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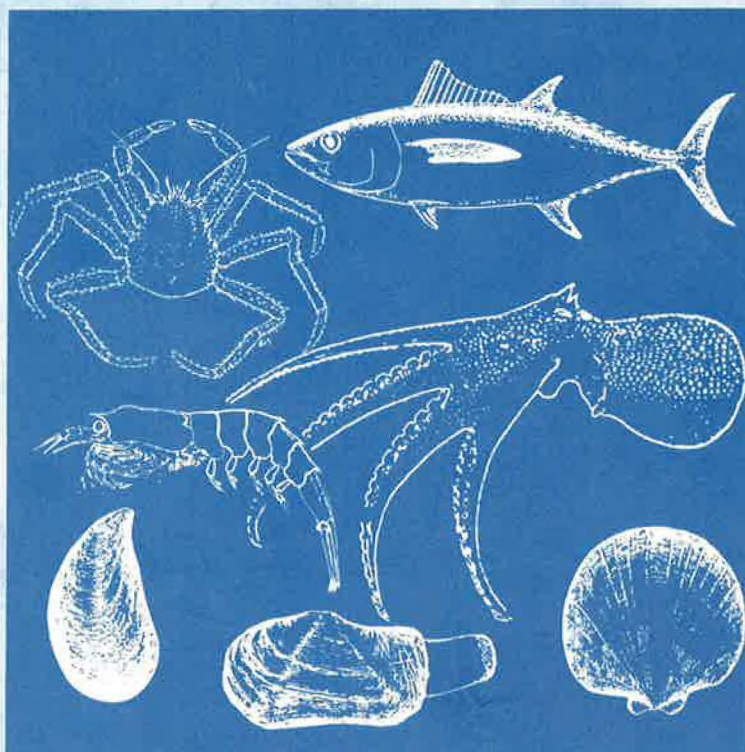


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**THE UNITED STATES
MARKET
FOR SEAFOOD:
A GUIDE FOR
DEVELOPING COUNTRIES**



**OVERSEAS DEVELOPMENT
NATURAL RESOURCES INSTITUTE
BULLETIN**

**OVERSEAS DEVELOPMENT
NATURAL RESOURCES
INSTITUTE**

Bulletin No. 12

**THE UNITED STATES MARKET
FOR SEAFOOD:
A GUIDE FOR
DEVELOPING COUNTRIES**

J.P. COULTER

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GLOSSARY OF TERMS AND ABBREVIATIONS

c. & f.	Cost and freight included
c.i.f.	Cost, insurance and freight included
EEZ	Exclusive Economic Zone, usually extending up to 200 miles of a country's shore, in which it exercises sole right of fishery management
FDA	Food and Drug Administration of the United States
FAO	Food and Agriculture Organization of the United Nations
f.o.b.	Free on board
Food-service	Synonymous with catering
GSP	Generalized System of Preferences
h. & g.	Headed and gutted (fish)
i.q.f.	Individually quick-frozen
NFI	(United States) National Fisheries Institute
NMFS	(United States) National Marine Fisheries Service
NSSP	(United States) National Shellfish Sanitation Program
ODNRI	Overseas Development Natural Resources Institute
Oligopolistic	This word describes a market which is dominated by a few large sellers
PDI	Personal disposable income
p. & d.	Peeled and deveined (shrimp)
p.u.d.	Peeled and undeveined (shrimp)
Sashimi	Japanese-style raw fish preserved in such a way as to maximize freshness and red colouration of the meat
Sushi	Sashimi prepared in cake form with rice and seaweed
Seafood	This term includes finfish as well as crustaceans and molluscs
Surimi	See Appendix E, page 89 of this bulletin for an explanation
Substitution	In some United States trade literature, substitution means the dishonest use of an inferior product being passed off as a superior product (Dore, 1984). However in this bulletin, the word does not bear this connotation unless specified
USDA	United States Department of Agriculture

CONVENTIONS USED IN TABLES

—	Nil or negligible
...	Not available

A NOTE ON WEIGHTS AND MEASURES

The metric system is normally used, with weights expressed in tonnes, kilogrammes (kg) and grammes (g). Wholesale and retail prices are nevertheless expressed in United States dollars per pound (lb), as this is the way they are quoted in the United States. 2.2 lb = 1 kg; 2,204.6 lb = 1 tonne.

Major findings of the bulletin

MAJOR FINDINGS OF THE BULLETIN

A booming market for seafood

Many of the economic difficulties experienced by developing countries can be attributed to their dependence for foreign exchange revenue on commodities for which demand is stagnant or slow-growing, real prices declining over the long term while fluctuating wildly in the short term, and which in some cases are subject to protectionism of the importing countries or replacement by synthetic substitutes. Such features can be found in varying degrees in the markets of many primary commodities, such as sugar, tea, coffee, cocoa, bananas, cotton, rubber and tin.

Against this rather depressing background, the United States seafood market presents a very encouraging picture. Though seafood consumption is low in comparison with beef and poultry, it has grown at an unprecedented rate during the 1980s, reaching 6.7 kg per caput in 1986. As United States' waters are more or less fully exploited, the country is becoming increasingly dependent upon foreign supplies, which in 1986 amounted to \$ 4.8 billion, equivalent to over 60% of the value of all fishery products consumed. In world terms, the United States is the second largest fisheries products importer after Japan, accounting for about 22% of the world total in value terms.

Two other facts are of particular significance in view of the foregoing comments about the state of markets for other primary commodities. Firstly, developing countries, mainly in Latin America and Asia, now supply 52% of the value of United States imports, and secondly, United States consumption and imports have grown in spite of increasing prices of seafood *vis-à-vis* beef and poultry. Also of interest is the limited impact of protectionism. With several exceptions, notably canned tuna, and despite the fact that foreign fishing vessels are prohibited from landing at United States ports (except in American Samoa), most fisheries imports are exempt from duties, levies or quantitative limits. Even in the case of canned tuna, imports are growing in the face of a 12.5% duty.

Per caput consumption of 6.7 kg can be broken down into the following components: fresh and frozen fish 4.1 kg, canned fish 2.5 kg and cured fish 0.1 kg. Consumption of canned fish (mainly tuna) has been growing since 1982, but this is largely a result of an easing in prices. Most of the growth in underlying demand is for fresh and frozen items, and corresponds to people's desire for healthier food and more innovative life-styles. A very high proportion is consumed outside the home, as much as 60% according to some sources. As incomes grow, a higher proportion of food consumption takes place outside the home; this means that more seafood is consequently eaten.

The outlook for fisheries products consumption must be considered from both a medium-term perspective, up to 1990, and a long-term perspective, up to the year 2000. In the medium term it is possible that the scarcity of ground fish, a weak United States dollar and other macro-economic problems will combine to prevent further growth in per caput consumption. The long-term outlook is bright however, and a 44% increase in consumption has been forecast by the end of the century. This is because demand will be subject to the same positive influences which have been evident up to 1986, while supply problems should eventually be solved by the development of aquaculture.

Opportunities for developing countries

The main types of seafood for which opportunities are being created are given below:

Table A

Product	Imports (1986)		Annual growth in volume (average, 1980-86)
	tonnes	\$ millions	
Shrimp	181,500	1,434	10.5%
Fin fish (fresh and frozen, not tuna)	548,000	1,548	9%
Canned tuna	107,300	229	14%
Scallop	21,700*	193	15%

Note: * Weight of scallop is meat weight

In the case of fin fish, most imports still consist of cold-water ground fish (cod, halibut, etc.) from the northern hemisphere. However, these were, and are being, fully exploited and the inadequacy of supply in the face of rising demand gave rise to large price increases, typically around 50%, during 1986. Another effect of the ground fish shortage has been greatly to increase demand for other kinds of fish, and coupled with the consumers' desires for variety, this has caused the United States market to absorb exotic and unfamiliar species from around the globe.

The above is not an exclusive list of opportunities, there being demand for increased quantities of oyster, spiny lobster, crab meat, squid and frogs' legs. There may even be room for special types of clam and mussel, where the United States is expected to be reasonably self-sufficient, appealing to particular segments of the market*.

The 1980s have witnessed meteoric growth in consumption of surimi-based products, mainly imitation crab products, whose consumption has increased from approximately 3,000 tonnes in 1980 to 46,000 tonnes in 1986. Apart from crab meat and possibly lobster tails, it is unlikely that these products will be a direct source of competition for natural seafood exported by developing countries. Of more significance is the fact that the world-wide ground fish shortage is forcing Japanese surimi manufacturers to search for sources of raw material other than Alaska pollock on which the industry has hitherto been based. This is resulting in increasing demand for under-utilized ground fish species such as New Zealand hoki, and even for darker-fleshed pelagic species, as in the case of Chilean jack mackerel which is now being processed under a joint venture arrangement.

Problems and challenges

Despite this encouraging situation, there are still problems for developing country suppliers. Growing world demand for fish under conditions of static or slowly growing supplies increases the danger of over-fishing. The cycle of 'boom and bust' which has in the past characterized much of United States fisheries may simply be transferred to countries with less expertise in fisheries management.

*It should be noted that imports of clam, oyster and mussel are subject to the supplying countries fulfilling strict sanitary requirements, as discussed in Section 3 and Section H.5, Appendix H

Even if countries succeed in regulating fishing within their respective 200-mile limits (Exclusive Economic Zones), most of the tropical species are available in limited quantities compared to the cold-water ground fish which they would replace. The United States will turn increasingly to those species which are not subject to supply shortages such as shrimp, salmon, catfish, tuna and rainbow trout. Except for tuna, increasing supplies of all these species are expected to come from aquaculture. In developing countries, export-based aquaculture has so far only been implemented in a large way with shrimp, and there is a need for research and development to find new species which can be cultured. In the case of fin fish, species which are fine flavoured and/or yield large white fillets suitable for grilling, for example grouper and some sea bass, would be suitable candidates, subject to positive trade and organoleptic evaluation in the United States.

Spectacular aquaculture development in Ecuador and Taiwan has allowed increasing world demand for shrimp to be satisfied. Now however, the pace of development is accelerating and several other exporters including China, Mexico, Philippines and Indonesia, are expected to increase their output of cultured shrimp. It is possible that there will be an excess of supply over demand by 1992; this will give rise to a buyers' market and will greatly intensify competition between suppliers both in terms of price and quality. Despite this, the volume of United States imports should continue its upward trajectory, with cyclical peaks and troughs resulting from macro-economic fluctuations. It is uncertain by how much demand will increase, but it should be noted that the United States market has large segments with potential which has not been fully exploited, especially the retail sector and fast-food restaurants.

The importance of being earnest marketers

Discussion of fresh and frozen fin fish in Section 3 of this bulletin highlights the fact that some of the species exported by developing countries, such as snapper, grouper, sea bass, mahi-mahi and kingclip, have been adversely affected by a history of quality and supply problems. At the same time, there has often been a lack of any consistent strategy for building up demand, with exports from a single country being handled by a large number of packers in competition with one another and without any co-ordinated approach. As a result of this, many species have not generated the demand or the prices that their inherent qualities would merit.

Such experiences can be contrasted with the successful introduction of orange roughy from New Zealand, discussed in Section 4 (*The orange roughy experience*) and which in many ways is a textbook case of good marketing. Based on this case, suppliers in other countries should pay particular attention to the following needs when attempting to introduce a species to the United States:

- careful stock assessment and resource management, with a view to guaranteeing supply;
- a long-term approach. If possible the various shippers from the country concerned should work in a co-ordinated manner to develop the market;
- consistency in quality and grading;
- careful selection of importers;
- market segmentation and targetting;
- if the species is unfamiliar, careful selection of a suitable name for use in the United States.

While these points are addressed to the individual packer or exporter, the role of governments and industry associations is of paramount importance, because it is they who can determine national policies towards resource management and quality control, and can influence the way in which the industry is organized.

PRINCIPAUX RESULTATS CONSTATES SUR LE BULLETIN

Les produits de la pêche, un marché en pleine expansion

Il est possible d'attribuer une multiplicité des difficultés économiques auxquelles les pays en voies de développement sont confrontés à leur dépendance au niveau des revenus en devises de produits pour lesquels la demande est stagnante ou se caractérise par une croissance lente, les prix réels étant en baisse à long terme tandis qu'ils présentent des fluctuations imprévisibles à court terme et que, dans certain cas, font l'objet de mesures de protectionnisme de la part des pays exportateurs ou sont remplacés par des produits synthétiques. De telles caractéristiques peuvent être observées, à des degrés variables, sur les marchés de multiples marchandises primaires: c'est le cas du sucre, du thé, du café, du cacao, des bananes, du coton, du caoutchouc et de l'étain.

Par rapport à cette toile de fond relativement déprimante, le marché américain des produits de la pêche présente une physionomie très encourageante. Bien que la consommation de ces produits soit assez faible comparée à celle de la viande de bœuf et la volaille, elle s'est accrue, pendant les années 60, à une cadence sans précédent, atteignant 6,7 kg par personne en 1986. Les eaux territoriales des Etats-Unis étant plus ou moins totalement exploitées, le pays est de plus en plus tributaire des approvisionnements en provenance de l'étranger; ceux-ci se sont élevés, en 1986, à 4,8 milliards de \$, ce qui représente plus de 60% de la valeur de tous les produits de pêche consommés. Sur le plan mondial, les Etats-Unis est le deuxième plus important importateur de produits de pêche après le Japon, représentant quelque 22% du total mondial sur le plan de la valeur.

Deux autres faits sont particulièrement significatifs étant donné les observations formulées ci-dessus quant à la situation des marchés pour les autres produits. En premier lieu, les pays en voie de développement, principalement en Amérique latine et en Asie, desservent dorénavant 52% du montant des importations des Etats-Unis et, en second lieu, la consommation et les importations américaines se sont accrues en dépit des prix en hausse des produits de la pêche comparé au bœuf et à la volaille. Il est aussi intéressant de noter l'impact restreint des mesures de protectionnisme. A quelques exceptions près, principalement le thon en boîte et en dépit du fait que le débarquement des navires de pêche étrangers est interdit dans les ports américains (à l'exception des îles Samoa américaines), la plupart des importations de pêche sont exemptes de droits, de taxes ou de limites quantitatives. Même dans le cas du thon en boîte, les importations sont en augmentation malgré des droits s'élevant à 12,5%.

La consommation de 6,7 kg par personne peut être ventilée comme suit: poisson frais et congelé 4,1 kg, poisson en boîte 2,5 kg et poisson salé 0,1 kg. La consommation de poisson en boîte (thon principalement) est en augmentation depuis 1982 mais ceci est en grande partie dû à la réduction des prix. La plupart de la croissance dans la demande de base se situe au niveau du poisson frais et congelé et correspond au souhait du consommateur exigeant des produits alimentaires plus sains et des genres de vie plus innovateurs. Une très forte proportion est consommée hors du foyer, qui est, selon certaines sources, un pourcentage aussi élevé que 60%. Au fur et à mesure de l'augmentation des revenus, une proportion plus élevée de la consommation de produits alimentaires intervient hors du foyer et ceci signifie qu'il est donc consommé davantage de produits de la pêche.

Les perspectives concernant la consommation en produits de la pêche doivent être considérées aussi bien sur le plan de l'horizon à moyen terme, jusqu'en 1990 que sur le plan de l'horizon à long terme, jusqu'en l'an 2000. A moyen terme, il est possible que la pénurie en poisson de pêche de fond, la faiblesse du Dollar américain et autres problèmes macro-économiques se

combineront pour empêcher toute nouvelle croissance dans la consommation par personne. A long terme néanmoins, les perspectives sont excellentes et il a été prévu une croissance de la consommation s'élevant à 44% d'ici la fin du siècle. La demande sera en effet soumise aux mêmes influences positives qui ont été observées jusqu'en 1986, tandis que les problèmes d'approvisionnements devraient être en fin de compte résolus grâce au développement de l'aquaculture.

Debouchés pour les pays en voie de développement

Les principaux types de produits de la pêche dont les débouchés augmentent rapidement sont indiqués dans le tableau A.

Tableau A

Produit	Importation (1986)		Volume de croissance annuelle (moyenne 1980-1986)
	tonnes	millions de \$	
Crevettes	181 500	1 434	10,5%
Poissons à nageoires (frais & congelé, thon excepté)	548 000	1 548	9%
Thon en boîte	107 300	229	14%
Coquilles St. Jacques	21 700*	193	15%

Remarque: * Le poids des coquilles St. Jacques est le poids de chair

Dans le cas des poissons à nageoires, la plupart des importations se composent toujours de poissons de pêche de fond en eaux froides (cabillaud, flétan, etc.) provenant de l'hémisphère Nord. Ces poissons ont été et continuent toutefois à être totalement exploités et l'insuffisance des approvisionnements devant la demande en augmentation a suscité de fortes augmentations de prix, de manière typique s'élevant à 50% au cours de 1986. Une autre répercussion de la pénurie des poissons de pêche de fond a été d'augmenter fortement la demande pour d'autres types de poissons et, couplée aux exigences des consommateurs quant à la variété, le marché américain a donc absorbé des espèces exotiques et peu familières provenant de tout le globe.

Ce qui précède ne constitue pas une liste exclusive de débouchés, il existe une demande accrue pour les huîtres, les langoustes, la chair de crabe, les calmars et les cuisses de grenouilles. Il pourrait même y avoir de la place pour certains types de praires et de moules, pour lesquels il est prévu que les Etats-Unis seront raisonnablement indépendants, et plaisant à des segments particuliers du marché*

Il a été observé au cours des années 1980 la croissance spectaculaire de la consommation de produits à base de surimi, principalement des produits d'imitation de la chair de crabe, dont la consommation est passée d'environ 3 000 tonnes en 1980 à 46 000 tonnes en 1986. En dehors de la chair de crabe et peut-être des queues de homard, il est peu probable que ces produits constituent une source directe de concurrence des fruits de mer naturels exportés par les pays en voie de développement. Il est plus significatif de noter que la pénurie mondiale de poissons de pêche de fond contraint les fabricants japonais de surimi à rechercher des sources de matières premières autres que le *theragra chalcogrammus* sur laquelle l'industrie se basait jusqu'alors. Il en résulte une demande croissante pour les espèces de poissons de pêche de fond sous-exploitées telles que le *macruronus novaezealandae* et même pour les espèces pélagiques à chair plus foncée, comme c'est le cas de *trachurus spp.* chilien faisant actuellement l'objet de traitement industriel au titre d'un accord en 'joint venture'.

*Remarque — * Il convient de noter que les pays exportateurs de praires, d'huîtres et de moules doivent respecter des exigences sanitaires rigoureuses quant à ces produits, comme étudié dans les sections 3 et H.5 (Annexe H).*

Problemes et defis

En dépit de cette situation encourageante, il existe toujours des problèmes pour les fournisseurs des pays en voie de développement. La demande mondiale croissante en poisson dans des conditions d'approvisionnements statiques ou à faible croissance augmente le risque de la surexploitation des fonds de pêche. Le cycle d'emballement et de dépression, qui a dans le passé caractérisé une grande partie des pêcheries américaines peut simplement être transféré à des pays manquant d'expertise en matière de gestion des pêcheries.

