative will not enable the canneries in Puerto Rico or California to maintain past volume levels.

In American Samoa, canned-lightmeat production probably will remain at strong levels as long as harvesters find it uneconomical to operate in the ETP. As discussed above, WTP harvests are high and the Samoan canneries are fully supplied—a situation that is partly the result of the dolphin-safe policies and which is expected to continue at least through the next few years.

Canned whitemeat production in every geographic region of the U.S. industry is expected to fall below the levels that would have been achieved without the driftnet moratoria, because of the tight supplies of raw albacore. This situation probably will continue at least through the next few years, until the driftnet fleet is replaced and the albacore resource has recovered from its depleted state. The tight albacore market increases the likelihood of further cutbacks or closures in all of the Puerto Rican canneries except Bumble Bee, which has a dominant share of the market and reportedly has been able to obtain its albacore needs.

Trade

In the short term, U.S. imports of lightmeat canned tuna probably will not be significantly different from the level that would have prevailed without the dolphin-safe policies, because the overall effect on U.S. production is uncertain. Eventually, imports probably will rise above the levels that would have prevailed without the policies, because of both a decline in U.S. production, especially in Puerto Rico, and the diversion of foreign countries' exports away from the foreign

[70] Kevin T. Dolan, president, Pan Pacific Fisheries; transcript of the hearing, Feb. 4, 1992, pp. 186-187.

[71] In the cases of Pan Pacific and some canners in Puerto Rico, other, unrelated factors, such as the increased processing of imported loins, have offset this pressure and have allowed the canneries to maintain volume. Kevin T. Dolan, transcript of the hearing, pp. 188; William P. Woods, transcript of the hearing, p. 125; Michael McGowan, transcript of the hearing, p. 137; and Michael Dunn, vice president, Mitsubishi Foods (Caribe Tuna), transcript of the hearing, p. 157.

[72] One industry representative attributed the production cutbacks to industry-specific import competition. "The job losses that took place during 1990 which were principally closures of plants and reductions of scale in Puerto Rico I believe were not likely reversible unless the tariff structure is changed. . . . [They were] not part of the business cycle." William P. Woods, vice president, StarKist Foods, transcript of the hearing, Feb. 4, 1992, pp. 107, 128.

[73] Michael Dunn, transcript of the hearing, p. 159.

[74] Ibid.

[75] Jacques Marcille, "Tuna Stocks and Tuna Fishing—Present Situation and Trends," *Tuna 91 Bali*, Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, pp. 2-3.

dolphin-unsafe markets.[76] U.S. imports of canned whitemeat tuna probably will be lower than they would have been without the dolphin-safe policies, because both domestic and foreign production is expected to be lower than otherwise.

Long-Term Effects in the Market for Raw Tuna

The expected longer term effects of the dolphin-safe policies on U.S. albacore fishermen are unambiguously positive: higher prices and potential U.S. production levels than without the policy actions. These effects are expected because U.S.-harvested albacore is entirely dolphin-safe and because the U.S. albacore harvest is only a portion of the international harvest of the albacore resources of the Pacific Ocean.

The expected effects on the purse seine fleet are less clear. One expected effect is a long-term increase in the average cost of harvesting tropical tuna in both the ETP and WTP fisheries. This increase in costs probably will drive some U.S. purse seiners out of the fishery or will raise tropical-tuna prices.

Prices for albacore

Although the U.S. albacore harvest probably will rise, the total world harvest is expected to decline, thereby tending to put upward pressure on the price of raw albacore in international trade and thus on the price received by the U.S. fleet. This effect has been seen in the short-term; as noted, spot prices for albacore rose almost immediately after the imposition of the policies. But even in the long term, the higher price probably will not increase supply enough to completely replace that lost by the elimination of the driftnet fleet. Thus, prices for raw albacore are expected to remain higher than they would have been in the absence of the policies.

Production of albacore

As noted earlier, driftnets have accounted for 25 to 30 percent of the world albacore harvest in recent years. The share of the Pacific albacore harvest may be even greater because the Pacific probably has a greater concentration of driftnets than other oceans do. A moratorium on driftnets will eliminate these foreign fleets and will significantly reduce the total level of international fishing effort in the Pacific albacore fishery. A smaller active international fleet in turn will allow the albacore stock to increase in size. Such a stock increase would take a number of years, depending on the rate of natural reproductivity of the resource, environmental events such as the El Niño, and the extent to which nondriftnet fleets replace the driftnet fleets.[77] A stock increase will reduce albacore harvesting costs. This reduction, combined with an increase in prices, is expected to induce more U.S. fishermen to enter the albacore fishery. Thus, production of albacore by the U.S. fleet is expected to be higher than in the absence of the driftnet moratoria.

Prices for tropical tuna

The long-term effect of the dolphin-safe policies on prices of raw tropical tuna is uncertain. Long-term average unit values (i.e., weighted-average prices) received by the typical U.S. tropical-tuna fisherman probably will decline as a result of the policies, because the vessel's harvest from now on will consist of smaller fish (skipjack and small yellowfin) than before the policies. As noted elsewhere, the lower price for small fish merely reflects the higher processing costs associated with small fish.

However, harvesting costs for all dolphin-safe tuna are expected to rise in the long term because the dolphin-safe policies will cause an increase in harvesting effort on such dolphin-safe tuna. Therefore, the short-term decline in the prices of raw tropical tuna will be partly or completely offset by a longer-term increase in such prices as such abundance is diminished. Thus, it is not presently clear as to whether the long-term prices will be higher or lower than in the absence of the policies.

Production of tropical tuna

In the long term, the quantity of tropical-tuna harvested by U.S. fishermen is expected to be lower than it would have been without the dolphin-safe policies. This conclusion rests largely on the fact that currently there is a 50-vessel limit on U.S. participation in the WTP tuna fisheries of the member nations of the South Pacific Forum Fisheries Agency. (See chapter 4.) An increase in this quota may or may not result from current U.S.-SPFFA negotiations to extend the treaty authorizing U.S. vessel participation. However, the quota is now almost filled; therefore, without an increase in the quota there can be no significant increase in the U.S. tuna harvest in the WTP. This constraint, combined with the low present and future U.S. tuna harvests in the ETP, suggests a long-term drop in U.S. tropical tuna harvests below what would have prevailed had the U.S. fleet not been diverted from the ETP because of the dolphin-safe policies.

Trade

In the long term, U.S. imports of raw albacore are expected to be lower and U.S. exports are expected to be higher than in the absence of the policies. The higher prices anticipated because of reduced world

[76] This conclusion assumes that both the current scale of U.S. loin processing and the dolphin-unsafe status of markets in Europe and Latin America remains unchanged.

[77] Some of the foreign harvesting vessels using driftnets probably would be converted to dolphin-safe technology (e.g., poles-and-lines), but in view of the greater efficiency of driftnets over such other methods, it is unlikely that all of the harvesting effort represented by these vessels would be converted. Thus, in the long run, one can reasonably expect a net decrease in international harvesting effort in the albacore fishery.

supplies are expected to reduce U.S. canners' total purchases of raw albacore. The expected increase in U.S. production of raw albacore in response to the higher prices will probably lead to increased exports since some of the existing fleet or probable new entrants may elect to deliver their catch to foreign canners. However, since the U.S. fleet currently supplies less than 9 percent of the albacore consumed in the U.S. market and exports little of its catch (table D-33), such anticipated increases in exports would have little net effect on trade.

Both U.S. imports and U.S. exports of raw tropical tuna are expected to be higher because of the dolphin-safe policies. Despite the expected long-term production decline owing in part to the current constraints on the size of the purse seine fleet in the WTP, the fleet would be expected to deliver an increasing share of its catch to foreign buyers. Thus imports of raw tropical tuna are expected to be higher to offset some of the reduction in the supply of U.S.-caught tuna to domestic canneries.

Long-term Effects in the Market for Canned Tuna

Whitemeat

U.S. production of canned whitemeat tuna is expected to be lower because of the long-term decline in the world catch of raw albacore.[78] Both domestic and foreign canned-tuna production will be adversely affected by this reduction in raw-albacore availability. The price in the U.S. market is expected to be higher than would have been the case without the dolphin-safe policies. Since consumption is expected to decrease, it is unclear as to whether imports will increase or decrease.

Lightmeat

Domestic production is expected to decline, especially in Puerto Rico, as the supply of raw tropical tuna from the ETP declines.[79] In contrast, canned-tuna production in Samoa probably will continue to be strong, but capacity constraints (such as fresh water availability) will prevent a significant increase in production despite the rising availability of raw tropical tuna from the WTP.[80] This rising availability will therefore probably help foreign canners near the WTP to increase production, which will increase the U.S. supply of imported canned tuna. The effect on the overall U.S. supply of canned lightmeat tuna is uncertain, therefore, because imports are expected to be higher, and domestic production lower, than had the dolphin-safe policies not been implemented. Because the net effect on U.S. canned-tuna supply cannot be determined, the price in the U.S. market also cannot be determined. If the increase in canned-tuna imports exceeds the decline in domestic production, prices will fall, and vice versa.

[78] This decline in world catch is relative to recent years and acknowledges that continued use of driftnets would further deplete the resource and thus lead to an even lower world catch.

[79] The long-run effects of the dolphin-safe policies on the Puerto Rican canneries are similar to (and not easily distinguished from) other, unrelated factors that have induced the capacity cutbacks and plant closures that have been observed in recent years.

[80] For additional information about the industry, see U.S. International Trade Commission, *Tuna: Competitive Conditions Affecting the U.S. and European Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990; USITC, *Competitive Conditions in the U.S. Tuna Industry* (investigation No. 332-224), USITC publication 1912, Oct. 1986; and, USITC *Certain Canned Tuna Fish* (investigation No. TA-201-54), USITC publication 1558, Aug. 1984.

CHAPTER 4
INTERNATIONAL FISHERY ACCESS AGREEMENTS AND ISSUES

The Treatment of Tuna in U.S. and Foreign Fishery Conservation Zones

Prior to 1992, the United States excluded tuna from its jurisdiction under its 200-nautical-mile fishery conservation zone (FCZ) and did not recognize other nations' claims concerning tuna within their zones. As of January 1, 1992, however, the United States claims exclusive control over the tuna resources within 200 nautical miles of the U.S. coastline and recognizes the 200-mile fishery conservation zones of other nations. Most foreign nations already exercise exclusive control of tuna within their 200-mile boundaries.[1] The long-standing U.S. policy of excluding tuna from fishery-management jurisdiction within the FCZ led to a series of bilateral and multilateral treaties and negotiations with other countries concerning tuna management.

One of the most important issues in these treaties and negotiations is access by foreign fleets to tuna stocks when such stocks pass through a coastal nation's EEZ. The access issue has several facets. From the perspective of a foreign tuna-fishing fleet, the main goal in concluding an access agreement is uninterrupted access to migrating tuna stocks to keep operating efficiently. From the perspective of the coastal nation, the advantages of access agreements include (1) developing its own harvesting capability to take advantage of the tuna near its shores, (2) capturing some of the economic value of the fish by charging other nations a fee for the right to harvest the resource, and (3) safeguarding its resources from overfishing by foreign fleets. In addition, the coastal nation might seek to maintain national security by preventing unwanted access to waters close to shore.

With as many as 30 different maritime boundaries around the Continental United States, Alaska, Hawaii, and various territories and possessions, the United States has found it necessary to negotiate a variety of treaties governing other nations' access to fisheries under U.S. jurisdiction. Of equal importance to the U.S. fishing industry are the agreements negotiated for U.S. access to other nations' waters.

[1] The body of law governing most international fisheries issues, excluding trade, is the third United Nations Conference on the Law of the Sea (UNCLOS). The United States, for reasons not related to fisheries, is one of the few coastal nations that is not a signatory to UNCLOS. Under UNCLOS, each nation has exclusive tuna management authority within its Exclusive Economic Zone, which includes its FCZ.

Background of the U.S. Fishery Conservation Zone

Concern over the depletion and overfishing of fisheries off the U.S. coast led to the enactment of the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA).[2] The MFCMA, which became effective on March 1, 1977, established the U.S. FCZ (the so-called 200-mile limit) to provide for the conservation and exclusive management by the United States of most fishery resources. Section 103 of the MFCMA specifically excluded from national jurisdiction "highly migratory species" such as tuna. Additionally, the MFCMA made clear that the United States did not recognize any other nation's claims or jurisdiction over tuna resources beyond the nation's territorial sea (12 nautical miles off the coast). This position was reinforced by a Presidential proclamation establishing a 200-mile U.S. EEZ in March 1983—an act that brought under U.S. control, in addition to the fisheries resources covered by the MFCMA, most of the natural resources in the seabed, subsoil, and waters within 200 miles of the U.S. coast. The only exception was for highly migratory species of fish. Section 205 authorizes an embargo of fisheries products from any nation that seizes a U.S. vessel fishing within a foreign nation's EEZ on the basis of jurisdictional claims not recognized by the United States.[3]

Rationale for the Exclusion of Tuna From the U.S. Fishery Conservation Zone

The rationale behind the exclusion of tuna from the U.S. FCZ was that tuna typically spend only a few weeks or months per year in the waters adjacent to any one country, thus no one country has the ability to effectively manage or control the fishing of these populations. The U.S. position has been that the proper management arrangement is a multilateral one, preferably including all nations in the region within which tuna populations migrate. In addition, because most of the tuna harvested for canning has been caught on the high seas or off foreign shores, little economic loss was perceived by permitting foreign vessels unlimited access to tuna in U.S. waters.[4]

In recent years, however, domestic pressure to include tuna within the U.S. 200-mile limit surfaced from sport fishermen, charterboat owners, and other interests with a stake in the tuna fisheries of the East Coast and the Gulf of Mexico. These fisheries are not targeted by vessels supplying the cannery sector. Rather they primarily support recreational fishermen

[2] 16 U.S.C. 1801, et. seq.

[3] As a practical matter, this embargo provision was rendered obsolete by the inclusion of tuna in the 200-mile limit.

[4] U.S. Senate, Committee on Commerce, Science, and Transportation, *Tuna Management*, 101st Cong., 1st sess. July 20, 1989, pp. 1-2.

and the small but growing U.S. restaurant demand for fresh tuna and sushi.[5]

Recent Changes in the U.S. Fishery Conservation Zone Relating to Tuna

On November 28, 1990, the President signed into law the Fishery Conservation Amendments Act of 1990 (FCA).[6] Section 103 of the FCA amends the MFCMA by dropping the existing tuna exclusion and extending U.S. FCZ management authority to include tuna species effective January 1, 1992. The Secretary of Commerce is responsible for the management of tuna and other highly migratory species along the East Coast, and the Pacific Fishery Management Council is responsible for such stocks in the Pacific.

Section 105 of the FCA calls for the strengthening of international fishery agreements. The Secretaries of State and Commerce are to initiate negotiations to gain access for U.S. tuna vessels fishing within other nations' EEZs. In addition, the U.S. Government is to begin negotiations with governments of nations who have signed the South Pacific Tuna Treaty to extend the treaty for 10 years.[7] U.S. vessels fishing without permission in the waters of a foreign nation's EEZ will no longer be protected against seizure under the provisions of the Fishermen's Protection Act.

Impact of Recent Changes to the Magnuson Act on the U.S. Tuna Industry

The amendment to the Magnuson Act that effectively recognizes other nations' claims to tuna jurisdiction within their FCZ has had minimal impact on the U.S. purse seine fleet.[8] Currently there are only six U.S. purse seiners fishing in the Eastern Tropical Pacific (ETP). Most such vessels fish outside the FCZs of coastal nations.

An additional, related concern is that the Mexican Government has denied licenses for U.S. baitboats and small purse seiners following the U.S. embargo on Mexican tuna. Those boats that choose to risk seizure by venturing unlicensed into Mexican waters are no longer protected against financial loss resulting from such seizure under the provisions of the Fishermen's Protection Act. Consequently, without an access agreement between the United States and eastern Pacific Rim nations, this fleet probably will cut back its production of tuna for U.S. canneries in California and Puerto Rico.

The Fishermen's Union of America[9] contends that U.S. vessels need access to coastal nations' FCZs in the ETP and that the amendment has injured U.S. fishermen. Mexico, whose waters are rich with tuna, has never permitted large U.S. purse seiners in their FCZ; however, as noted, such vessels were protected against the financial loss from seizure by U.S. law. According to the union, U.S. vessel owners are now unprotected by current U.S. law and must seek more distant waters to fish (such as the WTP or Indian Ocean). Thus, crew members must be absent from their families for longer periods or must exit the industry. Some vessels are too small to fish the WTP, and some vessel owners cannot afford the expense to reoutfit their vessels to adjust to conditions of the WTP. Consequently, some vessel owners have been forced into bankruptcy.

In 1982, the Western Fishboat Owners Association (WFOA) negotiated an industry-to-government access agreement to Mexican waters for U.S. baitboats,[10] thus the Magnuson Act had no direct bearing on WFOA's baitboats' access to Mexican waters. However, following the U.S. embargo on Mexican tuna during the fall of 1990, no baitboat licenses were issued for 1991. Some baitboat owners continued to fish in Mexican waters under the protection of the Magnuson Act. The baitboats, like the purse seiners, lost this safeguard effective January 1, 1992, under the amended act.[11] These vessels supplied most of Pan Pacific Fisheries, Inc.'s raw material needs. William Perkins, president of WFOA, testified at the Feb. 4, 1992, ITC hearing that without access to Mexican waters the U.S. baitboat fleet would be unable to supply a sufficient quantity of raw tuna to Pan Pacific.[12]

Pan Pacific reported that a U.S.-Mexican fisheries access agreement would benefit small baitboats, the longline fleet, and small purse seiners (less than 400 tons). These vessels fishing within Mexico's EEZ could provide ample supplies of raw tuna to Pan Pacific's cannery as well as serve the Puerto Rican canneries. The availability of tuna from this source would contribute to the cost efficiencies of these canneries.[13] Without an agreement, Pan Pacific will have to rely more on imports of tuna loins or incur additional transportation cost to purchase raw tuna from more distant waters.[14]

Fishery Access Treaties and Negotiations

Because most U.S. tuna vessels operate beyond the U.S. EEZ, access by U.S. tuna harvesters to tuna stocks

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[5] U.S. Senate, Committee on Commerce, Science, and Transportation, William Paty, chairman, Western Pacific Fishery Management Council, testimony before the committee, *Tuna Management*, 101st Cong., 1st sess. July 20, 1989, pp. 69, 73.

[6] Public Law 101-627.

[7] See the additional discussion on the South Pacific Forum Fisheries Agency, later in this chapter.

[8] Richard C. Atchison, executive director, American Tunaboat Association, transcript of the hearing, Feb. 4, 1992, p. 31.

[9] Theresa Hoinsky, president, Fishermen's Union of America, transcript of the hearing, Feb. 4, 1992, p. 72.

[10] See U.S. baitboats agreement with Mexico later in this chapter.

[11] William Perkins, president, Western Fishboat Owners Association, transcript of the hearing, Feb. 4, 1992, pp. 162-170.

[12] Ibid., pp. 162-183.

[13] Pan Pacific Fisheries, Inc., posthearing submission by counsel, Apr. 15, 1992, p. 15.

[14] Kevin T. Dolan, president, Pan Pacific Fisheries, Inc., transcript of the hearing, Feb. 4, 1992, pp. 191, 195.

is controlled primarily by foreign governments and international agreements. There has been a history of disputes with other nations over access by U.S. tuna harvesters to the territorial waters claimed by other nations. As a result of U.S. recognition of other nations' EEZs, the U.S. Government will be more likely in the future to initiate negotiations to gain access for U.S. tuna vessels to fish within other nations' EEZs.

To improve tuna management and to settle disputes over U.S. access to territorial waters claimed by other nations, the United States has negotiated a series of multilateral and bilateral agreements and treaties as well as taking other measures. These agreements and treaties are summarized in figure 4-1. Initially, the U.S. sought multilateral management of tuna resources in the ETP as this region was the principal fishing grounds for U.S. tuna harvesters. Resource management was also the impetus behind the establishment of the International Convention for the Conservation of Atlantic Tunas. As the U.S. tuna fleet sought more distant waters, (i.e., the South Pacific in the 1980s) access to the fishing grounds became increasingly important, resulting in the negotiation of access agreements.[15] For the most part these treaties and agreements have been negotiated under the authority of the MFCMA. Although many of the treaties have concerned species other than tuna, only those concerning tuna are discussed below.

Inter-American Tropical Tuna Commission

The Inter-American Tropical Tuna Commission Convention of 1950 was the first major treaty concerning tuna. It originally entered into force as a result of an agreement between the Governments of the United States and the Republic of Costa Rica, but it has always been open to all other governments whose nationals fish for tropical tuna in the ETP. In addition to Costa Rica (which withdrew in 1979, then rejoined in 1989) and the United States, later adherents to the convention (and their periods of membership) have included Panama (1953 to the present), Ecuador (1961-68), Mexico (1964-78), Canada (1968-84), Japan (1970 to the present), France (1973 to the present), and Nicaragua (1973 to the present).

The convention established the Inter-American Tropical Tuna Commission (IATTC), a scientific body charged with the responsibility to conduct—

> investigations concerning the abundance, biology, biometry, and ecology of yellowfin (*Neothunnus*) and skipjack (*Katsuwonus*) tuna in the waters of the eastern Pacific Ocean . . . and the kinds of fishes commonly used as bait in the tuna fisheries . . . and of other kinds of fishing vessels; and the effects of natural factors and human activities on the abundance of the populations of fishes supporting all these fisheries.

and to—

> Recommend from time to time, on the basis of scientific investigations, proposals for joint action... designed to keep populations of fishes covered by this Convention at those levels of abundance which will permit the maximum sustained catch.[16]

Although it preceded the MFCMA by over a quarter of a century,[17] the IATTC originally established and continues to advocate a tuna management system consistent with the U.S. approach, namely, a multilateral management program jointly carried out by all nations having an interest in the tuna resource. However, the contrasting unilateral approach favored by almost all other coastal nations has been a particularly strong factor in the weakened management ability (as well as the high rate of turnover of signatories) of the IATTC. The IATTC's recommended regulations thus far have applied only to yellowfin tuna, the only species in the region that has suffered unsustainably high harvest rates.[18] Yellowfin regulations apply to harvesters operating in the Commission Yellowfin Regulatory Area (figure 4-2).

Since the late 1970s, however, many IATTC member nations, including the United States, have refused to adhere to the catch limits and other IATTC recommendations designed to prevent overfishing of the tuna stocks. Such refusal has been based primarily on the grounds that there is no assurance that such catch limits would be honored by nonmember countries (most importantly Mexico), which harvest large amounts of tuna in the area.[19] Consequently, what were actual quotas are now recommended catch levels, and IATTC's role has diminished from an effective resource management body to an advisory body with significantly less effective management control over the tuna stocks under its purview.[20]

South Pacific Forum Fisheries Agency

The South Pacific Forum Fisheries Agency (SPFFA) is a consortium of 16 nations (including Australia, New Zealand, and 14 smaller island nations in the region) and the Pacific Trust Territory located in the WTP (figure 4-3). Among other activities, the SPFFA manages the fishery resources within the 200-mile EEZs of the member nations. Tuna is by far

[15] As a result of the movement of many U.S. boats to the WTP in 1990-91, access agreements in this area have become a serious concern for the U.S. fleet.

[16] From article II of the IATTC Convention; quoted in each issue of the Inter-American Tropical Tuna Commission's *Annual Report.*

[17] In 1976 the Commission's responsibilities were widened to include dolphin analyses. See chapter 3 for further discussion.

[18] National Marine Fisheries Service, *International Fishery Agreements Memorandum,* Jan. 11, 1990.

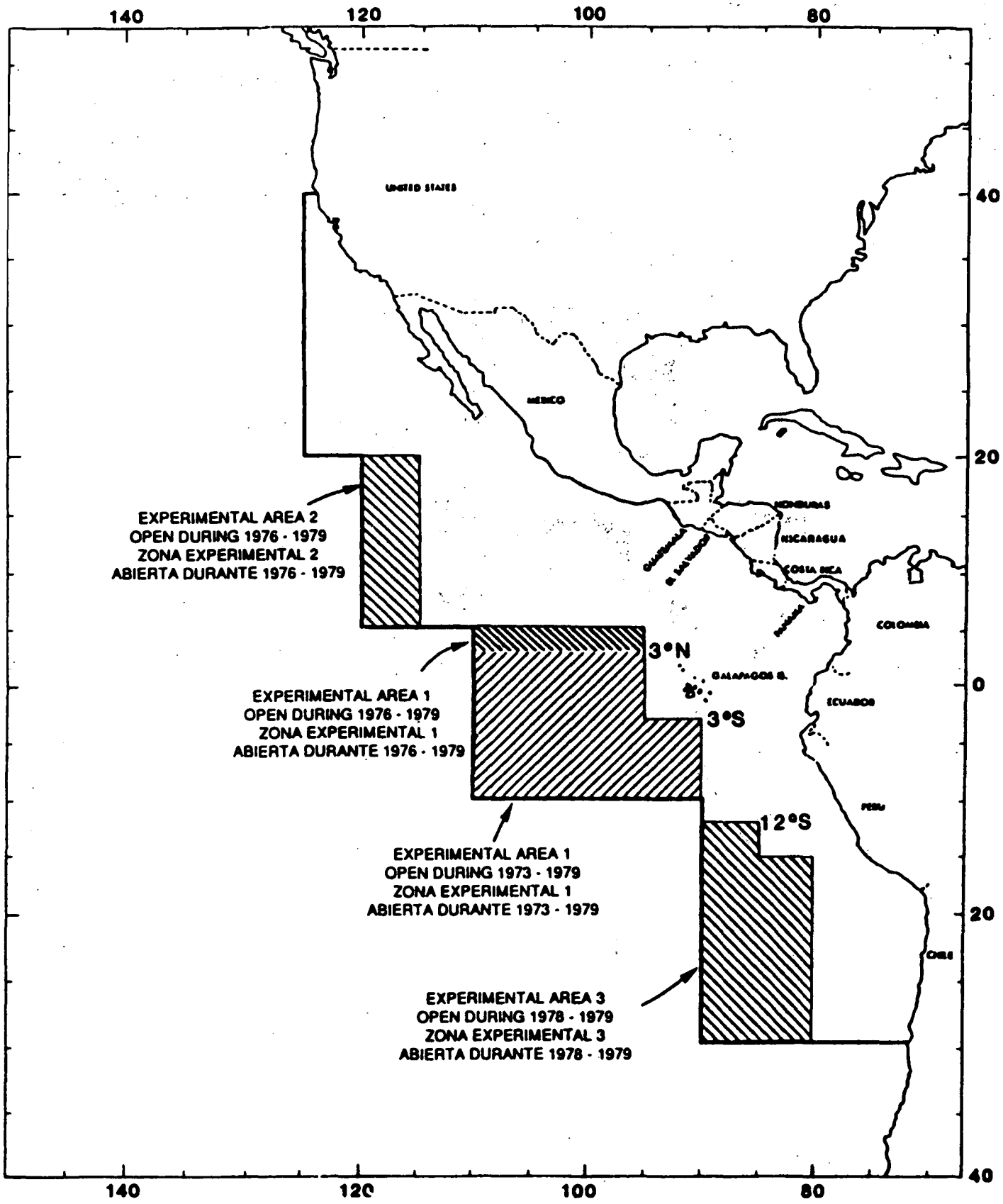
[19] Ibid.