Même si les pays réussissent à réguler la pêche au sein de leurs limites respectives de 200 miles marins (zones économiques exclusives), la plupart des espèces tropicales sont disponibles en quantités restreintes comparé aux poissons de pêche de fond des eaux froides qu'ils remplaceraient. Les Etats-Unis se tourneront de plus en plus vers les espèces qui ne sont pas soumises à des pénuries d'approvisionnements, telles que la crevette, le saumon, le chat marin, le thon et la truite arc-en-ciel. A l'exception du thon, il est envisagé que des approvisionnements croissants de toutes ces espèces proviendront de l'aquaculture. Dans les pays en voie de développement, l'aquaculture à vocation à l'exportation n'a, jusqu'à maintenant, été mise en oeuvre à grande échelle que pour la crevette, et des études de recherche et de développement sont nécessaires afin de trouver de nouvelles espèces pouvant être cultivées. Dans le cas des poissons à nageoires, les espèces à saveur délicate et/ou produisant de gros filets de chair blanche convenant à la cuisson au grill, par exemple le mérou et le bar, seraient des candidats adaptés, sous réserve d'évaluation commerciale et organoleptique positive aux Etats-Unis.

Le développement spectaculaire de l'aquaculture en Equateur et à Taiwan a permis de satisfaire à la demande mondiale croissante en crevettes. La cadence du développement s'accélère dorénavant et il est envisagé que plusieurs pays exporteurs tels que la Chine, le Mexique, les Philippines et l'Indonésie notamment augmenteront leur production de crevettes de culture. Il est possible que l'on observera un excédent des approvisionnements par rapport à la demande d'ici 1992; il en résultera un marché orienté à la baisse et ceci intensifiera fortement la concurrence entre les fournisseurs aussi bien sur le plan du prix que de la qualité. Malgré cela, le volume des importations américaines devrait continuer à se caractériser par une trajectoire ascendante, ayant des hauts et des bas cycliques résultant des fluctuations macro-économiques. Le volume d'augmentation de la demande est incertain, mais il convient toutefois de noter que le marché américain présente d'importants segments dont le potentiel est inexploité et plus particulièrement dans le secteur du commerce de détail et de la restauration rapide.

De l'importance d'être des hommes de marketing constants

La discussion du poisson à nageoires frais et congelé dans la section 3 de ce bulletin fait ressortir le fait que certaines des espèces exportées par les pays en voie de développement, tels que le vivaneau, le mérou et le bar, la dorade tropicale 'Kingclip' (et le *Genypterus* spp.) ont été affectés par une série de problèmes sur le plan des approvisionnements et de la qualité. Simultanément, il a souvent été observé l'absence d'une stratégie cohérente afin d'intensifier la demande, les exportations en provenance d'un seul pays étant prises en charge par un grand nombre de conditionneurs en concurrence les uns avec les autres et sans aucune optique coordonnée. Par suite de ceci, de nombreuses espèces n'ont pas suscité la demande ou les prix que leurs qualités intrinsèques leur faisaient mériter.

On peut opposer de telles expériences avec l'introduction menée à bien du 'orange roughy' (*Hoplostethus atlanticus*) de Nouvelle-Zélande, examiné dans la section 4 et lequel, à maints égards est un exemple classique d'excellent marketing. En se basant sur cet exemple, les fournisseurs dans d'autres pays devront accorder une attention toute particulière aux exigences suivantes lorsqu'il est tenté d'introduire une espèce aux Etats-Unis:

- évaluation prudente des stocks et gestion des ressources, en vue de garantir la qualité,
- une optique à longue échéance. Les divers expéditeurs du pays intéressé devront travailler de manière concertée afin de développer le marché,
- la cohérence en matière de qualité et de catégories,
- la sélection rigoureuse des importateurs,
- la segmentation du marché et la définition des cibles,
- si l'espèce est mal connue, la sélection soigneuse d'un nom adapté pour utilisation aux Etats-Unis.

Tandis que ces points sont présentés au conditionneur ou à l'exportateur individuel, le rôle des gouvernements et des associations de l'industrie a une importance prépondérante; c'est en effet eux qui sont en mesure de déterminer les politiques nationales en faveur de la gestion des ressources et du contrôle de la qualité et qui peuvent exercer une influence sur la manière dont l'industrie est organisée.

LAS CONCLUSIONES PRINCIPALES DE ESTE BOLETIN

Un mercado en auge para productos pesqueros

Muchas de las dificultades económicas experimentadas por los países en vías de desarrollo pueden atribuirse a su dependencia de la exportación de productos cuya demanda se ha estancado o ha aumentado lentamente, cuyos precios fluctúan mucho a corto plazo y tienden a bajar a largo plazo, y en algunos casos son objeto de medidas proteccionistas o reemplazados por sustitutos sintéticos en los países importadores. Estas características se aplican en grados que varían en los mercados para muchos productos, como azúcar, te, café, cacao, bananas, algodón, caucho y estaño.

Frente a esta situación algo deprimente, el mercado para productos pesqueros en los Estados Unidos presenta un panorama muy alentador. Aunque el consumo de pescado y mariscos es bajo en comparación con la carne de res y aves, ha crecido a un ritmo sin precedentes durante lo que va de la década de los '80, alcanzando 6.7 kg per cápita en 1986. Como los aguas de los Estados Unidos son más o menos plenamente explotados, el país depende cada vez más de las importaciones, las cuales en 1986 alcanzaron \$4.8 billones, lo que equivale a más del 60% del valor del consumo nacional. Los Estados Unidos están en segundo lugar en el mundo como país importador, después del Japón, y representan el 22% del valor total mundial.

En vista de los comentarios anteriores sobre el estado de mercados para otros productos primarios, dos hechos adicionales tienen un significado especial. En primer lugar, los países en vías de desarrollo, sobre todo en América Latina y Asia, suministran el 52% del valor de las importaciones de Estados Unidos. En segundo lugar el consumo y las importaciones de Estados Unidos se han incrementado a pesar de un aumento de precios en comparación con la carne de res y aves. También es interesante el impacto limitado del proteccionismo. Con ciertas excepciones, siendo el más notable el atún enlatado, y a pesar de que es prohibido que barcos pesqueros extranjeros desembarquen su captura en puertos de los Estados Unidos (salvo en Samoa Americana), la mayoría de las importaciones pesqueras están exentas de aranceles, impuestos o cupos de importación. Aun en el caso del atún enlatado, las importaciones han aumentado a pesar de un arancel del 12½%.

El consumo per cápita de 6.7 kg puede clasificarse en las siguientes categorías: pescado fresco y congelado 4.1 kg; pescado enlatado 2.5 kg y pescado curado 0.1 kg. El consumo de pescado en lata (especialmente el atún) ha estado aumentando desde 1982, pero esto se debe en gran parte a una baja en el nivel de precios. La mayoría del aumento en la demanda subyacente ha

sido por productos frescos y congelados, y esto se debe a la demanda popular por alimentos más saludables y estilos de vida más innovadores. Una alta proporción se consume fuera del hogar, hasta un 60% según ciertas fuentes. A medida que aumentan los ingresos familiares, hay más consumo de alimentos fuera del hogar, y esto significa que consecuentemente se come más pescado y mariscos.

Las perspectivas para el consumo de productos pesqueros deben considerarse a mediano plazo, hasta 1990, y a largo plazo hasta el año 2000. En el mediano plazo es posible que la escasez de peces demersales, la debilidad del dólar estadounidense y otros problemas macroeconómicos se combinaran para impedir que siga creciendo el nivel del consumo. La perspectiva a largo plazo es prometedora empero, y se ha pronosticado un aumento de 44% en el consumo para fines del siglo. Esto se debe a que la demanda será objeto de las mismas influencias positivas que se han manifestado hasta 1986, mientras que se espera que la acuicultura a la larga resolverá los problemas de suministro.

Oportunidades para países en vías de desarrollo

El cuadro A señala los principales productos del mar para los cuales se están creando oportunidades.

Cuadro A

Producto	Importaciones (1986)		Aumento promedio en volumen '80-'86
	T.M.	\$ millones	
Camarón	181,500	1,434	10.5%
Pescado (fresco y congelado, excluyendo atún)	548,000	1,548	9%
Atún en lata	107,300	229	14%
Concha de abanico, venera*	21,700	193	15%

Nota: * peso neto de la carne

En el caso del pescado, la mayoría de las importaciones todavía consisten de especies demersales de aguas heladas, (bacalao, halibut, etc.) del hemisferio norte. Sin embargo, estas especies están siendo plenamente explotadas y la insuficiencia en la oferta frente a una demanda creciente ha dado lugar a grandes aumentos de precios, de alrededor de 50%, durante 1986. La escasez de pescados demersales también ha aumentado en gran medida la demanda por otras especies, y junto con el deseo de variedad de parte del consumidor, esto ha hecho que el mercado estadounidense absorba especies exóticas y desconocidas de todas partes del globo.

La lista anterior no es exclusiva, puesto que existe demanda para mayores cantidades de ostras, langostas, carne de cangrejo, calamar y ancas de rana. Aún puede haber demanda para tipos especiales de almejas y mejillones a pesar de la relativa autosuficiencia de los Estados Unidos en lo que a estos mariscos se refiere, con tal de satisfacer determinados segmentos del mercado*.

En la década de los 80 se ha podido observar un aumento meteórico en el consumo de productos basados en el surimi, especialmente productos de imitación del cangrejo, cuyo consumo ha aumentado de aproximadamente 3,000 toneladas métricas en 1980 hasta 46,000 toneladas en 1986. A excepción de la carne de cangrejo y posiblemente las colas de langosta, es poco probable que estos productos compitan directamente con los alimentos del mar naturales que exportan los países en vías de desarrollo. Es más significativo el hecho de que la escasez mundial de peces demersales está obligando a los fabricantes japoneses de surimi a buscar nuevas materias primas, aparte del abadejo de

* Conviene notar que los proveedores de almejas, ostras y mejillones deben cumplir requisitos sanitarios estrictos (véase Sección 3 y Sección H.5, Apéndice H)

Alaska que hasta hace poco era la base para esta industria. Esto aumenta la demanda para especies demersales subutilizadas como el *hoki* de Nueva Zelanda, y aun para especies pelágicas con carne más oscura como el jurel chileno que está siendo procesado en conjunto por japoneses y chilenos.

Problemas y desafíos

A pesar de esta situación alentadora, los proveedores de los países en vías de desarrollo todavía enfrentan ciertos problemas. Una demanda creciente bajo condiciones de oferta estática o que crece paulatinamente aumenta el peligro de la sobrepesca. El ciclo de auge y caída que en el pasado ha caracterizado gran parte de la pesca estadounidense puede transferirse sencillamente a países con menos habilidad en administración pesquera.

Aunque estos países logran regular la pesca dentro de sus respectivos límites de 200 millas (Zonas Económicas Exclusivas) la disponibilidad de las especies tropicales sería reducida comparada con los pescados demersales de agua helada que llegarían a sustituir. Los Estados Unidos buscarán cada día más las especies que no sufran escasez tales como camarón, salmón, bagre, atún y trucha. Salvo en el caso de atún, se espera que la oferta de estas especies provendrá de la acuicultura. En el caso de los países en vías de desarrollo, hasta la fecha sólo se ha implementado la acuicultura en gran escala para el camarón y hace falta investigación y desarrollo para encontrar otras especies que pueden ser cultivadas. En el caso del pescado, las especies con sabor especial y/o de las cuales se sacan filetes grandes y blancos que son apropiados para asar, por ejemplo mero, cherna etc. serían las más convenientes para la piscicultura, sujeto a resultados positivos de evaluaciones comerciales y organolépticas en los Estados Unidos.

El desarrollo espectacular de la acuicultura en el Ecuador y Taiwán ha permitido que se satisfaga la demanda mundial creciente para el camarón. Sin embargo, ahora, el ritmo del desarrollo se está acelerando y se espera que varios países exportadores incluyendo China, Méjico, Filipinas e Indonesia aumentan su producción de camarón cultivado. Es posible que antes del año 1992 la oferta mundial supere la demanda favoreciendo al comprador e intensificando la competencia entre proveedores en cuanto a precio y calidad se refiere. A pesar de ésto, se espera que el volumen de las importaciones estadounidenses seguirá su trayectoria ascendente, con puntos altos y bajos dependiendo de los ciclos económicos. Existe incertidumbre en cuanto al volumen del aumento que se producirá, pero debe notarse que el mercado estadounidense tiene grandes segmentos cuyo potencial no ha sido plenamente explotado, especialmente la venta al detalle y los restaurantes tipo *fast food* (servicio rápido).

La importancia de una buena política de comercialización

La discusión sobre pescado fresco y congelado en la Sección 3 de este boletín subraya el hecho de que algunas especies exportadas por los países en vías de desarrollo, tales como pargos, meros, chernas, dorado y congrio, han sido perjudicadas por un historial de problemas relacionadas con calidad y suministro. A veces ha hecho falta una estrategia consecuente para aumentar la demanda, dándose a menudo el caso de muchos exportadores de un solo país que compiten entre sí, sin adoptar un enfoque coordinado. Como resultado, muchas especies no han generado la demanda o los precios que les corresponden por sus cualidades intrínsecas.

Tales experiencias contrastan con el lanzamiento exitoso del *orange roughy* de Nueva Zelanda, que se discute en la Sección 4, y que en muchos aspectos constituye un ejemplo de buena comercialización. Basándose en este caso, se recomienda que los proveedores de otros países que buscan introducir una nueva especie a los Estados Unidos presten atención especial a las siguientes necesidades:

- determinación y administración cuidadosa de los recursos pesqueros, para poder garantizar un cierto nivel de suministro;
- un enfoque a largo plazo. De ser posible los exportadores de un país deberían de coordinar sus esfuerzos para desarrollar el mercado;
- consistencia en calidad y selección del producto;
- selección cuidadosa de importadores;
- segmentación del mercado y selección de grupos objetivos;
- si la especie es poco conocida, debe de seleccionarse con cuidado un nombre apropiado para usarse en Estados Unidos.

Mientras estas recomendaciones son dirigidas al empacador o exportador individual, el papel de los gobiernos o de las asociaciones industriales es de primordial importancia, pues son ellos los que pueden determinar las políticas nacionales sobre la administración de recursos pesqueros y el control de calidad, y que pueden influir en el modo de organización de la industria.

PRINCIPAIS CONSTATAÇÕES DO BOLETIM

Rápida expansão no mercado de pescados e mariscos

Muitas das dificuldades económicas sofridas pelos países em desenvolvimento podem ser atribuídas à sua dependência de rendas provenientes de exportações de produtos básicos cuja procura encontra-se ou estagnada ou em lento desenvolvimento, e cujos preços reais diminuem a longo prazo fluctuando drasticamente a curto prazo, e os quais, em alguns casos, ficam sujeitos à política proteccionista dos países importadores ou a substituições por produtos sintéticos. Estas características podem ser encontradas em graus variados nos diferentes mercados de muitos produtos básicos, tais como açúcar, chá, café, cacau, banana, algodão, borracha e estanho.

Em contraste a este panorama um tanto deprimente, o mercado dos pescados e mariscos nos Estados Unidos apresenta um quadro muito animador. Embora o consumo de pescados e mariscos seja baixo em comparação ao da carne de boi e de aves, ele aumentou a uma taxa sem precedentes durante a década de 1980, chegando a 6.7 kg per capita em 1986. Visto que as águas dos Estados Unidos estão mais ou menos totalmente exploradas, o país está se tornando cada vez mais dependente do fornecimento estrangeiro, que em 1986 atingiu um total de \$4.8 bilhões, o equivalente a mais do 60% do valor de todos os produtos de pesca consumidos. Em termos mundiais, os Estados Unidos são o segundo maior importador de produtos da indústria da pesca depois do Japão, sendo responsável por 22% do total mundial em termos de valor.

Dois outros factos são de importância significativa em vista dos comentários anteriores acerca do estado dos mercados para outros produtos básicos. Primeiramente, os países em desenvolvimento, especialmente na América Latina e Ásia, fornecem agora 52% do valor das importações dos Estados Unidos, e em segundo lugar, o consumo e a importações dos Estados Unidos aumentaram apesar dos preços crescentes de pescados e mariscos em face à carne de boi e de aves. O impacto limitado da política proteccionista é também de interesse. Com várias excepções, notavelmente o atum enlatado, e apesar do facto que os navios pesqueiros estrangeiros, estão proibidos de desembarcar em portos dos Estados Unidos (excepto na American Samoa), a maioria das importações de produtos de pesca estão isentas de tarifas, impostos ou limites quantitativos. Mesmo no caso do atum enlatado, as importações estão crescendo apesar de um imposto de 12½%

O consumo per capita de 6.7 kg pode ser desdobrado nos seguintes componentes: pescado fresco e congelado 4.1 kg, pescado enlatado 2.5 kg e pescado curado 0.1 kg. O consumo de pescado enlatado (sobretudo o atum) tem aumentado desde 1982 mas isto é principalmente um resultado de uma

atenuação dos preços. A maior parte do aumento na procura subjacente é por artigos frescos e congelados, e corresponde á preferência por alimentos mais saudios e estilos de vida mais inovadores. Uma proporção muito elevada é consumida fora de casa, aproximadamente 60% de acordo com algumas fontes. A medida que os salários aumentam, o consumo de alimentos fora de casa também aumenta e isto significa maior consumo de pescados e mariscos.

A perspectiva para o consumo dos produtos da indústria da pesca deve ser considerada tanto o meio prazo, até 1990, como a longo prazo, até o ano 2000. A meio prazo é possível que a escassez de peixes de fundo, um dólar americano fraco e outros problemas macroeconómicas combinar-se-ao para impedir maior aumento do consumo per capita. Contudo, a perspectiva a longo prazo é animadora, e foi previsto um aumento de 44% no consumo até o fim de século. Isto porque a procura estará sujeita às mesmas influencias positivas evidentes até 1986, ao mesmo tempo que os problemas de provisão eventualmente deverão ser resolvidos com o desenvolvimento da aquacultura.

Oportunidades para os países em desenvolvimento

A Tabela A apresenta os principais tipos de pescados e mariscos para os quais grandes oportunidades estão a ser criadas.

Tabela A

Produto	Importacoes (1986)		Aumento anual em volume (média, 1980-1986)
	toneladas	\$ milhoes	
Camarao	181.500	1.434	10.5%
Peixe (fresco e congelado, nao o atum)	548.000	1.548	9%
Atum enlatado	107.300	229	14%
Scallops	21.700*	193	15%

Nota: * O peso indicado dos scallops é o peso da carne apenas.

No caso dos pescados, a maior parte das importacoes consistem de pescados de fundo (bacalhau, halibut, etc.) das águas frias do hemisfério norte. Contudo, estes tipos de pescados foram, e estão a ser, inteiramente explorados e a insuficiência da provisô em face à crescente procura ocasionou grandes aumentos de preços, geralmente cêrca de 50%, durante 1986. Uma outra consequência da escassez de pescados de fundo foi o grande aumento da procura de outras espécies de pescado, que juntamente com o desejo do consumidor em ter mais variedade, fez com que o mercado nos Estados Unidos absorvesse espécies exóticas e desconhecidas de todas as partes do globo.

O que apresentamos acima nao é uma lista exclusiva da oportunidades, e continua havendo procura de quantidades sempre maiores de ostras, lagostas, caranguejos, calamares e pernas de ras. Poderá mesmo haver oportunidade para tipos especiais de moluscos e mexilhoes, onde espera-se que os Estados Unidos sejam razoavelmente auto-suficientes, atraindo segmentos específicos do mercado*.

A década de 1980 presenciou um crescimento meteoro rico no consumo de produtos à base do método surimi, priincipalmente os produtos imitando caranguejo, cujo consumo cresceu de aproximadamente 3.000 toneladas em 1980 para 46.000 toneladas em 1986. Além de caranguejo e provavelmente lagosta, não é provável que estes produtos sejam uma fonte directa de competição para os mariscos e crustáceos naturais exportados pelos países em desenvolvimento. Ainda de maior significado é o facto que a escassez mundial de peixes de fundo está forçando os fabricantes de surimis japoneses a procurar fontes de matéria prima que não e pescada-polaca do Alasca na qual a indústria

(Nota — * Deve-se observar que as importações de moluscos, ostras e mexilhoes estão sujeitas aos países fornecedores cumprirem rigorosamente as exigencias sanitárias impostas, conforme discutido na Seccão 3 e Secção H.5 (Apêndice H))

tem se baseado até agora. Isto provocou uma procura crescente pelas espécies menos utilizadas dos peixes de fundo tal como o 'hoki' da Nova Zelândia, e mesmo pelas espécies pelágicas de carne mas escura, conforme é o caso da cavala chilena que agora é processada por uma operação em empresa conjunta.

Problemas e desafios

Apesar desta situação animadora, ainda existem problemas para os fornecedores nos países em desenvolvimento. A crescente procura mundial de peixe nas condições de aumento estático ou vagaroso da oferta, torna ainda maior o perigo da pesca em excesso. O ciclo de 'surto e desenvolvimento' que no passado caracterizou grande parte da indústria da pesca nos Estados Unidos pode simplesmente ser transferido para países com menos perícia técnica na administração desta indústria.

Mesmo que os países consigam regular a pesca dentro de seus respectivos limites de 200 milhas (zonas Económicas Exclusivas), a maior parte das espécies tropicais estão disponíveis em quantidades limitadas em comparação aos peixes de fundo das águas frias os quais essas espécies substituiriam. Os Estados Unidos recorrerão cada vez mais àquelas espécies que não estão sujeitas à escassez tais como o camarão, salmão, bagre, atum e a truta arco-íris. Excepto no caso do atum, espera-se que provisões maiores de todas estas espécies provenham da aquacultura. Nos países em desenvolvimento, a aquacultura para exportação só tem sido até agora implementada em grande escala em relação ao camarão, e há necessidade de pesquisas e explorações para que sejam descobertas novas espécies que possam ser cultivadas. No caso de peixes, as espécies que tenham fino sabor e/ou produzam grandes filetes brancos adequados para grelhar, por exemplo garoupas e robalos, seriam peixes adequados, mediante avaliação comercial e organoléptica positiva nos Estados Unidos.

Um espetacular empreendimento de aquacultura no Equador e em Taiwan permitiu satisfazer a procura mundial crescente de camarões. Agora contudo, o passo do desenvolvimento está acelerando e espera-se que varias outras regiões de exportação incluindo a China, Mexico, Filipinas e Indonésia, aumentem a produção de sua cultura de camarões. É possível que a oferta excederá a procura em 1992; isto produzirá um mercado do consumidor e intensificará grandemente a competição entre os fornecedores tanto em termos de preços como de qualidade. Apesar disto, o volume das importações dos Estados Unidos deverá continuar a sua trajetória ascendente, com subidas e descidas cíclicas resultantes das flutuações macroeconómicas. Não sabemos qual sera o aumento da procura, mas deve-se observar que o mercado dos Estados Unidos tem grandes segmentos que não tem sido plenamente explorados, especialmente o sector retalhista e os restaurantes que fornecem refeições rápidas.

A importância dos comerciantes dedicados

A discussão sobre pescados frescos e congelados na Secção 3 deste boletim acentua o facto que algumas das espécies exportadas pelos países em desenvolvimento, tais como caranhas, garoupas, robalos, doirada e o 'kingclip', foram desfavoravelmente afectadas por uma longa série de problemas quanto à qualidade e à provisão. Ao mesmo tempo, tem havido com frequência falta de uma estratégia consistente para criar a procura, com as exportações de um único país entregues a várias companhias empacadoras em competição umas com as outras e sem um método coordenado. Em consequência disto muitas espécies não criaram a procura ou os preços que suas qualidades inerentes mereceriam.

As mencionadas experiências podem ser comparadas em contraste à introdução vitoriosa do 'orange roughy' da Nova Zelândia, discutido na Secção 4, e que em muitos aspectos é um exemplo clássico de boa comercialização.

Baseado neste caso, fornecedores em outros países devem dedicar atenção especial aos seguintes requisitos ao tentar introduzir uma espécie nos Estados Unidos.

- Cuidadosa avaliação da provisão e boa administração dos recursos, com vistas a garantir o fornecimento;
- um sistema a longo prazo. Se possível os diversos expedidores do país concorrente deverão trabalhar de forma coordenada a fim de desenvolver o mercado;
- consistência de qualidade e classificação;
- selecção cuidadosa dos importadores;
- segmentação do mercado e selecção de objectivos;
- se a espécie for desconhecida, selecção cuidadosa de um nome adequado para ser usado nos Estados Unidos.

Enquanto os pontos acima mencionados destinam-se ao empacotador ou exportador individual, o papel dos governos e das associações industriais é de suma importância, pois eles podem determinar as políticas nacionais relativamente à administração de recursos e controle de qualidade, e poderão influenciar a forma pela qual a indústria será organizada.

重要简报节选

迅速兴隆起来的美国渔产品市场

发展中国家所面临的很多经济困难,可以说是由于它们在获得出口贸易收入时所依赖的产品,在国际上的需求量基本处于停滞或缓慢增长状态;而这些产品的实际价格从长期看来是处于下降趋势,而在短期内波动很大,且有受到进口国贸易保护主义的限制,或是被合成产品取代,在市场上,这些特征不同程度地表现很多初级产品上,如:食糖,茶,咖啡,可可,香蕉,棉花,橡胶及锡。

在这种不景气的市场背景下,美国渔产品市场呈现出令人振奋的场面。尽管相对家禽来说,渔产品的消费量还是低的,但在八十年代其增长速度却是空前的。一九八六年人均消费量已达6.7斤。由于美国的水资源几乎已全部开发利用了,所以美国越来越依赖进口渔产品。一九八六年进口了48亿美元的渔产品相当于全部消费量的60%以上。在全世界看来,美国是第二大渔业产品进口国,仅次于日本,其进口量在价值上大约占全世界进口总量的22%。

对上述评论来说,另外两个有关其它基本产品市场情况的实事,也有特殊的意义.其一,发展中国家(主要是拉丁美洲和亚洲的一些国家)目前向美国出口量在价值上占美国全部进口量的52%;其二,尽管渔产品的价格相对于牛肉和家禽来说有所上涨,美国渔产品消费量和进口量仍然在增长.另外一件有兴趣的事是保护主义的限度.除几个例外(如名贵的金枪鱼罐头),尽管外国渔船不准在美国港口停泊(除美国萨摩亚群岛),大部分渔产品进口是免税的或不限量的.即使对金枪鱼罐头来说,在上税12.5%的情况下,进口量仍在增长.

人均6.7公斤的消费量包括:鲜鱼和冻鱼4.1公斤,罐装鱼2.5公斤以及干鱼0.1公斤.罐头鱼(主要是金枪鱼)的消费量自一九八二年以来一直在增长,但主要是价格降低的结果.而市场上主要需求的鲜鱼及冻鱼的增长量则最大,其原因是人们追求更有利于健康的鱼类以及丰富生活.据有关资料显示,高达60%的渔产品不在家庭消费.随着工资的提高,更多的食物在公共场所消费,这说明渔产品的需求量将更多.

对于未来渔业产品的消耗情况,必须分两步看.一是近期内(1990年前),一是远期内(2000年前).在近期内,陆地鱼的缺乏,美元的软弱以及其它宏观经济的问题,这些因素的综合作用,很可能会阻止人均消费量的进一步增长.但是,从长远地看,前景是光明的.预计本世纪末消费量将增加44%.这是因为需求量将受到和1986年之前相同有利因素的影响,而供应方面的问题最终会通过养殖业的发展而获得解决.

发展中国家的良机

能给发展中国家提供良机的几种主要渔产品列于表1

表A: 美国进口渔产品

产品名称	进口量 (1986)		年增量 (1980-1986, 平均值)
	重量(吨)	价值(百万美元)	
虾 (Shrimp)	181,500	1,434	10.5%
鳍类鱼 (Finfish) (包括鲜鱼及冻 鱼, 不包括金枪 鱼)	548,000	1,548	9%
罐头金枪鱼 (Tuna)	107,300	229	14%
扇贝 (Scallop)	21,700*	193	15%

在鳍类鱼中, 大部分进口鱼仍然是来自北半球的低温陆地鱼, 如: 鳕鱼 (Cod), 大比目鱼 (Halibut) 等. 但这些内地水源已经或正要被全部开发利用, 而面对不断增长的需求, 这些渔

注: *扇贝的重量指贝肉重.

产品资源的缺乏就引起了价格的大幅度上升. 1986年间的典型增量值为50%左右. 陆地鱼的短缺的另一个后果是大大地增加了对其它鱼类的需求, 加之消费者对不同风味的追求, 导致美国市场从世界各地吸收异味和陌生鱼类.

上述机会并未概括一切. 对蚝 (Oyster), 龙虾 (Spiny lobster), 螃蟹肉 (Crabmeat), 鱿鱼 (Squid) 以及蛙腿 (Frogs' legs) 的需求量也在增长. 甚至还有出口特种蚌 (Clams) 和贻贝 (Mussels) 的机会, 只是需要寻求特殊市场, 因为预计美国可以自足*.

八十年代仿造产品的消费急增. 其中主要是仿蟹产品, 其消费量从1980年的3,000吨增至1986年的46,000吨. 除蟹肉以及可能的龙虾尾外, 仿造产品不可能直接与从发展中国家进口的自然渔产品相竞争. 更有意义的是世界范围的陆地鱼短缺正在迫使日本仿制品加工商寻求阿拉斯

加州绿鳕 (Alaska Pollock) 之外的原料来源, 而迄今为至, 此加工业一直以这种绿鳕为基础。这将导致对有些利用不足的陆地鱼种的需求量的增加。如新西兰的一种内地鱼 (Hoki) 甚至对有些黑肉远洋鱼种的需求也在增长。如目前正在由一个联合风险企业加工的智利鲈鱼 (Jack Mackerel)。

注: * 须注意对于蚌、蚝和贻贝, 出口国须满足进口国严格的卫生要求。如在第00页以及第00页, 附录H.5所讨论的那样。

竞争及存在的问题

除这些令人鼓舞的形势外, 对发展中国家的出口者来说, 仍然存在一些问题。相对于不变或缓慢增长的鱼类资源, 世界对渔产品需求的增长, 增加了打捞过度的危险性。昔日美国渔业经历的由“兴盛到萧条”的周期可能会容易地转移到缺少专业化渔业管理的国家。

即使各国在其各自的 200 英里海域内 (即非公经济区) 成功地进行了有规律地打捞, 大多数热带鱼种的打捞量相对于将被其取代的陆地鱼冷水鱼来说是有限的。美国将逐步转向不受资源不足限制的渔产品, 如虾, 大麻哈鱼 (Salmon), 鲶鱼 (Catfish), 金枪鱼, 以及鲑鱼 (Trout)。除金枪鱼外, 增加其它几种鱼类的资源是通过发展养殖业。在发展中国家, 以出口为主的养殖业目前只有养虾在大规模进行。新的可养殖鱼种尚需进一步研究和发展的。对鳍鱼类来说, 具有美味或带有便于烤制形状特点的鱼类, 如鲷科鱼 (Groupers) 及一些鲈鱼 (Sea Basses), 是很有竞争力的, 当然取决于合理的贸易以及对美国市场的正确分析。

厄瓜多尔 (Ecuador) 和台湾引人注目的养殖业发展, 已经满足了世界不断增长的对虾的需求, 但是, 目前发展的步伐正在加快, 而且其它几个出口地区, 包括中国。

墨西哥、菲律宾和印度尼西亚,也在增加它们的养虾出口量。到1992年,可能会出现供过于求,这将引起买方市场,并会大大地强化供应者在质量和价格上的竞争。尽管如此,美国进口量当继续其上升趋势,并随宏观经济的波动而出现周期性峰谷交替的现象。需求量将增加多少,尚未能肯定,但应注意到美国市场有很大潜力未被发掘。尤其是零售部和快餐馆。

作一个认真的市场家的重要性

在本简报第三节中对鲜鱼及冻鱼的讨论,强调了某些由发展中国家出口的鱼种,如新西兰真鲷 (Snappers), 鲷科鱼, 鲈鱼, 大海鱼 (King clip) 以及称为 Mahi-Mahi 的鱼, 在一段时期中存在质量和供应问题, 故其出口受到影响。同时, 缺少发掘和建立需求的长期战略。实际情况却是, 一个国家的出口产品, 由众多批发商竞争, 没有任何合作形式。其结果是, 很多鱼种没有找到需求, 而鱼的质量也得不到价格上的制裁。

这些经验可以与在第00页所讨论的一个成功的例子相对照。即从新西兰引进一种叫 Orange roughy 的品种。它可以在各种教科书中作为成功销售的例子。基于这种情况, 其它国家的出口者在企图向美国推销某种渔产品时应当特别注意以下要求:

- * 认真估计库存,管理资源,以保证供应.
- * 长期计划. 如果可能的话,全国各有关渔业公司应合作起来,共同开发市场.
- * 统一的质量标准和档次.
- * 慎重选择出口对象.
- * 划分市场,制订指标.
- * 如果是陌生鱼种,仔细命名以便于在美国使用.

在向各批发商或出口者指出以上几点的同时,还应强调政府及工业联盟的举足轻重的作用. 因为他们可以决定国家关于资源管理及质量控制的政策,并影响着工业的组织形式.

Introduction

The Overseas Development Natural Resources Institute (ODNRI) is the research and development unit of the Overseas Development Administration concerned with the optimal use of renewable natural resources in developing countries. ODNRI assists a number of countries in Asia, Africa and Latin America in the handling, storage, processing, loss reduction, quality assurance and marketing of fish.

The purpose of the present publication is to inform interested parties in developing countries about the second largest seafood market in the world, which in recent years has shown unprecedented growth. However, as the United States seafood market is vast and complex, it is not possible to produce a bulletin providing comprehensive information on all matters of interest to the prospective reader, and for this reason the author has concentrated on two main areas:

- (a) an outline of how the United States market works, its long-term trends and consequent opportunities (and dangers) for suppliers in developing countries; and
- (b) how developing countries can gain access to and optimize their performance in the United States market, and avoid some of the major pitfalls. This is approached both from the perspective of an individual exporter and of the exporting country as a whole.

The market for all kinds of seafood, fresh, frozen, canned and cured, is discussed in the bulletin but focus is primarily on fresh and frozen products, since these are the items for which imports are expected to show most growth. The main body of the bulletin has been deliberately condensed into three sections, dealing with supply and demand, developing country prospects and how to market effectively. Detailed information on individual types of seafood is given in the appendices, which also contain details of packaging, technical requirements, sources of further information and other matters of interest.

It should be noted that only limited information is given on product specifications, packaging and prices. For more comprehensive data the reader is referred to publications listed in Appendix I. In the case of price data, it is not possible to provide figures which will be up to date at the time of publication; such data as are included are shown simply to demonstrate the working of the market and to illustrate differentials between species.

Names and addresses of importers are *not* given, there being already several good sources of information which the reader can use. These are listed in Appendix I.

The reader should finally note that this is a **one-off** publication, describing the United States seafood market up to 1986. Readers wishing for up-dated information on particular commodities will find that the United States has a highly informative trade press. Appropriate publications are also listed in Appendix I.

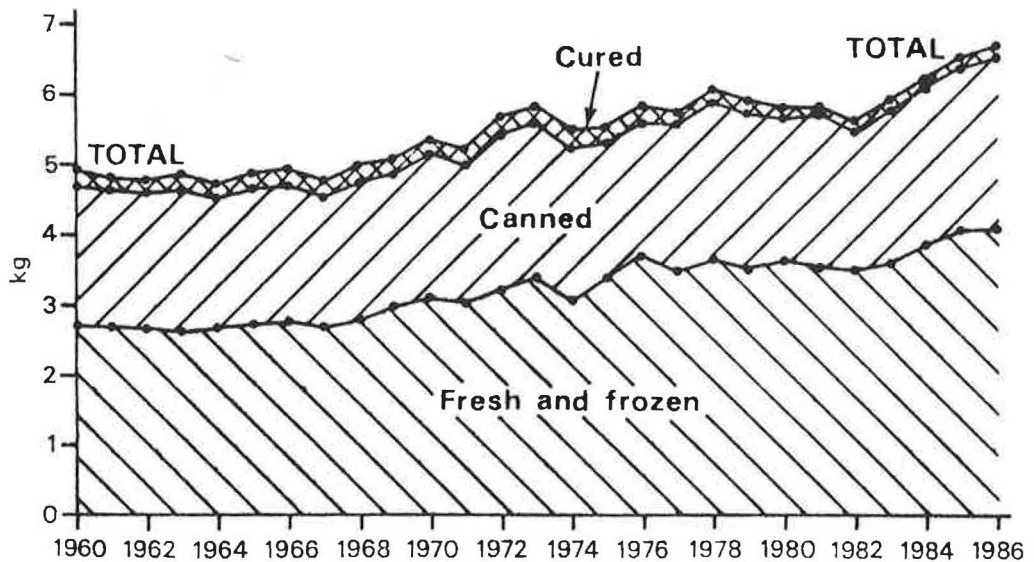
Supply and demand for seafood in the United States

TRENDS IN CONSUMPTION

Overall consumption levels

Throughout most of the twentieth century, United States per caput consumption of commercially caught seafood, excluding fish caught by sports fishermen, has hovered at about 5 kg edible meat weight per annum. However since the late 1960s there has been an upward trend and, although there were temporary declines due to cyclical and other factors, consumption had by 1985 reached a record figure of 6.6 kg per caput per annum. An acute shortage of ground fish and a weak dollar brought about an extraordinary rise in prices in 1986, but despite this, consumption further increased to 6.7 kg.

Figure 1:
Annual United States consumption of seafood per caput



The data shown in Figure 1 are for per caput consumption, but total consumption has grown faster due to population growth at about 1% per annum. For 1986, the total volume consumed was 1.6 million tonnes.

Most of the growth since the 1960s has been in fresh and frozen seafood, with per caput consumption rising from about 2.7 kg in the period 1960-67 to 4.1 kg by 1986. Per caput consumption of canned seafood has increased since 1982, but the level of 2.4 kg for 1985 was only just above previous peaks in 1973 and 1978 and below the all-time record of 2.6 kg per caput in 1936. Cured seafood is now of little overall significance, with consumption of 0.1 kg per caput.

Official statistics do not show fresh and frozen seafood as separate items, but it is clear that the market share of fresh seafood is growing fast at the expense of frozen seafood. The proportion of seafood marketed unfrozen is reported to

have increased from 19.4% in 1978 to 25.3% in 1982 (Olafsson, 1985) and reached 29% in 1986 (Short, 1987, quoting data from Technomics Inc.).

In addition to commercially caught seafood, there is also substantial consumption of recreationally caught seafood. Approximately 320,000 tonnes were caught in 1986, equivalent to about 1.3 kg per caput of population (Anon., 1987). However, only commercially caught seafood will be discussed in the remainder of this bulletin.