[20] The IATTC continues to strongly advocate effective tuna management and to warn against the consequences of poor or ineffective management. James Joseph (IATTC director), "The Conservation Ethic and Its Impact on Tuna Fisheries," *Tuna 91 Bali,* Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, pp. 12-18.

Figure 4-1
U.S. Fishery Agreements

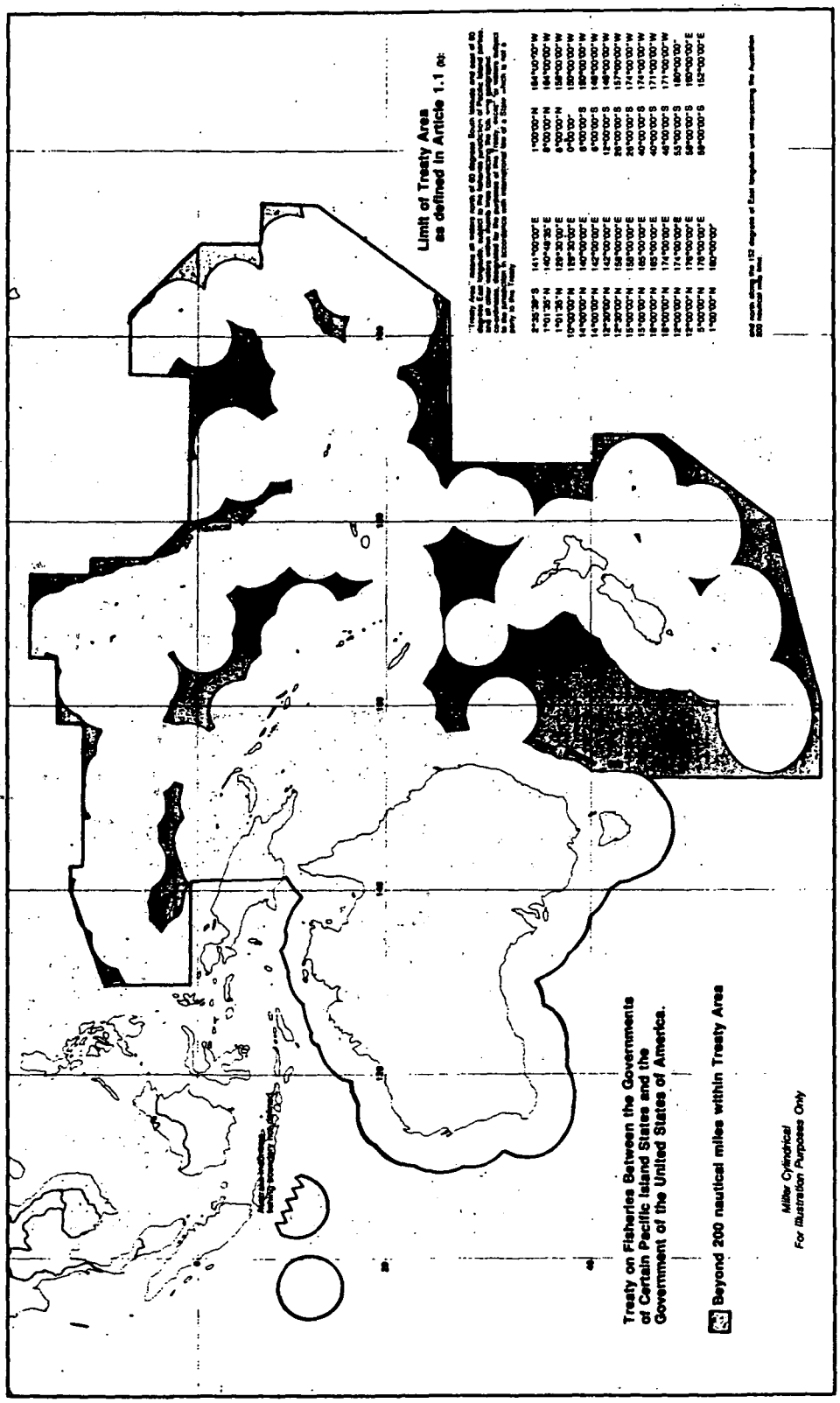
Treaty	Date	Purpose
U.S. Baitboats Agreement with Mexico	1940s 1976 1982 1991	• Enabled U.S. baitboats and small purse seiners access to Mexican waters • Mexico withdraws license agreement with the passage of the Magnuson Act • Licensing program for baitboats and disadvantaged purse seiners reestablished • Mexico denies licenses subsequent to the U.S. embargo on Mexican tuna
Inter-American Tropical Tuna Commission (IATTC)	1950	• Scientific body responsible for tuna management in the eastern Pacific Ocean
International Convention for the Conservation of Atlantic Tunas (ICCAT)	1969	• Management of tuna resources, primarily northern bluefin, in the Atlantic Ocean • Quotas first set for bluefin in 1975 • In April 1992, the United States, Canada, Japan, and Morocco agreed to reduced their harvest of Atlantic bluefin to avoid a possible international ban on the harvesting of Atlantic bluefin
Treaty on Pacific Coast Albacore Tuna Vessels and Port Privileges	1982	• Provides for bilateral access to fishing grounds and to certain ports for U.S. and Canadian albacore fleets
South Pacific Forum Fisheries Agency (SPFFA)	1986	• Provides U.S. tuna fleet licensed access to various Pacific nations' tuna resources located in the southern and western Pacific
U.S-France	1991	• Provide U.S. tuna fleet access to territorial waters of France, namely New Caledonia, and Wallis and Futuna Islands

Figure 4-2
The Inter-American Tropical Tuna Commission Yellowfin Regulatory Area (CYRA)



Source: Inter-American Tropical Tuna Commission.

Figure 4-3
South Pacific Tuna Fisheries Treaty and Ocean Territorial Claims



Source: U.S. Department of State.

the most important of these fishery resources, but the member nations of the SPFFA do not have the capability to harvest the entire annual catch possible from these resources, and hence there is considerable interest among non-SPFFA nations (such as Japan, the former Soviet Union, and the United States) in obtaining access to the tuna fisheries.

U.S. tuna fishermen first began fishing in the region in significant numbers in the early and mid 1980s, when poor harvests in the ETP induced many to relocate to the WTP. Marketing the catch was easy because for many years two of the largest U.S. tuna canneries have been located in American Samoa. The harvest rates have been consistently high since then, and in recent years almost every U.S. tuna purse seiner has conducted most or all of its fishing effort in the WTP.

The refusal of the United States to recognize unilateral management jurisdiction over tuna within a nation's EEZ, combined with the limited ability of many SPFFA members to enforce their 200-mile EEZs, enabled U.S. tuna fishermen to operate in the region almost with impunity (occasional vessel seizures by offended foreign governments aside[21]). There were a few instances of U.S. industry negotiations with individual island nations for access to their EEZ, but for the most part, U.S. tuna fishermen fished the region without local permission.

As the number of seizures grew, pressure mounted for the United States to conclude some form of access agreements. The preferred approach for the U.S. Government was a regionwide agreement, which was in keeping with the U.S. position (backed up by certain provisions of the U.N. Law of the Sea) that highly migratory species such as tuna are best managed under a single scheme jointly by all nations in the resource's migration route. In this respect the SPFFA was regarded as the ideal negotiating partner, because its membership encompassed the WTP tuna fishing grounds. After lengthy, often difficult negotiations,[22] an agreement was concluded between the United States and the SPFFA that provided for access to the region's tuna fishing grounds for 50 U.S.-flag vessels, in exchange for an annual fee of $50,000 per vessel and a lump-sum contribution of $12 million (in cash and in-kind development assistance) from the U.S. Government. The agreement is currently being renegotiated.[23]

[21] And even in those cases, the U.S. Government backed up the U.S. fishermen with financial and legal support to regain the vessel, under the provisions of the Fishermen's Protective Act, because the vessel was seized on the basis of claims to jurisdiction that are not recognized by the United States.

[22] U.S. International Trade Commission, *Competitive Conditions in the U.S. Tuna Industry* (investigation No. 332-224), USITC publication 1912, Oct. 1986, pp. 38-40.

[23] Section 105 of the Fishery Conservation Amendments Act of 1990 directs the U.S. Government to begin negotiations with the SPFFA to extend the existing treaty for 10 years.

By all accounts, according to industry representatives and government officials contacted by Commission staff, the agreement has been a success. As noted, the fishing has been good and the revenues received by SPFFA members have been used to develop the local economies, which in many cases center on the fishing industry.

The dolphin-safe policy has made access to the WTP critical to the U.S. fleet and to the canneries operating in American Samoa. The U.S. tuna industry considers it extremely important that the U.S. Government renegotiate the SPFFA agreement, as it is currently the only significant region available to the U.S. tuna fleet. By December 1991, a tentative agreement had been reached increasing the number of U.S. licenses to 55 for a 10-year period.[24]

U.S. Agreement With France

The "Agreement Between the Government of the United States of America and the Government of the French Republic on Matters Relating to Fishing in the Economic Zones of the French Overseas Territories of New Caledonia and Wallis and Futuna Islands" was signed March 1, 1991, and became effective November 1, 1991. The U.S. tuna fleet was interested in gaining access to these waters, as some of these areas are close to waters covered by the SPFFA treaty. In addition, U.S. vessels that navigate the waters of New Caledonia en route to and from ports in New Zealand and Australia consider the region a possible source for tuna.

Conditions and terms of the agreement are to be established jointly each year by the parties. During the first year, 25 licenses will be available for New Caledonia and 7 licenses for Wallis and Futuna Islands. The first year is primarily dedicated to exploratory fishing to help determine access terms for future years. A lump-sum access fee of 1 million French Francs (F) (US$150,000) for New Caledonia and F500,000 (US$75,000) for Wallis and Futuna Islands is required before licenses are issued. Subsequently each vessel must pay F40,000 (US$6,000) for an annual fee to include both areas. Fees will be paid entirely by the U.S. tuna fleet; no financial support is provided by the U.S. Government. In addition, the U.S. fleet must provide the French Government with data on the species and quantity harvested in the access areas.[25]

International Commission for the Conservation of Atlantic Tunas

The tuna resources of the Atlantic Ocean support a very small part of the U.S. canned tuna industry. Less than 5 percent of the tuna catch is taken in Atlantic waters, and most of that goes to the fresh market, not canneries. Management of these resources, like those

[24] Van Camp Seafood Co. Inc., posthearing brief, Apr. 15, 1992.

[25] U.S. Secretary of State, "Report of the Secretary of State to the Congress of the United States on the Status of Efforts to Negotiate Access Agreements for U.S. Vessels to Fish for Tuna in the Exclusive Economic Zones of Other Countries," Aug. 18, 1991, pp. 3-5.

of the Pacific Ocean, is carried out mainly by the ICCAT, which was established by the International Convention for the Conservation of Atlantic Tunas. ICCAT has a total membership of 22 nations, the most important of which (in terms of active management responsibilities) are the United States, Japan, and Canada. The only tuna species of significant concern to ICCAT is northern bluefin (Thunnus thynnus), which is the most populous Atlantic tuna species and the only Atlantic tuna species for which there is sufficient evidence of depletion to indicate a need for management. In 1975 ICCAT began setting annual quotas to limit the bluefin harvest in the Atlantic. The quota on the total annual harvest was allocated among fishing nations on the basis of their past respective shares of the total harvest. These same proportions continued as the basis for allocations through the 1980s as well and, until the passage of the Fishery Conservation Amendments Act of 1990, remained the principal basis of Atlantic bluefin fishery management by the United States. The current quota is set at 2,660 metric tons and is allocated among the United States, Japan, and Canada.

As noted, the Atlantic tuna resource is of little concern to the canned tuna industry and the fishermen that supply tuna to the canneries. Instead, almost all Atlantic bluefin goes to the "fresh" tuna market,[26] where it enjoys rapidly growing popularity, especially among consumers of sashimi (raw fish, usually tuna) and sushi (raw or cooked fish wrapped in rice and seaweed). Atlantic bluefin is especially prized by Japanese consumers.

The great popularity of bluefin in Japan and in the United States has added pressure on ICCAT to restrict the harvest of this species. However, because the fishery is largely a sport fishery and because ICCAT has no enforcement power, its management success has been viewed by many in the United States as limited. Therefore, largely in an effort to better regulate bluefin harvesting, the United States in 1990 reversed its longstanding position of excluding tuna from its EEZ. This action means that unilateral tuna management, if effectively carried out, could largely replace ICCAT.

In the autumn of 1991, the Government of Sweden called for a ban on international trade in Atlantic bluefin, on the grounds that the resource is so excessively depleted that it is an endangered species. The Swedish proposal was to be voted on by the signatory countries to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (known as CITES) in March 1992.[27] Sweden withdrew its proposal after negotiating an agreement with the United States, Canada, Japan, and Morocco. These four nations agreed to reduce their bluefin harvest, to be monitored under the authority of the ICCAT, and to keep CITES informed on the status of the bluefin tuna population.[28]

Albacore Agreement With Canada

A dispute between the United States and Canada concerning jurisdiction over certain Pacific Ocean albacore resources peaked in 1982, when the Canadian Coast Guard seized a U.S. albacore vessel for illegally fishing within Canada's EEZ. To settle this dispute, the two nations concluded the Treaty on Pacific Coast Albacore Tuna Vessels and Port Privileges.[29]

The treaty provides for bilateral access to fishing grounds and is unique in that it also provides for bilateral access to certain ports by albacore fishing vessels seeking to land their catch. Normally, under the provisions of the so-called Nicholson Act,[30] no fish may be landed directly to a U.S. port (including Puerto Rico but excluding insular possessions such as American Samoa) by a foreign-flag fishing vessel. The United States-Canada albacore treaty is the only exception to that law.

U.S. Baitboats Agreement With Mexico

The Western Fishboat Owners Association (WFOA) represents the small boats in the tuna industry, primarily albacore trollers and baitboats. The WFOA currently represents 300 vessels with the flags of 7 different nations. Although large purse seine vessels have never successfully negotiated fishing access agreement with Mexico, small U.S. tuna boats have traditionally been licensed to fish in Mexican waters. With the enactment of the Magnuson Act in 1976, such licenses were withdrawn. In late 1982, the tuna fishing industry reestablished a licensing program for U.S. baitboats and disadvantaged purse seiners.[31] Initially 144 U.S. vessels were licensed to fish in Mexican waters; however, due to attrition, only 14 vessels now qualify for licenses.

In the fall of 1990, the United States placed an embargo on Mexican tuna on the grounds that Mexican fishermen were violating the MMPA by exceeding U.S. standards on the incidental taking of marine mammals.[32] When the U.S. tuna fishing industry applied for relicensing in 1991, it was denied. In denying U.S. licenses, the Mexican Government reported that its tuna fleet was forced to fish on small log fish (fish found swimming under floating logs)

[26] In truth the fish is rarely kept fresh, but usually is frozen immediately upon landing at the dock and is thawed immediately before preparation for the final consumer.

[27] Currently, 107 nations, including the United States, are signatories to CITES. For more information, see U.S. International Trade Commission, *International Agreements to Protect the Environment and Wildlife* (investigation No. 332-287), USITC publication 2351, Jan. 1991, pp. 5-29-5-34.

[28] "Tuna Trade Ban Averted, but Warning Sounded," *Commercial Fisheries News*, Apr. 1992, p. 1.

[29] T.I.A.S. No. 10057.

[30] 46 U.S.C. 251.

[31] Western Fishboat Owners Association, the San Pedro Fisherman's Coop and U.S. tuna fleet owners, transcript of the hearing, Feb. 4, 1992, p. 166.

[32] See chapter 3 for a more indepth discussion of the MMPA.

whose resources were limited, instead of fishing on dolphins. Concerned about overfishing the small log fish, Mexican officials suspended all foreign fishing licenses. Efforts by WFOA to persuade Mexico to reissue licenses are continuing.

Non-U.S. Access Treaties Concerning Tuna

Given the increasing importance of fisheries access for U.S. tuna vessels in the wake of the amendment of the Magnuson Act recognizing tuna within the 200-mile FCZ, access treaties not involving the U.S. tuna fleet are being observed by U.S. interests in terms of future competition for tuna resources. The following discussion provides a description of major foreign access treaties. These treaties generally cover tuna fishing grounds not currently exploited by the U.S. tuna fleet, mainly in the Atlantic and Indian Oceans.

OLDEPESCA (Latin America)

As noted Mexico does not participate in the ETP tuna management agency, IATTC, on the grounds that the principles underlying IATTC include multilateral rather than unilateral management authority. As an alternative to IATTC Mexico has for several years been attempting to develop a proposed management agency, the Organización Latinoamericana de Desarrollo Pesquero, commonly known by its acronym, OLDEPESCA. This proposed agency would emphasize unilateral (i.e., coastal state) management authority over tuna. The agreement has been signed by certain other countries but has not come into force.

EC Treaties in the Atlantic, Indian, and Pacific Oceans

The European Community has for several years sought to secure access to tuna for its member nations' tuna fleets by negotiating access agreements with coastal countries on behalf of those fleets. The specifics of some of these agreements were discussed in an earlier Commission report.[33]

Fishery agreements between the EC and some nations and island states (located mainly on the coast of Africa and in the Indian Ocean) typically give EC vessels the right to fish within the EEZ of the foreign partner. In return for these fishing privileges, the EC agrees to improve the fishing industry of the foreign partner, either through financial or educational programs. The agreements typically include other fish species as well as tuna. The typical agreement specifies such things as the number of EC vessels and their total annual catch allowed within the foreign EEZ and the form of the EC payment or compensation. Most of the agreements are effective for 3 years with an option to extend the agreement at the end of the 3-year period on a yearly basis. Renegotiations of some EC fisheries access agreements, as well as additional EC access agreements, are discussed below.

An agreement effective June 16, 1991, through June 15, 1993, has been reached between the EC and the Republic of Guinea-Bissau. The EC is granted fishing rights for 20 freezer tuna seiners and 12 pole and line tuna vessels and surface longliners. Financial compensation to Guinea-Bissau amounts to ECU 12 million and an additional ECU 850,000 for scientific and technical programs.[34] Shipowners' fees amount to ECU 20 per ton of fish caught in the territorial waters of Guinea-Bissau.[35]

A 2-year fishing agreement was reached between the EC and the Republic of Senegal. This agreement (effective May 1, 1990, to April 30, 1992) established EC fishing rights within the waters of Senegal and provided financial compensation for Senegal. The total EC allowable catch of fish, cephalopods, and shrimp amounts to 30,600 metric tons per year. Wet tuna vessels must land not less than 3,500 tons of tuna at Senegal ports. A total of 48 freezer tuna seiners and 35 surface longliners are permitted in Senegal waters. Compensation to Senegal amounts to ECU 28.8 million with an additional ECU 800,000 for scientific programs.[36]

A 2-year agreement (January 1, 1992, to December 31, 1993) was reached between the EC and the Republic of Guinea. This agreement allows up to 12,000 tons of fish a month for trawlers. The EC is granted fishing rights for 24 freezer tuna seiners and 13 pole-and-line and surface longliners. In exchange, the EC will provide ECU 6.7 million for financial compensation to Guinea. The EC will contribute an additional ECU 400,000 to further the scientific and technical development of Guinea's fisheries. Shipowners' fees amount to ECU 20 annually per ton of tuna caught in Guinea's waters.[37]

An agreement was signed on November 12, 1990, between the EC and the Islamic Republic of Mauritania establishing fishing rights for the EC and financial compensation for Mauritania for the period August 1, 1990, to July 31, 1993. A total of 25 EC freezer tuna seiners and 38 EC pole-and-line tuna vessels and surface longliners are permitted to fish within Mauritania's waters. In exchange, the EC will provide financial compensation of ECU 27.8 million for the 3-year period. An additional ECU 900,000 will be contributed to further the scientific and technical development of Mauritanian fisheries.[38]

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[33] USITC, *Tuna: Competitive Conditions Affecting the U.S. and European Tuna Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990, ch. 4.

[34] In 1991, 1 ECU=$1.24. International Monetary Fund, *International Financial Statistics*, Apr. 1992, p. 552.

[35] *Official Journal of the European Communities*, No. L 42 (Feb. 18, 1992).

[36] *OJ* No. L 53 (Feb. 27, 1991).

[37] *OJ* No. L 107 (Apr. 24, 1992).

[38] *OJ* No. L 334 (Nov. 30, 1990).

An agreement effective from May 3, 1990, to May 2, 1992, was signed between the EC and the Government of the People's Republic of Angola. This agreement allows 28 EC tuna freezer seiners and 5 wet tuna boats in Angola's waters. EC financial compensation to Angola consists of ECU 15.9 million over a 2-year period. The EC will also contribute ECU 800,000 for scientific and technical development.[39]

On December 1, 1990, the EC reached a 3-year agreement with the Republic of Cote d'Ivoire (Ivory Coast) allowing EC fishermen access to territorial waters of the Ivory Coast. Among other things, the agreement provides fishing rights for 54 EC tuna seiners and 35 surface longliners and pole-and-line tuna vessels. In exchange, the EC will reimburse the Ivory Coast ECU 6 million. The EC will contribute ECU 600,000 to advance scientific and technical programs of the Ivory Coast. Shipowners' license fees amount to ECU 20 per ton of tuna caught annually in the waters of the Ivory Coast.[40]

An agreement effective from July 1, 1990, to June 30, 1993, was signed between the EC and the Republic of the Gambia. This agreement allows 40 freezer tuna seiners and 17 pole and line vessels. EC financial contribution to Gambia amounts to ECU 3.9 million with an additional ECU 80,000 provided to further the scientific development of their fisheries. Shipowners' license fees amount to ECU 20 per ton of tuna caught annually in the waters of Gambia.[41]

An agreement effective June 1, 1990, to May 31, 1993, was reached between the EC and the Government of the Democratic Republic of Sao Tome e Principe. This agreement provides fishing rights for 46 EC freezer tuna seiners and 5 pole-and-line wet tuna vessels. In exchange the EC will provide financial compensation of ECU 1.7 million. An additional ECU 150,000 is provided to advance Sao Tomean scientific and technical programs.[42]

There is also a 3-year agreement between the EC and the United Republic of Tanzania that was signed on December 19, 1990. This agreement permits fishing rights for 46 EC tuna seiners and 8 surface longliners. An annual limit of 7,000 tons of tuna and other migratory species is set. Financial contribution to Tanzania amounts to ECU 1.1. million, plus an additional ECU 430,000 to advance scientific and technical programs. Shipowners' license fees amount to ECU 20 per ton of tuna caught annually in the waters of Tanzania.[43]

[39] *OJ* No. L 379 (Dec. 31, 1990).
[40] Ibid.
[41] Ibid.
[42] *OJ* No. L 334 (Nov. 30, 1990).
[43] *OJ* No. L 379 (Dec. 31, 1990).

CHAPTER 5
RECENT TECHNOLOGICAL DEVELOPMENTS AND EFFECTS ON U.S. TUNA PRODUCTION AND TRADE

Technological development in the tuna industry has a long and active history. From the inception of tuna canning in 1903, technological improvements have involved both incremental changes and major breakthroughs. Technological developments in the tuna industry included both advances in machinery and improvements in production processes, as the industry has been motivated by efforts to meet environmental requirements and to improve competitiveness.

This chapter presents information on technological developments in both the harvesting and processing sectors of the U.S. tuna industry and analyzes the economic effects of recent technological developments on the U.S. tuna industry and market. The first section briefly discusses factors that have contributed to technological developments in the harvesting and processing sectors. The second section discusses technological developments in the harvesting sector and focuses on harvesting technology to avoid dolphin mortality to comply with the dolphin-safe policy of U.S. tuna canners. The third section discusses technological developments in the processing sector and focuses on loin processing. The final section analyzes the economic effects of recent technological developments—namely, loin processing—on U.S. tuna production, consumption, and trade.

Factors Contributing to Technological Development in the U.S. Tuna Industry

The development of the U.S. tuna industry, particularly with respect to technological innovation, has been greatly influenced by geographic factors. Technological innovation by the harvesting sector has been largely shaped by oceanographic and meteorological conditions, which vary substantially by geography. The location of tuna processing plants historically has been influenced by the location of major fishing grounds and other inputs, such as labor. Worldwide, tuna canneries generally have developed near primary tuna stocks—such proximity lowers transportation costs—and in locations that offer relatively low labor and other input costs. The geographic location, in turn, influences technological development, particularly in terms of fish handling (as most canneries are in tropical areas), plant climate control (which affects yields), and environmental waste controls (which vary depending on local government regulation). Innovation is also spurred by competitive factors caused by geographic clustering of production facilities. Tuna vessels generally fish within the same geographic areas, and tuna canneries generally operate in multiplant locations.

A proponent of the prominence of geography in the location of industries and the development of technology has observed that the location of industries, such as tuna harvesting and processing, has been determined in part by "history and accident."[1] The tendency toward the geographic clustering of industries,[2] particularly tuna,[3] is fostered by factors such as the pooling of labor with specialized skills;[4] access to raw material inputs, intermediate goods and services, and shared infrastructure;[5] and the generation of technological spillovers.[6] The same proponent notes: "It is a commonplace that technological innovation in developed countries and the transfer of technology to less developed countries both play an important role in determining the pattern of world trade and changes in that pattern over time."[7] This transfer, through acquisitions and joint ventures, is closing the technology gap between developed countries and developing countries.

Environmental factors have also led to technological developments. For example, the dolphin-safe policy of U.S. tuna canners has led to efforts to develop harvesting techniques that avoid setting on dolphins. Waste disposal requirements have led to the development of water treatment technologies and odor-control measures in tuna canneries and have contributed to the development of loin-processing technology.

Economic factors have played a large role in the long-term development of tuna harvesting and processing technologies. Efforts to minimize costs and improve efficiencies have been mainly driven by economic considerations such as the cost of energy and labor.

These general factors affecting innovation have been instrumental in the development of technology in the U.S. tuna industry. Two major recent technological innovations in the tuna industry, dolphin-safe harvesting methods[8] and loin processing, are the focus of this chapter. These two developments are among those that have had the greatest impact on the

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[1] Paul R. Krugman, *Geography and Trade* (Leuven, Belgium: Leuven University Press, 1991), p. 9. One example has been the development of the loining industry in Ecuador.

[2] Ibid., pp. 36-37.

[3] For example, tuna harvesters generally ply the same fish stocks in the same waters, whereas tuna processors generally operate plants that are adjacent to at least one another.

[4] This factor is illustrated by the fact that tuna cannery workers in such concentrated locations as Puerto Rico and Thailand often move from one firm to another depending on wage differentials and company labor needs.

[5] Such as sharing dock facilities to unload raw tuna.

[6] Mainly due to information exchanges, such as through the movement of employees between companies.

[7] Paul R. Krugman, *Rethinking International Trade*, (Cambridge, MA: MIT Press, 1990), p. 139.

[8] Dolphin-safe harvesting refers to methods employed to eliminate or avoid dolphin mortality, as opposed to methods employed to reduce lower mortality, as discussed later in the chapter.

industry and are currently at the center of major issues shaping the industry's future.

Technological Developments in the U.S. Tuna Harvesting Sector

Technological innovation in the U.S. harvesting sector generally has been motivated by attempts to reduce or avoid dolphin mortality, to lower costs, and to improve productivity. Most recent efforts have been directed at the elimination of dolphin mortality by developing harvesting techniques that avoid setting on dolphins, thus limiting mortality to accidental, incidental catches; such efforts have been catalyzed by the dolphin-safe policy of U.S tuna canners. More longstanding are efforts and developments to reduce dolphin mortality in connection with dolphin encirclement (which has been allowed but limited under the Marine Mammal Protection Act) and to improve harvesting efficiency (which generally has been driven by nondolphin considerations).

Technological Developments to Avoid Dolphin Mortality

The U.S. tuna industry, Government agencies, academic institutions, and private organizations have been engaged in developing harvesting technology to avoid dolphin mortality for many years. Cooperative efforts have included research and development activities and information sharing through workshops and journal articles. In addition, proprietary research by individual tuna harvesters has led to major innovations with respect to dolphin-safe techniques. As a general indication of the direction of these technologies, one workshop on dolphin-safe tuna harvesting identified the following three categories of alternative fishing methods to avoid dolphin mortality:[9]

1. Develop techniques to separate tuna and dolphins before they are encircled;

2. Develop techniques to locate tuna not associated with dolphins; and

3. Develop techniques other than purse seining for tuna.

A recent research report, which considered the results of this and several other workshops on the subject of dolphin mortality, also identified these measures to avoid dolphin mortality.[10]

Breaking the tuna-dolphin bond poses the most substantial challenge to reducing dolphin mortality because the cause of the bond is not understood. The report suggests that the causes and nature of the bond should be studied more carefully to develop methods to separate the two species.

Alternative methods of locating tuna, specifically yellowfin, suggested by the report include employing acoustical systems, such as listening devices and sonar; remote sensing techniques, such as satellite imagery, to determine oceanographic conditions such as surface water temperature and color; light-induced detecting and ranging (LIDAR) to detect subsurface tuna schools; and synthetic aperture radar (SAR) to detect surface-feeding tuna.

The use of fish aggregating devices (FADs), usually in the form of random flotsam, to locate and capture tuna is longstanding and practiced on a global scale. In addition to FADs, the report suggests that a shift to fishing methods other than purse seining, such as baitboats, longlining, trawls, and gillnets, may be necessary to avoid dolphin mortality.

Regulatory alternatives are suggested by the report to provide incentives or disincentives to tuna fishermen with respect to either eliminating or reducing dolphin mortality. Regulatory options include the immediate and total prohibition of dolphin mortality;[11] the establishment of a declining dolphin mortality quota system, with quotas issued by captain; the provision of price incentives for fishermen to produce dolphin-safe tuna; and the establishment of performance standards for captains with respect to dolphin mortality.

In summary, the report concluded that there is no practical way to totally eliminate dolphin mortality in the Eastern Tropical Pacific (ETP) but that a mortality reduction strategy should be pursued by the United States and other tuna producing nations.[12] The report recommended that international efforts be established to develop an educational, monitoring, and incentives program targeted at tuna vessel captains and to develop a research program directed at gear design and dolphin behavior to reduce or eliminate dolphin mortality.

Current research regarding harvesting technology to avoid dolphin mortality is concentrated in the areas of FADs, the separation of tuna and dolphin schools, and the use of electronic devices to locate tuna. Such research is being undertaken on a proprietary basis by individual tuna vessels and processing companies as well as on a cooperative basis by private firms and public institutions. For example, Bumble Bee has contributed $500,000 to a joint effort with the Inter-American Tropical Tuna Commission and the National Marine Fisheries Service to develop dolphin-safe fishing methods in the ETP.[13] This effort

[9] Douglas P. DeMaster, *Workshop on Alternative Methods to Purse-Seining for Yellowfin Tunas in the Eastern Tropical Pacific: Held at Southwest Fisheries Center on October 11-12, 1988*, National Oceanographic and Atmospheric Administration, NMFS, Southwest Fisheries Center, Administrative Report LJ-89-06, p. 2.

[10] National Research Council, *Reducing Dolphin Mortality From Tuna Fishing*, (Washington, DC: National Academy Press, 1992), pp. 55-80.

[11] This option was effectively implemented for the market by the dolphin-safe policy of the private sector U.S. tuna processing industry.

[12] National Research Council, press release, Feb. 26, 1992.

[13] Michael McGowan, vice president, Bumble Bee Seafoods, Inc., transcript of the hearing, p. 135.

involves FADs and LIDAR technology. StarKist has been involved in proprietary research involving acoustical sounding devices and FADs.[14] In addition, the first international accord regarding dolphin mortality was recently concluded under the auspices of the IATTC. Under the accord, a total of $4 million has been committed to research on reducing dolphin mortality by governments of tuna producing nations that operate in the ETP,[15] with Mexico pledging $1 million and Venezuela $500,000.[16]

The effectiveness and success of experimental measures such as FADs and LIDAR have been limited to date.[17] For example, FADs have tended to attract juvenile tuna[18] (which are smaller and less valuable), and efforts to employ LIDAR are still in the developmental stage. Accordingly, developments regarding fishing technology generally have been directed at incremental changes in fishing gear and techniques. To date, these developments have been more successful in reducing rather than eliminating dolphin mortality. The movement of the bulk of the U.S. ETP tuna fleet to the WTP after the imposition of the dolphin-safe policy by U.S. canners is but one indication of this fact.

The Development of Harvesting Techniques to Reduce Dolphin Mortality

In contrast to research efforts to avoid dolphin mortality, there have been long-term efforts and successes in developing technology to reduce dolphin mortality. Some of the major technological developments in the tuna harvesting sector resulted from attempts to improve techniques of setting on dolphins. Such harvesting techniques arose from U.S. tuna harvesters' increasing use of the practice of setting on dolphins in the ETP. As this technique became more widespread and dolphin mortality rose, increasing concern by both tuna fishermen[19] and conservationists led to the development of fishing techniques to reduce dolphin mortality and the subsequent requirement of such techniques by U.S. law.[20] The following discussion presents a history and description of these techniques and describes current efforts to further reduce dolphin mortality.

In the 1950s, the purse seiner became the predominant vessel in the U.S. tuna fishery. This vessel introduced a powerful new technology to the industry. The increased speed of this type of vessel enabled the development of harvesting techniques that targeted the relatively fast-swimming tuna. Increased power allowed for improved gear-handling techniques that led to ever-decreasing dolphin mortality. These techniques mainly involved maintaining a portion of the net open using skiffs and bow thrusters. In addition new net technologies were developed, with such features as spacing net corklines farther apart to facilitate the dolphins' escape.

About 1960, the most important harvesting technique to reduce dolphin mortality was developed—the backdown procedure. This technique, which was developed by Capt. Manual Neves[21] and remains the basic dolphin-mortality-reduction technique in use today, involves the following steps. After making a set, the vessel gathers about two-thirds of its net aboard, reverses its engines, and initiates the "backdown." As a result, the far end of the net sinks (the corks and the net edge submerges), thus allowing dolphins to escape. In some cases, the net may be pulled from under a school of dolphin using this procedure. Most of the tuna associated with the dolphins remain deeper in the net and do not escape.

The next major technology introduced to improve harvesting techniques to reduce dolphin mortality was the "Medina Panel." In 1971, Capt. Harold Medina developed a safety panel that was inserted in the backdown area of the net.[22] This panel was composed of a smaller mesh than the rest of the net (1-1/4 inch replaced 4-1/4 inch). This purpose of the panel was to prevent the mandible (beak) of the dolphins from becoming entrapped in the mesh during a set. Initially the panel was about 180 meters in length and 11 meters in depth and was inserted at the top edge of the net. Later this panel was enlarged to about 330 meters and 22 feet and comprised two strips, stacked vertically. This panel eventually became required gear under the Marine Mammal Protection Act of 1974 and is still in use. The Medina Panel, along with the backdown procedure, led to a substantially large reduction in dolphin mortality.[23]

The National Research Council report discussed earlier identified several measures that may be attempted to reduce dolphin mortality. These measures include making both minor and major modifications to current fishing gear and techniques; considering dolphin behavior to assist in their release; breaking the

[14] William P. Woods, vice president, StarKist Seafood Co., transcript of the hearing, pp. 218-129.

[15] Costa Rica, France, Japan, Nicaragua, Mexico, Panama, Spain, the United States, Venezuela, and Vanuatu.

[16] Mexico and Venezuela were not members of the IATTC before the accord.

[17] Tuna industry officials, interviews by and conversations with USITC staff.

[18] Michael McGowan, vice president, Bumble Bee Seafoods, Inc., transcript of the hearing, p. 142.

[19] Tuna fishermen recognized the need to conserve the dolphin population if for no other reason than to maintain dolphin stocks to facilitate their fishing activity. U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Commerce, Consumer Protection and Competitiveness, *Statement of American Tunaboat Association*, hearing regarding H.R. 2926, The Dolphin Consumer Protection Act, July 25, 1990, pp. 6-7.

[20] See chapter 3 for a more indepth discussion of the dolphin-safe issue.

[21] Robert F. Allen, James F. Boyd, and Douglas H. Dirks, "The Impact of the Dolphin Mortality Issue on Tuna Seine Fishery Technology," *Tuna 91 Bali*, Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, p. 26.

[22] Ibid.

[23] Ibid.

bond between tuna and dolphin; using alternative methods to locate tuna (apart from dolphins); using alternatives to dolphin-associated fishing techniques; and considering additional regulatory restrictions and incentives.

Minor modifications identified by the report include the "Medina double corkline," which allows the floats on the upper lip of the net to more easily submerge during the backdown procedure, thus facilitating the escape of dolphins. Also, the report suggested the use of jet boats to direct dolphin out of the net.[24] Other measures include a Doppler current profiler to provide captains with subsurface current data to assist in setting their nets with a minimum hazard to dolphins due to net collapses and canopies;[25] pear-shaped snap rings to reduce the time before the backdown begins; an additional small-mesh Medina panel; the use of a third fine-mesh strip; and the use of a safety crook to help guide dolphins out of the net. Many of these measures are being tried on an experimental basis.

Major modifications to current fishing gear and techniques are aimed at more comprehensive measures to reduce net canopies and rollups, which are the primary causes of dolphin mortality. The incidence of these problems may be minimized by modifications in netting material design. Furthermore, the report suggested that nets be designed with barriers to separate tuna and dolphins and channels to allow for easier escape of dolphins without allowing tuna to exit. The report also suggests experimentation with techniques and modifications to allow the net to remain open while deployed and to allow for the escape of dolphins without using the backdown maneuver.

Dolphin behavior-based measures recommended by the report include developing strategies to exploit dolphin behavior to direct them out of the net without performing the backdown procedure and improving the education of tuna captains regarding backdown release methods and the use of underwater illumination in the event of sundown sets.

Other Technological Developments

Although technological developments related to the avoidance (and reduction) of dolphin mortality are the focus of this study, several other innovations have played substantial roles in the development of the U.S tuna harvesting industry. These technological developments, which have largely been driven by economic considerations, can be broadly categorized as those related to vessel and gear design and those related to fishing techniques. The following discussion chronicles developments that led to the current state of the art in the harvesting sector (figure 5-1).

[24] This type of craft has no propeller to injure dolphins as do currently used craft.

[25] Net collapses, canopies, and rollups occur during the backdown procedure and may result in the accidental drowning of dolphins when the net covers them.

The first tuna vessels were baitboats and used pole and line gear. These vessels were originally sardine boats and were of limited size and range. During 1916-25, the purse seiner was developed. This innovation was major, both in terms of the size and range of the vessels and in terms of productivity gains enabled by new gear design. Another development away from the original pole and line fishery occurred during the post World War II period when the Japanese industry developed longlining.

One of the most significant technological developments in the tuna industry occurred in the 1950s with the Puretic power block[26] and the refinement of nylon nets. The power block allowed for the use of larger vessels and heavier gear, thus improving the economies of size and extending the range of vessels in the tuna harvesting sector. Purse seining became the dominant fishing technique during this period.

Technological developments since the power block have been more in the nature of refinement. The period during the 1960s to the 1980s was marked by the increasing use of electronics, the development of more power in virtually all vessel systems, and a trend toward ever-larger vessels.

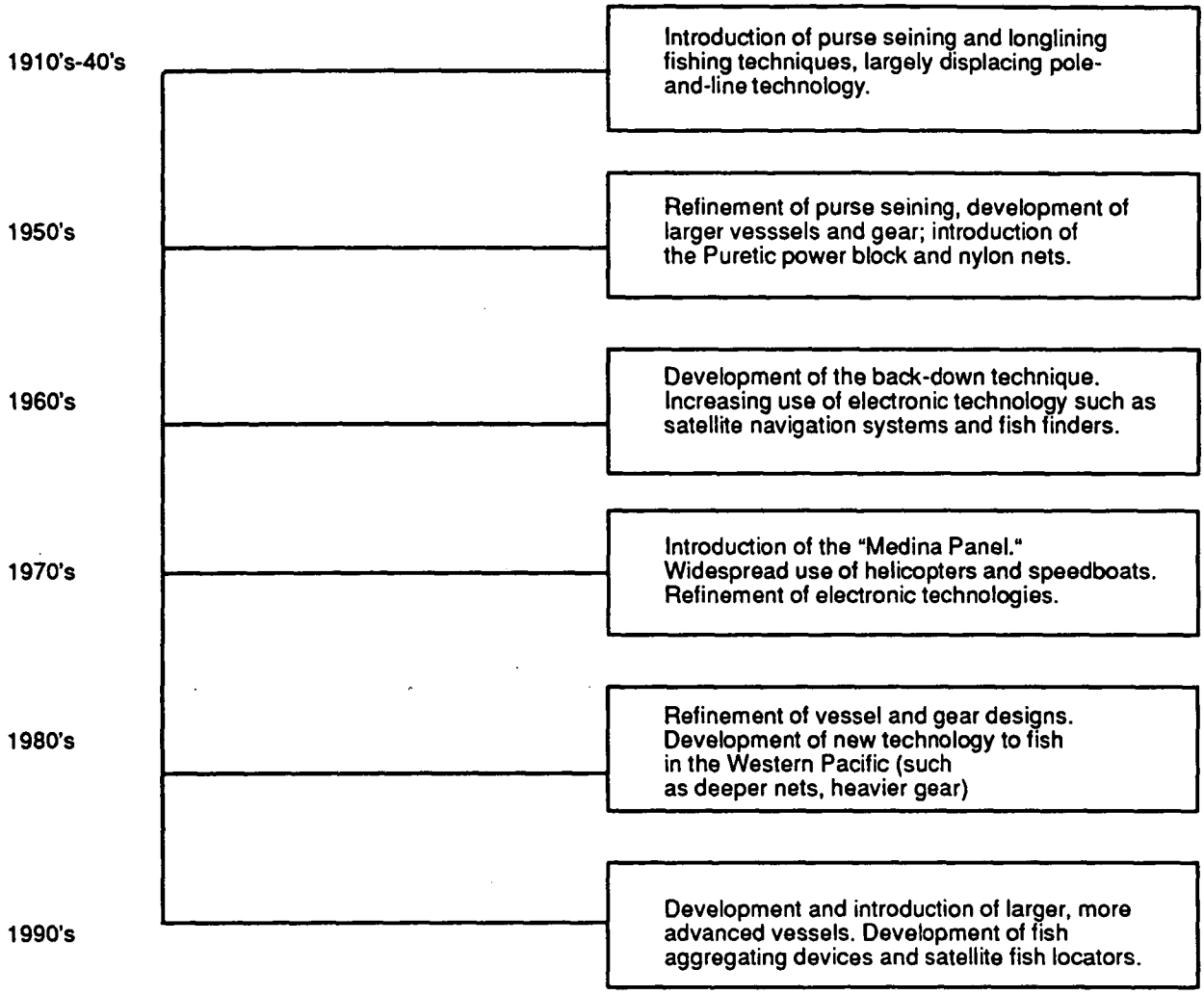
In 1983, a major shock led to further innovation by the tuna harvesting sector. A particularly severe occurrence of the meteorological phenomenon known as "El Niño" forced many U.S. tuna vessels to leave the ETP and fish in the WTP, where the waters are clearer and the thermocline[27] is deeper. Innovations that resulted from these changes in fishing conditions included the transfer and refinement of technology employed in the ETP to the WTP. Major changes in technology in response to the change in fishing conditions included larger and deeper nets to reach the deeper thermocline. To handle these larger nets, upgraded winches and booms were developed. A larger vessel size class was developed,[28] mainly to provide a larger work space to accommodate larger nets and effect repairs but also to provide larger fishwells, not to increase capacity but to facilitate faster refrigeration (with tuna more loosely packed in wells) to improve quality. A general upgrading of other systems, such as propulsion, hydraulic, refrigeration, electronics, etc., was developed to improve vessel speed, power, and reliability. Increases in speed were needed because the clearer waters of the WTP make tuna more difficult to catch. More power was needed to handle the larger net and vessel, and greater

[26] A heavy-duty block and tackle system used to hoist the net.

[27] The thermocline is the region in a stratified body of water where the warmer, upper layer meets the colder, lower layer. Most tunas are believed to inhabit this region most of the time.

[28] An intermediate step whereby some ETP vessels were modified by lengthening the hull and by other measures. A new, even larger size class was later developed (see below).

Figure 5-1
Tuna: Major technological developments in the U.S. tuna harvesting industry



reliability was needed because of the scarcity of repair facilities and the greater range of vessel operations in the WTP.

One of the primary technological innovations that resulted from the 1983 El Niño and the subsequent development of the tuna fishery in the WTP was a new class of tuna seiner—the "Super Pacific." This class, developed by Campbell Industries, a shipbuilder in San Diego, is a 1,600-ton seiner, with heavier gear than the previous 1,200-ton seiners. As of May 1991, nine of these vessels had been delivered or were under construction, with 1 going to the United States, 4 to South Korea, and 1 to France (fishing off the west coast of Africa).[29] Table 5-1 shows a comparison of typical vessel characteristics for tuna vessels in use between 1970 and 1990.

[29] Allen, Boyd, and Dirks, "The Impact of the Dolphin Mortality Issue on Tuna Seine Fishery Technology," pp. 23-39.

Technological Developments in the U.S. Tuna Processing Sector

The U.S. tuna canning industry historically has been responsible for the invention and development of most of the technology currently used by tuna processors throughout the world. U.S. tuna processors also are the vanguard of tuna loin-processing technology, which is the focus of this section. Following a discussion of loin processing is a brief discussion of other technological developments in the canned tuna processing sector.

The Domestic Processing of Imported Tuna Loins

Background

A relatively recent development in the canned tuna industry is the use of precooked tuna loins as a raw

Table 5-1
Typical characteristics of U.S. tuna seiners, 1970, 1980, 1988, and 1990

Characteristic	1970 (Eastern Pacific)	1980 Eastern Pacific)	1988[1] (Western Pacific)	1990 (Western Pacific)
Vessel:				
Fish hold capacity[2]	1,200	1,200	1,550	1,600
Overall length[3]	67.50	67.50	76.03	78.33
Maximum beam[3]	12.27	12.27	12.27	13.64
Speed and power:				
Speed (single engine)[4]	16	16	15.5	17.5
Propulsive efficiency	.0.58	0.58	0.57	0.68
Horsepower[5]	2,600	2,600	2,900	1,950
Efficiency[6]	100	100	86	56
Net:				
Length[3]	1,300	1,600	1,800	1,800
Number of strips	14	22	25	27
Depth[3]	154	242	275	297
Other gear:				
Hydraulic power[7]	240	500	764	1,000
Power block pull[8]	26,000	32,000	47,000	62,000
Main boom topping blocks[9]	16	30	30	55
Bow thruster[7]	200	350	350	500
Deck work area[8]	.220	220	320	310
Refrigeration:				
Brine chillers	0	0	0	2
Compressors[7]	325	425	575	750
Coil circuits per fish well	2	2	2-3	3-4
Electrical:[10]				
Generators	900	900	900	1,400
Switchboard	600	600	900	1,400

[1] Modified from Eastern Pacific vessel.
[2] Cubic meters.
[3] Meters.
[4] Knots.
[5] Brake horsepower at 15 knots.
[6] Fuel cost per can of tuna relative to 1970.
[7] Horsepower.
[8] Kilograms, at 1/2 radius.
[9] Tons.
[10] Kilowatts.

Source: Robert F. Allen, James F. Boyd, and Douglas H. Dinks, "The Impact of the Dolphin Mortality Issue on Tuna Seine Fishery Technology," *Tuna 91 Bali*, Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, p. 32.

material. Tuna loins are the lighter meat, edible portion of tuna, similar to fillets. Tuna loins are produced by thawing, cooking, and cleaning frozen, whole tuna. The loins are then packaged, usually in vacuum-sealed plastic; frozen; and shipped to canneries. The production of tuna loins is a major and integral component in the production of canned tuna[30] and occupies up to 80 percent of the labor cost. By shifting the production of loins to locations with relatively low labor costs, canned tuna producers realize substantial cost savings.

Tuna firms have been experimenting with the technology to produce and utilize frozen loins for many years and have intensified their efforts during the past decade. U.S. processors utilized frozen tuna loins, imported mainly from Japan, as early as the 1960s. The bulk of loin imports at that time were of albacore, and the loins were imported mainly because of a scarcity of raw albacore.

In the late 1970s, Bumble Bee, then owned by Castle and Cooke, purchased a tuna processing plant in Manta, Ecuador, to use as a transshipping facility to send raw tuna to its cannery in Puerto Rico. The Ecuadorean Government enacted legislation shortly thereafter that required a certain share of the fish to be processed in Ecuador. Thus, Bumble Bee decided to produce a relatively small quantity of loins for shipment to Puerto Rico in order to maintain the Ecuadorean facility.[31] Also in the late 1970s, StarKist

[30] The process for producing tuna loins and canned tuna generally is the same up to the point where the tuna loin is produced. In loin production the loin is packaged in plastic and frozen, whereas in canned tuna production the loin is packed directly into the can.

[31] Official of Bumble Bee, telephone conversation with USITC staff, Dec. 3, 1991.

contracted with tuna processors in Ensenada, Mexico, for frozen loins. Ensenada, which was the principal Mexican tuna production center, is relatively close to Southern California, and the frozen loins were transported by truck. Van Camp opened a tuna cannery in San Diego in the late 1970s, partly with the rationale of using relatively low-cost loins imported from Mexico. The cannery used a state-of-the-art environmental control system designed to minimize odor and waste. However, the cannery was closed in 1984, in large part because of an embargo on Mexican tuna products[32] and the high cost of environmental compliance. The embargo also halted StarKist's loin-related activities in Terminal Island, California.

After these earlier efforts, firms did not use loins on a commercial scale until quite recently. Increasing competition in the U.S. market, mainly from imported canned tuna, put pressure on U.S. processors to decrease production costs. An example of the renewed interest in using loins is the purchase of Bumble Bee by Unicord, and Bumble Bee's subsequent opening in 1990 of a U.S. tuna canning plant that exclusively uses imported frozen loins (supplied, in large part, by Unicord).

Yield and quality are the major concerns in the development of tuna loining technology and are thus the focus of research and development efforts. Yield, or the amount of tuna meat that can be put into a can from a whole fish, affects costs. Quality affects prices. Thus, U.S. tuna processors have been interested in improving the performance of tuna loining with respect to these factors. Yield is affected both by factors exogenous to tuna canners, such as fish habitat conditions and conditions under which tuna harvesters handle and transport fish, and by factors endogenous to tuna canners, such as fish thawing, cooking, and cleaning. Processors have developed methods of maximizing yield based on experience at relatively long-established production facilities. These processors have also had long-term relationships with vessels with known fishing methods and quality records. The practice of using frozen, precooked tuna loins may introduce quality and yield variations into the production process. To minimize this variation, U.S. tuna processors have transferred technology to foreign production locations, either through ownership or joint venture relationships with foreign processors.[33]

Advantages to loining

The use of loins as a raw material provides processors with distinct advantages over using whole tuna. These advantages are related primarily to production cost. First, labor costs are significantly reduced; as much as 80 percent of total labor costs in a traditional tuna cannery are employed in processing tuna to the loin stage.[34] Second, freight costs are substantially reduced by shipping frozen loins. Depending on the species and size of fish, the loin represents less than half the weight of the whole fish. Third, by using loins, processors can streamline their production process and have greater flexibility in choosing canning locations, since there is relatively little waste to dispose of when processing loins.[35] Fourth, the use of loins enables tuna canners to increase effective capacity with a minimal increase in capital investment and labor. Fifth, by using loins firms may reduce or eliminate the need to produce tuna-based byproducts such as fish meal and oil and pet food; the markets for these products have become increasingly competitive and less profitable in recent years.

The use of tuna loins also offers substantial savings compared with shipping canned tuna, whether imported or produced by U.S. firms in American Samoa or Puerto Rico. First, by shipping tuna loins, transportation costs are somewhat lowered by not transporting as much water—frozen tuna loins do not contain as much water as canned tuna packed in water. Second, the packaging surrounding frozen tuna loins, namely plastic, is substantially lighter than the metal cans surrounding canned tuna, and so transportation costs are further reduced.[36]

Another advantage gained by importing tuna loins rather than canned tuna is duty avoidance. The marginal duty rate on U.S. imports of canned tuna in water is 12.5 percent ad valorem; the duty on imports of tuna loins is 1.1 cents per kilogram. In 1991 the ad valorem equivalent duty rate for canned tuna was 11 percent and for tuna loins was 0.4 percent.

One spinoff benefit of loining is the effect of this intermediate product on the development of new end uses. Tuna loins may lead to the incorporation of tuna as an ingredient in nontraditional products, thus increasing the demand for tuna.[37] However, this effect is believed to be relatively minor at present.

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[32] The embargo was imposed on July 14, 1980, under the Magnuson Fisheries Conservation and Management Act of 1976 (16 U.S.C. 1801) as a result of Mexico's seizing U.S. tuna vessels. U.S. International Trade Commission, *Tuna: Competitive Conditions Affecting the U.S. and European Tuna Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990, p. 3-10.