United States' citizens still eat little seafood compared to other meats; consumption of beef is five times greater than that of seafood, and that of chicken is four times greater. Nevertheless seafood consumption has been expanding faster than that for most other food items and is forecast by the United States Department of Agriculture (USDA) to rise by over 44% by the end of the century, an increase of more than that for beef (30%) or poultry (7%) (Short, 1987).

The medium-term prospect for consumption, up to 1990, is less attractive however. Due to the current supply shortage, a weak United States dollar and general uncertainty over the state of the economy, it is possible that per caput consumption will fall below the level for 1986.

In international terms, United States per caput consumption is still moderate if compared to European countries. It is low when compared to the fish-consuming countries of Scandinavia and the Iberian Peninsula, but high in relation to the land-locked countries of central Europe.

Table 1
Seafood consumption per caput in selected countries, 1980-82 average

	kg per annum, live weight equivalent
Norway	49.1
Sweden	32.3
Spain	34.8
Portugal	28.9
UNITED STATES	16.6
Austria	6.2
Switzerland	10.9
Hungary	3.9
Czechoslovakia	5.2

Source: FAO, quoted in *Fisheries of the United States*, US Dept of Commerce NMFS

In the same way, United States consumption levels are much higher in coastal states than in the land-locked states of the Mid-West (see Appendix A).

Consumption of fresh and frozen seafood

The main types of seafood consumed are fillets and steaks, lesser processed fin fish ('in the round', dressed, etc.), sticks and portions, clam, oyster, scallop, lobster, crab, freshwater crayfish, surimi-based products and various prepared foods (stuffed products, prepared meals, etc.). Table 2 gives per caput consumption for those items for which statistics are available.

Sales of frozen sticks and portions, which are mainly breaded, have stagnated, as increasingly health-conscious consumers have turned towards unbreaded fillets and steaks, whose consumption per caput grew by 22% in the first half of the decade (i.e. 1980-85). Most of the fin fish consists of white-fleshed ground fish such as cod, haddock and flounder, from the major fishing grounds of the northern hemisphere, though the importance of non-traditional species has grown very rapidly. This trend accelerated in 1986 due to the world-wide scarcity of ground fish species.

Of particular note is a 56% increase in per caput consumption of shrimp, which in monetary terms is by far the most popular seafood in the United States. This growth chiefly reflects an excellent supply situation with the development

Table 2

United States per caput consumption of selected fresh and frozen seafood products

	1980	1981	1982	1983	1984	1985	1986	Change 1980-86
Filletts and steaks	1.19	1.24	1.22	1.30	1.36	1.45	1.45	x 1.22
Sticks and portions	0.87	0.81	0.80	0.81	0.82	0.82	0.82	x 0.94
Shrimp*	0.64	0.67	0.69	0.78	0.86	0.90	1.00	x 1.56
Surimi-based products	0.01	0.02	0.04	0.08	0.14	0.17	0.19	x 19

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS, and by private communication. Data on surimi for 1986, from *Seafood Business*, July/August 1987

Note: * Shrimp figures include a small amount of canned product

of aquaculture by some exporters and the high degree of acceptability which shrimp enjoys, particularly in the food-service market.

Consumption of other types of shellfish has also increased during the same period, with the exception of crab which have been affected by the collapse of the Alaska king crab fishery. The effect of this has been mitigated by the popularization of surimi-based products, over 90% of which consist of imitation crabmeat. So explosive has been the growth of the trade for surimi-based products that sales by weight now exceed those of all types of shellfish except shrimp and clam. Most surimi products are presently made from Alaska pollock, caught by Japanese, Korean and United States vessels. These foods are discussed further in Appendix E, Section E.12.

After surimi-based products, frozen fish dishes have the fastest growing market for those frozen foods which use seafood ingredients, with sales growing from 7,900 tonnes in the 52 weeks to September 1982 to 18,000 tonnes in the 52 weeks to September 1985 (SAMI data reported in *Frozen Food Age*, January 1986). Such prepared fish dishes may be microwavable products, boil-in-the-bag packs and pizzas. Dinners based on seafood are proving popular because of their healthy image and convenience. They are often 'calorie-controlled', containing no more than 300 calories per meal and they overcome the traditional objections to preparing fish in the home, that is, smell, difficulty of preparation and the presence of bones. The main seafood used in such products tend to be items with a large and regular supply, including cod, flat fish, shrimp, scallop, tuna, clam and lobster. Manufacturers include Stouffer's (a Nestlé subsidiary), Weightwatchers (a Heinz subsidiary), Pillsbury and Conagra.

Consumption of canned seafood

In 1986 the average United States citizen consumed 2.4 kg of canned seafood, of which 67% was tuna (see Table 3). Other items included salmon, sardine, mackerel, herring, anchovy, clam, oyster, shrimp, crab meat and abalone.

Per caput consumption of canned seafood increased by 20% between 1980 and 1986, but given the trend to less processed foods, it is not believed that this is due primarily to a long-term increase in underlying demand, but to improved supplies and lower prices. The latter is particularly true for canned tuna, oyster, clam, shrimp and crab meat, for which there has been a shift in the source of supply from the United States to lower-cost countries in the Far East, especially Thailand.

Table 4 compares retail volumes and prices for certain canned fish items between April 1983 and November 1985. Data for sardine and shrimp were unfortunately not available.

In volume terms, tuna, salmon and crab meat consumption grew by between 6% and 8% over the 2½ year period. However oyster and clam consumption

Table 3

Per caput consumption of canned seafood in the United States — alternate years

	kg per caput (lbs per caput)*			
	1980	1982	1984	1986
Total	2.0 (4.5)	2.0 (4.3)	2.2 (4.9)	2.4 (5.4)
of which:				
Tuna	1.3 (2.9)	1.2 (2.7)	1.5 (3.2)	1.6 (3.6)
Salmon	0.2 (0.5)	0.2 (0.5)	0.3 (0.6)	0.2 (0.5)
Sardines	0.1 (0.3)	0.1 (0.3)	0.1 (0.2)	0.1 (0.3)
Other fin fish	0.1 (0.3)	0.2 (0.4)	0.2 (0.5)	0.3 (0.6)
Shellfish	0.2 (0.5)	0.2 (0.4)	0.2 (0.4)	0.2 (0.4)

Sources: Fisheries of the United States,
United States Dept. of Commerce
NMFS

Note: * Figures in brackets are amounts in
pounds per caput, and are given for
greater precision

hardly grew at all, and the consumption of the low-valued mackerel fell by over 20%. As for prices, unit values fell in real terms for all items, with tuna falling by 18%.

Table 4

Retail volume of selected canned seafood

	Volume ('000 tonnes)			Unit value (\$ per lb)		
	52 week period ending		Change between periods (%)	Period ending Nov. 8 1985	Change between periods	
	Apr. 29 1983	Nov. 8 1985			in money terms	in real terms
Tuna	252.83	270.80	+7.1	2.30	-9.0	-18.0
Salmon	39.16	41.62	+6.3	2.51	+5.1	-5.4
Herring	2.39	2.57	+7.5	2.88	+5.8	-4.7
Mackerel	13.93	10.84	-22.2	0.80	+2.9	-7.3
Oyster	4.95	4.99	+0.8	3.01	+2.1	-8.1
Clam	7.37	7.43	+0.8	2.39	+2.3	-7.9
Crab meat	2.07	2.22	+7.2	7.15	+1.7	-8.5

Source: Selling Areas Marketing Inc., published in *Pacific Fishing*, August 1983 and February 1986

Consumption of cured seafood

Since 1980, per caput consumption of cured seafood has been stable at around 0.3 lb (0.14 kg) of edible meat weight per caput per annum, but has continued to fall as a proportion of overall seafood consumption (down 2% in 1986). Most cured seafood is salted and pickled, and some is smoked; very small quantities of dried products are consumed.

Salted and pickled products are primarily made from ground fish, herring and salmon. Salmon accounts for over half of all smoked fish consumed, with smaller quantities of whitefish, herring, chub, sablefish, hake, cod and other species. Shrimp and cod are the main dried items consumed.

Cured fish is not eaten by the average United States citizen, but is popular with particular ethnic groups such as Jews, Eastern Europeans and Scandinavians. It might be expected that smoked fish would have a wider appeal, particularly with identifiable social groups with high disposable incomes, in view of the trend towards exotic and unusual species and

preparations, but it has so far made very limited impact. Smoked fish could be made more popular if greater resources were devoted to promotion and distribution, but such resources are beyond the means of the relatively small processors presently involved in this trade.

Table 5

United States supply of cured seafood, 1984

Type	United States production	Imports	Total
Total	27.0	30.9	57.9
of which:			
Salted and pickled	16.6*	27.2 ⁺	44.3
Smoked	9.9 [†]	1.9	11.8
Dried	0.5	1.3	1.8

Source: United States production: *Annual Products Summary 1984*, United States Dept. of Commerce, Current Fisheries Statistics No. 8357.
Imports: *FT246*, United States Dept. of Commerce Bureau of the Census

Notes: * Includes salmon (6,300 tonnes), sea herring (5,000 tonnes) and cod (1,200 tonnes)
⁺ Includes ground fish (17,300 tonnes) and sea herring (9,200 tonnes)
[†] Includes salmon (4,900 tonnes) and whitefish (1,300 tonnes)

In-home versus out-of-home consumption

The United States seafood market is characterized by high out-of-home consumption in restaurants and other eating places, but there is disagreement about the true percentage of seafood thus consumed. Officially sponsored surveys carried out in 1977-78 and 1981 indicate that between 25% and 30% by weight is consumed out of the home (Hu, 1985). Nevertheless, it is widely believed in trade circles that the true figure is about 60%, and this tends to be supported by a recent work by Technomics Inc. (Short, 1987), which shows that 66% of fresh and frozen seafood is consumed outside the home, with only 34% moving through retail channels.

Table 6

United States consumption of fresh and frozen seafood in the food-service and retail sectors

	Fin fish	Shellfish	Specialities*	Surimi
Total	54	39	3	4
of which:				
Fresh	20	9	—	—
Frozen	34	30	3	4
and of which:				
Food-service	32	30	1	3
Retail	22	9	2	1

Source: Technomics Consultants quoted by Short (1987)

Note: * Prepared meals, stuffed, etc.

Some, but not all, of the difference between the two surveys is because of the fact that the Technomics data does not include canned seafood, which is mainly consumed in the home. If the Technomics data is accepted for fresh and frozen fish and it is assumed (somewhat arbitrarily) that 85% of canned and cured fish is consumed at home, the overall figure for consumption outside the home is about 47%.

Whatever the true figures, the 1981 study can still be used to illustrate the relative importance of out-of-home consumption for different product types. The figures given are 47.4% for shellfish, 19.3% for fin fish and 5.6% for canned

tuna. Equally indisputable is the fact that the quantity consumed outside the home is higher in terms of value than of weight, as high-value species, especially shellfish, tend to be consumed in restaurants.

The food-service sector is highly developed and includes various types of outlets serving different income levels and tastes. Appendix B provides some information on the working of the food-service and retail sectors.

DETERMINANTS OF DEMAND

Appendix A contains a discussion of consumption patterns in the United States and shows that most seafood is consumed by people of above-average income living in large cities. This group is moreover important in terms of money spent on food consumed outside the home, and this helps explain why consumption of fresh and frozen seafood tends to be income-elastic. Out-of-home food consumption varies with personal disposable income (PDI), which is dependent upon the general economic conditions. Rising consumption between 1982 and 1986 can clearly largely be attributed to the expanding economy in this period.

Price is of more limited importance as a determinant of consumption of fresh and frozen seafood, because of the higher-than-average income of consumers, and because food-service demand is not normally price-sensitive. However price is important in the case of canned fish, which is mainly consumed in the home. Consumption of tuna is sensitive to the relative prices of chicken and other meats, and it is not surprising that tuna sales rose between 1982 and 1986, a period when the relative price of tuna was falling.

Despite these comments, it should be recognized that very large price changes, such as occurred with ground fish during 1986, can be expected to affect consumption of fresh and frozen fish significantly. For this reason it is possible that per caput consumption will not continue its upward trend in 1987 and 1988.

Apart from the factors of economic prosperity and price, seafood consumption has been stimulated by growing awareness of healthy eating. Seafood, unlike beef or pork, is low in those saturated fats which contribute to heart disease. There is evidence that Omega 3, a fatty acid contained in fatty fish, can actually help prevent heart attacks and other diseases. Seafood is especially popular with people of above-average disposable incomes, who are innovative in their tastes and who eat in restaurants a great deal. Such people are often opinion leaders and their patronage of seafood probably has a positive effect on its overall consumption.

The behaviour and organization of suppliers also has a major influence on demand. The organization of the United States' fisheries industry is relatively undeveloped compared to the poultry and red meat industries. Firms marketing seafood products are small and there has been a lack of vertical integration between the production, processing and marketing phases of the industry. Expenditure on promotion has been low and there has been scarcely any generic advertising at a Federal level, unlike that carried out by the national beef, pork and sheep councils. This situation is slowly changing, due partly to increasing involvement of major food processing companies, including such household names as Pillsbury, Campbells Soup Co., General Mills, Kraft, Heinz and Nestlé. Also the increasing importance of aquaculture as a source of supply, as in the case of shrimp, crayfish, catfish and salmon, is providing a more dependable basis on which to plan market development. At the same time, legislation has recently been passed for a National Seafood Marketing Council.

Poor quality of fishery products has also been given as a reason for low demand, and it is notable that the United States still has no system of mandatory inspection for seafood marketed internally. Nevertheless, concern over quality is growing in the industry and many users have instituted their own stringent quality standards.

Despite the importance of organization and quality, the main constraint limiting the consumption of seafood is the lack of supply itself.

SOURCES OF SUPPLY

Regulation of fishing within the domestic Exclusive Economic Zone

To understand the United States' domestic supply situation requires familiarity with the mechanism which has been used to regulate access to United States fisheries by domestic and foreign flag vessels.

Until 1976, the lack of regulatory mechanisms had tended to result in a pattern of 'boom and bust' as successive fisheries were over-exploited. However the introduction of the Magnuson Fishery Conservation and Management Act (MFCMA) in 1981 ushered in a gradual change in approach. A 200-mile **Exclusive Economic Zone (EEZ)** has been established, and within this fishing is being managed through **Fishery Management Plans (FMPs)** and **Preliminary Management Plans (PMPs)**. FMPs are used to regulate domestic and foreign fishing effort within eight geographical areas and are designed to ensure a continuous **optimal yield** in the relevant fisheries. PMPs however only regulate foreign fishing. Priority is accorded to fishing by United States flag vessels *vis-à-vis* foreign fleets, so that foreign fishing is only allowed up to that portion of the optimum yield that will not be harvested by United States' vessels. Foreign vessels are allowed to fish up to specified quotas under 'Governing International Fishery Agreements' (GIFAs), which are negotiated between the interested country and the United States.

United States catches

Table 7 provides statistics on four different types of catches/landings which take place under United States jurisdiction.

- (i) *United States marine catches*. These are fish and shellfish caught by United States flag vessels and landed by the same, generally at United States ports. It should be noted that under the Nicholson Act, foreign vessels are not allowed to land at United States ports, except in American Samoa and in the Commonwealth of the Northern Mariana Islands.
- (ii) *Foreign catches*. These are catches by foreign vessels under international agreements (GIFAs), not landed at United States ports.
- (iii) *Joint-venture catches*. These are catches by United States flag vessels which are subsequently unloaded onto foreign vessels within the United States EEZ.
- (iv) *Aquaculture production*. Figures for United States marine catches do not include aquaculture production, except for clam and oyster, as aquaculture is regulated by the USDA, not by the National Marine Fishery Service (NMFS) as in the case of marine fishing.

The total of the above catches grew by about 38% between 1980 and 1985, when it reached approximately 5,342,000 tonnes. Aquaculture production figures are not available for 1986, but if the marine figures are considered in isolation it is clear that catches have fallen back by about 5% from their peak in 1984.

Table 7

Catches within United States waters and other catches by United States vessels

	'000 tonnes					
	1980	1982	1983	1984	1985	1986
Marine catches*						
Catches in United States waters						
Landed by United States vessels	2,764	2,775	2,783	2,835	2,807	2,703
Foreign catches	740	641	1,316	1,353	1,162	588
Joint-venture catches	62	255	435	665	911	1,310
Total catches in United States waters	3,566	3,671	4,534	4,853	4,880	4,610
Catches by United States vessels in international and foreign waters	230	201	283	261	229	246
Total marine catches	3,796	3,872	4,817	5,114	5,109	4,856
Aquaculture production†	81	162	172	195	233	...
Total	3,877	4,034	4,989	5,309	5,342	...

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS, and private communication

Notes: * Data does not include production of oysters and clams which are treated as marine catches

† Aquaculture data are 'best guestimates' by NMFS officials

The development of the four different catches is analysed below:

- (i) *United States marine catches*. The volume of such catches has been more or less static in recent years at around 3 million tonnes, of which 90% has been caught within the 200 mile limit of the United States EEZ and the remainder in international waters or off foreign coasts. The main types of seafood landed are shown in Table 8.

Table 8

Principal types of fish and shellfish landed at United States ports*

Fin fish		Shellfish	
Type	Average landings 1981-86	Type	Average landings 1981-86
Menhaden	1,199	Crab	160
Salmon	300	Shrimp	145
Tuna	96	Clam	59
Flounder	96	Squid	23
Sea herring	92	Lobster	22
Cod	85	Oyster	22
Rockfish	46	Scallop	17
Mackerel	45	Other	22
Other	407		
Total	2,366	Total	470

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS

Note: * Excludes landings in Puerto Rico, American Samoa and other ports outside the mainland and Hawaii

The most important species landed, in volume terms, is menhaden; this is not used for human consumption but converted into fish meal. It should also be noted that tuna is much more important to the United States fishery than indicated; this is due to most of it now being landed in Puerto Rico and American Samoa which are not included in the figures shown. Total landings at all ports including these territories were 252,000 tonnes in 1986, while landings on the mainland and Hawaii were only 40,000 tonnes for that year.

(ii) *Foreign catches and joint-venture catches.* Both of these expanded greatly after 1980, as a result of increased exploitation of underutilized species, principally Alaska pollock, in the Pacific. In 1986, Alaska pollock accounted for 66% of the combined total of these catches, Pacific flounder for 15%, and other significant fish included Pacific cod, Pacific hake, atka mackerel and Atlantic mackerel. Japan and Korea are the two countries mainly involved in these fisheries and Alaska pollock is used as a raw material in the manufacture of surimi (see Appendix E, Section E.12).

Exploitation of the pollock resource within the United States EEZ is now close to its limit and it is the policy of the United States Government to encourage United States fishing companies to exploit this and other fisheries within the EEZ. As a result, foreign catches are being progressively supplanted by those of United States vessels which are being built or re-equipped for this purpose. At the same time there is growing political pressure in favour of the phasing out of joint-venture agreements.

(iii) *Aquaculture production.* In contrast to landings of wild-caught fish, aquaculture output grew from approximately 81,000 tonnes in 1980 to 233,000 tonnes in 1985, constituting about 4.4% of total catches. The main types of seafood farmed are shown in Table 9.

Table 9

Estimated United States aquaculture production*

Type	Production (1985) (‘000 tonnes)	Change (1980-85)
Total	233	...
of which:		
Catfish	123	x 3.5
Pacific salmon	38	x11.1
Crawfish	30	x 2.7
Trout	23	x 1.1
Baitfish	11	x 1.1
Other fish	8	...

Source: NMFS (private communication)

Note: * Oyster and clam not included

Apart from the above-mentioned fisheries, there is still some commercial freshwater fishing, especially around the Great Lakes, but this is negligible compared to overall landings. Given the importance of recreational fishing, the scope for commercial exploitation is correspondingly low.

Imports

The United States imports about four times as much seafood as it exports. While imports of edible fishery products have grown steadily, from approximately 900,000 tonnes in 1980 to over 1,300,000 tonnes in 1986, exports have tended to stagnate, at about 300,000 tonnes per annum (consisting mainly of salmon products).

Growing imports are clearly part of a long-term trend, as supplies are required to cover the growing gap between domestic demand and supply. In 1986, imports were worth approximately \$ 4.8 billion, that is to say 61% of the combined value of domestic commercial landings and edible imports. About half of this value is supplied by countries in the Western hemisphere, with Latin American and Caribbean countries accounting for 29.6% and Canada 21.2%. Of the remainder, Asia accounted for 28.7%, followed by Europe with 14.1%, Australasia and Oceania with 5.0% and Africa with 1.4%. The very rapid growth of United States imports is of immense benefit to the economies of the developing countries, which as a group supplied 52% both by weight and by value of United States fishery product imports for 1986. The leading countries and territories in order of importance by value are: Mexico, Ecuador, Taiwan,

Table 10

United States imports of edible fishery products

'000 tonnes

	1980	1981	1982	1983	1984	1985	1986
Fin fish							
Fresh or frozen not filleted	627	686	641	668	669	721	746*
Tuna	269	274	220	199	183	175	208
Other	61	66	83	92	111	135	153
Fish blocks	130	150	131	163	133	136	140
Filletts, steaks, etc.	166	192	200	199	215	243	245
Surimi-based foods†	1	3	7	15	27	32	...
Canned fish	64	67	72	82	104	136	150
Cured	26	33	32	30	31	30	34
Miscellaneous preparations	16	19	24	24	27	33	43
Total fin fish	726	799	762	798	825	920	975*
Shellfish							
Canned	17	19	21	24	24	30	33
Other (fresh, frozen, live, etc.)	147	162	186	234	237	257	278
Total shellfish	164	181	207	258	261	287	311
Total imports	897	986	976	1,062	1,092	1,207	1,284*

Source: FT 246, United States Dept. of Commerce, Bureau of the Census. Data on surimi from Vondruska (1985b and private communication)

Notes: * Excludes surimi-based foods
† According to Japanese export statistics

Thailand, Brazil and Panama. It should be noted that these are all middle-income countries and territories, but that the *least developed countries* in Africa and Asia have so far derived limited benefit from the booming United States seafood market.

Most imports are of fresh and frozen items, though canned seafood is also important. Shellfish constitutes only about 24% of imports by volume but in value terms is about 48% of the total. Most shellfish imports consist of shrimp, while fin fish imports are predominantly ground fish from Canada, Iceland, Denmark and Norway.

Imports are further discussed in the appendices dealing with individual types of seafood. Fresh and frozen fin fish other than tuna for canning is covered in Appendix C, tuna in Appendix D and shellfish in Appendix E.

Trade barriers

Developing countries do not face high rates of duty on seafood they export to the United States, but there are some notable exceptions. Most developing countries are beneficiaries of the Generalized System of Preferences (GSP) and items dutiable under the GSP are listed in Table 11. Only products which are supplied or which might be supplied by developing countries are shown.

While the rates shown apply under the GSP, it should be noted that the group of countries benefitting from the Caribbean Basin Initiative have duty-free access for all seafood items, apart from canned tuna which bears the GSP rate.

All fresh and frozen seafood except for hake fillets, crab meat and fish sticks from GSP countries, enters duty free. The duty on hake fillets is very low, less than 2 c per lb. The main items bearing duty are canned tuna, canned sardine, fish sticks and crab meat, products for which there are strong domestic interests opposing unrestricted entry of competitors' products. The most powerful of these is the United States tuna industry and canned tuna is an exception to the

Table 11

Dutiable seafood imports under the generalized system of preferences (GSP)*

	GSP rate	Rate for 'least developed countries' (when different)
Hake fillets	1.875-1.96 c per lb [†]	
Mackerel, salted and pickled, containers no more than 15 lb	5%	
Mackerel, smoked and kippered	2.6%	Free
Canned fish, not in oil:		
Anchovy, in containers not over 15lb	5%	
Bonito and yellow tail	6%	
Tuna:		
In containers not over 15 lb, within quota	6%	
Other	12.5%	
Sardine:		
In containers less than 8 oz	2.8%	2.5%
Others, excepting sardines in tomato sauce, in containers not more than 15 lb	6.25%	
In containers over 15 lb	1.7%	
Canned fish, in oil:		
Bonito and yellow-tail	5.2%	4.9%
Sardine†:		
Neither skinned nor boned		
Smoked	4.3%	4.0%
Not smoked	15%	
Skinned or boned	20.5%	20.0%
Tuna	35%	
Balls, cakes and puddings:		
In oil	7.3%	6.6%
Not in non-airtight containers — over 15 lb	6.0%	
Other, excluding canned products	0.8%	
Fish sticks:		
Neither cooked nor in oil	10%	
Other	15%	
Boiled fish roe, other than sturgeon roe, canned	2.5%	
Clam juice	8.5%	
Crab meat:		
Fresh, chilled or frozen	7.5%	
Prepared or preserved, canned	11%	
Oyster:		
Canned smoked	0.3%	
Canned unsmoked	4.7%	
Soups containing oyster or oyster juice	3.0 c per lb	

Source: *Tariff Schedules of the United States Annotated* (1986), United States International Trade Commission.

Notes: * Products referred to as 'canned' include all products in airtight containers. When the weight of containers is stated this is a gross weight including the packaging material
[†] The rate depends on whether the fish is within or outside a ground-fish quota
[‡] For canned sardines in oil, the rates shown only apply to products valued over 30 c per lb, and in the case of smoked products over 45 c or 50 c per lb depending on the kind of container

duty-free treatment generally accorded to seafood under the Caribbean Basin Economic Recovery Act. Other items bearing significant duties are canned smoked oyster, canned bonito and yellowtail, anchovy in bulk cans over 15 lb and certain products denominated 'balls, cakes and puddings'.

The duty-free status which affects most imports reflects the fact that the United States is not self-sufficient in seafood. With the development of fish farming, United States producers may in the future be able to counter the

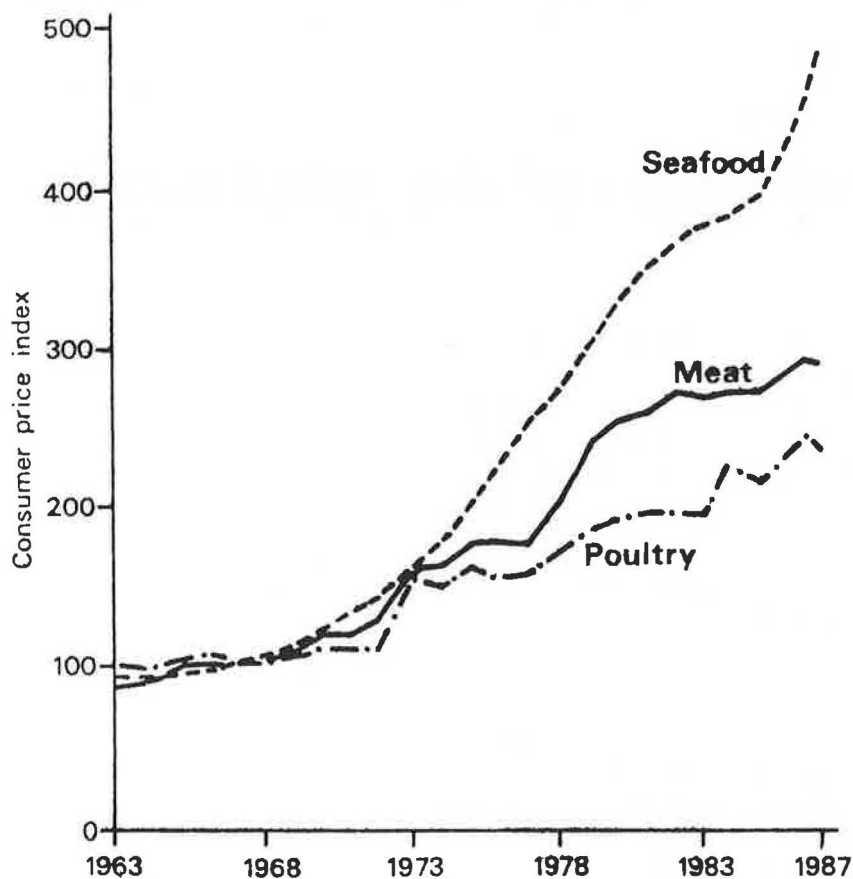
increasing dependence on imports, and it is possible that they will press for some measure of official support and protection much as is afforded to a number of agricultural products. Foreign supplying countries should be vigilant about this possibility.

PRICE LEVELS

The effect of expanded world-wide demand on a limited resource base has had the long-term effect of increasing the price of seafood relative to other meats. The rise in fish prices was particularly notable during 1986, due to the world-wide shortage of ground fish and the weak United States dollar.

Figure 2

United States consumer prices for seafood versus red meat and poultry



Most of the increase in prices in the last 10 years has been felt by fresh and frozen items, and canned fish has actually fallen in constant price terms. The overall price rise for fish between December 1977 and December 1986 was 75%, but while the figure for fresh and frozen fish was 113%, for canned fish it was only 37.5%.

Despite past trends it is not to be expected that seafood prices will continue rising indefinitely relative to poultry and red meat. Development of aquaculture will prevent this from happening.

Prospects for developing country suppliers

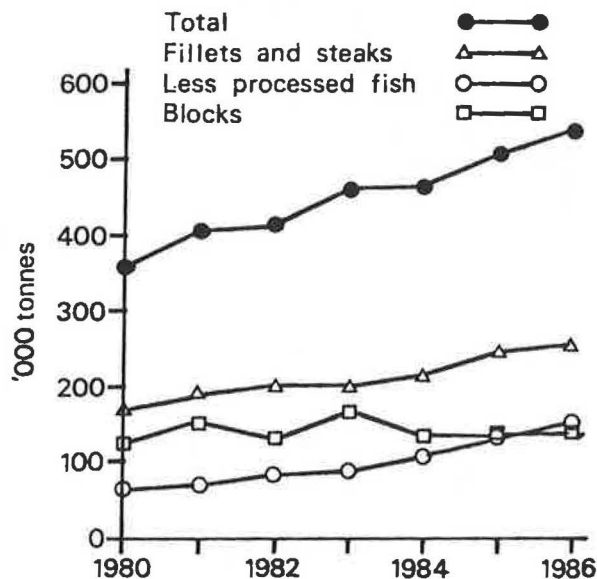
INTRODUCTION

As explained above, Appendices C, D and E respectively contain detailed information on the markets for fresh and frozen fin fish (other than tuna), tuna and shellfish. The appendix dealing with shellfish includes discussion of frogs' legs and surimi-based products. The following two sub-sections contain conclusions about prospects for developing country suppliers of these products. Readers requiring more detailed background information on any type of seafood should turn to the relevant appendix.

FRESH AND FROZEN FIN FISH, OTHER THAN TUNA

Figure 3

United States imports of fresh and frozen fin fish, other than tuna



Given insufficient supply of traditionally consumed ground fish species and the willingness of many United States consumers to eat unfamiliar and exotic species, overall prospects are good, but several further comments should be made, as follows:

(a) there are a number of species supplied by developing countries for which demand is strong, but where supply limitations prevent major expansion of the market, for example, some snapper, grouper, mahi-mahi, pompano, Chilean sea bass and some shark. In such cases, supplying countries need to protect their resources from over-exploitation while optimizing their marketing strategies, thereby maximizing revenue from limited resources;

(b) some species, for example mahi-mahi, golden kingclip and some snapper, have not generated the demand or the prices which their intrinsic

qualities would merit, because of problems of quality and reliability of supply, and lack of a clear marketing strategy on behalf of suppliers;

(c) the boom in consumption of fresh fish will increase demand for all kinds of fin fish, but the major increases will be for those species not subject to problems of availability or quality, such as farm-raised salmon, catfish, tuna, rainbow trout, and striped bass hybrids recently developed in the United States. With the exception of tuna, these are mainly farmed species of which developing countries' production is very limited or non-existent;

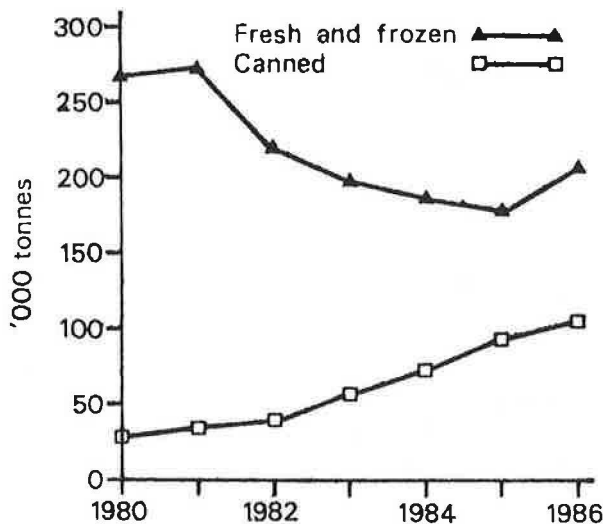
(d) in view of (c) above, developing countries need to find new species which can be cultured for export. These should preferably be fine flavoured and yield large white fillets suitable for grilling. Some grouper and sea bass would be suitable.

Points (a) and (b) above stress the importance of having a good overall strategy with which to develop the United States market, a subject which should concern not only the individual shipper but the exporting country as a whole. This is further discussed in Section 4.

TUNA

Figure 4

United States imports of tuna



World-wide tuna supplies are still reasonably abundant, but this is due to natural circumstances rather than to man's conservation efforts. Expert opinion points to the need for international conservation efforts in the future to prevent overfishing of resources. Although tuna boat operators might relish a period of scarcity and abnormally high prices, the long-term consequences for development of the United States market would probably be bad. Consumers would switch to poultry and red meat, and to regain the lost ground would prove difficult and costly even if prices subsequently returned to previous levels.

As it is a migratory fish, tuna requires truly international conservation measures, but these are much harder to agree or implement than measures affecting a single country's EEZ. However, in view of the price-sensitive nature of the United States and other markets for this product, it is important that this be done.

The market for canned tuna seems to be near saturation, with increases in per caput consumption happening more in response to reduced real prices than to an increase in underlying demand. Providing raw tuna supplies remain abundant, it is likely that overall consumption will grow slowly, at say 2% per annum, over the next five years. Imports of canned tuna are likely to continue

increasing, as in the period up to 1986, but the rate of increase may fall if the dollar weakens further against other major currencies.

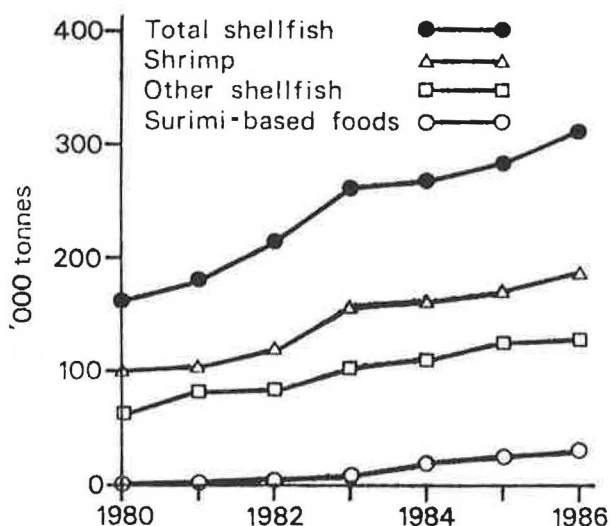
There is considerable over-capacity in the world tuna canning industry and profit margins are low. This situation is likely to persist as established manufacturers in Asia and Latin America continue to make inroads into the markets of the United States and Europe. In the face of such competition and the oligopolistic nature of the marketing system, it will not be easy for new suppliers to start a canning industry from scratch. In order to be successful, such suppliers will probably need to establish co-packing or other arrangements with established canners or distributors.

Long-term growth in tuna consumption beyond 1990 will probably depend on finding new uses other than in canning. Prospects are good, and a start is already being made in this direction, with increasing usage as fresh or frozen fillets, sashimi and prepared meals.

SHELLFISH (INCLUDING FROGS' LEGS AND SURIMI-BASED PRODUCTS)

Figure 5

United States imports of shellfish and surimi-based products



The main items are discussed briefly below.

(a) *Shrimp*. Developing countries already supply most of the shrimp imported into the United States. Demand should continue to follow an upward trend, but with peaks and troughs in line with conditions in the United States economy as a whole. At the same time, supply is expected to grow faster than previously due to aquaculture, and this may precipitate an over-supply situation during the next five years. Despite the fact that international supply and demand are extremely hard to forecast, it seems likely that the world trade for shrimp will be more of a buyers' market than in the past. For further details, see Appendix E, Section E.4.

(b) *Spiny lobster*. Spiny lobster will continue to be in good demand, but growth in the market will be limited by supply (see Appendix E, Section E.5).

(c) *Crab*. Due to limited domestic output, imports of crab meat are growing and will probably continue growing. Korea, Thailand, Venezuela and Malaysia are already significant suppliers (see Appendix E, Section E.6).

(d) *Bivalve molluscs, i.e. scallop, clam, oyster and mussel*. The United States is a major producer of the first three of these molluscs, and a lesser producer of mussel. Due largely to environmental pressures which have limited

aquaculture development, domestic output has not kept pace with demand during the last decade (since the mid-1970s), and this has allowed foreign producers, including several developing countries, to supply larger quantities.

It should, however, be noted that almost all developing country supplies of clam and oyster have been canned and that little impact has been made on the much larger market for fresh and frozen products. This may be attributed in part to the fact that only two developing countries, Mexico and Korea, are presently participants in the National Shellfish Sanitation Program (NSSP), by which the FDA monitors the condition of the growing water as well as the inter-state shipments of raw clam, oyster and mussel in fresh and frozen form. Chile is expected to join in 1988. Only countries which participate in the NSSP may export these products to the United States. Further details of this programme are given in Appendix H, Section H.5.

The low price of domestically produced clam and oyster has been a further disincentive to foreign suppliers, particularly in the case of fresh products.

Scallop is also a filter-feeder, but countries exporting scallop to the United States do not need to participate in the NSSP, as only the adductor muscle is eaten and other parts, including the stomach, are discarded.

The outlook for foreign suppliers of scallop and oyster is quite good, as the long-term trend of dependence on imports is likely to continue. The outlook for clam, and for mussel for which there is a small but growing market, is not good, as domestic output is expected to expand in line with demand. However, there will be a market for shippers who can compete on price or who can supply segments of the market which require a particular type of shellfish, for example, soft-shell clam, or which can be persuaded to buy a new speciality product. The latter has been done with New Zealand green-lipped mussel, which is considerably larger than the blue mussel cultured off the east coast of the United States. Markets for scallop, clam and oyster are discussed in Appendix E, Sections E.7 to E.9.