[33] In the case of Unicord and Bumble Bee, the ownership is foreign.

[34] Officials of U.S., Thai, and Indonesian canned tuna producers, interviews by USITC staff. William P. Woods, Jr., vice president, StarKist Seafood Co., transcript of the hearing, p. 126.

[35] According to industry sources, the relatively high cost of compliance with environmental regulations was a significant factor in the movement of the U.S. canned tuna industry from the mainland United States (particularly California) during the 1980s.

[36] However, these savings are mitigated to some extent by the higher cost of refrigerated freight.

[37] Thai Food Processors' Association, posthearing submission, Apr. 15, 1992, p. 34. Such products include prepared meals, salads, and hors d'oeuvres, either frozen, canned, or packaged in another form that does not require refrigeration.

Disadvantages to loining

The principal disadvantage to processing frozen tuna loins is related to quality. The primary quality consideration with respect to loining technology has been the consistency of the tuna meat after it has been subjected to an additional process of freezing and thawing. This process tends to produce a less firm consistency, as ice crystals form in the meat cells during freezing and damage the cell structure. In addition, since the loins are frozen and generally transported relatively long distances, additional measures must be taken to ensure adequate handling to maintain quality by preventing spoilage and minimizing breakage of the solid fish meat. However, StarKist and Bumble Bee claim the quality differences between using frozen loins and frozen whole tuna are minor and that final product quality is most affected by the initial quality of the raw fish.[38] Pan Pacific, on the other hand, acknowledges that its loin-processing operation presently yields a lower quality end product.[39]

Another major disadvantage to using loins is lower yield. In addition to affecting quality, the additional freezing and thawing step affects yield. Freezer burn, dehydration, and breakage during transportation may also decrease yields from using loins as compared with whole fish.

The use of loins by U.S. plants in American Samoa is discouraged to some extent by the U.S. tariff treatment of products of insular possessions.[40] Such products are subject to U.S. duties if their inputs are imported, dutiable, and exceed 70 percent of the total value of the finished product. Imported frozen tuna loins, if used exclusively as an input (compared with frozen whole tuna), likely would exceed the 70-percent threshold and thus shipments of canned tuna from American Samoa would be subject to duties. However, the use of a mix of domestic and imported frozen whole tuna by U.S. tuna processors in American Samoa would mitigate this disincentive if they were to use imported loins to some degree. U.S. processors currently do not use loins in their American Samoa facilities, mainly because of the relative abundance of raw whole tuna in the region as well as labor costs lower than California and Puerto Rico.

U.S. loin processing

It is believed that most if not all U.S. canned tuna producers are using loins to some extent. At one extreme, Bumble Bee has opened a tuna cannery in California that exclusively uses frozen loins as a raw material. Other processors are reported to be considering similar facilities on the mainland United States. Tuna canning facilities in California and Puerto Rico use imported frozen loins to varying degrees as part of their input mix with raw tuna. The dolphin-safe policy announced by U.S. processors in early 1990 reinforced the advantages of using loins inasmuch as the primary source of raw material in the past for Puerto Rican plants, yellowfin supplied by U.S. vessels from the Eastern Tropical Pacific, was substantially reduced.

Bumble Bee

Bumble Bee Seafoods, which is owned by the Thai company Unicord, is the principal user of imported tuna loins.[41] Loins account for a substantial share of Bumble Bee's raw material input, the largest share among U.S. processors.[42] Bumble Bee processes tuna loins in both California and Puerto Rico. The California plant is dedicated to processing only frozen loins; the Puerto Rico plant processes both frozen loins and raw tuna. Bumble Bee's loining activities began with the small-scale use of Japanese loins in its plants in Astoria, Washington, and San Diego, California, in the 1970s and of Ecuadorean loins in its plant in Puerto Rico. The acquisition of Bumble Bee by Unicord in late 1989 was a catalyst in the commercialization of tuna loining. Bumble Bee procures virtually all the tuna loins for its California plant from its parent company Unicord as well as from other Thai tuna processors. It procures loins for its Puerto Rican plant from its facility in Ecuador.[43] Unicord has relatively low production costs,[44] particularly with respect to the primary processing stages (mainly fish cleaning), as well as the geographic proximity to sources of raw tuna.[45] Bumble Bee possesses superior canning technology[46] as well as the geographic proximity to major U.S. market areas.[47]

StarKist

Although StarKist is the leading U.S. canned tuna producer and has the largest share of the U.S. market for canned tuna, StarKist is a relatively small user of

[38] William P. Woods, vice president, StarKist Seafood Co. transcript of the hearing, p. 123; Michael McGowan, vice president, Bumble Bee Seafoods, Inc., transcript of the hearing, p. 152.

[39] Kevin T. Dolan, president, Pan Pacific Fisheries, Inc., transcript of the hearing, p. 188.

[40] General Note 3.(a)(iv)(A) of the *Harmonized Tariff Schedule of the United States.*

[41] For a more detailed profile of Bumble Bee, see USITC, *Tuna: Competitive Conditions Affecting the U.S. and European Tuna Industries in Domestic and Foreign Markets* (investigation No. 332-291), USITC publication 2339, Dec. 1990, p. 2-16.

[42] The actual share is proprietary.

[43] Loins in Ecuador are produced mainly from skipjack or smaller yellowfin not harvested in association with dolphin.

[44] See, for example, USITC, *Tuna: Competitive Conditions,* USITC publication 2339, pp. 5-2 to 5-3.

[45] This proximity is relative to the United States (including Puerto Rico).

[46] Compared with its parent company, Unicord. However, the transfer of technology since Unicord's purchase of Bumble Bee has diminished this advantage.

[47] Bumble Bees's California plant is situated within the major West Coast market region whereas its Puerto Rico plant is relatively proximate to the major East Coast market region. In addition Bumble Bee possesses a U.S. marketing network based on a strong, longstanding brand name.

tuna loins.[48] According to company officials, about 5 percent of StarKist's raw material input is accounted for by loins.[49] However, StarKist has been increasing its loining activities, as efforts by all U.S. tuna processors to improve loining technology to meet ever-increasing competition have intensified. As is the case for other major U.S. tuna processors, StarKist has experimented with tuna loining for many years. However, StarKist only recently began using loins, virtually all in its Puerto Rico plant.

StarKist's relatively late entry into commercial loin processing likely is attributed to several factors. StarKist's size and tradition of international operations have provided an advantage over its competition with respect to procurement of raw whole tuna supplies. Whereas other U.S. processors generally have relied more heavily on U.S. vessels for the bulk of their raw tuna requirements and have imported mainly from the spot market as a supplement, StarKist generally has contracted a larger share of its requirements because of its larger size and, thus larger raw tuna needs.[50] StarKist operates two of the largest canneries in the world; these canneries must be operated at near capacity to be profitable. StarKist's production for the U.S. market is limited to these canneries, and the conversion to using loins involves an initial lowering of output, as well as retraining of the labor force. These factors likely have led to a reluctance by StarKist to shift a significant share of production to loin processing, which is still viewed as relatively high risk.

StarKist currently processes loins only in its Puerto Rican plant. The substantial reduction of raw tuna supplies from the ETP as a result of the dolphin-safe policy and relatively high labor costs in Puerto Rico contributed to StarKist's increase in loin processing at that location. In contrast, the StarKist plant in American Samoa enjoys access to ample raw fish supplies and relatively low labor costs, and thus shifting to loin processing affords little if any competitive advantage and has the previously noted disadvantage in tariff treatment. StarKist has retained facilities in Southern California but has not processed tuna there since 1984, because of prohibitively high production costs.[51]

StarKist has experimented with several loin supply locations in recent years, mainly in Latin America. StarKist has procured loins in Venezuela, Colombia, and Costa Rica in the past,[52] and currently procures loins from plants in Ecuador and in Ghana. The Ghana cannery began to send loins to StarKist's cannery in Puerto Rico in late 1990. StarKist recently purchased a fish cannery in Portugal. This new plant is another potential source of loins; however, it likely will concentrate on the European market.

Caribe

Caribe Tuna, Inc., a wholly owned subsidiary of Mitsubishi Corp. of Japan, operates a tuna cannery in Puerto Rico. Caribe, which had been procuring most of its raw tuna supplies from Ecuador, began small-scale utilization of loins from a plant in Ecuador in late 1990. Caribe made this change in response to rising labor costs in Puerto Rico as well as the reduced availability of raw tuna from the ETP following the dolphin-safe policy in early 1990.[53] Caribe is a relatively small participant and is more vulnerable to shifts in raw material supplies and prices than its larger competitors are, since it traditionally has lower volume requirements and has purchased more on the spot market. As such, Caribe has stated its intent to increase its share of raw material input supplied by loins to 25 percent by the end of 1991.[54]

Van Camp

Van Camp Seafood, a wholly owned subsidiary of P.T. Mantrust of Indonesia,[55] currently is not using loins. Van Camp operates a cannery on American Samoa that (for the same reasons discussed above for StarKist's plant in that location) uses only raw tuna as an input. Van Camp ceased operating its cannery in Puerto Rico in 1990, thus opting not to follow the same strategy of loining taken by its competitors. However, Van Camp's parent company operates plants in Indonesia and has been considering exporting loins to Japan and Europe. Loins could be sent to Van Camp's plant in American Samoa in the future.[56]

Pan Pacific

Pan Pacific Fisheries, Inc., a wholly owned subsidiary of Marifarms, Inc., operates the sole full-scale tuna cannery in the continental United States, in Terminal Island, California. Pan Pacific, which traditionally used raw tuna from its own vessels or

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[48] For a more detailed profile of StarKist, see USITC, *Tuna: Competitive Conditions*, USITC publication 2339, pp. 2-13 to 2-16.

[49] William P. Woods, Jr., vice president, StarKist Seafood Co., transcript of the hearing, p. 125.

[50] StarKist also procures a greater amount and share of its raw tuna from foreign fleets than do other U.S. processors.

[51] USITC, *Tuna: Competitive Conditions*, USITC publication 2339, pp. 2-13 to 2-16.

[52] StarKist terminated loining operations in these countries because they lacked a dolphin-safe policy and were subject to the U.S. embargo. William P. Woods, Jr., vice president, StarKist Seafood Co., meeting with USITC staff, Washington, DC, Mar. 17, 1992.

[53] Michael Dunn, vice president, Caribe Tuna, Inc., transcript of the hearing, p. 157.

[54] Ibid., p. 161.

[55] For a more detailed profile of Van Camp, see USITC, *Tuna: Competitive Conditions*, USITC publication 2339, p. 2-17.

[56] Official of Van Camp Seafoods, telephone interview by USITC staff, Nov. 18, 1991.

from the relatively small local fleet, began to import frozen tuna loins in 1990, virtually all from Thailand.[57]

Other Developments in Processing Technology

The primary motivation for technological developments other than loin processing in the tuna processing sector is largely related to improving yield and quality. Innovations occur as processors attempt to put as much of the raw tuna (either whole or loins) that comes into the receiving end of the plant into the cans that leave the shipping dock while maintaining product quality. Ever-increasing competition compels firms to innovate to lower costs and to keep pace with their rivals, no matter how small a particular innovation may seem.

Recent developments in the tuna processing sector may be categorized according to the stage of the production process. These stages generally are divided into six groups: (1) thawing, (2) cooking/conditioning, (3) cleaning, (4) canning/retort, (5) storing, and (6) transporting.[58]

Recent technological advances in the thawing stage have been largely directed toward uniformity and temperature control. Increasing industry use of automatic fish sizers that group incoming raw tuna by size improves the control of the thawing process. Another development is the circulation of the water bath in the thaw tanks, which improves quality by promoting more uniform thawing.

One of the most critical stages of tuna processing is the cooking/conditioning stage.[59] The industry is currently making intense efforts in this area to improve yields. In the past, refinements in this stage have included the use of pressure cookers and the uniform sizing of fish to ensure even cooking. More recent innovations include efforts to introduce vacuum cooking and conditioning methods.[60] Benefits from this process include the minimization of waste and a higher yield resulting from less superficial oxidation on the flesh and easier peeling of the skin during the cleaning process. In addition, a dramatic increase in product flow can be realized, since the cooking/conditioning time under the vacuum system purportedly can be reduced from 18-22 hours to 3 hours. Vacuum conditioning also decreases the "curing"[61] time of sterilized canned tuna from 40 days to 20 days, and thus inventory can be shipped twice as quickly.

The cleaning stage is another critical point in the tuna canning process. Most industry members indicate that this phase has been the most difficult one to improve using technology. Despite longstanding efforts to mechanize this process, tuna cleaning must still be done manually.

The canning/retort stage is the most mechanized link in the tuna canning process. The industry has used automatic can filling and sealing machines for decades. Innovations have been aimed mainly at improving the accuracy of the fillers, handling the cans more gently so as not to break the fibers of the tuna meat, and improving the flow of the cans from the can sealers to the retorts. A relatively new concept to further increase mechanization in this stage is the "Automated Batch Retort System." The main components of this system include a computer control system, a flexible container handler (robot arm to load and unload cans into and out of the retort), and an automated guided vehicle system (AVS) to move product to and from the robot arm. The retort uses air pressure, water spray, and steam to more evenly distribute heat. It is flexible, can be customized according to can size, shortens retort time, and minimizes errors in timing. The computer can adjust optimal retort parameters (mainly time and temperature), thereby lowering costs (mainly energy) and improving quality, with a more even retort. The automated loader and the AVS lowers cost (mainly labor) and improves quality by handling cans more gently. It is unclear at this point the extent to which this system will be employed by U.S. tuna processors.

Economic Effects of Loining on the U.S. Tuna Industry and Market

Economic Effects on Production

The effects of the development of loining on U.S. tuna production are best examined by separating the effects on the production of raw tuna from those on canned tuna, because the two types of effects are quite different. Raw-tuna producers (the U.S. harvesting sector) would be adversely affected by a transformation of the canning sector from full-scale to loin-only processing operations because the latter import virtually their entire raw-material needs. Therefore, the buyers for U.S. tuna harvests would all be in foreign countries, necessitating a change by U.S. tuna harvesters from a domestic-oriented to an export-oriented marketing system.

The likely effects of loining on the volume of tuna harvested by U.S. vessels depend largely on the effect on the price of raw tuna resulting from the move by canneries into loin processing. To the extent that loining reduces the costs of processing canned tuna (see below), these cost savings would be expected to be

[57] The exact share of loins of total raw input is proprietary. However, according to the Thai Food Processors' Association, the share may be as high as 60 percent. Thai Food Processors' Association, posthearing submission, Apr. 15, 1992, p. 35.

[58] For a more detailed discussion of the tuna canning process, see USITC, *Competitive Conditions in the U.S. Tuna Industry*, USITC publication 1912, pp. 18-19.

[59] Conditioning refers to the cooling of the fish in between the cooking and cleaning stage.

[60] See, for example, Michele Vitali Nari, "New Developments in Tuna Processing," *Tuna 91 Bali*, Papers of the 2nd World Tuna Trade Conference, Bali, Indonesia, May 13-15, 1991, pp. 189-193.

[61] Curing refers to the reabsorption into the flesh of packing medium and gases formed during the retort. This process mainly affects flavor.

reflected in a lower price of canned tuna or a higher price of raw tuna, or both; therefore, the likely effects on the price paid for raw tuna by loin producers should be positive or at least neutral.

The likely effects of loining on the U.S. tuna harvest also depend on cost effects, particularly the transportation costs necessary to export the raw tuna to foreign loin producers. The likely future locations of foreign loin producers are in Latin America, Southeast Asia, and possibly the Pacific islands. All of these locations are near current U.S. tuna-fishing grounds in the ETP and WTP, thus the probable effects on transportation costs incurred by U.S. harvesters would appear to be small.

Production of canned tuna, on the other hand, would be expected to increase, because the cost savings that are the primary impetus to the actual adoption of the new loining technology would act to increase the supply of tuna (the quantity offered at any given price). At least part of the cost savings would be passed on to consumers in the form of lower prices, which would boost consumption.[62]

The positive effects expected on canned tuna production include an increase in U.S. cannery capacity. In 1990, for example, although Bumble Bee cut in half its capacity utilization at its full-scale cannery in Puerto Rico, it opened a large state-of-the-art loin-processing facility in California. Perhaps others that have cut back or closed their facilities will follow suit. Some canneries have begun processing loins in addition to their full-scale operations in order to reduce costs and maintain a high-capacity level of output. Thus, the development of loin processing may help stem the decline of the cannery sector or even bring much of the sector back to the United States.

The effects of loining on U.S. cannery employment are significant, for a loin-processing facility employs somewhere between one-fifth and one-third of the labor force of a full-scale cannery of equal output capacity. Thus, in the extreme case of a complete conversion of the U.S. tuna-canning industry to loin processing (with the same level of canned-tuna output), cannery employment could fall by as much as 80 percent.

Equally significant is the potential geographic relocation of cannery demand for labor. The sites of all but one of the present full-scale U.S. canneries are Puerto Rico and American Samoa. Much of the reason for putting canneries in these sites relate to labor costs, which are much lower than in California, where most of the canneries used to be located. With a shift to loin processing, the attractiveness of low-wage locations diminishes, as evidenced by Bumble Bee's decision to locate their loin cannery in southern California. If other canneries follow Bumble Bee's action, the expected effects on cannery employment are significant reductions in Puerto Rico, possible reductions in American Samoa, and increases (accounting, however, for only one-fifth to one-third of the reductions) in California or other mainland locations.

Recent developments, such as the cutback by Bumble Bee to one shift at its California plant that exclusively uses frozen loins as raw material, have cast some doubt as to the economic feasibility of full-scale tuna loin processing. Other U.S. tuna processors use loins as a relatively small share of their total input mix and have been observing the outcome of Bumble Bee's attempt to process only loins at a single location with considerable interest. Bumble Bee asserts that it is continuing to improve and perfect loining technology and that loin-processing plants are critical to the future of the U.S. tuna industry.[63] However, Van Camp believes that substantial improvements in loining technology, and thus lower costs, are not likely because of the current high level of efficiency in the industry and the high costs of research and development.[64]

Economic Effects on Consumption

As noted, if price declines as a result of the development of domestic processing of imported loins, consumption is expected to expand. However, the loin issue is not a purely supply-side one. The quality problems cited earlier may dampen increases in consumption.

Economic Effects on Trade

All or almost all loins are imported and will probably continue to be, because the primary advantage in processing loins prepared elsewhere is that such loin preparation can be done in low-wage locations. Thus, a shift in domestic canning activity from full-scale to loin-only processing operations would mean that future imports of loins would increase and imports of raw whole tuna would decrease.

However, as an alternative, imported loins may displace imported canned tuna; for example, Bumble Bee imports loins from Thailand as an alternative to importing canned product from the same source. A plausible argument in support of this is the tariff-avoidance argument noted earlier. Therefore, to the extent that imported loins displace canned product, one would expect that future canned tuna imports will also decline.[65] The degree of substitution of tuna loins

[62] The increased production of canned tuna would raise canneries' demand for (imported) raw material, in turn raising foreign loiners' demand for raw tuna harvested by U.S. vessels. This would tend to offset (at least partly) the above-noted adverse effects of loining on harvesters.

[63] Michael McGowan, vice president, Bumble Bee Seafoods, Inc., transcript of the hearing, pp. 138-139.

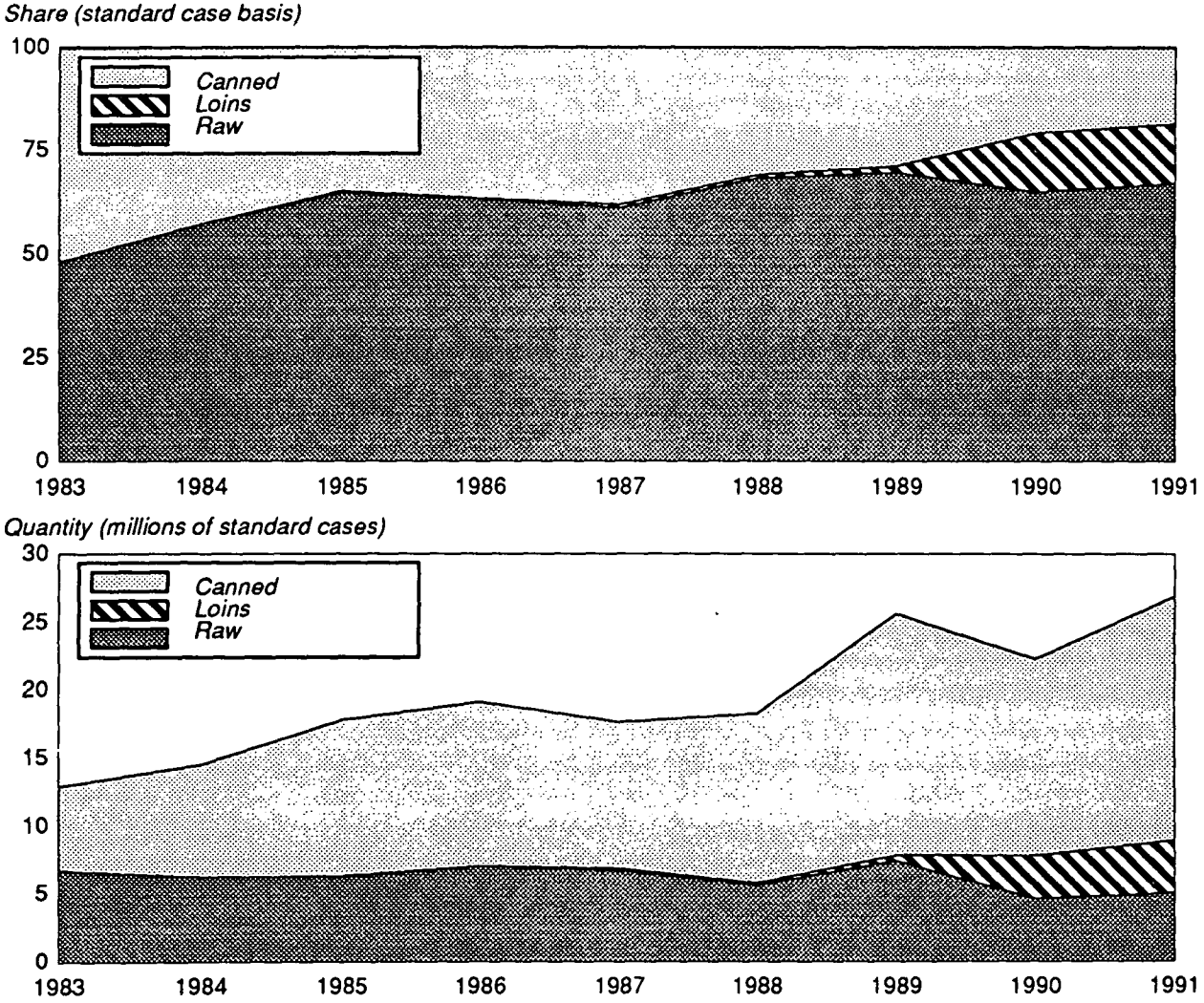
[64] Paul Krampe, vice president, Van Camp Seafood Co. Inc., posthearing brief, p. 8.

[65] However, this substitution would be mitigated by the fact that the increase in U.S. canned tuna production resulting from increased imports of loins would enlarge the tariff rate quota for canned tuna imports, thus allowing more canned tuna to be imported at the lower duty rate of 6 percent ad valorem.

for raw tuna vis-à-vis canned tuna, however, is indiscernible (figure 5-2).[66]

[66] The tariff avoidance aspect may be reinforced by an ancillary effect whereby increased U.S. production of canned tuna afforded by using loins enlarges the import tariff rate quota amount and, thus, increases the amount of imported canned tuna that can enter at the below-quota duty rate of 6 percent ad valorem. Beneficial effects would accrue to firms that import tuna loins to utilize in the domestic production of canned tuna as well as import canned tuna.

Figure 5-2
Tuna: U.S. imports, by product form, 1983-91



Source: Calculated based on official statistics of the U.S. Department of Commerce.

APPENDIX A
COPY OF THE LETTER TO CHAIRMAN BRUNSDALE FROM LLOYD BENTSEN, CHAIRMAN, U.S. SENATE COMMITTEE ON FINANCE

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510-6200

The Honorable
Anne E. Brunsdale
Acting Chairman
United States International
Trade Commission
500 "E" Street, S.W.
Washington, D.C. 20436

Dear Madam Chairman:

The Committee on Finance has reviewed the Commission's recent report on Investigation Number 332-291, entitled "Tuna: Competitive Conditions Affecting the U.S. and European Tuna Industries in Domestic and Foreign Markets," which was instituted pursuant to requests from the Senate Committee on Finance and the House Committee on Ways and Means.

After considering the contents of the report, it has come to the Committee's attention that certain events in 1990 appear to have had a dramatic impact on the U.S. canned tuna industry and continue to affect the industry in 1991. Additional economic data and related information are needed for Congress to carefully examine these events.

Accordingly, the Committee on Finance requests that the Commission conduct an investigation under section 332(g) of the Tariff Act of 1930, as amended (19 U.S.C. 1332(g)), for the purposes of examining current issues affecting the U.S. canned tuna industry and market and providing an updated profile of the U.S. canned tuna industry.

In its investigation, the Commission should provide the following, to the extent possible:

(1) A discussion of the "dolphin-safe" issue, including its background, relevant company policies and Government legislation, and an analysis of the effects of the dolphin-safe issue on U.S. tuna production, trade, and consumption;

(2) A discussion of international fishery access issues relating to tuna, including a discussion of the treatment of tuna in the U.S. and foreign fishery conservation zones, fishery access treaties and negotiations, and other relevant information;

(3) A discussion of recent technological developments, such as the domestic processing of imported tuna loins, with a description of the effect of such developments on U.S. tuna production and trade; and

(4) A profile of the U.S. tuna industry and market, including information on levels and trends in U.S. production, consumption, trade, and prices for both domestic and raw tuna, the number of operations, employment and wages, capacity utilization, financial experience, sources of raw tuna used by the processing sector, sources of imported canned and raw tuna, productivity, and changes in industry structure, such as ownership changes.

In view of the importance that industry input would have on this investigation, the Committee believes that it would be helpful for the Commission to hold a public hearing which will permit interested members of the industry an opportunity to present their views.

The Commission should report the results of the investigation no later than July 31, 1992.

Thank you for your cooperation in and attention to this matter.

Sincerely,

Bob Packwood
Ranking Member

Lloyd Bentsen
Chairman

APPENDIX B
THE COMMISSION'S NOTICE OF INVESTIGATION

and cement clinker. The investigation was requested in a petition filed on May 21, 1991, by the Ad Hoc Committee of Florida Producers of Gray Portland Cement, Washington, DC.

Participation in the Investigation and Public Service List

Persons wishing to particpate in the investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in § 201.11 of the Commission's rules, not later than twenty-one (21) days after publication of this notice in the Federal Register. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to this investigation upon the expiration of the period for filing entries of appearance.