(e) *Other shellfish.* Squid, in the form of cleaned rings, strips, steaks, tubes, etc., is another item offering increased opportunities to developing countries (see Appendix E, Section E.10). So are frogs' legs, which will need to be farmed if supply limitations are to be overcome (see Appendix E, Section E.11). Consumption of abalone or substitutes such as Chilean 'locos', is limited by the scarcity and very high prices for these products. Abalone is popular on the West Coast, but in the face of prices of up to \$ 30 per lb, consumers generally prefer squid steaks. The main markets for these items are likely to be in the Far East, while limited quantities will probably be consumed in the United States by ethnic groups who appreciate their special culinary and reported aphrodisiac qualities.

(f) *Surimi-based products.* Consumption of surimi-based products will continue growing, but at a more moderate rate than previously, not more than at 10-15% per annum. The availability of suitable raw material is a major constraint on this industry and the impact of surimi on markets for real shellfish will be more limited than previously expected. Most surimi-based products are crab meat imitations, but lobster imitations may become popular. The surimi industry is generating demand for certain previously underutilized species, such as jack mackerel from Chile, and this opportunity could be valuable to developing countries. (See Appendix E, Section E.12, for further details.)

Recommendations for the effective marketing of seafood

INTRODUCTION

This section contains certain recommendations to exporters or governments of countries wishing to export to the United States. The main subjects covered are: (a) understanding the market for the product to be exported; (b) selecting importing and distribution channels; (c) selecting an importer; (d) naming the species. The section ends with a short case history of the marketing of orange roughy, which is intended to illustrate some of the points made earlier.

UNDERSTANDING THE MARKET

A prospective supplier of seafood to the United States market, and who intends to engage in that activity for a long period of time, is urged in the strongest terms: 'Know thy market'. A good understanding will help target the product at the most advantageous 'niche' and generate maximum acceptance.

Market research may be started by studying publications such as those mentioned in Appendix I and obtaining up-to-date information through FAO and other sources. However it is likely that more detailed investigation will be required for the product in question, by means of which the supplier will seek to answer the following questions.

a) *Is the product a commodity, or has it distinctive characteristics?*

Warm-water shrimp, spiny lobster, major white fish species, etc. can by and large be classified as commodities. Once the species, piece size (or count), colour, etc. have been defined, the price which the product will fetch can be predicted on the basis of prices of similar offerings from other origins. Likewise standards for packaging and presentation are well-defined. Premiums or discounts between the same grades from different origins are moderate and depend on the market's perception of quality and reliability of supply. If the product is a commodity, marketing consists mainly in tailoring supply to existing market requirements. The volume of trade is usually very large and shippers must be price-takers.

If however the product has characteristics which, in the eyes of customers, differentiate it from major traded species, marketing is more complicated and requires answering the following questions:

- to which market segment should the product be targetted: retail or institutional, fast-food or fashionable restaurant, etc.?
- how should the product be marketed, i.e. how should it be presented, packaged, distributed, promoted, etc.?

In practice, seafood does not fit neatly into the categories of 'commodities' or 'differentiated products'. For example, freshwater shrimp has some different characteristics from penaeid species and its marketing requires separate consideration. Besides this, the perception of what a commodity is differs according to the size of the shipper. For example, the company Ocean Garden Products, which markets most of the Mexican shrimp catch, has the necessary

resources to establish a promotional platform differentiating its product from competitors, but this would not be true of a small shipper, for example from Bangladesh. Ocean Garden Products' marketing strategy is discussed by Blake (1986).

b) *To which market segment should the product be sold?*

Markets may be segmented in many ways according to geography, demographic characteristics, ethnic groups, in-home versus out-of-home consumption, life style, etc.

Tropical fin fish are characterized by (a) being of limited supply compared with the major ground fish species like cod, and (b) having large heads and therefore low filleting yields. Both these facts highlight the advantage of finding specialist markets which will pay above-average prices. Generally, expensive and fashionable restaurants constitute a suitable outlet for such fish, because they are less price-sensitive than the other sector and less sensitive to seasonal variations in availability. The latter is particularly true where the restaurants offer fresh fish 'in season'.

A species which has too strong a flavour for the typical United States consumer may have characteristics which make it attractive to specific ethnic groups, as is the case with king mackerel among certain Hispanic populations. Some species may be desired in particular regions where they have traditionally been fished but are now in short supply, as with mahi-mahi in Hawaii and Florida. While the lack of a well-known name is likely to hinder the acceptance of a new species, it should be remembered that restaurants serving social groups with high disposable incomes tend to base their appeal on the novelty aspect and may be interested in unusual items.

In order to select the correct 'target segment' for a particular species, the shipper should have the product evaluated for shelf-life, to determine its keeping characteristics in both fresh and frozen form, and in cookery trials to compare its organoleptic properties with species already on the market and to find out how it could be prepared within a restaurant, home, etc. If it is found that the species bears a marked similarity to other species already on the market, the most sensible course of action will often be to sell it as a cheaper alternative.

A discussion of the approach taken to market segmentation and targeting by a major seafood processor, Fishery Products Inc., can be seen in an article by Short (1987).

c) *Fresh or frozen?*

Where a market can be developed for a fish in its fresh state, and satisfactory carriers are available, it will often be advisable to market it in this form. The higher prices paid will normally more than offset the increased freight costs. Besides, the presence of the fresh fish on the full-service counter of a supermarket or as the 'fish-of-the-day' in a fashionable restaurant provides a powerful promotional effect which will assist in the sale of the same species in the frozen state. Another advantage of supplying fresh fish is that the shipper has much less working capital tied up in stocks, given that relatively small lots can be shipped at a time and payment is fast.

It must however be recognized that many countries do not have suitable air services to the United States, and even where such services do exist, lack of airspace often limits the level of shipments.

SELECTION OF IMPORTING AND DISTRIBUTION CHANNELS

The selection of importing and distribution channels is discussed from two perspectives, firstly that of an individual exporter in a developing country, and secondly that of the country itself.

From the exporter's perspective

If the quantity of a product that the supplier can sell is relatively small (in the case of shrimp this might be less than 150 tonnes per annum), he may find it simpler to sell into just one region of the United States, by finding an importer who can handle the product in that area. Larger volumes may call for brokers in several regions of the country. These brokerages may be supplied directly from overseas, but it will probably be preferable to appoint a master importer or master broker, in order to assure better co-ordination and so that the supplier only has to deal with one company. A further alternative open to major exporters is to set up a wholly or partially owned subsidiary within the United States, with its own sales staff, to manage the broker-distributor network.

From the perspective of the exporting country as a whole

In several cases, governments of supplying countries have intervened by setting up, or encouraging the formation of, companies to handle exports to the United States and other countries, a practice which has certain advantages. A single supplier having control over the bulk of a country's resource can more easily regulate supply to meet demand. A long-term marketing strategy is more likely to be adopted with a view to competing with other countries, instead of competing with shippers from the same country. Uniform high quality standards can be set by a single large shipper. Centralized marketing may result in greater market efficiency and better prices to producers.

By contrast, a free-for-all situation where there are many shippers, none with a dominant market share, may result in intense competition between them, to the detriment of long-term market development. Some suppliers will inevitably cut corners and this may earn the country a mediocre reputation for quality and reliability of supply.

Against this line of argument must be set the normal counter-arguments against centralizing such activity, for example bureaucratization, stifling of initiative and political interference.

Three examples of such centralized marketing arrangements are (i) the company Frionor, Norway's main exporter of fresh and frozen seafood, mainly ground fish products, (ii) the Mexican company Ocean Garden Products, the largest supplier of shrimp to the United States market, handling over 20,000 tonnes per annum of headed shell-on tails, and (iii) Interbras, the Brazilian state trading corporation which in 1979 organized the lobster packing houses and fishing operators into a single entity in order to market in the United States. All these have set up wholly-owned subsidiaries in the United States and have organized broker-distributor networks, selling principally to the food-service trade. Frionor moreover carries out large-scale processing within the United States at its plant at New Bedford, Massachusetts.

These companies differ however in their form of ownership. For example, Frionor is a co-operative privately owned by the Norwegian processors, and its formation was 'inspired' by a government initiative in 1946. Processors are free to join Frionor or may alternatively leave and sell their shares. However, if a processor joins, he is obliged to sell through Frionor in those markets in which it operates. In reality Frionor is handling most of Norway's seafood exports. Ocean Garden is wholly-owned by the Mexican Government. Other exporters are allowed to compete, though in practical terms Ocean Garden's official status gives it an advantage when dealing within Mexico. In the United States, Ocean Garden is a major promoter of shrimp and has achieved considerable brand identity. Interbras has involved producers in its operation, through a co-operative which acts as a profit-sharing mechanism (Levy, 1980). Strong brand identity has been created and Brazilian lobster earns a premium over warm-water tails from other origins.

It is not possible to make any general judgement in favour or against the creation of such organizations, and it is simply pointed out that those already

created have achieved some degree of success. Such initiatives seem to be more successful where the government acts as a promoter and a catalyst of cooperation among private sector companies, rather than becoming a marketer in its own right. It should also be noted that the same objectives, that is, a co-ordinated long-term approach and a high degree of market efficiency, may be achieved without setting up subsidiaries within the United States, as is demonstrated in the section on the discussion of orange roughy.

SELECTING AN IMPORTER

The most critical decision that the shipper will face is the selection of an importer or importers. While there are many competent importers, foreign suppliers are forewarned that **standards of performance vary enormously**.

As a first step, a shipper will require a list of potential importers interested in the types of products he wishes to sell. Some assistance can be obtained by writing to the National Fisheries Institute to which a large part of the importers belong, and there are several other good sources of information mentioned in Appendix I.

Secondly, the shipper should if possible visit the United States to get a 'feel' for the market, to see how the fish is handled and distributed, and to meet and evaluate potential importers. Evaluation requires an assessment of the customer's ability, his reputation and creditworthiness. To gauge the importer's ability, information of the following kind will be required: how long he has been in business, his sales territory, number of salesmen, number and type of customers, etc. References should be sought from his suppliers, customers and banks, using not only the names given by the importer but other sources. A picture of creditworthiness should be put together from information provided by the importer himself and from his banking and trade references, and this should be corroborated by credit ratings.

Taking these steps will prove a good investment as they will allow the shipper to make a well-informed decision about his prime contact in the United States market. A good importer will not only be an efficient buyer but will be able to advise on the other marketing matters discussed here, that is, packaging, segmentation and targetting, selection of distribution channels, naming new species, etc.

NAMING THE SPECIES

The naming of a fish can be a key marketing decision when introducing an unfamiliar species into the United States market. This is illustrated by the case of New Zealand orange roughy, which has proved an outstanding marketing success, but would not have been so had it been called by another candidate name, 'slimehead', used for a similar European fish. Likewise squid was made popular in the United States when sold under the name 'calamari'. On the other hand, American dogfish has been rendered virtually unsaleable because of its unsavoury name, but has nonetheless appeared in United Kingdom fish and chip shops as 'rock salmon' and other names.

A more bizarre example of how naming has been used to increase acceptability is that of tilapia, which was imported from Israel under the name St Peter's fish because, the importers say, the fish was caught by St Peter in the Sea of Galilee. This nomenclature has been prohibited by the FDA because of confusion with John Dory, also called St Peter's fish, a fine eating fish with culinary qualities far superior to those of tilapia.

Given that the United States consumer knows the name of only a few species of fish, it is quite common to find a cheaper lesser-known species being sold to the consumer under the name of a more expensive and desirable fish. A shipper in a foreign country may be tempted to let his product be sold in this way, or

it may even happen without his knowledge, but he should be aware that the practice is hazardous. The sale of substantial quantities of a misnamed species may result in complaints from competing suppliers, leading to detention of shipments by the FDA. The consequence for the shipper is that his marketing effort will be dislocated and he will be forced to find a new name for the species.

To avoid such problems, it is recommended that seafood suppliers wishing to supply an unfamiliar species make a careful study before deciding upon a name. Guidelines for doing this are provided in an article by Dore (1987), which is summarized in Appendix L.

The introduction into the market of seafoods of unfamiliar names will be greatly facilitated by the use of merchandising and promotion, within a long-term plan. It is also important to develop consumer confidence in the new food; this will be greatly assisted if it is sold by major supermarket or restaurant chains as this will lend the food credibility by association. Both these points have been amply demonstrated in the marketing of orange roughy.

THE ORANGE ROUGHY EXPERIENCE

Although New Zealand is not a developing country, the challenges and problems it faces as a supplier of the United States market are similar to those faced by developing countries. It is physically isolated and distant from the United States, and it has underutilized species which are unfamiliar in United States waters and for which demand has to be created.

Orange roughy is found in deep waters within New Zealand's EEZ, and, until the late 1970s, it was only caught by Korean and Japanese fishing vessels; the skin and fatty bloodmeat was used to make dehydrated strips which were sold as a laxative. It was then discovered that by deep filleting to remove the thick layer of subcutaneous fat, high-quality fillets could be obtained. The fillets were found to be white, boneless and very mild tasting with a firm and flaky texture; that is to say the fish had ideal characteristics for the United States market and indeed many other markets. It was also found to have a long shelf-life, allowing quality to be maintained on a consistent basis; it is commonly described as 'virtually indestructible' and can be prepared in almost any way.

From the outset, orange roughy has been exploited on the basis of resource assessments and quotas allocated to individual fishing companies. The quotas subsequently proved conservative, so that catches have never fallen short of expectations.

Processing and exporting have been dominated by three companies which between them handle 70-5% of the catch. These companies have pursued a co-ordinated approach to the United States market, supported by the New Zealand Government which has reimbursed 60% of their promotional expenditure. Their performance has been characterized by the maintenance of consistent quality and the guaranteeing of FDA passage, bolstering the confidence of the importing trade.

The breakthrough came in 1982, when the Washington Fish and Oyster Co., the broker representing Sealord Products of New Zealand, succeeded in selling the frozen fillets to the Safeway supermarket chain, following an exhaustive series of market tests. The product was introduced at a price of \$ 1.55 per lb wholesale, that is, at a discount of 35-50 c per lb compared to competing flatfish. Having full confidence in the supplier, Safeway actively promoted the product. Sales grew and other retailers introduced orange roughy into their seafood range. In the first year, about 95% of sales were to the retailers, but Red Lobster Inns and other restaurants soon started buying and the food-service now takes about 30% of the total.

United States imports grew from 1,600 tonnes in 1982 to 7,100 tonnes in 1984, and then levelled off to a figure of between 7,800 tonnes and 8,000

tonnes in 1985, because of supply limitations. Demand had grown more rapidly than supply, causing upward pressure on prices, which by April 1986 had risen to \$ 3.35 per lb (cf. \$ 1.85 for Canadian flounder).

At such levels, some buyers considered orange roughy to be overpriced, and that demand was vulnerable to the decisions of a few major customers who were less inclined than before to spend on promotion. The role of the twelve or more minor exporters, who between them handled 25-30% of total shipments, was also criticized by some parties who said that they had been instrumental in bidding up prices without due concern for the stimulation of long-term demand. According to one trader, New Zealand's interests would have been best served if these smaller shippers had been formed into a consortium.

Despite possible reservations, orange roughy stands out as a remarkable success story in seafood marketing. Owing to the fish's unique characteristics and the control of the resource by a single country, it probably cannot be repeated. However, the experience confirms some of the recommendations made previously, and suggests certain conditions that, if satisfied, will improve a country's performance; these are given below.

- (a) Careful stock assessment and resource management.
- (b) Commercial exploitation by a few experienced companies, in order to achieve good long-term planning and co-ordination.
- (c) Consistently high quality and excellent grading, which result in guaranteed FDA passage.
- (d) Careful selection of importers (in this case brokers).
- (e) Careful market analysis on the basis of which an appropriate vehicle (in this case Safeway) with major resources being selected to introduce the product, and an appropriate strategy being decided upon, involving a highly competitive introductory price and promotion by the market retailer (in this case Safeway).
- (f) Positive support from the exporting government in the form of coherent regulatory action and the funding of some of the promotion.

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Appendices

APPENDIX A: WHO CONSUMES SEAFOOD IN THE UNITED STATES?

Since 1969, four surveys have been conducted on seafood consumption and spending in the United States, and the results of these are summarized and compared by Hu (1985). The last such survey was commissioned by NMFS in 1981 and carried out by the Market Research Corporation of America (MRCA) through its National Consumer Panel, and this has formed the basis of a usage segmentation study by Longwoods Research Group Ltd. (1984). On the basis of these surveys and studies, a picture has been built up of the typical United States seafood consumer, and of certain regional and ethnic variants.

Regional variations. The figure for average per caput consumption, 6.7 kg for 1986, hides large regional variations, between the extremes of approximately 11.3 kg (25 lb) in New England and 2.3 kg (5 lb) in the west-north-central census region*. Seafood consumption is greatest in New England, the mid-Atlantic States (New Jersey, New York and Pennsylvania) and the Pacific coast States, and least in the mid-West, mountain and southern states. As might be expected, fresh fish is mainly consumed on the coast, whereas the mid-West has a marked preference for frozen fish.

The typical United States consumer. The 'heavy users' of seafood are a group constituting 23% of the population but accounting for 62% of all seafood occasions served at home and 66% of seafood occasions consumed away from home (Longwoods Research Group Ltd., 1984). These consumers are typically non-Hispanic whites, possess high school education or above, reside in large cities of 500,000 inhabitants or more, are middle aged (i.e. 35-54 years old), have a professional or managerial occupation and earn a total household income of \$ 25,000 or more.

It is only since the 1960s that seafood consumption has become strongly associated with higher incomes and higher levels of education. Indeed the first of the four surveys in 1969-70 showed that people with a lower level of education consumed more fish than those with a higher level of education. It should also be noted that the association of seafood consumption with income level is less pronounced with canned fish than with fresh and frozen items.

Ethnic minorities. Despite the importance of white people in overall seafood consumption, the 1981 survey also indicated that blacks and orientals ate more seafood per caput than previously. This was not the case with people classified as white Hispanics however. Among oriental people, Japanese-Americans stand out as very heavy consumers of seafood and this has led to the proliferation of sushi bars which serve raw fish, now patronized by whites.

Particular ethnic groups prefer certain species. For example black people consume much weakfish (or 'sea-trout'), Hispanics on the eastern seaboard are leading consumers of kingfish, while both blacks and Hispanics purchase a lot

*Estimates by Richard A. Hohman and John Hofer, based on the NMFS consumer survey, presented at NFI Convention, Chicago, 1986

of hake. Orientals, including Chinese, Filipinos, Vietnamese and others, consume a very wide variety of species including live items.

Young professional urban dwellers with high disposable incomes. 'Young urban professionals' are defined by one market research agency as household heads between 25 and 39 years of age who live in households of 1-3 people, have total household incomes of \$ 25,000 or more, reside in a metropolitan area, hold professional or managerial positions and have at least a college degree (*Frozen Food Age*, December 1985). According to this definition, 5% of the population is accounted for by 'young urban professional' households.

This group is characterized by a high degree of eating-out, their tastes tend to be avant-garde and they are receptive to novel foods and restaurant concepts like sushi bars and oyster bars. Certain restaurant companies such as the Steak and Ale Group and the Chart House are seeking to develop this clientele, which should not be ignored by foreign suppliers wishing to introduce little-known seafoods into the United States (see list of major restaurant chains in Appendix B).

APPENDIX B: OPERATION OF THE FOOD-SERVICE AND RETAIL SECTORS

B.1 The food-service sector

To understand the working of the food-service sector refer to table B.1, which shows a breakdown of purchases between different types of establishment. The sector is first classified into 'primarily public' establishments, accounting for approximately 58.4% of purchases, and 'primarily captive' establishments, accounting for 41.6% of purchases.