Limited Disclosure of Business Proprietary Information (BPI) Under an Administrative Protective Order (APO) and BPI Service List

Pursuant to section 207.7(a) of the Commission's rules, the Secretary will make BPI gathered in this final investigation available to authorized applicants under the APO issued in the investigation, provided that the application is made not later than twenty-one (21) days after the publication of this notice in the Federal Register. A separate service list will be maintained by the Secretary for those parties authorized to receive BPI under the APO.

Authority: This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.20 of the Commission's rules.

Issued: September 10, 1991.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 91-22487 Filed 9-17-91; 8:45 am]

BILLING CODE 7020-02-M

[Investigation No. 332-313]

Tuna; Current Issues Affecting the U.S. Industry

AGENCY: United States International Trade Commission.

ACTION: Notice of investigation, public hearing, and request for comments.

EFFECTIVE DATE: September 5, 1991.

SUMMARY: Following the receipt on July 29, 1991, of a request from the Committee on Finance, U.S. Senate, the Commission instituted investigation No. 332-313 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) for the purpose of providing the following, to the extent possible, on current issues affecting the U.S. tuna industry:

1. A discussion of the "dolphin-safe" issue, including its background, relevant company policies and Government legislation, relevant treaty obligations of the United States as a signatory to the Inter-American tropical Tuna Commission and the General Agreement on Tariffs and Trade, and an analysis of the effects of the dolphin-safe issue on U.S. tuna production, trade, and consumption;

2. A discussion of international fishery access issues relating to tuna, including a discussion of the treatment of tuna in the U.S. and foreign fishery conservation zones, fishery access treaties and negotiations, and other relevant information;

3. A discussion of recent technological developments, such as the domestic processing of imported tuna loins, with a description of the effect of such developments on U.S. tuna production and trade; and

4. A profile of the U.S. tuna industry and market, including information on levels and trends in U.S. production, consumption, trade, and prices for both domestic and raw tuna, the number of operations, employment and wages, capacity utilization, financial experience, sources of raw tuna used by the processing sector, sources of imported canned and raw tuna, productivity, and changes in industry structure such as ownership changes.

As requested by the Finance Committee, the Commission will seek to report the results of its investigation by July 31, 1991

FOR FURTHER INFORMATION CONTACT: Roger Corey ((202) 205-3327), Agriculture Division, Office of Industries, U.S. International Trade Commission. For information on the legal aspects of this investigation, contact William Gearhart ((202) 205-3091) of the Office of the General Counsel. Hearing-impaired persons can obtain information on this investigation by contacting the Commission's TDD terminal on (202) 205-1810.

PUBLIC HEARING: A public hearing in connection with this investigation will be held at a time and place to be announced. All persons will have the right to appear by counsel or in person, to present information, and to be heard.

WRITTEN SUBMISSIONS: Interested persons may submit written statements concerning the investigation. To be assured of consideration, written statements must be received by the close of business on April 15, 1992. Commercial or financial information that a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform to the requirements of § 201.6 of the Commission's rules of practice and procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons. All submissions should be addressed to the Secretary, U.S. International Trade Commission, 500 E St. SW, Washington, DC 20436.

Issued: September 6, 1991.

By order of the Commission.

Kenneth R. Mason,

Secretary.

[FR Doc. 91-22488 Filed 9-17-91; 8:45 am]

BILLING CODE 7020-02-M

INTERSTATE COMMERCE COMMISSION

Agency Information Collection Under OMB Review

The following proposal for collection of information under the provisions of the Paperwork Reduction Act (44 U.S.C. Chapter 35) will be submitted to the Office of Management and Budget for review and approval. Copies of the forms and supporting documents may be obtained from the Agency Clearance Officer, Darlene Proctor (202) 275-7322. Comments regarding this information collection should be addressed to Darlene Proctor, Interstate Commerce Commission, Room 2203, Washington, DC 20423 and to Wayne Brough, Office of Management and Budget, Office of Information and Regulatory Affairs, Washington, DC 20503.

Type of Clearance: New Collection.

Bureau/Office: Office of Proceedings.

Title of Form: Requirement that maps be submitted in all Abandonment Exemption proceedings.

OMB Form Number: 3120-.

Agency Form No.: N/A.

Frequency: At discretion of Applicant.

No. of Respondents: 139.

Total Burden Hours: 1 hour per response. 139 Estimated total Annual Burden hours.

Sidney L. Strickland, Jr.,

Secretary.

[FR Doc. 91-22400 Filed 9-17-91; 8:45 am]

BILLING CODE 7035-01-M

APPENDIX C
WITNESSES AT THE PUBLIC HEARING

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject	:	TUNA: CURRENT ISSUES AFFECTING THE U.S. INDUSTRY
Inv. No.	:	332-313
Date and Time	:	February 4-5, 1992 - 8:30 a.m. (PST)

Sessions were held in connection with the investigation at the Sheraton Los Angeles Harbor Hotel, 601 South Palos Verdes Street, San Pedro, California, 90731-3329.

WITNESS AND ORGANIZATION:

American Tunaboat Association
San Diego, CA

Richard C. Atchison, Executive Director

Tuna Trust Fund One
San Diego, CA

Julius Zolezzi

United Industrial Workers, Service, Transportation,
Professional and Government of North America
Wilmington, CA
(Affiliated with Seafarers International)

Steve Edney, President
(Representing Cannery Workers)

Fishermen's Union of America
San Pedro, CA
(Affiliated with Seafarers International)

Theresa Hoinsky, President

Shawn Gehan, Research Assistant

- more -

WITNESS AND ORGANIZATION:

Star-Kist Foods, Inc.
Long Beach, CA

William P. Woods, Jr., Vice President,
Procurement and Government Relations

Van Ness, Feldman & Curtis
Washington, D.C.
On behalf of

Michael McGowan, Vice President,
Bumble Bee Seafoods, Inc.

Mike McCulley

Howard J. Feldman)--OF COUNSEL

Mitsubishi Foods (MC), Inc.
San Diego, CA

Michael E. Dunn, Vice President,
Mitsubishi Foods, Inc. and
Caribe Tuna, Inc.

Western Fishboat Owners Association
San Diego, CA

William Perkins, President

Olsson, Frank & Weeda, P.C.
Washington, D.C.
On behalf of

Pan Pacific Fisheries, Inc.

Kevin T. Dolan, President

David L. Durkin)--OF COUNSEL

- more -

WITNESS AND ORGANIZATION:

American Tuna Sales Association
San Diego, CA

William J. Gillis, Jr., Advisor

Earthtrust
Kailua, Hawaii

Donald White, President and CEO

Zolezzi Enterprises
San Diego, CA

Julius Zolezzi, Far Pacific Management

Earth Island Institute
San Francisco, CA

David C. Phillips, Executive Director

Fishermen's Cooperative Association
San Pedro, CA

Thomas M. Crehan, General Manager

- end -

APPENDIX D
STATISTICAL TABLES

Table D-1
U.S. tuna purse seine fleet: Fleet size, additions, removals, and average capacity, Jan. 1, 1986, to Jan. 1, 1992

Year	Fleet size on January 1		Additions during year		Removals during year		Net change during year		January capacity,
	No.	Capacity[1]	No.	Capacity	No.	Capacity	No.	Capacity	Average
1986	90	97,131	1	1,500	11	10,742	-10	-9,242	1,079
1987	80	87,889	4	3,800	13	13,510	-9	-9,710	1,099
1988	71	78,179	3	4,400	11	12,650	-8	-8,250	1,115
1989	63	69,929	3	3,700	3	2,670	0	-1,030	1,110
1990	63	72,370	3	4,350	10	9,580	-7	-5,230	1,149
1991	56	67,140	2	2,850	1	1,100	1	1,750	1,199
1992[2]	57	68,890	0	0	4	3,550	-4	-3,550	1,209

Summary of additions by type

	New		Transfer from other fishery		Total additions	
	No.	Capacity	No.	Capacity	No.	Capacity
1986	1	1,500	0	0	1	1,500
1987	1	1,200	3	2,600	4	3,800
1988	1	1,200	2	3,200	3	4,400
1989	1	1,500	2	2,200	3	3,700
1990	3	4,350	0	0	3	4,350
1991	2	2,850	0	0	2	2,850
1992[3]	0	0	0	0	0	0

Summary of removals by type

	Lost at sea		Transfer to other fishery		Sale to foreign flag		Total removals	
	No.	Capacity	No.	Capacity	No.	Capacity	No.	Capacity
1986	3	2,242	1	950	7	7,750	11	10,742
1987	1	1,400	0	0	12	12,110	13	13,510
1988	0	0	0	0	11	12,650	11	12,650
1989	1	270	0	0	2	2,400	3	2,670
1990	1	1,200	0	0	9	8,380	10	9,580
1991	1	1,100	0	0	0	0	1	1,100
1992	0	0	0	0	4	3,550	4	3,550

[1] Capacity in short tons, carrying capacity.
[2] As of January 1992, there were 3 inactive vessels totaling 3,100 tons.
[3] None as of Apr. 1, 1992.

Source: Data submitted by American Tunaboat Association, prehearing brief, July 27, 1990; correspondence dated Jan. 17, 1992, and Jan. 31, 1992.

Table D-2
Number and capacity[1] of U.S.-flag vessels operating in the eastern Pacific Ocean, by vessel types and years, 1986-92

Vessel type and year	*Number of vessels*	*Total capacity*	*Average capacity*
		(Short tons)	*(Short tons)*
Purse seiners:			
1986	64	43,235	676
1987	54	41,965	777
1988	60	44,568	743
1989	51	33,009	647
1990	28	27,120	969
1991	17	16,590	976
1992	9	8,990	999
Baitboats:			
1986	3	348	116
1987	11	668	61
1988	12	938	78
1989	9	839	93
1990	8	560	70
1991	8	560	70
1992	0	0	0
Jigboats:			
1986	0	0	(2)
1987	0	0	(2)
1988	3	70	23
1989	0	0	(2)
1990	0	0	(2)
1991	0	0	(2)
1992	0	0	(2)

[1] Carrying capacity.
[2] Not meaningful.

Source: Compiled from official statistics of the *Annual Report of the Inter-American Tropical Tuna Commission*, various annual issues.

Table D-3
Location of the U.S. tuna purse seine fleet

Year as of Jan 1:	Eastern Pacific		Western Pacific		Total	
	Boats (No.)	Capacity (Tons)	Boats (No.)	Capacity (Tons)	Boats (No.)	Capacity (Tons)
1990	28	27,120	35	45,250	63	72,370
1991	17	16,590	39	50,550	56	67,140
1992[1]	13	11,990	44	56,900	57	68,890

[1] Capacity includes two vessels in the Eastern Pacific not in operation with a total capacity of 1,700 tons and one vessel not operating in the Western Pacific with a capacity of 1,400 tons.

Source: American Tunaboat Association.

Table D-4
U.S. tuna purse seiners: Capacity and capacity utilization, 1986-92

Jan. 1 of—	Total catch	Total fleet capacity[1]	Share of total catch
	(Short tons)	(Short tons)	(Percent)
1986	260,939	339,959	77
1987	283,899	307,612	92
1988	283,273	273,627	104
1989	252,838	244,752	103
1990	195,977	253,295	77
1991	180,994	234,990	77
1992	([2])	241,115	([2])

[1] The total fleet capacity was derived by multiplying the annual fleet capacity by 3.5, the average number of trips per year.
[2] Not available.

Source: Data on capacity compiled from information provided by the American Tunaboat Association; catch data represent cannery receipts; 1990-91 total catch data taken from posthearing brief of Bumble Bee Seafoods, attached data on cannery receipts provided by Commerce Department.

Table D-5
Tuna: U.S. landings,[1] by distance caught off U.S. shores and in international waters, 1986-91

(Value (1,000 dollars) and Quantity (1,000 pounds))

Year and species	From 0 to 3 miles		Between 3 and 200 miles		High seas or off foreign shores		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1986:								
Albacore	6	4	9,122	4,896	2,447	1,341	11,575	6,241
Bigeye	21	88	1,278	4,820	85	184	1,384	5,092
Bluefin	(2)	1	7,755	5,424	2,932	1,366	10,687	6,791
Skipjack	210	237	2,113	2,201	235,141	75,456	237,464	77,894
Yellowfin	277	402	11,370	14,792	281,117	104,780	292,764	119,974
All other	75	16	728	999	338	227	1,141	1,242
Total	589	748	32,366	33,132	522,060	183,354	555,015	217,234
1987:								
Albacore	3	1	4,795	3,932	4,735	3,405	9,533	7,338
Bigeye	8	20	2,910	8,646	527	848	3,445	9,514
Bluefin	1	3	2,575	13,944	1,756	2,516	4,332	16,463
Skipjack	(2)	(2)	4,226	3,882	225,962	85,140	230,188	89,022
Yellowfin	490	637	16,884	28,015	360,170	169,437	377,544	198,089
All other	146	21	762	518	294	467	1,202	1,006
Total	648	682	32,152	58,937	593,444	261,813	626,244	321,432
1988:								
Albacore	4	2	8,896	7,566	10,155	8,710	19,055	16,278
Bigeye	63	270	3,667	12,860	1,719	2,019	5,449	15,149
Bluefin	16	21	2,916	16,877	813	407	3,745	17,305
Skipjack	1	1	5,291	5,772	294,707	143,279	299,999	149,052
Yellowfin	495	885	25,481	39,353	254,319	141,964	280,295	182,202
All other	98	9	683	537	(2)	(2)	781	546
Total	677	1,188	46,934	82,965	561,713	296,379	609,324	380,532
1989:								
Albacore	5	1	3,392	2,728	8,709	7,781	12,106	10,510
Bigeye	171	594	4,205	14,400	171	593	4,547	15,587
Bluefin	3	27	3,191	22,142	1,555	724	4,749	22,893
Skipjack	290	322	3,362	3,542	241,940	97,689	245,592	101,553
Yellowfin	360	543	20,354	35,116	252,942	121,951	273,656	157,610
All other	89	20	710	763	14	16	813	799
Total	918	1,507	35,214	78,691	505,331	228,754	541,463	308,952
1990:								
Albacore	128	183	4,220	3,566	12,214	10,827	16,651	14,576
Bigeye	924	3,329	2,967	10,969	1,160	3,464	5,051	17,762
Bluefin	15	77	3,314	23,614	2,187	1,145	5,516	24,836
Skipjack	536	1,086	1,100	2,185	250,873	100,366	252,509	103,637
Yellowfin	1,973	4,930	13,561	30,788	217,590	112,290	233,123	148,008
All other	198	54	818	895	33	73	1,049	1,022
Total	3,744	9,659	25,979	72,017	484,056	228,165	513,809	309,841
1991:								
Albacore	16	7	2,289	1,891	12,223	9,508	14,528	11,406
Bigeye	0	0	4,173	15,881	1,058	3,910	5,231	19,791
Bluefin	1	1	1,813	16,940	51	57	1,865	16,998
Skipjack	278	318	2,562	2,753	388,696	152,310	391,536	155,381
Yellowfin	176	481	10,489	22,937	94,894	46,059	105,559	69,477
All other	203	42	773	521	168	86	1,144	649
Total	674	849	22,099	60,923	497,090	211,930	519,863	273,702

[1] Landings reported in round (live) weight.
[2] Less than 500.

Note.—Data include landings by U.S.-flag vessels at Puerto Rico and ports outside the customs territory of the United States.
Source: Compiled from official data of the National Marine Fisheries Service.

Table D-6
Cannery receipts of raw tuna and domestic exports: U.S.-flag vessels domestically-landed raw tuna, by species and locations of the catch, 1986-91[1]

Species and location	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
			(Short tons)			
Albacore:						
East Atlantic	0	0	0	0	0	0
West Atlantic	0	0	8	0	0	0
East Pacific	3,158	2,589	4,276	1,624	2,499	1,387
West Pacific	369	1,088	3,376	3,257	4,434	5,009
Total	3,527	3,677	7,660	4,881	6,933	6,396
Skipjack:						
East Atlantic	0	0	0	0	0	0
West Atlantic	1,825	884	0	0	0	402
East Pacific	7,938	14,845	39,325	21,582	12,946	28,413
West Pacific	103,049	87,842	110,145	99,304	117,949	172,534
Total	112,812	103,571	149,470	120,886	130,895	201,349
Yellowfin:[3]						
East Atlantic	0	0	0	0	0	0
West Atlantic	839	60	18	0	0	317
East Pacific	103,402	106,300	98,827	81,610	62,777	17,773
West Pacific	40,359	70,291	27,298	45,461	62,974	36,994
Total	144,600	176,651	126,143	127,071	125,751	55,084
All species:						
East Atlantic	0	0	0	0	0	0
West Atlantic	2,664	944	26	0	0	719
East Pacific	114,498	123,734	142,428	104,816	78,222	47,573
West Pacific	143,777	159,221	140,819	148,022	185,357	214,537
Total	260,939	283,899	283,273	252,838	263,579	262,829
			(1,000 pounds)			
Albacore:						
East Atlantic	0	0	0	0	0	0
West Atlantic	0	0	16	0	0	0
East Pacific	6,316	5,178	8,552	3,248	4,999	2,774
West Pacific	738	2,176	6,752	6,514	8,868	10,018
Total	7,054	7,354	15,320	9,762	13,866	12,792
Skipjack:						
East Atlantic	0	0	0	0	0	0
West Atlantic	3,650	1,768	0	0	0	804
East Pacific	15,876	29,690	78,650	43,104	25,892	56,826
West Pacific	206,098	175,684	220,290	198,608	235,898	345,068
Total	225,624	207,142	298,940	241,772	261,790	402,698
Yellowfin:[3]						
East Atlantic	0	0	0	0	0	0
West Atlantic	1,678	120	36	0	0	634
East Pacific	206,804	212,600	197,654	163,220	125,554	35,546
West Pacific	80,718	140,582	54,596	90,922	125,948	73,988
Total	289,200	353,302	252,286	254,142	251,502	110,168
All species:						
East Atlantic	0	0	0	0	0	0
West Atlantic	5,328	1,888	52	0	0	1,438
East Pacific	228,996	247,468	284,856	209,632	156,444	95,146
West Pacific	287,554	318,442	281,638	296,044	370,714	429,074
Total	521,878	567,798	566,546	505,676	527,158	525,658

[1] Includes tuna landed directly or transshipped to a foreign country; excludes tuna exported from the east coast.
[2] Includes bigeye, blackfin, and bluefin tuna.

Source: National Marine Fisheries Service, Industry Analysis and Information Section, Southwest Region.

Table D-7
Frozen tuna: Profit-and-loss data for U.S. tuna purse seiners, average per vessel, accounting years 1979-91

Item	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Value (in dollars)												
Net sales of tuna	1,445,886	2,226,952	2,185,942	2,051,667	2,111,452	2,786,039	2,287,353	2,739,476	2,921,360	3,783,440	3,127,615	3,373,481	3,196,880
Crew expense	472,456	673,747	625,837	555,235	542,849	759,745	620,941	827,238	791,960	926,680	841,423	978,259	944,480
Fuel expense	257,557	431,241	503,419	520,510	465,269	547,196	532,686	419,095	377,640	406,840	460,423	477,963	578,760
Galley expense	31,215	43,434	50,326	52,196	49,462	61,980	59,118	64,857	69,320	78,320	82,000	75,852	86,240
License fees	8,557	11,253	10,256	12,225	17,312	23,745	23,234	31,048	27,880	64,680	48,808	38,593	48,560
Transhipment fees	671	5,663	7,140	67,020	79,774	84,098	76,255	29,048	22,320	58,214	40,706	90,111	89,600
Repairs	229,747	291,193	276,291	314,324	260,409	246,392	261,275	263,952	278,240	456,920	509,769	540,444	472,480
Gear and supplies	27,215	35,060	44,709	42,892	50,236	67,353	64,804	70,333	89,840	117,680	103,885	113,704	130,200
Insurance	85,367	100,880	129,046	141,980	143,548	198,529	267,667	335,714	303,880	345,720	373,269	360,963	381,320
Helicopter	25,456	40,566	56,128	72,510	79,258	75,490	93,451	83,905	95,480	126,000	106,577	84,000	82,480
Travel	19,582	25,084	30,744	37,471	39,140	29,608	27,647	21,190	22,600	31,640	39,231	47,778	67,840
Administration	30,696	42,566	41,965	46,206	43,204	55,784	61,941	92,429	84,240	105,160	90,769	82,074	69,840
Interest	177,202	249,843	355,640	422,549	376,140	285,294	280,000	349,048	274,520	140,680	204,962	242,963	223,520
Other expenses	126,418	119,554	137,035	167,147	118,828	169,667	229,412	218,905	160,160	135,400	137,269	157,852	145,440
Total expenses excluding depreciation and amortization	1,492,139	2,070,084	2,268,535	2,452,265	2,265,430	2,604,881	2,598,431	2,806,762	2,598,080	2,993,934	3,039,091	3,290,556	3,320,760
Income or (loss) before depreciation and amortization, taxes and other	(46,253)	156,867	(82,593)	(400,598)	(153,978)	181,158	(311,078)	(67,286)	323,280	789,506	88,524	82,925	(123,880)
Depreciation and amortization	156,139	199,626	257,140	290,520	308,763	291,765	276,647	264,857	255,967	314,818	389,910	384,815	358,400
Income or (loss) before taxes and other income/expenses	(202,392)	(42,759)	(339,732)	(691,118)	(462,742)	(110,607)	(587,725)	(332,143)	67,313	474,688	(301,386)	(301,890)	(482,280)
	Share of net sales (in percent)												
Income or (loss) before depreciation and amortization, taxes and other	(3.2)	7.0	(3.8)	(19.5)	(7.3)	6.5	(13.6)	(2.5)	11.1	20.9	2.8	2.5	(3.9)
Income or (loss) before taxes and other income/expenses	(14.0)	(1.9)	(15.5)	(33.7)	(21.9)	(4.0)	(25.7)	(12.1)	2.3	12.5	(9.6)	(8.9)	(15.1)
	Number of												
Vessels reporting	79	83	86	102	93	51	51	21	25	25	26	27	25
Organizations reporting	56	56	56	56	56	42	42	11	12	12	13	27	23

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-8
Frozen tuna: Profit-and-loss data for U.S. tuna purse seiners, by primary ocean fished, average per vessel, accounting years 1990-91

Item	Year and ocean fished			
	1990		1991	
	ETP	WTP	ETP	WTP
	Value (in dollars)			
Net sales of tuna	2,825,923	3,881,929	1,788,000	3,549,100
Crew expense	881,538	1,068,071	590,600	1,032,950
Fuel expense	395,077	554,929	353,800	635,000
Galley expense	53,846	96,286	23,400	101,950
License fees	27,462	48,929	33,800	52,250
Transhipment fees	26,615	149,071	12,400	108,900
Repairs	410,077	661,500	195,600	541,700
Gear and supplies	85,923	139,500	94,000	139,250
Insurance	355,462	366,071	306,200	400,100
Helicopter	74,769	92,571	58,800	88,400
Travel	31,538	62,857	26,800	78,100
Administration	71,385	92,000	76,200	68,250
Interest	173,923	307,071	41,800	268,950
Other expenses	171,077	145,571	168,800	139,600
Total expenses excluding depreciation and amortization	2,758,692	3,784,427	1,982,200	3,655,400
Income or (loss) before depreciation and amortization, taxes and other	67,231	97,502	(194,200)	(106,300)
Depreciation and amortization	253,308	506,929	96,200	423,950
Income or (loss) before taxes and other income/expenses	(186,077)	(409,427)	(290,400)	(530,250)
	Share of net sales (in percent)			
Income or (loss) before depreciation and amortization, taxes and other	2.4	2.5	(10.9)	(3.0)
Income or (loss) before taxes and other income/expenses	(6.6)	(10.5)	(16.2)	(14.9)
	Number of			
Vessels reporting	13	14	5	20
Organizations reporting	13	14	5	18

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-9
Frozen tuna: Individual cost items as a share of total expenses before depreciation for U.S. tuna purse seiners, average per vessel, accounting years 1979-91

Item	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
	Share of net expenses excluding depreciation and amortization												
Crew expense	31.7	32.6	27.6	22.6	24.0	29.2	23.9	29.5	30.5	31.0	27.7	29.7	28.4
Fuel expense	17.3	20.8	22.2	21.2	20.5	21.0	20.5	14.9	14.5	13.6	15.2	14.5	17.4
Galley expense	2.1	2.1	2.2	2.1	2.2	2.4	2.3	2.3	2.7	2.6	2.7	2.3	2.6
License fees	0.6	0.5	0.5	0.5	0.8	0.9	0.9	1.1	1.1	2.2	1.6	1.8	1.5
Transhipment fees	(1)	0.3	0.3	2.7	3.5	3.2	2.9	1.0	0.9	1.9	1.3	2.7	2.7
Repairs	15.4	14.1	12.2	12.8	11.5	9.5	10.1	9.4	10.7	15.3	16.8	16.4	14.2
Gear and supplies	1.8	1.7	2.0	1.8	2.2	2.6	2.5	2.5	3.5	3.9	3.4	3.5	3.9
Insurance	5.7	4.9	5.7	5.8	6.3	7.6	10.3	12.0	11.7	11.6	12.3	11.0	11.5
Helicopter	1.7	2.0	2.5	3.0	3.5	2.9	3.6	3.0	3.7	4.2	3.5	2.6	2.5
Travel	1.3	1.2	1.4	1.5	1.7	1.1	1.1	0.8	0.9	1.1	1.3	1.5	2.0
Administration	2.1	2.1	1.9	1.9	1.9	2.1	2.4	3.3	3.2	3.5	3.0	2.5	2.1
Interest	11.9	12.1	15.7	17.2	16.6	11.0	10.8	12.4	10.6	4.7	6.7	7.4	6.7
Other expenses	8.4	5.6	5.8	6.9	5.3	6.5	8.7	7.8	6.2	4.5	4.5	4.8	4.4
Expenses excluding depreciation and amortization	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Depreciation and amortization	10.5	9.6	11.3	11.8	13.6	11.2	10.6	9.4	9.9	10.5	12.8	11.7	10.8
	Number of—												
Vessels reporting	79	83	86	102	93	51	51	21	25	25	26	27	25
Organizations reporting	56	56	56	56	56	42	42	11	12	12	13	27	23

[1] Less than 0.05 percent

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-10
Frozen tuna: Individual cost items as a share of total expenses before depreciation for U.S. tuna purse seiners, by primary ocean fished, average per vessel, accounting years 1990-91

(In percent)

	Year and ocean fished			
	1990		1991	
Item	ETP	WTP	ETP	WTP
Crew expense	32.0	28.2	29.8	28.3
Fuel expense	14.3	14.7	17.8	17.4
Galley expense	2.0	2.5	1.2	2.8
License fees	1.0	1.3	1.7	1.4
Transhipment fees	1.0	3.9	.6	3.0
Repairs	14.9	17.5	9.9	14.8
Gear and supplies	3.1	3.7	4.7	3.8
Insurance	12.9	9.7	15.4	10.9
Helicopter	2.7	2.4	3.0	2.4
Travel	1.1	1.7	1.4	2.1
Administration	2.6	2.4	3.8	1.9
Interest	6.3	8.1	2.1	7.4
Other expenses	6.2	3.8	8.5	3.8
Total expenses excluding depreciation and amortization	100.0	100.0	100.0	100.0
Depreciation and amortization	9.2	13.4	4.9	11.6
			Number of	
Vessels reporting	13	14	5	20
Organizations reporting	13	14	5	18

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-11
Comparison of the U.S. tuna purse seine fleet, 1984-85, 1986-89, and 1990-91

	1984-85 fleet		1986-89 fleet		1990-91 fleet	
Average vessel cost	$4,563,833		$5,030,000		$4,482,402	
Average capital expenditures per vessel per year	$99,789		$158,021		$340,233	
Average number of years vessel owned	10.2		12.5		13.7	
Age of vessels:	Number	Percent	Number	Percent	Number	Percent
0 to 5 years	9	18	0	0	0	0
6 to 10 years	16	31	5	19	3	10
11 to 15 years	17	33	5	19	9	30
16 to 20 years	7	14	15	56	5	17
20 years and older	2	4	2	7	13	43
Total	51	100	27	100	30	100
Average age of fleet	11.9 years		15.6 years		17.5 years	

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-12
U.S. tuna canneries, by plant locations, 1980, 1985-91

Plant location	*1980*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
Continental United States	12	1	1	1	1	1	[1]2	2
Hawaii	1	0	0	0	0	0	0	0
Puerto Rico	5	5	5	5	5	5	3	3
American Samoa	2	2	2	2	2	2	2	2
Total	20	8	8	8	8	8	7	7

[1] Bumble Bee opened a plant in February 1990 that processes tuna loins.

Source: 1980, 1985-89 from National Marine Fisheries Service; 1990 data compiled from data submitted to the U.S. International Trade Commission.

Table D-13
Average number of workers employed in the reporting establishments producing canned tuna, hours worked by production and related workers for all products and for canned tuna,[1] and wages and fringe benefits paid to them, 1985-91

Item	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
Average number employed in the reporting establishments:							
All persons . . number	14,197	12,458	12,601	12,151	12,051	11,529	10,898
Production and related workers producing							
All products . number	13,393	12,040	12,190	11,679	11,690	10,832	10,498
Canned tuna . . . . . do	12,887	11,122	11,118	10,882	10,957	10,036	9,613
Hours worked by production and related workers producing:							
All products . 1,000 hours	21,738	24,392	23,687	25,276	24,259	28,004	19,379
Canned tuna . . . . . do	21,121	21,118	20,388	21,768	21,129	18,582	17,934
Wages paid to production and related workers producing:							
All products . 1,000 dollars	106,362	109,490	108,847	111,382	112,634	101,318	96,044
Canned tuna . . . . . do	101,745	95,439	95,897	98,123	100,799	92,905	86,916
Value of fringe benefits provided to production and related workers producing:							
All products . 1,000 dollars	13,630	15,531	18,925	19,501	20,194	21,367	24,892
Canned tuna . . . . . do	13,037	14,587	18,139	18,870	19,715	18,564	20,663

[1] Includes operations in the continental United States, Puerto Rico, and American Samoa.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-14
Raw Tuna: By processors' purchases, domestic, imported, and total, 1986-91

Purchases	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
	Quantity (1,000 pounds)					
Domestic	467,565	537,952	533,431	492,020	304,735	357,607
Imported	586,091	533,125	484,787	568,576	264,242	409,618
Total	1,053,656	1,071,077	1,018,218	1,060,596	568,977	767,225
	(Percent of total)					
Domestic	44	50	52	46	54	47
Imported	56	50	48	54	46	53
Total	100	100	100	100	100	100

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-15
Processors' domestic purchases of raw tuna by species, by quarters, 1986-91

(Quantity (1,000 pounds) and Value (1,000 dollars))

	Albacore		*Yellowfin*		*Skipjack*		*Other*		*Total*	
By quarter	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
1986:										
1st	29	15	68,908	23,259	35,216	10,701	8	3	104,161	33,978
2nd	91	49	61,434	21,976	55,074	16,891	216	78	116,815	38,994
3rd	4,412	2,284	78,158	28,111	39,702	12,435	15,254	5,406	137,526	48,236
4th	1,645	1,003	53,616	18,857	53,321	17,234	481	173	109,063	37,267
Total	6,177	3,351	262,116	92,203	183,313	57,261	15,959	5,660	467,565	158,474
1987:										
1st	16	9	80,382	29,197	57,217	18,724	0	0	137,615	47,930
2nd	28	15	92,642	35,652	56,150	19,170	0	0	148,820	54,837
3rd	2,502	1,841	82,289	42,972	38,279	17,888	525	267	123,595	62,968
4th	1,238	966	85,177	44,575	41,507	19,893	0	60	127,922	65,494
Total	3,784	2,831	340,490	152,396	193,153	75,675	525	327	537,952	231,229
1988:										
1st	1,190	1,314	52,858	25,874	55,237	25,566	0	0	109,285	52,753
2nd	2,266	2,172	66,879	35,348	83,886	40,681	4	2	153,035	78,203
3rd	5,045	4,822	46,955	22,396	70,720	32,767	821	427	123,541	60,412
4th	3,363	3,961	55,549	27,479	88,635	39,286	23	12	147,570	70,738
Total	11,864	12,269	222,241	111,096	298,478	138,299	848	441	533,431	262,106
1989:										
1st	9	7	44,443	20,827	59,044	24,564	0	0	103,496	45,398
2nd	1,046	1,177	51,350	23,739	81,517	32,124	0	0	133,913	57,040
3rd	1,737	1,570	74,389	34,560	60,191	23,327	1,290	558	137,607	60,015
4th	1,823	1,799	77,352	37,812	37,563	14,991	266	119	117,004	54,721
Total	4,615	4,553	247,534	116,938	238,315	95,006	1,556	677	492,020	217,174
1990:										
1st	2,848	3,284	29,948	14,494	24,814	10,721	142	84	57,752	28,583
2nd	3,408	3,709	41,709	20,051	21,728	8,472	186	50	67,031	32,282
3rd	4,111	3,503	41,408	18,551	48,974	19,517	1,971	752	96,464	42,323
4th	1,806	1,446	29,509	13,680	52,043	22,260	130	53	83,488	37,439
Total	12,173	11,942	142,574	66,776	147,559	60,970	2,429	939	304,735	140,627
1991:										
1st	7,386	6,131	19,070	9,110	41,961	17,714	0	0	68,417	32,955
2nd	4,403	3,368	34,935	16,140	56,432	22,420	154	59	95,924	41,987
3rd	1,882	1,383	12,741	5,023	91,827	34,945	404	117	106,855	41,468
4th	931	973	8,618	3,187	76,850	28,413	12	4	86,411	32,577
Total	14,602	11,855	75,364	33,460	267,071	103,492	570	180	357,607	148,987

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-16
Processors' imported purchases of raw tuna by species, by quarters, 1986-91

(Quantity (1,000 pounds) and Value (1,000 dollars))

	Albacore		Yellowfin		Skipjack		Other		Total	
By quarter	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1986:										
1st	49,703	40,016	43,646	15,853	50,990	15,440	2,677	645	147,016	71,953
2nd	70,138	54,140	40,999	15,111	42,047	12,743	4,040	1,522	157,224	83,516
3rd	63,373	48,565	29,774	10,439	44,258	13,008	2,348	932	139,753	72,943
4th	44,770	31,798	35,731	13,294	52,147	16,956	9,450	3,374	142,098	65,421
Total ..	227,984	174,518	150,150	54,697	189,442	58,147	18,515	6,472	586,091	293,834
1987:										
1st	46,848	33,740	14,545	5,303	38,572	12,250	6,805	2,557	106,770	53,850
2nd	40,428	31,206	38,952	15,632	29,993	10,195	3,328	1,353	112,701	58,386
3rd	56,889	53,417	61,839	35,778	59,978	25,554	3,878	1,987	182,584	116,736
4th	57,624	60,967	20,509	10,899	48,233	23,648	4,704	2,717	131,070	98,232
Total ..	201,789	179,331	135,845	67,612	176,776	71,648	18,715	8,614	533,125	327,204
1988:										
1st	46,298	47,264	27,124	14,596	47,836	22,270	3,080	1,588	124,338	85,718
2nd	47,525	51,704	20,917	10,750	31,137	14,776	2,106	1,119	101,685	78,349
3rd	52,255	58,876	21,120	11,524	69,705	34,265	2,446	1,379	145,526	106,044
4th	52,662	62,217	18,656	8,301	38,963	16,758	2,957	1,461	113,238	88,738
Total ..	198,740	220,061	87,817	45,171	187,641	88,069	10,589	5,547	484,787	358,847
1989:										
1st	56,734	66,408	38,666	18,026	44,154	16,806	1,495	677	141,049	101,917
2nd	55,928	63,993	33,323	15,881	78,239	30,416	5,521	2,576	173,011	112,866
3rd	37,580	40,172	35,700	16,579	43,908	16,329	2,274	881	119,462	73,962
4th	43,784	48,639	38,519	19,253	49,959	19,730	2,792	1,662	135,054	89,283
Total ..	194,026	219,212	146,208	69,740	216,260	83,281	12,082	5,796	568,576	378,028
1990:										
1st	32,722	33,663	7,090	2,974	4,236	1,026	16,108	8,747	60,156	46,410
2nd	34,609	36,254	2,417	649	10,991	4,897	15,812	8,652	63,829	50,451
3rd	29,972	33,598	9,669	4,438	18,619	7,116	141	70	58,401	45,222
4th	33,972	35,933	17,404	7,719	30,298	10,930	182	88	81,856	54,670
Total ..	131,325	139,448	36,580	15,779	64,144	23,969	32,243	17,557	264,242	196,753
1991:										
1st	26,462	24,424	36,841	17,393	64,751	26,112	392	195	128,446	68,124
2nd	33,399	31,012	28,857	12,943	38,916	15,008	650	322	101,822	59,285
3rd	36,950	34,871	17,300	7,085	38,032	13,606	157	75	92,439	55,637
4th	39,672	44,691	13,400	5,210	33,382	11,857	457	233	86,911	61,991
Total ..	136,483	134,998	96,398	42,631	175,081	66,583	1,656	825	409,618	245,037

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-17
Processors' purchases of tuna loins, by species, by quarters, 1990-91

(Quantity (1,000 pounds) and Value (1,000 dollars))

	Albacore		Yellowfin		Skipjack		Other		Total	
By quarter	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1990:										
1st	0	0	0	0	0	0	0	0	0	0
2nd	0	0	0	0	0	0	0	0	0	0
3rd	0	0	3,140	4,033	5,817	6,848	0	0	8,957	10,881
4th	0	0	1,998	2,667	6,365	7,640	0	0	8,363	10,307
Total ...	0	0	5,138	6,700	12,182	14,488	0	0	17,320	21,188
1991:										
1st	4,838	10,844	6,136	7,455	17,227	20,111	50	51	28,251	38,461
2nd	7,324	16,382	6,923	8,319	22,405	27,139	164	170	36,816	52,010
3rd	7,324	16,382	8,304	9,789	35,632	43,023	308	321	51,568	69,515
4th	2,486	5,538	7,317	8,526	43,610	50,711	548	609	53,961	65,384
Total ...	21,972	49,146	28,680	34,089	118,874	140,984	1,070	1,151	170,596	225,370

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-18
Canned tuna: U.S. production by types and packs, 1985-91

Type and pack	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
	Quantity (1,000 pounds)						
Albacore:							
Solid	116,493	141,726	122,675	114,953	118,229	112,145	103,272
Chunk	14,859	15,327	17,180	16,166	19,052	19,734	18,428
Flakes and grated	648	288	36	(1)	(1)	(1)	(1)
Total	132,000	157,341	139,891	131,119	137,281	131,879	121,700
Light meat:							
Solid	7,937	6,728	22,055	8,619	10,842	9,438	7,644
Chunk	405,054	471,881	491,829	457,977	536,933	438,204	461,351
Flakes and grated	(2)	882	216	468	1,206	1,080	2,088
Total	412,991	479,491	514,100	467,064	548,981	448,722	471,083
Grand total	544,991	636,832	653,991	598,183	686,262	580,601	592,783
	Value (1,000 dollars)						
Albacore:							
Solid	240,308	291,102	277,470	278,745	301,348	285,186	245,520
Chunk	29,001	29,253	34,873	38,419	43,943	41,731	35,189
Flakes and grated	653	440	52	(1)	(1)	(1)	(1)
Total	269,962	320,795	312,395	317,164	345,291	326,917	280,709
Light meat:							
Solid	11,903	9,109	33,391	15,115	16,317	13,974	11,462
Chunk	538,904	550,978	670,487	627,487	695,068	559,881	582,515
Flakes and grated	(2)	636	170	443	1,086	1,242	1,866
Total	550,807	560,723	704,048	643,045	712,471	575,097	595,843
Grand total	820,769	881,518	918,446	960,209	1,057,762	902,014	876,552
	Unit value (per pound)						
Albacore:							
Solid	$2.06	$2.05	$2.26	$2.42	$2.55	$2.54	$2.38
Chunk	1.95	1.91	2.03	2.38	2.31	2.11	1.91
Flakes and grated	1.01	1.53	1.44	(1)	(1)	(1)	(1)
Total	2.05	2.04	2.23	2.42	2.52	2.48	2.31
Light meat:							
Solid	1.50	1.35	1.51	1.75	1.50	1.48	1.50
Chunk	1.33	1.17	1.36	1.37	1.29	1.28	1.26
Flakes and grated	(2)	.72	.79	.95	.90	1.15	.89
Total	1.33	1.17	1.37	1.38	1.30	1.28	1.26
Grand total	1.51	1.38	1.40	1.61	1.54	1.55	1.48

[1] Included with light meat.
[2] Included with albacore.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service of the United States 1986-89.

Table D-19
Canned tuna: U.S. production by pack, 1986-91

(In thousands of standard cases)

Type of pack	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
Water:						
White	6,466	6,003	6,160	6,546	6,396	5,962
Light	15,461	17,731	17,385	19,310	16,995	18,458
Total in water	21,927	23,733	23,545	25,857	23,391	24,421
Oil:						
White	1,544	1,091	956	820	894	692
Light	9,047	8,869	8,345	7,913	6,115	6,843
Total in oil	10,590	9,960	9,300	8,734	7,008	7,535
Total in Water & Oil:						
White	8,010	7,094	7,116	7,367	7,290	6,654
Light	24,508	26,600	25,730	27,224	23,110	25,301
Grand Total	32,517	33,694	32,845	34,591	30,399	31,956

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-20
Canned tuna in water or oil: U.S. processors' domestic shipments,[1] by types, 1986-91

Product	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
	Quantity (1,000 standard cases)					
Tuna in water:						
Whitemeat	5,981	6,201	5,839	6,039	6,322	6,850
Lightmeat	18,600	19,024	18,826	21,984	18,783	17,534
Total, tuna in water	24,581	25,225	24,665	28,022	25,105	24,384
Tuna in oil:						
Whitemeat	1,378	1,240	1,044	909	851	772
Lightmeat	9,440	8,764	8,115	7,730	7,191	6,844
Total, tuna in oil	10,818	10,004	9,158	8,639	8,042	7,616
Grand total	35,399	35,229	33,823	36,661	33,147	32,000
	Value (1,000 dollars)					
Tuna in water:						
Whitemeat	259,504	295,065	320,141	327,449	332,151	352,807
Lightmeat	485,667	545,930	591,065	632,993	516,747	490,641
Total, tuna in water	745,171	840,995	911,206	960,442	848,898	843,448
Tuna in oil:						
Whitemeat	59,071	57,129	55,943	48,748	44,636	41,099
Lightmeat	249,408	250,924	251,740	217,578	194,884	183,016
Total, tuna in oil	308,479	308,053	307,683	266,326	239,520	224,115
Grand total	1,053,650	1,149,048	1,218,889	1,226,768	1,088,418	1,067,563
	Unit value (per case)					
Tuna in water:						
Whitemeat	$43.39	$47.58	$54.83	$54.22	$52.54	$51.50
Lightmeat	26.11	28.70	31.40	28.79	27.51	27.98
Average, tuna in water	30.31	33.34	36.94	34.27	33.81	34.59
Tuna in oil:						
Whitemeat	42.87	46.07	53.59	53.63	52.45	53.24
Lightmeat	26.42	28.63	31.02	28.15	27.10	26.74
Average, tuna in oil	28.52	30.79	33.60	30.83	29.78	29.43
Average, all tuna	29.76	32.62	36.04	33.46	32.84	33.36

[1] Includes canned tuna imported by some processors.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-21
Canned tuna: Retail, institutional, and total shipments[1], 1986-91

Year	Retail			Institutional	Total
	Processors' own brand	Private label	Total, retail		
	Quantity (1,000 pounds)				
1986	451,835	67,117	518,952	82,865	601,817
1987	460,197	72,276	532,473	90,156	622,629
1988	621,248	101,600	722,848	92,397	815,245
1989	720,079	99,428	819,507	101,897	921,404
1990	585,390	119,847	705,237	99,996	805,233
1991	591,284	108,516	699,800	102,130	801,930
	Share of total (percent)				
1986	75	11	86	14	100
1987	74	12	86	14	100
1988	76	12	88	12	100
1989	78	11	89	11	100
1990	73	15	88	12	100
1991	74	14	87	13	100

[1] Includes both domestically produced and imported canned tuna.

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-22
Canned tuna: U.S. shipments of domestic and imported whitemeat and lightmeat tuna, and share of shipments, 1986-91

Year	Whitemeat			Lightmeat			Total		
	Domestic	Import	Total	Domestic	Import	Total	Whitemeat	Lightmeat	Total
	Quantity (1,000 pounds)								
1986	156,195	11,622	167,817	477,906	113,861	591,767	167,817	591,767	759,584
1987	138,333	10,628	148,961	518,700	105,944	624,644	148,961	624,644	773,605
1988	138,762	17,394	156,156	501,735	128,681	630,416	156,156	630,416	786,572
1989	143,657	27,593	171,249	530,868	173,043	703,911	171,249	703,911	875,160
1990	139,874	31,532	171,405	506,493	127,296	633,789	171,405	633,789	805,194
1991	148,620	23,953	172,572	475,384	153,974	629,358	172,572	629,358	801,930
	Share of total (percent)								
1986	93	7	100	81	19	100	22	78	100
1987	93	7	100	83	17	100	19	81	100
1988	89	11	100	80	20	100	20	80	100
1989	84	16	100	75	25	100	20	80	100
1990	82	18	100	80	20	100	21	79	100
1991	86	14	100	76	24	100	22	78	100

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-23
Canned tuna: Market shares of retail, institutional, and total shipments, 1986-91

Year	Retail						Institutional		Total	
	Processors' own brand		Private label		Total, retail					
	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import
1986	88	12	80	20	87	13	32	68	80	20
1987	88	12	80	20	87	13	31	69	79	21
1988	89	11	81	19	88	12	24	76	81	19
1989	85	15	76	24	84	16	30	70	78	22
1990	89	11	74	26	87	13	35	65	80	20
1991	86	14	76	24	84	16	32	68	78	22

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-24
Canned tuna: U.S. processors' inventories, by packs, as of Dec. 31 of 1986-91

Type of pack	1986	1987	1988	1989	1990	1991
	Quantity (1,000 standard cases)					
Tuna in water:						
Whitemeat	1,911	1,546	1,684	2,151	1,958	1,252
Lightmeat	3,594	4,108	5,906	6,244	3,792	4,792
Total, tuna in water	5,505	5,653	7,590	8,395	5,750	6,044
Tuna in oil:						
Whitemeat	611	393	356	317	329	168
Lightmeat	1,861	1,885	1,965	1,829	1,536	1,694
Total, tuna in oil	2,472	2,278	2,321	2,145	1,864	1,862
Grand total	7,977	7,931	9,911	10,540	7,615	7,906
	Ratio of inventories to shipments (percent)					
Tuna in water:						
Whitemeat	32.0	24.9	28.8	35.6	29.4	18.3
Lightmeat	14.6	21.6	31.4	28.4	20.2	27.3
Total, tuna in water	22.4	22.4	30.8	30.0	22.9	24.8
Tuna in oil:						
Whitemeat	44.3	31.7	34.1	34.9	38.7	21.8
Lightmeat	19.7	21.5	24.2	23.7	21.4	24.6
Total, tuna in oil	22.9	22.8	25.3	24.8	23.2	24.4
Grand total	22.5	22.5	29.3	28.7	23.0	24.7

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-25
Canned tuna: U.S. importers' inventories, by packs, Dec. 31, 1990 and Dec. 31, 1991

(In standard cases)

Type of pack	*1990*	*1991*
Tuna in water:		
Retail-sized containers:		
White meat	222,357	246,712
Light meat	981,463	2,004,051
Subtotal	1,203,820	2,250,763
Institutional-sized containers:		
White meat	215,487	169,676
Light meat	536,609	660,437
Subtotal	752,096	830,113
Total, tuna in water	1,955,916	3,080,876
Tuna in oil	0	0
Total Tuna	1,955,916	3,080,876

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-26
Canned tuna: U.S. production, capacity, and capacity utilization, 1986-91

(In thousands of standard cases)

Period	*Production*			*Capacity*	*Capacity Utilization*
	In water	*In oil*	*Total*		
					Percent
1986	21,927	10,590	32,517	41,503	78.3
1987	23,733	9,960	33,694	42,904	78.5
1988	23,545	9,300	32,845	43,160	76.1
1989	25,857	8,734	34,591	45,107	76.7
1990	23,391	7,008	30,399	44,627	68.1
1991	24,421	7,535	31,956	40,695	78.5

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission

Table D-27
Financial experience of U.S. tuna processors on the overall operations of their establishments within which canned tuna is produced, fiscal years 1979-91

Item	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
	Value (1,000 dollars)												
Net sales	1,027,697	1,115,691	1,307,480	1,202,093	1,158,003	1,189,011	1,163,438	1,132,708	1,222,527	1,305,394	1,273,701	1,253,498	1,262,700
Cost of goods sold	852,533	917,861	1,112,889	1,071,367	990,434	991,730	962,493	923,195	1,015,124	1,087,611	1,092,706	1,094,158	1,078,507
Gross profit (loss)	175,164	197,830	194,591	130,726	167,569	197,281	200,945	209,513	207,403	217,783	180,995	159,340	184,193
Operating income (loss)	73,940	80,783	63,796	2,319	32,293	74,331	81,769	114,592	111,586	110,866	76,963	45,281	65,889
Net income (loss) before income taxes	54,706	61,852	28,226	(174,316)	(6,819)	1,521	62,901	111,755	100,166	95,035	21,706	(48,798)	13,828
Depreciation and amortization included above	16,561	16,583	18,608	17,992	18,107	17,456	15,588	15,520	15,415	19,026	28,537	27,638	25,126
	Share of net sales (in percent)												
Cost of goods sold	83.0	82.3	85.1	89.1	85.5	83.4	82.7	81.5	83.0	83.3	85.8	87.3	85.4
Gross profit (loss)	17.0	17.7	14.9	10.9	14.5	16.6	17.3	18.5	17.0	16.7	14.2	12.7	14.6
Net income (loss) before income taxes	5.3	5.5	2.2	(14.5)	(0.6)	0.1	5.4	9.9	8.2	7.3	1.7	(3.9)	1.1
	Number of firms reporting												
Operating losses	2	2	3	5	3	1	2	1	0	1	1	3	3
Data	5	5	5	6	6	6	6	6	6	6	6	6	6

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-28
Financial experience of U.S. tuna processors on their operations producing canned tuna for human consumption only, fiscal years 1979-91

Item	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Value (1,000 dollars)												
Net sales	960,687	1,037,591	1,220,005	1,111,621	1,073,153	1,056,654	1,042,946	1,071,008	1,163,765	1,250,024	1,228,685	1,191,497	1,188,700
Cost of goods sold	832,909	864,265	1,040,683	996,189	942,210	885,028	866,789	873,684	965,540	1,040,897	1,048,848	1,037,286	1,005,433
Gross profit (loss)	127,778	173,326	179,322	115,432	130,943	171,626	176,157	197,324	198,225	209,127	179,837	154,211	183,267
General, selling and administrative expenses	87,333	101,477	115,217	106,555	117,397	105,542	100,905	90,586	92,482	103,525	101,589	107,075	113,595
Operating income (loss)	40,445	71,849	64,105	8,877	13,546	66,084	75,252	106,738	105,743	105,602	78,248	47,136	69,672
Interest income/ (expense)	(15,160)	(19,266)	(35,367)	(39,732)	(24,598)	(4,932)	(5,447)	(3,580)	(6,904)	(9,572)	(50,256)	(48,719)	(28,315)
Other income/ (expense), net	(890)	1,410	(10,336)	(30,813)	(39,341)	(65,735)	(11,873)	(951)	(4,010)	(6,256)	(5,000)	(44,237)	(22,636)
Net income (loss) before income taxes	24,395	53,993	18,402	(61,668)	(50,393)	(4,583)	57,932	102,207	94,829	89,774	22,992	(45,820)	18,721
Depreciation and amortization included above	11,799	12,485	14,421	13,871	14,591	14,957	13,773	15,260	15,171	18,644	27,725	26,534	23,889
	Share of net sales (in percent)												
Cost of goods sold	86.7	83.3	85.3	89.6	87.8	83.8	83.1	81.6	83.0	83.3	85.4	87.1	84.6
Gross profit (loss)	13.3	16.7	14.7	10.4	12.2	16.2	16.9	18.4	17.0	16.7	14.6	12.9	15.4
General, selling and administrative expenses	9.1	9.8	9.4	9.6	10.9	10.0	9.7	8.5	7.9	8.3	8.3	9.0	9.5
Operating income (loss)	4.2	6.9	5.3	0.8	1.3	6.3	7.2	10.0	9.1	8.4	6.4	4.0	5.9
Net income (loss) before income taxes	2.5	5.2	1.5	(5.5)	(4.7)	(0.4)	5.6	9.5	8.1	7.2	1.9	(3.8)	1.6
	Number of firms reporting												
Operating losses	2	0	2	4	2	1	2	1	0	1	1	3	3
Data	5	5	5	6	6	6	6	6	6	6	6	6	6

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-29
Financial experience of U.S. tuna processors on their operations producing tuna-based pet food, fiscal years 1984-91

Item	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
				Value (1,000 dollars)				
Net Sales	119,512	112,053	59,879	55,812	51,051	41,132	34,020	37,449
Cost of goods sold	92,875	86,370	47,597	46,423	42,353	39,563	36,700	42,689
Gross profit (loss)	26,637	25,683	12,282	9,389	8,698	1,569	(2,680)	(5,240)
General, selling and administrative expenses	17,256	18,196	4,335	3,335	3,392	2,443	54	138
Operating income (loss)	9,381	7,487	7,947	6,054	5,306	(874)	(2,734)	(5,378)
Interest income/(expense)	(611)	(940)	516	(103)	(137)	52	(210)	(336)
Other income/(expense), net	(1,522)	(593)	1,178	(403)	134	(53)	(132)	(307)
Net income (loss) before income taxes	7,248	5,954	9,641	5,548	5,303	(875)	(3,076)	(6,021)
Depreciation and amortization included above	742	532	260	238	382	812	1,104	1,237
				Share of net sales (in percent)				
Cost of goods sold	77.7	77.1	79.5	83.2	83.0	96.2	107.9	114.0
Gross profit (loss)	22.3	22.9	20.5	16.8	17.0	3.8	(7.9)	(14.0)
General, selling and administrative expenses	14.4	16.2	7.2	6.0	6.6	5.9	0.2	0.4
Operating income (loss)	7.8	6.7	13.3	10.8	10.4	(2.1)	(8.0)	(14.4)
Net income (loss) before income taxes	6.1	5.3	16.1	9.9	10.4	(2.1)	(9.0)	(16.1)
				Number of firms reporting				
Operating losses	0	1	1	1	0	1	2	2
Data	5	5	4	4	4	4	4	4

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-30
Canned tuna: U.S. processors' cost of goods sold on operations producing canned tuna for human consumption, by cost components, fiscal years 1979-91

Item	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Value (million of dollars)												
Cost of goods sold:													
Raw tuna	460.0	481.3	603.8	544.6	491.2	421.5	366.8	531.3	591.6	690.2	680.3	725.1	727.1
Other raw materials	65.0	57.8	56.4	63.9	69.2	89.6	84.2	129.0	156.5	148.2	168.0	123.3	124.5
Direct labor	72.8	66.2	79.5	73.0	81.0	69.3	51.5	73.4	83.7	83.5	79.7	66.2	61.1
Other factory costs	115.7	92.5	112.1	124.3	136.6	113.9	156.1	139.9	133.7	118.9	120.9	122.7	92.7
Total	713.6	697.8	851.8	805.9	778.1	694.2	658.6	873.6	965.5	1,040.8	1,048.9	1,037.3	1,005.4
	(In percent)												
Cost of goods sold:													
Raw tuna	64.5	69.0	70.9	67.6	63.1	60.7	55.7	60.8	61.3	66.3	64.9	69.9	72.3
Other raw materials	9.1	8.3	6.6	7.9	8.9	12.9	12.8	14.8	16.2	14.3	16.0	11.9	12.4
Direct labor	10.2	9.5	9.3	9.1	10.4	10.0	7.8	8.4	8.7	8.0	7.6	6.4	6.1
Other factory costs	16.2	13.2	13.2	15.4	17.6	16.4	23.7	16.0	13.8	11.4	11.5	11.8	9.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commmission.