Table B.1

Projected food-service purchases, 1986

Segment	Projected purchases (\$ billion)	Percentage of total	Percentage change in real value over 1985
Primarily public	45.3	58.4	+ 1.9
of which:			
Separate eating places	37.6	48.5	+ 1.9
Fast food	16.8	21.6	+ 4.7
Restaurants and lunch-rooms	19.5	25.1	- 1.0
Commercial cafeterias	1.3	1.7	+ 2.5
Hotel/motel	2.7	3.5	- 0.5
Recreation	2.3	3.0	+ 2.0
Retail hosts	2.3	3.0	+ 3.8
Primarily captive	32.3	41.6	+ 0.7
of which:			
Schools	6.4	8.2	- 0.5
Health care	6.5	8.4	- 1.2
In-plant/in-office	6.7	8.6	+ 2.0
Vending	5.6	7.2	+ 2.5
Colleges and universities	2.4	3.1	+ 0.5
Military	2.6	3.4	+ 0.5
Airline	1.1	1.4	+ 2.0
Total	77.6	100.0	+ 1.5

Source: Technomic Consultants, quoted in *Frozen Food Age*, Nov. 1985

Primarily public establishments

Separate eating places, consisting of restaurants, lunch rooms, fast-food restaurants and commercial cafeterias constitute 83.2% of the primarily public establishments. The remainder consists of eating places attached to other larger establishments (hotels, etc.).

Restaurants can be classified into four types: *white tablecloth*, *dinner house*, *family* and *fast-food* restaurants. In white tablecloth restaurants, dishes often require sophisticated preparation, there is always waiter service and the price for a meal is usually over \$ 20. Dinner house and family restaurants are likely to provide a more basic service and/or a more limited menu, with meals typically costing \$ 5-20 and \$ 3-10 per person respectively. In fast-food outlets, meals, which can cost \$ 2-5, are served from a counter and can either be eaten on the premises or taken out. It should be noted that these are not hard-and-fast definitions and other terms are often used to classify restaurants.

Major restaurant chains are taking an increasing share of the food-service trade. In 1984, the top 100 companies, which operate 179 chains, accounted for 44.7% of total sales volume among separate-eating places, and the figure was much higher (64.4%) among fast-food operators (*Frozen Food Age*, November 1985). Chicken and beef continue to dominate menus in chain restaurants, but there is a growing trend towards seafood, responding to customer demand for lighter entrées. Such is the case of the 180 steak houses belonging to the Dallas-based Steak and Ale Group chain, which now sell a variety of fresh seafood items.

Table B.2 lists a number of chains which specialize in seafood, of which by far the most important are the mid-scale chain Red Lobster Inns and the fast-food chain Long John Silver, both with annual turnovers of more than \$ 500 million.

Table B.2

Leading seafood restaurant chains*

Name of chain	Location of head office	Type	Number of units	Annual sales (\$ millions)
Arthur Treacher's Fish and Chips	Youngstown, Ohio	Fast-food	211	...
Captain D's	Nashville, Tennessee	Fast-food	543	194
Charley's Crab Restaurants	Detroit, Michigan	White tablecloth and dinner house	26	70
The Chart House	Solano Beach, California	Dinner house	56	100
Ivar's Seafood Bar	Seattle, Washington	Fast-food, dinner house and family style	23	...
Legal Sea Foods	Boston, Massachusetts	Dinner house	6	48
Long John Silver's	Lexington, Kentucky	Fast-food	1,405†	720†
Phillips	Ocean City, Maryland	Dinner house	7	44
Red Lobster Inns	Orlando, Florida	Dinner house	390	878
Rusty Pelican	Irvine, California	Dinner house	21	60
Sea Galley Stores Inc.	Seattle, Washington	Dinner house	41	55
Seaford Broiler Restaurant and Market	Lakewood, California	Dinner house	26	50
Seafood Shanty	Philadelphia, Pennsylvania	Dinner house	14	33
Skipper's Seafood and Chowder House	Bellevue, Washington	Fast-food	14	96

Source: *Seafood Business* May/June 1987

Notes: * The data was obtained by a telephone survey of restaurant chains, to which there were 43 respondents. Only those having *either* more than 20 restaurants *or* annual sales over \$ 25 million are shown above. Companies not responding to the survey, and those whose primary business is not seafood are not shown
 † Sales for 310 company-owned units only
 † Includes units in other countries

Fresh and frozen seafood imported from developing countries consists largely of shellfish and the more expensive and/or less common species of fin fish (e.g. grouper, mahi-mahi, snapper), and these are predominantly sold to the white tablecloth and dinner house restaurants. In such restaurants, much of the fish used is fresh; fast-food restaurants mainly use frozen portions of cod and other ground fish, though farm-raised catfish is becoming increasingly popular, especially in the southern States.

Among ethnic restaurants, Japanese style sushi bars, in which customers are served raw fish with certain condiments, are having a significant impact on United States eating habits. Originally created to serve the Japanese-American population, they are now heavily frequented by non-Hispanic whites, particularly the young urban professional group with avant-garde tastes. It is not known how many sushi bars exist, but some idea of their importance can be gauged from the fact that in southern California, an area with a notable concentration of such restaurants, there are about 400 (private communication from the trade).

Seafood catering is, in common with other branches of food-service, a highly competitive business, but factors other than price have assumed major significance, as restaurants base their appeal on virtues that include healthiness, freshness, variety and atmosphere.

Seafood restaurants are increasingly offering customers lighter and more health-giving meals. Instead of fried fish and chips, customers may be offered boiled and grilled seafood prepared with salads, steamed vegetables, boiled potatoes and pasta. Some restaurants are actively promoting the connection between seafood and health, using both advertising and point-of-sale materials. 'Freshness' is the hallmark of many restaurants, which are exploiting the consumers' preference (some would say a fetish) for fresh over frozen seafood. In many cases restaurants offer a fresh 'fish of the day', which both attracts the attention of customers while allowing the restaurant to adapt its menu according to daily availability of particular species.

Variety is used in many ways to increase sales, for example by the introduction of lesser-known seafoods and by selling regional seafood dishes like Cajun food from Louisiana and Hawaiian specialities. At the same time, restaurants are increasingly installing sushi-style raw fish bars, oyster bars and similar facilities, often allowing customers to watch the seafood being prepared in front of them.

Primarily captive establishments

The primarily captive segment of the market, consisting of schools, hospitals, office catering, the military, etc., is the most price-sensitive part of the seafood market. It generally buys frozen portions of lower-valued ground fish such as saithe, hake, rockfish and Alaska pollock. As far as the developing countries are concerned the only species of interest are hake from South America and southern Africa.

B.2 The retail sector

Retail sales of seafood products are handled primarily by supermarkets, but also by specialist fish markets (i.e. fishmongers) handling fresh and frozen products. Although there are some very large supermarket chains, the United States grocery trade is highly regionalized and does not show the same degree of concentration as in many countries of Western Europe. The largest three chains (Safeway, Kroger and American Stores) account for 16.5% of the market, while the top 20 chains which have more than 10,000 outlets have a 36% share (data from the Food Institute quoted in *Quick Frozen Foods*, August 1985).

Great changes have occurred in the retail handling of seafood in recent years, with a major movement from the use of self-service counters to full-service fresh fish counters, where the staff serve the customers, answer enquiries and advise on preparation. In a survey of supermarkets, *Seafood Business* (March/April 1984) found that 16% of respondents sold seafood strictly through full-service departments, 45% had both full-service and self-service counters while 39% had only self-service counters. There are however two factors which have made the trend towards full-service slower than might otherwise have been expected. On the one hand it demands much more supermarket space, and on the other hand there has been some resistance from labour unions, whose members are experienced in the handling of meat but not of seafood.

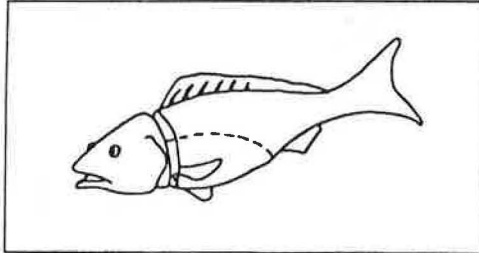
APPENDIX C: THE MARKET FOR FRESH AND FROZEN FIN FISH

C.1 Product form

Fresh and frozen fin fish is imported in a variety of forms, involving varying degrees of prior processing or added value, ranging from fish in the round to skinless and boneless portion-controlled fillets and steaks (see Figure C.1).

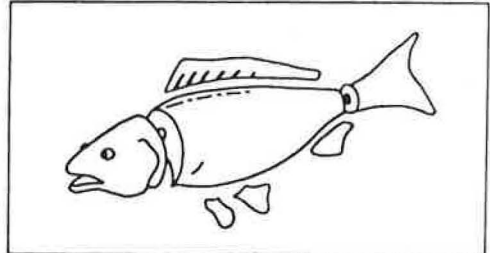
Figure C.1

Fin fish presentation in the United States



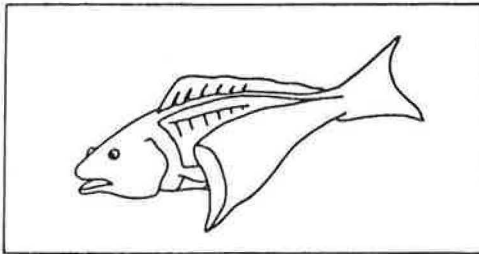
Drawn/headed and gutted

Drawn fish are whole fish that have been scaled and have had entrails removed. Head and fins are intact. A drawn fish has longer storage life than a round fish (sold just as it comes from the water), because entrails cause rapid spoilage. Headed and gutted fish means simply that heads and guts have been removed.



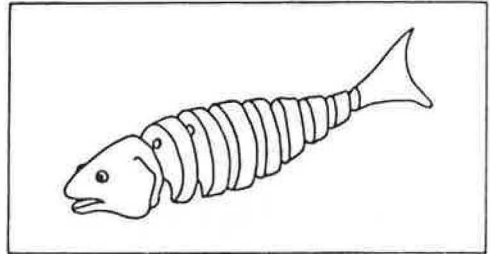
Dressed/pan dressed

Dressed fish have been scaled, gutted, and had gills removed. Head and fins are intact. A dressed fish is often cooked in one piece, by baking, poaching, or barbecuing. A pan-dressed fish has head, tail, fins and viscera removed.



Filleted

Fillets are the boneless or pinbone-in sides of a fish, cut away from the backbone and removed in one piece.



Steaked

Steaks are cross-section cuts from dressed fish. They are generally 1-1½ inches thick. Large fish such as salmon, halibut and swordfish are often steaked.

For the purpose of portion control, fillets and steaks tend to be size-graded at 1- or 2-ounce intervals, for example 2/4 oz up to 14/16 oz with the two figures shown indicating the upper and lower limits to which the weight of the individual fillets must comply. Large fillets are often cut into portion-controlled pieces or 'cuts'. Very large fish like swordfish, shark and marlin, are typically imported polythene- or cloth-wrapped as skin-on dressed trunks, or these may be split longitudinally into halves or quarters, or transversally into chunks or wheels. Alternatively, portion-controlled boneless steaks may be supplied.

Fish blocks are compressed slabs of fillets, usually without skin or bone, mainly used as raw material for fish sticks, portions and other breaded and battered items. They are almost always packed 4/16½ lb (i.e. 4 inner cartons of 16 lb net weight in each outer), but there is a small proportion of 3/18½ lb packs.

Sashimi-grade fish is fish specially handled to guarantee optimum freshness and colour required by the Japanese-American sashimi (or sushi) trade. It may be either fresh chilled or frozen at -60°C .

For more detailed information on product form, see Dore (1982; 1984).

C.2 General market characteristics

For the most part, the United States consumer prefers fish with flesh which is white, firm and flaky in texture and which is mild tasting, in the form of skinless boneless fillets. Demand for such fish has traditionally been met by the major cold-water ground fish (cod, flounder, rockfish, etc.) and, as the market has expanded, these have increasingly had to be imported. Due to resource limitations, the prospects for ever-increasing imports are poor, and not surprisingly there is now a world-wide scarcity of ground fish, with prices at unprecedented levels.

A consequence of this is that underutilized fish with similar characteristics have been used to supplement the limited supplies of the traditionally consumed ground fish. Examples of this are Alaska pollock and New Zealand orange roughy. Another consequence is greater use of cultured fish, such as catfish and farm-raised salmon, which are in more dependable supply.

Apart from the major ground fish, other native species have become scarce, making it necessary to find replacements. An example of this is the popular west coast species, white sea bass, which has been replaced by a sea bass from Chile (see Section C.7).

Another factor leading to greater diversity in the species consumed is the activity of food-service operators and retailers anxious to obtain a greater share of the consumer's spending. This has created increased demand for fine-flavoured species like John Dory and pompano which are in scarce supply, and has created a demand for substitutes. Grilling and barbecuing have become popular as ways of preparing fish and this has increased demand for fish yielding thick fillets such as halibut, swordfish, shark, tuna, grouper and some sea bass. Darker fleshed and stronger tasting fish like salmon and tuna have become popular as quality eating fish. Regional and ethnic markets have been developed and their tastes and cuisine have become popular among the wider United States public, for example, mahi-mahi (from Hawaii), crayfish, catfish and red drum (from the Gulf States) and tuna (through sushi-bars).

C.3 Prices and substitution

As prices are constantly changing, it is only possible to give a rough guide to relative prices. Table C.1 shows wholesale prices for fillets of a number of fin fish during the first half of 1986. As not all species are traded or quoted as fillets, prices for the form quoted (steaks, slabs, etc.) have been adjusted by the estimated filleting yield.

The most popular types of fish such as cod, haddock, rockfish and catfish generally had wholesale prices in the range of \$ 1.00 to \$ 2.50 per lb when marketed in frozen form, though some of them sold for over \$ 2.50 in the fresh state. High prices, over \$ 5.00 per lb, were paid for species such as red snapper, pompano, John Dory and fresh Atlantic salmon from Norway, sought after by fashionable restaurants. Some sashimi-grade fish also sold at high prices. The range of \$ 2.50-5.00 per lb included most of the previously mentioned species suitable for grilling, as well as frozen chum salmon, orange roughy and rainbow trout. Ground fish of lowest quality, including hake, Alaska pollock and saithe (Atlantic pollock), tended to have wholesale prices below \$ 1.00 per lb.

Fresh fillets sell at variable premiums over frozen fillets, depending upon supply and demand conditions. For fish available constantly and in large quantities, like trout and catfish, the premiums can be small, but in other cases fresh fillets may sell for anything up to 2½ times the price of the frozen product, such is the strength of demand.

During 1986, fin fish prices altered greatly due to the world wide ground fish shortage, with prices of most white-fleshed species typically rising by 50% over previous levels.

Scarcity of preferred types of fish opens up enormous possibilities for substitution of a species without the customer's awareness. This practice may occur at any point between the fishing vessel and the consumer, and it is facilitated by the fact that consumers are only familiar with the names of a few species and have difficulty in distinguishing taste and texture. Substitution in this way is most usual between similar-tasting species with a large price differential, for example, red snapper, for which there are many domestically caught and imported substitutes, swordfish (for which mako shark and Pacific thresher shark may be used), John Dory, pompano and others. When skinless fillets are used, substitution is often difficult to detect and for this reason certain high-priced species, like red snapper, tend to be traded skin-on.

A related practice is that of marketing a species with an unfamiliar or poor-sounding name under the name of familiar and well-liked fish. This practice and its implications for prospective suppliers is discussed in Section 4, *Naming the species*, of the main text.

Table C.1

Comparative wholesale prices for fin fish fillets*, first half of 1986

			\$ per lb
Price	Species/type of fish	Presentation (Fresh, frozen, etc.)	
More than \$ 7.50	Red snapper (<i>Lutjanus campechanus</i>)	Fresh	
	Pompano	Fresh	
	Swordfish	Fresh	
	Tuna, yellowtail	Sashimi quality	
\$ 5.00 - 7.49	Atlantic salmon (from Norway)	Fresh	
	Some red snapper substitutes	Fresh	
	Yellowtail	Fresh	
	John Dory	Fresh	
\$ 2.50 - 4.99	Grouper	Fresh/frozen	
	New Zealand groper	Fresh/frozen	
	Halibut	Fresh/frozen	
	Swordfish	Frozen	
	Shark (mako and thresher)	Fresh/frozen	
	Snapper from Brazil and Thailand	Frozen	
	Some sole and flounder, e.g. petrale sole and yellowtail flounder	Fresh/frozen	
	Chum salmon	Frozen	
	Orange roughy	Frozen	
	Cod	Fresh	
	Haddock	Fresh	
	Atlantic ocean perch	Fresh	
	Chilean sea bass	Fresh	
	Rainbow trout	Fresh/frozen	
	Catfish ⁺	Fresh/frozen	
\$ 1.00 - 2.49	Cod	Frozen	
	Some flounder	Fresh/frozen	
	Turbot	Frozen	
	Haddock	Frozen	
	Rockfish	Frozen	
	Wolf fish (ocean catfish)	Frozen	
	Chilean sea bass	Frozen	
	Mahi-mahi	Frozen	
	Golden kingclip	Fresh/frozen	
	Shark (angel, soupfin)	Fresh	
	Saithe	Fresh	
Less than \$ 1.00	Alaska pollock	Frozen	
	Black kingclip	Frozen	
	Hake ('whiting')	Frozen	
	Saithe	Frozen	

Source: *Erkins Seafood Letter, Seafood price — Current, Seafood Leader Buyer Guide*, private communication with the trade.

Notes: * Where quotes were not available for fillets, prices were estimated on the basis of quotes for other product form

⁺ Prices for catfish were close to \$ 2.50 per lb

C.4 Analysis of imports

Overall imports

Imports of fresh and frozen fin fish excluding tuna increased from 357,000 tonnes in 1980 to 548,000 tonnes in 1986, an average rate of about 9% per annum (see Table 10), but as a result of the ground fish shortage, hardly increased in 1986. Imports of different kinds of products, i.e. fish blocks, fillets and steaks, and lesser processed products, are analysed below, on the basis of published import statistics.

Fish blocks

Fish sticks and portions are manufactured almost entirely from imported frozen blocks made from cold-water ground fish. The quantity of sticks and portions imported is negligible and there is a 10% *ad valorem* duty on the former. Since 1980, imports of fish blocks have varied between 130,000 tonnes and 163,000 tonnes with no discernible trend. The main ground fish resources at the disposal of developing countries are hake from the southern hemisphere, but only limited quantities have been supplied to the United States. Imports of hake blocks, mainly South American, fell from 16,700 tonnes in 1980 to 5,400 tonnes in 1984, rising to 7,900 tonnes in 1986. (Hake is further discussed in Section C.5.)

Fillets and steaks

Imports of fish fillets and steaks increased from 166,000 tonnes per annum to 254,300 tonnes per annum over the period shown in Table C.2. The most important items are cod, flat fish, Atlantic Ocean perch (redfish in the United Kingdom), other ground fish and the miscellaneous category of 'other salt-water fish'. Although most of the ground fish is imported from Canada, Iceland and Europe, developing countries are significant suppliers of frozen flat fish fillets; Argentina and Korea supplied 4,400 tonnes and 2,900 tonnes respectively in 1986.

Table C.2

United States imports of fin fish as fillets, steaks, chunks, etc.