Table D-31
Raw tuna: U.S. cannery receipts, imports, exports, and apparent consumption, 1986-91

Year	U.S. cannery receipts: Domestic[1]	Imports[2]	Exports	Apparent consumption[3]	Ratio of imports to consumption	Ratio of exports to production[4]
	1,000 pounds				Percent	
1986	454,386	592,916	67,492	1,047,302	57	13
1987	507,872	557,530	59,926	1,065,402	52	11
1988	486,638	534,302	79,908	1,020,940	52	14
1989	451,984	618,152	53,692	1,070,136	58	11
1990	391,954	431,146	135,204	823,100	52	26
1991	361,988	484,742	162,944	846,730	57	31
	Short tons					
1986	227,193	296,458	33,746	523,651		
1987	253,936	278,768	29,963	532,701		
1988	243,319	267,151	39,954	510,470		
1989	225,992	309,076	26,846	535,068		
1990	195,977	215,573	67,602	411,550		
1991	180,994	242,371	81,472	423,365		

[1] Includes receipts in Puerto Rico, American Samoa, and California.
[2] Includes direct unloadings by foreign flag vessels at U.S. processing facilites in American Samoa.
[3] Domestic receipts plus imports.
[4] Production is the sum of U.S. cannery receipts from domestic sources and exports.

Note.—The data in this table represent actual receipts of raw tuna by U.S. tuna processors, and, as such, import data presented here may differ from import data released by the Bureau of the Census.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service, Southwest Region.

Table D-32
Raw tropical tuna: U.S. cannery receipts, imports, exports, and apparent consumption, 1986-91

Year	U.S. cannery receipts: Domestic[1]	Imports[2]	Exports	Apparent consumption[3]	Ratio of imports to consumption	Ratio of exports to production[4]
	1,000 pounds				Percent	
1986	447,332	368,332	67,492	815,664	45	13
1987	502,020	354,814	58,244	856,834	41	10
1988	471,318	336,838	79,908	808,156	42	14
1989	442,222	425,188	53,692	867,410	49	11
1990	378,088	255,298	135,204	633,386	40	26
1991	349,196	341,630	162,944	690,826	49	32
	Short tons					
1986	223,666	184,166	33,746	407,832		
1987	251,010	177,407	29,122	428,417		
1988	235,659	168,419	39,954	404,078		
1989	221,111	212,594	26,846	433,705		
1990	189,044	127,649	67,602	316,693		
1991	174,598	170,815	81,472	345,413		

[1] Includes receipts in Puerto Rico, American Samoa, and California.
[2] Includes direct unloadings by foreign flag vessels at U.S. processing facilites in American Samoa.
[3] Domestic receipts plus imports.
[4] Production is the sum of U.S. cannery receipts from domestic sources and exports.

Note.—The data in this table represent actual receipts of raw tuna by U.S. tuna processors, and, as such, import data presented here may differ from import data released by the Bureau of the Census.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service, Southwest Center.

Table D-33
Raw albacore tuna: U.S. cannery receipts, imports, exports, and apparent consumption, 1986-91

Year	U.S. cannery receipts: Domestic[1]	Imports[2]	Exports	Apparent consumption[3]	Ratio of imports to consumption	Ratio of exports to production[4]
	1,000 pounds				Percent	
1986	7,054	224,584	0	231,638	97	0
1987	5,672	202,722	1,682	208,394	98	23
1988	15,320	197,464	0	212,784	93	0
1989	9,762	192,964	0	202,726	95	0
1990	13,866	175,848	0	189,714	93	0
1991	12,792	143,112	0	155,904	92	0
	Short tons					
1986	3,527	112,292	0	115,819		
1987	2,836	101,361	841	103,356		
1988	7,660	98,732	0	106,392		
1989	4,881	96,482	0	101,363		
1990	6,933	87,924	0	94,857		
1991	6,396	71,556	0	77,952		

[1] Includes receipts in Puerto Rico, American Samoa, and California.
[2] Includes direct unloadings by foreign flag vessels at U.S. processing facilites in American Samoa.
[3] Domestic receipts plus imports.
[4] Production is the sum of U.S. cannery receipts from domestic sources and exports.

Note.—The data in this table represent actual receipts of raw tuna by U.S. tuna processors, and, as such, import data presented here may differ from import data released by the Bureau of the Census.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service, Southwest Region.

Table D-34
Raw skipjack tuna: U.S. cannery receipts, imports, exports, and apparent consumption, 1986-91

Year	U.S. cannery receipts: Domestic[1]	Imports[2]	Exports	Apparent consumption[3]	Ratio of imports to consumption	Ratio of exports to production[4]
	1,000 pounds				Percent	
1986	181,210	210,062	44,414	391,272	54	20
1987	174,630	190,116	32,512	364,746	52	16
1988	252,914	231,788	46,026	484,702	48	15
1989	206,098	252,770	35,674	458,868	55	15
1990	191,034	167,420	70,758	358,454	47	27
1991	269,792	226,198	132,182	495,990	46	33
	Short tons					
1986	90,605	105,031	22,207	195,636		
1987	87,315	95,058	16,256	182,373		
1988	126,457	115,894	23,013	242,351		
1989	103,049	126,385	17,837	229,434		
1990	95,517	83,710	35,379	179,227		
1991	134,896	113,099	66,091	247,995		

[1] Includes receipts in Puerto Rico, American Samoa, and California.
[2] Includes direct unloadings by foreign flag vessels at U.S. processing facilites in American Samoa.
[3] Domestic receipts plus imports.
[4] Production is the sum of U.S. cannery receipts from domestic sources and exports.

Note.—The data in this table represent actual receipts of raw tuna by U.S. tuna processors, and, as such, import data presented here may differ from import data released by the Bureau of the Census.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service, Southwest Region.

Table D-35
Raw yellowfin tuna: U.S. cannery receipts, imports, exports, and apparent consumption, 1986-91

Year	U.S. cannery receipts: Domestic[1]	Imports[2]	Exports	Apparent consumption[3]	Ratio of imports to consumption	Ratio of exports to production[4]
	1,000 pounds				Percent	
1986	266,122	158,270	23,078	424,392	37	8
1987	327,570	164,698	25,732	492,268	33	7
1988	218,404	105,050	33,882	323,454	32	13
1989	236,124	172,418	18,018	408,542	42	7
1990	187,054	87,878	64,446	274,932	32	26
1991	79,404	115,432	30,762	194,836	59	28
	Short tons					
1986	133,061	79,135	11,539	212,196		
1987	163,785	82,349	12,866	246,134		
1988	109,202	52,525	16,941	161,727		
1989	118,062	86,209	9,009	204,271		
1990	93,527	43,939	32,223	137,466		
1991	39,702	57,716	15,381	97,418		

[1] Includes receipts in Puerto Rico, American Samoa, and California.
[2] Includes direct unloadings by foreign flag vessels at U.S. processing facilites in American Samoa.
[3] Domestic receipts plus imports.
[4] Production is the sum of U.S. cannery receipts from domestic sources and exports.

Note.—The data in this table represent actual receipts of raw tuna by U.S. tuna processors, and, as such, import data presented here may differ from import data released by the Bureau of the Census.

Source: Compiled from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service, Southwest Region.

Table D-36
Canned tuna: U.S. production, beginning inventories, imports for consumption, exports of domestic merchandise, ending inventories, and apparent consumption, 1986-91

Year	Production[1]	Beginning[2] inventories	Imports	Exports	Ending[2] inventories	Apparent consumption	Ratio (percent) of imports to consumption	Ratio (percent) of ending inventories to production
				Quantity (1,000 pounds)				
1986 . . .	634,086	184,648	236,933	(3)	167,944	887,723	27	26
1987 . . .	657,025	167,944	211,685	(3)	163,201	873,453	24	25
1988 . . .	640,482	163,201	244,504	(3)	210,011	828,176	29	33
1989 . . .	674,515	210,011	348,212	(3)	243,960	988,778	35	36
1990 . . .	592,781	243,960	284,592	(3)	186,613	934,680	30	31
1991 . . .	623,142	186,613	351,744	(3)	214,247	947,252	37	34
				Value (1,000 dollars)				
1986 . . .	970,152	282,511	229,047	(3)	256,954	1,224,756	19	21
1987 . . .	1,097,232	280,466	206,920	(3)	272,546	1,312,072	16	21
1988 . . .	1,184,892	301,922	298,666	(3)	388,520	1,396,960	21	28
1989 . . .	1,160,166	361,219	375,911	(3)	419,611	1,477,685	25	28
1990 . . .	902,014	409,853	293,872	(3)	313,543	1,292,196	23	35
1991 . . .	876,552	263,124	358,890	(3)	302,088	1,196,478	30	34
				Unit value (dollars per pound)				
1986 . . .	1.53	1.53	.97	(3)	1.53	1.38	(4)	(4)
1987 . . .	1.67	1.67	.98	(3)	1.67	1.50	(4)	(4)
1988 . . .	1.85	1.85	1.22	(3)	1.85	1.67	(4)	(4)
1989 . . .	1.72	1.72	1.08	(3)	1.72	1.49	(4)	(4)
1990 . . .	1.68	1.68	1.11	(3)	1.68	1.38	(4)	(4)
1991 . . .	1.41	1.41	1.02	(3)	1.41	1.26	(4)	(4)

[1] Includes production by U.S. firms and subsidiaries in American Samoa and Puerto Rico.
[2] Includes importers' inventories.
[3] Negligible.
[4] Not meaningful.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce, National Marine Fisheries Service.

Table D-37
Canned tuna: Production, beginning inventories, imports for consumption, ending inventories, and apparent consumption, by types of pack, 1986-91

Item	1986	1987	1988	1989	1990	1991
	Quantity (1,000 pounds)					
Production:						
Tuna in water	427,577	462,794	459,128	504,212	456,125	476,210
Tuna in oil	206,505	194,220	181,350	170,313	136,656	146,933
Total	634,082	657,014	640,478	674,525	592,781	623,143
Beginning inventories:						
Tuna in water	114,886	119,730	118,775	164,756	202,137	150,265
Tuna in oil	69,762	48,204	44,421	45,200	41,828	36,348
Total	184,648	167,934	163,196	210,010	243,965	186,613
Imports:						
Tuna in water	236,322	211,358	244,188	347,791	284,169	351,400
Tuna in oil	611	328	317	423	423	344
Total	236,933	211,686	244,505	348,214	284,592	351,744
Ending inventories:						
Tuna in water	119,730	118,775	164,756	202,137	150,265	177,938
Tuna in oil	48,204	44,421	45,260	41,828	36,348	36,309
Total	167,934	163,196	210,010	243,965	186,613	214,247
Apparent consumption:						
Tuna in water	659,055	675,107	656,335	814,622	792,166	799,937
Tuna in oil	228,674	198,331	180,828	174,168	142,559	147,316
Total	887,729	873,438	838,163	988,790	934,725	947,253
	Share of total (percent)					
Production:						
Tuna in water	67	70	72	75	77	76
Tuna in oil	34	30	28	25	23	24
Total	100	100	100	100	100	100
Beginning inventories:						
Tuna in water	62	72	73	78	83	81
Tuna in oil	38	28	27	22	17	19
Total	100	100	100	100	100	100
Imports:						
Tuna in water	100	100	100	100	100	100
Tuna in oil	(1)	(1)	(1)	(1)	(1)	(1)
Total	100	100	100	100	100	100
Ending inventories:						
Tuna in water	72	73	78	83	81	83
Tuna in oil	28	27	22	17	19	17
Total	100	100	100	100	100	100
Apparent consumption:						
Tuna in water	74	77	78	82	85	84
Tuna in oil	26	23	22	18	15	16
Total	100	100	100	100	100	100

[1] Less than 0.05 percent.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-38
Distribution of shipments of U.S.-processed canned tuna: U.S. shipments of U.S.-processed canned tuna in retail-size containers for selected categories, institutional-size containers for selected categories, and total shipments of canned tuna, 1986-91

Period	Retail		Institutional		Total
	Processors own brand[1]	Private label	Processors own brand[1]	Private label	
	Quantity (1,000 standard cases)				
1986	29,611	4,380	933	475	35,399
1987	28,916	4,809	1,067	437	35,229
1988	28,436	4,238	858	291	33,823
1989	31,257	3,851	1,102	450	36,661
1990	26,821	4,510	1,297	520	33,148
1991	26,044	4,202	1,247	507	32,000
	Share of total shipments (percent)				
1986	83.6	12.4	2.6	1.3	100.0
1987	82.1	13.7	3.0	1.2	100.0
1988	84.1	12.5	2.5	0.9	100.0
1989	85.3	10.5	3.0	1.2	100.0
1990	80.9	13.6	3.9	1.6	100.0
1991	81.2	13.1	3.9	1.6	100.0

[1] Also referred to as "advertised retail brands."

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-39
Raw tuna: ATSA ex-vessel prices, by categories, by periods, January 1, 1990-May 20, 1992

(In dollars, per short ton)

Period	*Yellowfin over 20 pounds*	*Yellowfin 7.5-20 pounds*	*Skipjack 7.5 pounds and over*	*Yellowfin/ Skipjack 4-7.5 pounds*	*Yellowfin/ Skipjack 3-4 pounds*	*Yellowfin/ Skipjack less than 3 pounds*
1990:[1]						
January 1-April 30	1,075	885	360	775	570	350
May 1-June 30	885	785	765	685	475	280
July 1-July 30	910	810	785	700	495	300
August 1-October 31[2]	1,010	910	895	820	620	420
November 1-December 31[3]	985	910	895	820	620	420
1991:[4]						
January 1-February 28	985	910	895	820	620	420
March 1-April 15	985	930	920	855	660	460
April 16-May 20	945	890	880	815	620	420
May 21-June 20	870	815	805	740	545	345
June 21-July 20	835	780	770	705	510	310
July 22-August 20	775	720	710	645	450	250
August 21-September 20	880	825	815	750	555	355
September 21-October 20	923	868	858	793	598	398
October 21-October 31	820	745	735	670	475	275
November 1-November 10	805	730	720	655	460	260
November 11-November 20	790	715	705	640	445	245
November 21-December 20	790	715	705	640	445	245
December 21-January 20	810	720	710	645	450	245
1992:[4]						
January 21-February 20	810	720	710	645	450	250
February 21-March 20	835	750	740	680	480	280
March 21-April 20	860	795	795	735	540	340
April 21-May 20	905	840	835	780	585	385

[1] Prices negotiated by the American Tuna Sales Association and U.S. tuna canners operating in Puerto Rico and American Samoa for 1990 are based upon departure dates as reflected above.
[2] Sailing price negotiated on Sept. 19, 1990.
[3] Sailing price approved for all ATSA member vessels as of Feb. 6, 1991.
[4] Prices negotiated by the American Tuna Sales Association and U.S. tuna canners operating in Puerto Rico and American Samoa for 1991 and 1992 are based upon port arrival dates as reflected above. Price periods begin for member vessels at 00:01 on the first day of the period and end at 24:00 on the last day of the period.

Source: American Tunas Sales Association.

Table D-40
Raw tuna: Quarterly unit values of U.S. processors' purchases of imported raw tuna, by species, 1st quarter 1986-4th quarter 1991

(In dollars, per short ton)

Year and quarter	Albacore	Yellowfin	Skipjack	Other	Average
1986:					
Q1	1,610	726	606	482	979
Q2	1,544	737	606	753	1,062
Q3	1,533	701	588	794	1,044
Q4	1,421	744	650	714	921
Average	1,531	729	614	699	1,003
1987:					
Q1	1,440	729	635	752	1,009
Q2	1,544	803	680	813	1,036
Q3	1,878	1,157	852	1,025	1,279
Q4	2,116	1,063	981	1,155	1,499
Average	1,777	995	811	921	1,227
1988:					
Q1	2,042	1,076	931	1,031	1,379
Q2	2,176	1,028	949	1,063	1,541
Q3	2,253	1,091	983	1,128	1,457
Q4	2,363	890	860	988	1,567
Average	2,215	1,029	939	1,048	1,480
1989:					
Q1	2,341	932	761	906	1,445
Q2	2,288	953	778	933	1,305
Q3	2,138	929	744	775	1,238
Q4	2,222	1,000	790	1,190	1,322
Average	2,260	954	770	959	1,330
1990:					
Q1	2,058	839	485	1,086	1,543
Q2	2,095	537	891	1,094	1,581
Q3	2,242	918	764	993	1,549
Q4	2,115	887	722	967	1,336
Average	2,128	795	715	1,035	1,500
1991:					
Q1	1,846	944	807	995	1,061
Q2	1,857	897	771	991	1,164
Q3	1,887	819	716	955	1,204
Q4	2,253	778	710	1,020	1,427
Average	1,961	859	751	990	1,214

Source: Compiled from data submitted in respones to questionnaires of the U.S. International Trade Commission.

Table D-41
Raw tuna: Quarterly unit values of U.S. processors' purchases of domestically caught raw tuna, by species, 1st quarter 1986-4th quarter 1991

(In dollars, per short ton)

Year and quarter	Albacore	Yellowfin	Skipjack	Other	Average
1986:					
Q1	1,034	675	608	750	652
Q2	1,077	715	613	722	668
Q3	1,035	719	626	709	701
Q4	1,219	703	646	719	683
Average	1,085	704	625	709	678
1987:					
Q1	1,125	726	654	(1)	796
Q2	1,071	770	683	(1)	737
Q3	1,472	1,044	935	1,017	1,019
Q4	1,561	1,047	959	(1)	1,024
Average	1,496	895	784	1,246	860
1988:					
Q1	2,208	979	926	(1)	965
Q2	1,917	1,057	970	1,000	1,022
Q3	1,912	954	927	1,040	978
Q4	2,356	989	886	1,043	959
Average	2,068	1,000	927	1,040	983
1989:					
Q1	1,556	937	832	(1)	877
Q2	2,250	925	788	(1)	852
Q3	1,808	929	775	865	872
Q4	1,974	978	798	895	935
Average	1,973	945	797	870	883
1990:					
Q1	2,306	968	864	1,183	990
Q2	2,177	961	780	538	963
Q3	1,704	896	797	763	877
Q4	1,601	927	855	815	897
Average	1,947	938	824	825	932
1991:					
Q1	1,660	955	844	(1)	963
Q2	1,530	924	795	766	875
Q3	1,470	788	761	579	776
Q4	2,090	740	739	667	754
Average	1,687	852	785	503	842

[1] Not applicable.

Source: Compiled from data submitted in respones to questionnaires of the U.S. International Trade Commission.

Table D-42
Canned tuna: Unit values of U.S. producers' shipments, by packs, 1986-91
(In dollars, per case)

Type of pack	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
Water pack:						
White-meat:						
Retail:						
Advertised brand	44.36	48.47	55.68	55.12	53.25	52.76
Private label	.36.15	41.85	47.35	44.92	47.56	43.39
Institutional:						
Advertised brand	39.17	42.42	52.86	49.93	52.88	54.03
Private label	.40.51	44.95	51.27	52.91	22.03	(1)
Light-meat:						
Retail:						
Advertised brand	26.87	29.47	31.87	29.24	28.34	28.39
Private label	.22.22	24.88	27.73	24.74	25.29	25.84
Institutional:						
Advertised brand	23.34	25.66	31.30	29.18	20.22	27.84
Private label	.23.23	27.68	30.14	27.11	26.26	25.91
Oil pack:						
White-meat:						
Retail:						
Advertised brand	43.94	46.64	55.05	55.65	52.72	52.22
Private label	.33.25	41.76	44.70	42.68	48.67	40.22
Institutional:						
Advertised brand	(2)	(2)	(2)	(2)	(2)	(1)
Private label	.53.03	40.00	55.56	36.95	60.00	60.00
Light-meat:						
Retail:						
Advertised brand	27.02	29.64	31.78	29.02	27.40	27.41
Private label	.22.94	24.15	27.67	23.84	25.25	23.58
Institutional:						
Advertised brand	30.03	31.77	33.62	29.27	30.88	34.16
Private label.	33.84	37.25	42.85	41.14	33.96	28.04

[1] Confidential.
[2] No shipments reported.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-43
Canned tuna: Unit values of U.S. importers' shipments, by packs, 1986-91

(In dollars, per case)

Type of pack	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*
Water pack:						
White-meat:						
Retail:						
Advertised brand	37.62	36.42	46.11	50.43	41.66	41.18
Private label	34.12	34.20	41.72	41.79	32.24	37.88
Institutional:						
Advertised brand	33.97	33.98	46.85	42.45	39.75	39.01
Private label	33.55	32.09	41.68	39.56	39.63	37.50
Light-meat:						
Retail:						
Advertised brand	24.19	24.87	25.68	25.30	23.61	24.08
Private label	22.45	22.10	26.30	24.03	22.99	23.37
Institutional:						
Advertised brand	22.72	23.51	28.70	25.44	24.64	26.07
Private label	20.63	20.90	26.69	24.21	23.33	24.15
Oil pack:						
White-meat:						
Retail:						
Advertised brand	(1)	(1)	(1)	(1)	(1)	(1)
Private label	(1)	(1)	(1)	(1)	(1)	(1)
Institutional:						
Advertised brand	(1)	(1)	(1)	(1)	(1)	(1)
Private label	(1)	(1)	(1)	(1)	(1)	(1)
Light-meat:						
Retail:						
Advertised brand	(1)	(1)	(1)	(1)	(1)	(1)
Private label	(1)	(1)	(1)	(1)	(1)	(1)
Institutional:						
Advertised brand	(1)	(1)	(1)	(1)	(1)	(1)
Private label	(1)	(1)	(1)	(1)	(1)	(1)

[1] No shipments reported.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-44
Canned tuna: Quarterly weighted average prices for retail-size containers, by product, 1st quarter 1986-4th quarter 1991

(In dollars, per case)

Year and quarter	Private label:						Advertised brand:					
	Water:				Oil:		Water:				Oil:	
	White solid		Chunk light		Chunk light		White solid		Chunk light		Chunk light	
	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import
1986:												
1	38.50	41.10	23.12	22.85	23.71	(1)	42.29	44.22	25.49	23.83	26.52	(1)
2	36.11	28.45	23.21	22.95	23.44	(1)	40.40	40.16	26.32	24.70	26.47	(1)
3	38.03	36.35	23.45	23.20	24.58	(1)	42.42	40.85	25.21	24.00	25.22	(1)
4	36.32	35.58	22.38	23.31	24.75	(1)	40.98	39.34	24.72	23.82	25.03	(1)
1987:												
1	36.05	34.80	23.13	22.29	23.13	(1)	42.66	39.15	24.35	23.58	24.57	(1)
2	38.50	34.99	22.85	23.30	22.93	(1)	40.88	39.26	23.22	23.06	24.68	(1)
3	39.91	36.69	24.20	23.27	24.67	(1)	44.93	40.58	29.30	26.10	27.90	(1)
4	44.46	40.19	25.71	24.62	27.56	(1)	51.93	47.95	31.76	29.72	31.91	(1)
1988:												
1	48.75	47.19	29.33	27.23	29.53	(1)	52.62	49.85	30.92	29.05	30.99	(1)
2	45.73	46.04	29.79	28.57	30.20	(1)	52.81	52.12	31.23	29.33	31.10	(1)
3	49.28	48.36	29.19	28.35	29.81	(1)	52.16	55.21	30.29	28.77	30.38	(1)
4	49.21	48.09	29.43	27.52	29.69	(1)	56.69	53.38	29.46	28.29	29.57	(1)
1989:												
1	47.53	44.44	27.61	26.10	27.36	(1)	54.66	50.32	28.40	26.98	28.46	(1)
2	47.33	41.16	26.87	25.48	26.26	(1)	49.54	43.06	27.54	25.61	27.53	(1)
3	47.09	40.19	24.19	23.05	24.87	(1)	50.57	44.83	26.74	23.91	26.70	(1)
4	44.29	38.90	25.30	22.81	25.25	(1)	50.40	45.51	26.98	24.82	26.88	(1)
1990:												
1	46.72	39.79	26.21	24.46	25.78	(1)	51.40	46.08	27.45	25.10	27.57	(1)
2	47.65	41.10	25.85	23.28	25.63	(1)	50.53	49.88	26.16	23.97	26.40	(1)
3	49.81	38.62	24.92	21.83	24.76	(1)	50.05	43.61	25.31	21.74	25.24	(1)
4	49.70	37.79	24.70	22.80	25.09	(1)	51.34	39.87	27.87	22.88	25.84	(1)
1991:												
1	43.95	35.57	24.80	23.55	26.14	(1)	50.92	41.71	27.31	23.67	27.25	(1)
2	48.99	37.56	26.60	23.80	25.60	(1)	51.57	40.06	26.91	23.55	26.82	(1)
3	44.42	37.36	26.28	23.02	25.59	(1)	50.24	38.90	26.00	22.49	25.93	(1)
4	46.12	37.94	24.78	22.39	24.77	(1)	51.48	43.05	24.99	22.08	25.02	(1)

[1] No prices reported.

Note: Prices reported are on a f.o.b. east coast basis. Data reported on an f.o.b. west coast basis were insufficient.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-45
Canned tuna: Quarterly weighted average prices for institutional-size containers, by product, 1st quarter 1986-4th quarter 1991

(In dollars, per case)

Year and quarter	Private label:						Advertised brand:					
	Water:				Oil:		Water:				Oil:	
	White solid		Chunk light		Chunk light		White solid		Chunk light		Chunk light	
	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import	Domestic	Import
1986:												
1	48.06	38.10	29.54	20.80	(1)	(2)	46.66	38.59	28.14	24.26	(1)	(1)
2	45.09	36.09	27.43	21.73	(1)	(2)	49.31	38.73	28.65	25.03	(1)	(1)
3	41.01	34.19	21.32	(2)	(1)	(2)	47.11	37.39	28.24	25.31	(1)	(1)
4	44.08	40.21	25.98	21.49	(1)	(2)	46.59	37.79	28.13	24.45	(1)	(1)
1987:												
1	40.82	32.66	25.85	21.18	(1)	(2)	46.51	36.71	28.45	24.43	(1)	(1)
2	43.29	32.67	27.66	22.13	(1)	(2)	42.53	36.28	22.91	24.91	(1)	(1)
3	50.15	35.27	28.35	21.47	(1)	(2)	51.91	39.76	25.37	26.46	(1)	(1)
4	54.84	40.12	27.48	22.78	(1)	(2)	49.42	46.21	26.75	28.47	(1)	(1)
1988:												
1	53.96	43.49	35.17	26.00	(1)	(2)	53.40	50.24	27.90	29.74	(1)	(1)
2	59.34	42.91	34.34	27.22	(1)	(2)	56.90	51.79	29.41	31.79	(1)	(1)
3	60.20	46.46	34.34	27.22	(1)	(2)	57.27	51.93	31.09	32.21	(1)	(1)
4	61.36	48.12	35.37	28.51	(1)	(2)	57.17	51.13	29.07	31.10	(1)	(1)
1989:												
1	61.41	44.58	34.22	25.66	(1)	(2)	58.38	49.83	31.43	29.80	(1)	(1)
2	61.51	44.13	34.74	24.10	(1)	(2)	58.84	47.14	33.67	28.22	(1)	(1)
3	61.72	36.19	32.01	23.50	(1)	(2)	57.41	46.40	32.89	26.02	(1)	(1)
4	62.15	41.42	24.36	23.42	(1)	(2)	56.24	45.44	31.93	25.94	(1)	(1)
1990:												
1	55.24	40.08	29.32	23.04	(1)	(2)	57.10	44.10	30.99	26.05	(1)	(1)
2	61.98	39.28	27.61	22.19	(1)	(2)	54.77	43.73	30.71	26.06	(1)	(1)
3	61.27	43.25	25.29	27.31	(2)	(2)	53.37	47.49	29.15	27.76	(1)	(2)
4	63.06	44.11	25.82	25.14	(2)	(2)	52.53	46.19	25.71	28.77	(1)	(2)
1991:												
1	(2)	40.85	25.73	29.23	(2)	(2)	53.99	45.88	28.26	29.46	(1)	(2)
2	58.69	44.06	27.12	29.13	(2)	(2)	53.98	44.58	29.15	29.09	(1)	(2)
3	49.66	40.38	26.60	28.69	(2)	(2)	54.01	44.06	28.23	28.84	(1)	(2)
4	57.05	43.32	25.05	27.87	(2)	(2)	54.94	44.03	27.90	28.39	(1)	(2)

[1] Confidential.
[2] No prices reported.

Note: Prices reported are on a f.o.b. east coast basis. Data reported on an f.o.b. west coast basis were insufficient.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table D-46
Raw tuna: U.S. imports for consumption, by sources, 1988-March 1992

Source	1988	1989	1990	1991	January-March 1991	January-March 1992
			Quantity (1,000 kilograms)			
Taiwan	44,726	46,096	41,178	32,120	3,427	5,625
Spain	9,733	13,408	9,173	27,222	9,439	5,747
France	12,736	25,959	7,949	24,382	4,288	4,546
Japan	18,075	16,535	15,047	10,782	987	5,055
Ghana	21,219	19,194	23,698	17,723	3,742	7,779
Ecuador	6,609	9,480	11,098	7,478	2,200	1,103
Philippines	685	949	1,127	1,270	369	427
Panama	4,335	8,217	4,410	6,083	2,211	2,235
Venezuela	7,950	23,074	8,527	3,901	939	65
Singapore	2,297	1,248	938	1,371	371	314
All other	39,288	54,177	15,191	15,465	6,844	6,179
World	167,652	218,337	138,338	147,796	34,818	39,075
			Value (1,000 dollars)			
Taiwan	108,394	100,195	88,385	66,061	7,469	14,536
Spain	7,937	12,011	6,540	21,641	6,882	4,403
France	9,278	19,465	5,818	18,709	3,415	3,314
Japan	33,832	35,070	28,070	16,417	1,334	7,116
Ghana	15,347	13,837	17,299	13,748	3,499	5,681
Ecuador	8,157	9,339	11,022	9,380	2,543	1,617
Philippines	2,546	3,578	5,042	6,368	1,894	2,298
Panama	5,071	8,460	5,474	5,574	2,179	2,061
Venezuela	7,293	20,970	9,014	5,023	934	254
Singapore	5,915	4,952	3,998	4,935	1,472	960
All other	49,684	68,832	26,171	26,161	10,132	7,616
World	253,456	296,707	206,834	194,016	41,755	49,856
			Unit Value (dollars per kilogram)			
Taiwan	2.42	2.17	2.15	2.06	2.18	2.58
Spain	0.82	0.90	0.71	0.79	0.73	0.77
France	0.73	0.75	0.73	0.77	0.80	0.73
Japan	1.87	2.12	1.87	1.52	1.35	1.41
Ghana	0.72	0.72	0.73	0.78	0.94	0.73
Ecuador	1.23	0.99	0.99	1.25	1.16	1.47
Philippines	3.72	3.77	4.47	5.01	5.14	5.38
Panama	1.17	1.03	1.24	0.92	0.99	0.92
Venezuela	0.92	0.91	1.06	1.29	0.99	3.91
Singapore	2.58	3.97	4.26	3.60	3.96	3.06
All other	1.26	1.27	1.72	1.69	1.48	1.23
Average	1.51	1.36	1.50	1.31	1.20	1.28

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-47
Raw albacore tuna: U.S. imports for consumption, by sources, 1988-March 1992

Source	1988	1989	1990	1991	January-March 1991	January-March 1992
	Quantity (1,000 kilograms)					
Taiwan	39,793	43,953	32,708	29,095	2,844	5,264
Japan	10,795	12,005	8,515	5,258	229	1,832
Portugal	1,204	1,023	904	1,571	1,387	0
Ecuador	304	325	561	926	203	212
Singapore	1,753	637	435	489	135	142
Mauritius	3,322	4,138	1,588	1,159	0	0
Spain	371	1,078	0	1,029	0	205
Panama	1,789	2,025	2,624	1,286	687	511
Reunion	1,737	2,580	479	645	262	0
Trinidad and Tobago	229	481	10	518	45	0
All other	3,641	5,659	1,219	2,331	1,046	896
World	64,940	73,905	49,043	44,306	6,838	9,062
	Value (1,000 dollars)					
Taiwan	92,043	92,348	70,119	56,683	5,466	12,656
Japan	26,294	29,378	19,661	10,844	547	4,500
Portugal	1,860	1,457	1,394	2,872	2,358	0
Ecuador	1,120	1,084	1,810	2,793	559	612
Singapore	4,537	2,366	2,036	2,151	674	498
Mauritius	6,375	7,609	2,653	2,083	0	0
Spain	1,042	2,817	0	1,995	0	398
Panama	2,761	3,176	4,049	1,984	1,060	789
Reunion	2,681	3,982	739	995	405	0
Trinidad and Tobago	563	1,355	55	942	69	0
All other	8,483	14,876	2,438	4,332	1,724	1,804
World	147,759	160,447	104,953	87,675	12,861	21,257
	Unit Value (dollars per kilogram)					
Taiwan	2.31	2.10	2.14	1.95	1.92	2.40
Japan	2.44	2.45	2.31	2.06	2.39	2.46
Portugal	1.54	1.42	1.54	1.83	1.70	[1]
Ecuador	3.69	3.33	3.22	3.02	2.76	2.89
Singapore	2.59	3.71	4.68	4.40	5.01	3.51
Mauritius	1.92	1.84	1.67	1.80	[1]	[1]
Spain	2.80	2.61	[1]	1.94	[1]	1.94
Panama	1.54	1.57	1.54	1.54	1.54	1.54
Reunion	1.54	1.54	1.54	1.54	1.54	[1]
Trinidad and Tobago	2.46	2.82	5.66	1.82	1.54	[1]
All other	2.33	2.63	2.00	1.86	1.65	2.01
Average	2.28	2.17	2.14	1.98	1.88	2.35

[1] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-48
Raw Yellowfin Tuna: U.S. Imports for consumption, by sources, 1988-March 1992

Source	1988	1989	1990	1991	January-March 1991	January-March 1992
			Quantity (1,000 kilograms)			
Taiwan	4,359	2,067	1,782	2,324	384	152
Spain	1,327	973	722	7,542	1,059	108
Philippines	684	918	1,053	1,082	336	427
France	1,209	5,102	940	6,144	3,022	518
Venezuela	6,144	15,778	5,527	2,585	618	16
Ecuador	4,711	5,894	4,001	3,464	893	7
Ghana	932	885	2,179	2,693	1,399	877
Singapore	544	579	473	779	212	161
Japan	720	1,776	1,588	1,479	340	280
Oman	21	198	320	323	120	153
All other	11,106	24,041	5,823	4,384	1,033	370
World	31,756	58,209	24,408	32,800	9,418	3,070
			Value (1,000 dollars)			
Taiwan	15,891	7,704	6,030	6,859	1,371	516
Spain	1,105	846	592	6,230	875	89
Philippines	2,545	3,478	4,776	5,584	1,743	2,297
France	999	4,190	776	5,075	2,496	428
Venezuela	5,849	14,716	5,653	3,508	597	65
Ecuador	5,148	5,526	3,479	2,997	815	31
Ghana	780	731	1,800	2,979	1,821	725
Singapore	1,378	2,476	1,783	2,348	688	432
Japan	2,195	2,973	2,588	1,495	314	232
Oman	101	909	1,744	1,423	632	727
All other	12,620	23,696	9,697	7,774	1,895	1,322
World	48,610	67,243	38,918	46,272	13,248	6,864
			Unit Value (dollars per kilogram)			
Taiwan	3.65	3.73	3.38	2.95	3.57	3.40
Spain	0.83	0.87	0.82	0.83	0.83	0.83
Philippines	3.72	3.79	4.53	5.16	5.18	5.38
France	0.83	0.82	0.83	0.83	0.83	0.83
Venezuela	0.95	0.93	1.02	1.36	0.97	4.14
Ecuador	1.09	0.94	0.87	0.87	0.91	4.47
Ghana	0.84	0.83	0.83	1.11	1.30	0.83
Singapore	2.53	4.28	3.77	3.01	3.24	2.68
Japan	3.05	1.67	1.63	1.01	0.92	0.83
Oman	4.89	4.60	5.46	4.40	5.26	4.74
All other	1.14	0.99	1.67	1.77	1.83	3.57
Average	1.53	1.16	1.59	1.41	1.41	2.24

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-49
Raw Skipjack Tuna: U.S. Imports for consumption, by sources, 1988-March 1992

Source	1988	1989	1990	1991	January-March 1991	January-March 1992
	Quantity (1,000 kilograms)					
Spain	8,022	9,336	8,449	18,326	8,358	5,275
France	11,351	20,004	6,860	16,295	1,219	4,028
Ghana	20,275	18,293	21,519	15,030	2,342	6,798
Japan	6,470	2,698	4,649	3,969	418	2,903
Panama	848	1,773	459	3,458	1,301	1,659
Ecuador	1,488	3,060	6,212	2,695	1,007	724
Malta and Gozo	0	0	0	2,560	1,185	1,403
Vanuatu (New Hebrides)	1,902	8,638	461	2,000	1,096	2,642
Venezuela	1,733	7,033	2,615	1,117	286	0
Morocco	0	70	0	4489	489	0
All other	17,476	11,163	11,087	441	191	136
World	69,565	82,069	62,311	66,380	17,892	25,568
	Value (1,000 dollars)					
Spain	5,748	6,671	5,921	13,139	5,988	3,780
France	8,133	14,332	4,918	11,676	875	2,886
Ghana	14,556	13,092	15,498	10,769	1,678	4,870
Japan	5,071	2,528	5,081	3,817	466	2,319
Panama	645	1,340	329	2,478	932	1,189
Ecuador	1,512	2,118	4,615	1,927	799	373
Malta and Gozo	0	0	0	1,834	849	1,005
Vanuatu (New Hebrides)	1,871	6,686	342	1,433	785	1,822
Venezuela	1,335	5,177	1,934	800	205	0
Morocco	0	49	0	350	350	0
All other	13,781	8,180	15,001	474	205	112
World	52,652	60,174	53,638	48,698	13,134	18,356
	Unit Value (dollars per kilogram)					
Spain	0.72	0.71	0.70	0.72	0.72	0.72
France	0.72	0.72	0.72	0.72	0.72	0.72
Ghana	0.72	0.72	0.72	0.72	0.72	0.72
Japan	0.78	0.94	1.09	0.96	1.12	0.80
Panama	0.76	0.76	0.72	0.72	0.72	0.72
Ecuador	1.02	0.69	0.74	0.72	0.79	0.52
Malta and Gozo	([1])	([1])	([1])	0.72	0.72	0.72
Vanuatu (New Hebrides)	0.98	0.77	0.74	0.72	0.72	0.69
Venezuela	0.77	0.74	0.74	0.72	0.72	([1])
Morocco	([1])	0.69	([1])	0.72	0.72	([1])
All other	0.79	0.73	1.35	1.07	1.07	0.82
Average	0.76	0.73	0.86	0.73	0.73	0.72

[1] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-50
Raw Tropical Tuna: U.S. imports for consumption, by sources, 1988-March 1992

Source	1988	1989	1990	1991	January-March 1991	January-March 1992
	Quantity (1,000 kilograms)					
Spain	9,361	12,330	9,173	26,193	9,439	5,542
France	12,736	25,629	7,949	23,886	4,282	4,546
Ghana	21,219	19,194	23,698	17,723	3,742	7,779
Taiwan	4,932	2,143	8,470	3,025	583	361
Ecuador	6,305	9,155	10,536	6,551	1,997	891
Philippines	684	947	1,127	1,270	369	427
Japan	7,280	4,530	6,532	5,524	758	3,223
Venezuela	7,940	23,038	8,516	3,880	932	59
Panama	2,546	6,192	1,786	4,797	1,524	1,724
Singapore	544	611	503	882	237	172
All other	29,164	40,664	11,003	9,759	4,118	5,288
World	102,713	144,432	89,295	103,490	27,980	30,012
	Value (1,000 dollars)					
Spain	6,896	9,194	6,540	19,645	6,882	4,006
France	9,278	18,956	5,818	17,947	3,405	3,314
Ghana	15,347	13,837	17,299	13,748	3,499	5,681
Taiwan	16,352	7,847	18,267	9,378	2,004	1,880
Ecuador	7,037	8,255	9,213	6,588	1,985	1,006
Philippines	2,545	3,568	5,042	6,364	1,894	2,298
Japan	7,539	5,691	8,410	5,573	787	2,615
Venezuela	7,278	20,884	8,972	4,939	915	232
Panama	2,309	5,284	1,425	3,589	1,119	1,272
Singapore	1,378	2,586	1,962	2,783	798	462
All other	29,738	40,158	18,934	15,787	5,606	5,834
World	105,697	136,260	101,881	106,341	28,893	28,600
	Unit Value (dollars per kilogram)					
Spain	0.74	0.75	0.71	0.75	0.73	0.72
France	0.73	0.74	0.73	0.75	0.80	0.73
Ghana	0.72	0.72	0.73	0.78	0.94	0.73
Taiwan	3.32	3.66	2.16	3.10	3.44	5.21
Ecuador	1.12	0.90	0.87	1.01	0.99	1.13
Philippines	3.72	3.77	4.47	5.01	5.14	5.38
Japan	1.04	1.26	1.29	1.01	1.04	0.81
Venezuela	0.92	0.91	1.05	1.27	0.98	3.91
Panama	0.91	0.85	0.80	0.75	0.73	0.74
Singapore	2.53	4.24	3.90	3.16	3.37	2.68
All other	1.02	0.99	1.72	1.62	1.36	1.10
Average	1.03	0.94	1.14	1.03	1.03	0.95

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D–51
Tuna Loins: U.S. imports for consumption, by sources, 1988–March 1992

Source	1988	1989	1990	1991	January–March 1991	January–March 1992
			Quantity (1,000 kilograms)			
Thailand	3	0	22,267	28,184	6,723	7,421
Ecuador	1,261	1,934	2,863	3,018	340	540
Ghana	0	0	1	1,474	238	752
Colombia	0	14	562	1,285	852	0
Costa Rica	0	788	1,331	385	302	0
Japan	28	15	(1)	2	(1)	0
All other	24	865	1,293	0	0	0
World	1,316	3,616	28,317	34,348	8,455	8,713
			Value (1,000 dollars)			
Thailand	11	0	64,462	79,023	22,777	17,105
Ecuador	2,731	3,527	5,408	6,182	667	1,021
Ghana	0	0	3	3,183	470	1,427
Colombia	0	34	1,272	2,956	2,038	0
Costa Rica	0	751	574	153	119	0
Japan	144	99	3	26	5	0
All other	87	1,541	2,554	0	0	0
World	2,973	5,951	74,276	91,523	26,076	19,554
			Unit value (dollars per kilogram)			
Thailand	3.20	(2)	2.89	2.80	3.39	2.31
Ecuador	2.17	1.82	1.89	2.05	1.96	1.89
Ghana	(2)	(2)	2.07	2.16	1.98	1.90
Colombia	(2)	2.40	2.26	2.30	2.39	(2)
Costa Rica	(2)	0.95	0.43	0.40	0.39	(2)
Japan	5.25	6.36	18.66	12.25	13.45	(2)
All other	3.55	1.78	1.98	(2)	(2)	(2)
Average	2.26	1.65	2.62	2.66	3.08	2.24

[1] Less than 500 kilograms.

[2] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D–52
Canned Tuna: U.S. imports for consumption, by sources, 1988–March 1992

Source	1988	1989	1990	1991	January–March 1991	January–March 1992
			Quantity (1,000 kilograms)			
Thailand	81,168	112,620	93,009	112,253	35,672	32,558
Indonesia	2,202	10,269	9,756	21,470	4,210	10,620
Taiwan	10,892	12,644	7,897	10,572	2,506	1,843
Philippines	8,394	15,426	12,268	9,956	2,338	4,644
Malaysia	1,281	1,932	1,333	1,900	597	668
Ecuador	3,773	1,313	1,540	1,183	965	16
Japan	1,529	1,116	639	417	151	0
Venezuela	80	1,036	464	795	565	24
Singapore	754	284	1,339	551	223	0
Spain	87	127	154	46	11	17
All other	748	1,181	691	407	59	325
World	110,907	157,948	129,090	159,550	47,297	50,714
			Value (1,000 dollars)			
Thailand	207,538	260,996	213,562	252,488	84,255	70,947
Indonesia	5,690	19,667	18,056	39,946	7,878	16,571
Taiwan	41,759	44,857	26,120	32,725	8,076	6,162
Philippines	18,629	31,129	22,018	18,698	4,579	8,248
Malaysia	3,964	5,131	3,613	6,764	2,347	2,558
Ecuador	9,366	2,912	2,989	2,253	1,844	28
Japan	6,992	5,172	2,587	1,667	639	0
Venezuela	200	1,943	920	1,584	1,100	47
Singapore	1,974	768	1,394	1,215	491	0
Spain	485	669	773	367	102	128
All other	2,069	2,668	1,841	1,184	245	479
World	298,666	375,911	293,872	358,890	111,557	105,168
			Unit value (Dollars per kilogram)			
Thailand	2.56	2.32	2.30	2.25	2.36	2.18
Indonesia	2.58	1.92	1.85	1.86	1.87	1.56
Taiwan	3.83	3.55	3.31	3.10	3.22	3.34
Philippines	2.22	2.02	1.79	1.88	1.96	1.78
Malaysia	3.09	2.66	2.71	3.56	3.93	3.83
Ecuador	2.48	2.22	1.94	1.90	1.91	1.76
Japan	4.57	4.64	4.05	4.00	4.23	(1)
Venezuela	2.52	1.87	1.98	1.99	1.95	1.95
Singapore	2.62	2.70	1.04	2.21	2.20	(1)
Spain	5.57	5.27	5.00	7.99	9.22	7.74
All other	2.77	2.26	2.66	2.91	4.13	1.47
Average	2.69	2.38	2.28	2.25	2.36	2.07

[1] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D–53
Canned Tuna, not in oil: U.S. imports for consumption, by sources, 1988–March 1992

Source	1988	1989	1990	1991	January–March 1991	January–March 1992
	Quantity (1,000 kilograms)					
Thailand	81,168	112,619	93,009	112,219	35,672	32,558
Indonesia	2,202	10,269	9,756	21,470	4,210	10,620
Taiwan	10,891	12,643	7,892	10,570	2,506	1,843
Philippines	8,394	15,426	12,268	9,941	2,338	4,644
Malaysia	1,281	1,932	1,330	1,897	595	668
Ecuador	3,773	1,313	1,540	1,183	965	16
Japan	1,525	1,114	637	415	150	0
Venezuela	80	1,036	464	793	565	24
Singapore	754	284	1,339	551	223	0
Korea, South	230	(1)	49	58	(2)	1
All other	466	1,120	614	297	42	321
World	110,763	157,757	128,898	159,394	47,265	50,694
	Value (1,000 dollars)					
Thailand	207,538	260,993	213,562	252,319	84,255	70,947
Indonesia	5,690	19,667	18,056	39,946	7,878	16,571
Taiwan	41,755	44,854	26,105	32,720	8,076	6,162
Philippines	18,629	31,129	22,018	18,686	4,579	8,248
Malaysia	3,964	5,131	3,607	6,758	2,341	2,558
Ecuador	9,366	2,912	2,989	2,253	1,844	28
Japan	6,960	5,157	2,574	1,652	631	0
Venezuela	200	1,942	920	1,579	1,100	47
Singapore	1,974	768	1,394	1,215	491	0
Korea, South	594	1	112	210	4	4
All other	1,252	2,432	1,452	663	99	467
World	297,922	374,987	292,789	358,000	111,300	105,032
	Unit value (Dollars per kilogram)					
Thailand	2.56	2.32	2.30	2.25	2.36	2.18
Indonesia	2.58	1.92	1.85	1.86	1.87	1.56
Taiwan	3.83	3.55	3.31	3.10	3.22	3.34
Philippines	2.22	2.02	1.79	1.88	1.96	1.78
Malaysia	3.09	2.66	2.71	3.56	3.94	3.83
Ecuador	2.48	2.22	1.94	1.90	1.91	1.76
Japan	4.56	4.63	4.04	3.98	4.21	(3)
Venezuela	2.52	1.87	1.98	1.99	1.95	1.95
Singapore	2.62	2.70	1.04	2.21	2.20	(3)
Korea, South	2.59	5.29	2.30	3.64	2,067.00	3.42
All other	2.69	2.17	2.37	2.23	2.33	1.45
Average	2.69	2.38	2.27	2.25	2.35	2.07

[1] Less than 500 kilograms.

[2] Less than 50 kilograms.

[3] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D–54
Canned Tuna, in oil: U.S. imports for consumption, by source, 1988–March 1992

Source	1988	1989	1990	1991	January–March 1991	January–March 1992
	Quantity (1,000 kilograms)					
Spain	77	101	84	41	11	16
Portugal	44	40	39	36	13	2
Thailand	0	([1])	0	34	0	0
Italy	18	27	14	10	3	0
Korea, South	0	2	13	11	1	2
Japan	4	2	2	2	1	0
Philippines	0	0	0	15	0	0
Malaysia	0	0	3	3	3	0
Venezuela	0	0	0	2	0	0
Taiwan	1	1	5	2	0	0
All other	0	19	34	0	0	0
World	144	192	192	156	32	20
	Value ($1,000)					
Spain	435	597	610	346	99	117
Portugal	165	139	182	222	111	12
Thailand	0	3	0	169	0	0
Italy	108	147	102	68	31	0
Korea, South	0	11	47	42	3	7
Japan	32	15	13	15	8	0
Philippines	0	0	0	12	0	0
Malaysia	0	0	6	6	6	0
Venezuela	0	0	0	5	0	0
Taiwan	5	2	15	5	0	0
All other	0	11	108	0	0	0
World	744	924	1,083	890	258	136
	Unit value (Dollars per kilogram)					
Spain	5.63	5.94	7.27	8.37	9.24	7.38
Portugal	3.72	3.51	4.65	6.26	8.30	5.36
Thailand	([2])	6.27	([2])	5.04	([2])	([2])
Italy	6.14	5.52	7.37	6.54	9.58	([2])
Korea, South	([1])	4.34	3.75	3.75	3.94	4.53
Japan	8.55	6.58	7.38	7.02	6.35	([2])
Philippines	([2])	([2])	([2])	0.78	([2])	([2])
Malaysia	([2])	([2])	2.17	2.27	2.27	([2])
Venezuela	([2])	([2])	([2])	2.06	([2])	([2])
Taiwan	3.70	2.87	3.28	3.20	([2])	([2])
All other	([2])	0.56	3.21	([2])	([2])	([2])
Average	5.16	4.82	5.64	5.70	8.08	6.92

[1] Less than 500 kilograms.

[2] Not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.