	1980	1981	1982	1983	1984	1985	1986	Change 1980-1986
'000 tonnes								
Salt-water fish								
Cod	58.2	70.1	76.7	83.1	86.5	85.3	82.7	x 1.4
Cusk, haddock, hake, pollock	23.3	24.6	27.3	28.0	24.5	29.3	26.3	x 1.1
Wolf fish	1.9	2.3	2.4	2.9	1.7	1.8	1.4	x 0.7
Atlantic Ocean perch	17.3	26.3	29.9	24.1	28.6	24.1	22.2	x 1.3
Flat fish	32.6	38.4	33.2	23.7	28.7	36.4	34.6	x 1.1
Salmon	0.1	0.1	0.4	0.6	1.1	0.8	0.9	x 9.0
Other salt-water fish	22.1	21.9	23.5	31.0	35.8	57.8	67.4	x 3.0
Freshwater fish								
Pike pickerel, pike, perch	1.4	1.5	1.8	2.3	2.3	2.4	2.4	x 1.7
Yellow perch	2.0	1.8	1.5	1.3	1.7	2.2	2.3	x 1.2
Catfish	6.8	4.4	2.7	1.9	2.8	3.2	3.7	x 0.5
Other freshwater fish	0.4	0.9	0.6	0.5	1.1	0.9	1.5	x 3.8
Total fillets and steaks	166.0	191.9	200.0	199.5	214.8	243.5	245.3	x 1.5

Source: FT 246, US Dept. of Commerce, Bureau of the Census

Imports of 'other salt-water fish' have grown by a factor of three to 67,400 tonnes, with 55% being from developing countries and territories. The leading supplier under this category is New Zealand which in 1986 supplied 12,800 tonnes, followed by Argentina, Japan, Uruguay, Taiwan, Chile, Canada, Korea, Thailand and others (see Table M.1, Appendix M). Imports from New Zealand, mainly of frozen orange roughy fillets, have grown explosively, from only 177

tonnes in 1980 to 12,768 tonnes in 1986. The orange roughy experience is discussed in Section 4 of the main text.

Catfish imports have fluctuated within the range of 1,900 tonnes per annum to 6,800 tonnes per annum, mainly from Brazil.

Lesser processed fish, i.e. in the round, dressed, etc.

Imports of lesser processed fish have increased from 61,500 tonnes in 1980 to 152,800 tonnes in 1986 (see Table C.3). Of the major items listed, most were imported from Canada, except for salmon and 'other saltwater fish'. Salmon is mainly supplied by Norway and other northern hemisphere countries, though Chile is also significant (see Section C.6 (c)). Imports of 'other saltwater fish' increased by a factor of 2.7 from 1980 to 1986, with most of the growth being in fresh rather than frozen fish. Most imports from developing countries and territories were in these categories, indeed in 1986 fish from developing countries and territories accounted for 54% of the total (see Tables M.2 and M.3, Appendix M), the most notable suppliers being Mexico, Argentina, Costa Rica, Venezuela, Taiwan, Hong Kong and the Philippines.

Table C.3

United States imports of less processed fin fish (other than tuna), in the round, dressed, etc.*

	1980	1981	1982	1983	1984	1985	1986	Change 1980-1986
'000 tonnes								
Unscaled fish								
(a) Salt-water fish								
Smelt and sea herring	13.5	11.7	17.1	16.7	15.1	19.8	16.6	x 1.2
Mackerel	2.7	2.0	1.8	2.0	3.7	2.8	3.1	x 1.1
Cod, cusk, haddock, pollock, hake, sturgeon, shad, eel	6.8	11.8	16.0	20.0	30.9	35.4	35.0	x 5.2
Atlantic Ocean perch	0.1	0.4	0.3	0.7	1.2	1.8	2.0	x20.0
Halibut	2.9	2.9	3.1	2.9	3.7	5.8	5.1	x 1.8
Other flat fish	2.3	3.0	3.3	3.8	7.3	10.1	12.3	x 5.3
Salmon, fresh or chilled	0.7	0.8	2.5	3.7	6.8	8.7	12.9	x18.4
Salmon, frozen	1.8	2.1	2.2	2.8	2.7	3.5	5.5	x 3.1
Swordfish, fresh or chilled	0.1	0.4	—	0.3	0.7	3.4	5.0	x50.0
Swordfish, frozen	0.1	0.2	0.5	0.4	0.5	0.7	0.4	x 4.0
Other salt-water fish, fresh or chilled	5.2	5.0	10.0	10.2	12.3	14.5	25.8	x 5.0
Other salt-water fish, frozen	10.8	14.0	12.7	15.0	13.1	17.1	16.7	x 1.6
(b) Freshwater fish								
Pike, pickerel, yellow pike, pike-perch	2.6	2.7	2.8	2.5	2.2	1.8	1.9	x 0.7
Whitefish	3.7	3.4	3.8	4.4	3.9	2.7	3.6	x 1.0
Trout	0.3	0.5	0.4	0.7	0.7	0.6	0.6	x 2.0
Other freshwater fish	5.8	4.0	4.3	3.4	4.2	3.9	3.9	x 0.7
Scaled fish	2.2	1.6	2.0	2.4	1.7	2.2	2.4	x 1.1
Total	61.5	66.4	82.8	91.9	110.7	135.0	152.8	x 2.5

Source: FT 246, United States Dept. of Commerce, Bureau of the Census

Note: * The US tariff schedules refer to these categories of fish as being 'whole, or processed by removal of heads, viscera, fins, or any combination thereof, but not otherwise processed.'

Developing countries are also suppliers of flat fish (primarily from Mexico and Argentina), fresh salmon, swordfish and mackerel (from Chile), sea herring and smelt.

Californian data

For most species of fish supplied by developing countries and territories, quantification of market size is made difficult by the fact that United States

import data is insufficiently disaggregated. However, some more disaggregated data is collected by NMFS at the ports of entry and in the case of California and Arizona these are tabulated annually (see Table C.4). Hereafter this data will be referred to simply as 'imports into California'.

The remainder of this appendix contains a discussion of certain individual types of fish. Given the large number of species traded, it is not possible to give a comprehensive account of all of them and some species important to developing countries and territories have not been covered.

Table C.4

Imports of miscellaneous fresh and frozen fin fish into California and Arizona*

	1983	1984	1985	1986	Main supplying countries and territories 1986
Beltfish	188	192	274	183	Hong Kong
Corvina	156	191	90	136	Mexico, Hong Kong
Croaker, yellow	539	947	763	464	Hong Kong, China
Golden thread	...	101	19	164	Hong Kong
Eel	151	192	298	250	Korea, Taiwan, Thailand, Japan
Flounder	97	183	111	565	Korea, Japan, Mexico
Grouper	569	496	68	353	Argentina, Mexico, Chile
Groper, fillet	344	270	233	193	New Zealand
John Dory	68	179	116	115	New Zealand
Kingclip	...	...	36	112	Chile
Mahi-mahi:					
Fillet	782	678	1,864	544	Taiwan, Japan, Ecuador
Other	4	—	56	322	Costa Rica, Ecuador
Milkfish	1,031	966	816	1,630	Philippines, Taiwan, Hong Kong
Mudfish	13	24	45	84	Thailand
Mullet	63	35	74	38	Mexico, Italy
Pomfret	434	331	1,005	755	China, Hong Kong, Taiwan
Sea bass	363	38	1,653	1,846	Chile, Argentina, Mexico
Shark:					
Fillet	162	27	471	753	Japan, Taiwan
Other	842	299	3,586	617	Japan, Mexico, Ecuador
Snapper:					
Fillet	556	388	465	991	Taiwan, Thailand, Singapore
Other	268	336	506	618	New Zealand, Argentina, Thailand
Swordfish	2,281	4,052	7,158	7,043	Taiwan, Japan, Singapore, Chile, Mexico
Tilapia	...	38	360	1,128	Taiwan
Tuna, fresh yellow-fin (air-freighted)	445	693	919	715	Taiwan
Whiting (i.e. hake)					
Fillet	430	655	285	270	Korea, Japan, Argentina
Other	143	29	203	33	Uruguay
Yellowtail	627	710	759	912	Japan, Mexico, Korea, Thailand

Source: *Statistics and Market News*, NMFS, Terminal Island, California

Note: * Only items of interest to developing countries, and not separately classified in Federal trade statistics are shown here

Overall conclusions concerning the prospects for developing country suppliers are given in Section 3, *Fresh and frozen fin fish, other than tuna*, of the main text.

C.5 Hake

Hake (*Merluccius* spp. and *Urophycis* spp.) is a member of the cod family and is often marketed in the United States as 'whiting', the name more properly applied to the species *Merlangius merlangus* found in European waters. For trade purposes, the name hake tends to be used for larger soft-fleshed fish, while whiting is generally regarded as being a smaller firmer-fleshed fish. The Spanish name for hake, 'merluza', is also used, reflecting both the importance of South American supplies and the existence of an ethnic market for hake among Hispanics in the United States.

The United States itself has a major hake resource within its EEZ and the main types caught are Pacific whiting on the west coast, together with red hake, silver hake, and white hake on the east coast. Pacific whiting, red hake and silver hake are not fully utilized and to a large extent are exploited by foreign fleets, either directly or through joint-venture arrangements. In 1986 the combined optimal yield for these three species was fixed at 360,800 tonnes, 82% of this being for Pacific whiting. Of the combined optimal yield 120,500 tonnes were 'allowable for foreign fishing', and 71,400 tonnes were allocated directly to foreign fleets, mainly Polish. In 1986, 6,600 tonnes of white hake were caught.

Because hake have soft flesh and little flavour, they are among the cheapest of commercial ground fish and have to be sold on the basis of price competitiveness. Indeed it has proved difficult fully to utilize the resource for domestic consumption; this is especially true for Pacific whiting, which spoils easily and often contains parasites. In 1986, about 15,000 tonnes were headed and gutted by shore-based processors and the resulting products were targeted primarily at the Hispanic population.

Despite the above comments it is unlikely that Pacific whiting will remain underutilized for long, given the world-wide shortage of ground fish.

Although the United States exports Pacific whiting, it also imports other species of hake, particularly from South America. Imports consist of blocks used for making portions and sticks, headless and gutted (h.&g.) fish used for retail distribution and for smoking, and fillets, also for retail use. Imports of hake blocks fell between 1980 and 1984 from 16,700 tonnes per annum to 5,400 tonnes per annum, but recovered to 7,900 tonnes in 1986. Uruguay and Argentina are the main suppliers. Blocks are mainly defatted, that is to say the fishes' layer of sub-cutaneous fat has been removed.

Table C.5

United States imports of hake blocks

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	16,723	13,531	10,982	11,067	5,368	8,625	7,294
of which from:							
<i>Developing countries</i>							
Peru	1,205	—	—	—	—	43	144
Chile	268	1,190	105	—	—	46	211
Uruguay	4,513	5,244	3,877	4,502	3,481	5,466	4,135
Argentina	6,796	4,642	5,157	4,037	1,574	2,711	2,189
Korea	1,352	765	917	310	109	26	36
<i>Other countries</i>							
Canada	123	627	79	153	—	1	—
Denmark	488	214	208	126	85	80	68
United Kingdom	187	46	106	373	—	5	—
Poland	919	—	—	—	—	—	—
Japan	388	252	36	142	37	—	80
South Africa	224	—	60	299	—	46	155
New Zealand	203	460	245	69	—	102	198

Source: FT246, United States Dept. of Commerce, Bureau of the Census TSUSA Code 1104755

Imports of h.&g. hake and hake fillets are not separately recorded in the United States trade statistics. Supplies come mainly from Argentina and Uruguay (*Merluccius hubbsi*), Peru and Chile (*M. gayi*) and South Africa (*M. capensis*). The small Peruvian fish, about 6 oz h.&g., is the cheapest of the hakes and is popular in the retail trade. Like Pacific whiting its flesh is unsuitable for smoking and, for this purpose, hake from the South Atlantic (either from South America or South Africa) is preferred over all other types.

Prices for hake products in April 1986 were as follows: imported blocks, 62-3 c per lb; South American h.&g., 44 c per lb; South American, layer pack

fillets 10 oz, 63-7 c per lb. During the early part of 1987, prices greatly increased because of the ground fish scarcity, since hake was being used as a substitute for cod. More surprisingly Chilean hake has replaced catfish in many fast-food restaurants (*Seafood Business*, July/Aug. 1987).

The outlook for South American suppliers can only be described as good because of the scarcity of ground fish and the possible use of hake for making surimi (see Appendix E, Section E.12).

C.6 Farmed species: catfish, trout and salmon

Catfish

Development of the United States industry. There are many species of catfish, but it is the channel catfish (*Ictalurus punctatus*), being particularly suited to farmed production in the southern United States, that is mainly consumed. Farming in Mississippi in delta ponds started in the 1960s, since when it has spread to other states and overall production has increased, reaching approximately 34,900 tonnes in 1980 and 123,000 tonnes in 1986 (NMFS, private communication).

Catfish has regional associations with the south (United States) and is most consumed in this region. However, the catfish industry has sought to promote its product throughout the United States and has had much success, particularly with fast-food restaurants. Full advantage has been taken of its southern heritage by associating it with the increased interest in cajun cooking, in dishes such as 'blackened catfish'.

Despite immense progress, catfish is still not accepted throughout the United States, as it has a poor image which hinders its adoption in some traditionally sea-fish eating areas, especially New England and the north-west states.

The success of the industry can be attributed to its organization and unity of purpose. With a high degree of vertical integration, the organization of the catfish industry differs greatly from that of marine fisheries, but it has much in common with the poultry industry from which it has borrowed techniques of production, processing and marketing. Unlike the poultry industry however, catfish farmers are highly involved in all stages of the industry from feed manufacture to marketing, through co-operatives. Indeed two large co-operatively owned processors between them control 82% of the land presently used in catfish production (Barnett, 1987).

The organization of the catfish industry into a few large processing concerns has allowed it to become highly automated and efficient. It has also permitted considerable resources to be devoted to promotion, opening up of new markets, and development of value-added products. As in the poultry industry, consumer loyalty has been developed through branding.

Farmers are organized into an industry body called Catfish Farmers of America. This organization carries out public relations and generic advertising, funds research and development, etc. Its activities are funded by a levy on farmers — \$ 5 per short ton (2,000 lb) of feed in 1986.

The catfish industry has achieved a high degree of technical competence, having the support of Mississippi State University and the Mississippi Department of Agriculture. This is demonstrated by its ability to grow fish to precise specifications of flavour and size. The fat content of farmed catfish is substantially lower than that of wild catfish, it has whiter flesh and lacks the characteristically 'fishy' odour. Such features ensure maximum consumer appeal. At the same time, quality control is very thorough, eliminating a traditional concern with wild-caught seafood.

Foreign imports. Imported catfish consists almost entirely of wild fish from Brazil, although Mexico has supplied small quantities of farmed fish. Imports of catfish fillets and steaks fell from 6,800 tonnes in 1980 to 1,900 tonnes in 1983,

recovering to 3,700 tonnes in 1986 (see Appendix C, Table C.2). Brazilian catfish has difficulty in competing with the domestically raised fish, because it has a more 'fishy', and indeed more variable taste, and supply is less consistent, consequently it has to be sold at a discount.

Product form. Domestically raised fish are mainly sold h.&g. and skinless, sized between 8 oz and 12 oz. About half are sold fresh in tray packs or 30 lb vacuum packs, which have a 3-week shelf life. Frozen fish is sold i.q.f., individually polythene-wrapped and graded in 2- or 3-oz intervals. Catfish is also supplied as fillets and steaks, mainly frozen, and in breaded form; recently it has been marketed in a glazed form, using various different flavoured glazes.

Brazilian catfish is imported frozen and is typically larger than the farmed fish; if not sold h.&g. and skinless, it is usually cut into steaks with fillets being made of the tail sections. Catfish have a band of fat around the lateral line which has a stronger taste. Wild-caught fish are generally fatter than farmed fish, and the band of fat is generally removed.

Prices. Despite considerable promotion, catfish farmers have tended to produce more fish than the market can absorb. While prices for almost all species of fin fish increased in 1986 due to the ground fish shortage, those for catfish actually fell. In early 1987, wholesale prices were \$ 1.42-1.53 per lb for frozen h.&g. fish and \$ 2.50 for fillets. Imported Brazilian catfish had an average unit value at the point of entry of only 70 c per lb in 1986, clearly illustrating how these are discounted in relation to domestic produce.

Outlook for developing country suppliers. Due to its highly organized state, the United States industry poses formidable competition to any foreign country intending to supply cultured catfish to the United States. This might however be overcome if United States farmers or processors could be induced to transfer their technology and set up business in such countries.

Rainbow trout

Rainbow trout is normally farm-raised, and is traded either fresh or frozen in dressed or boneless form, with preferred sizes of between 5 and 10 ounces. Although suited to cold temperatures, trout can be cultured in a number of developing countries, either at high altitudes, as in Mexico or Peru, or in southerly locations, as in Chile.

United States domestic production of rainbow trout, based in Idaho, is estimated at about 23,000 tonnes per annum by NMFS, while imports for 1986 were only 615 tonnes. Of the latter, 257 tonnes were lake trout from Canada, while 358 tonnes were rainbow trout and other types mainly from Norway (118 tonnes), Chile (108 tonnes) and Argentina (49 tonnes). In the past, imported trout has been affected by disease problems, which resulted in import bans being imposed. More recently, Norway and Finland have been supplying an unusually large pink-fleshed trout raised in salt water and growing up to 8-10 lb. It has found good acceptance in the United States, obtaining prices similar to Norwegian salmon. However as the same strain can be produced in Idaho, this does not appear to be a major long-term threat to United States producers.

There is much competition among United States producers and pressure to make optimal use of feed. Conversion rates of 1.7:1 are normal. However market growth appears to have been sluggish during the 1980s, and unlike the younger catfish industry, there has been no co-ordinated attempt by the United States industry to develop markets. This situation may change in the future as producers are realizing the need for a more market-oriented approach (Brannon, 1987).

Stockholdings have often been high and margins low, and *Seafood Leader* (Jan. 1985) reported wholesale prices for random-packed dressed fish as low as \$ 0.87 per lb compared to a break-even point of \$ 1.15-1.20. Although prices returned to profitable levels, \$ 2.00-2.10 being quoted in March 1986, foreign

suppliers should be forewarned that it may be difficult to establish a strong presence in the United States market in the face of a well-established domestic industry.

Fresh farmed salmon

Although the United States is a leading producer of salmon and exports canned and frozen salmon products, a significant import market has developed for fresh farmed salmon, which Norway started supplying in 1980. Imports of fresh dressed salmon have grown from 700 tonnes in 1980 to 12,918 tonnes in 1986, of which 8,852 tonnes were from Norway, 2,480 from Canada, 679 from Chile, 367 from the United Kingdom, 160 from New Zealand and 105 from the Netherlands. This array of suppliers is indicative of the fact that a number of countries are developing their farming industries. An increasing amount of farmed salmon is being supplied domestically.

Fresh farmed salmon is much in demand because, unlike wild salmon, it is available throughout the year. It is in greatest demand during the winter when wild fish are not available fresh, and it is estimated that demand in the November-April period may be three times as great as during the United States commercial season for wild salmon. About 75% of imported farmed salmon goes to the restaurant trade, although retailers and smokers are also customers. Metropolitan areas of the east coast take most of the shipments, but outside this area and southern California, market penetration is limited.

The only developing country supplier, Chile, is exceptionally well placed to supply the United States market out of season, and is doing this very successfully with farmed coho salmon. Wholesale prices for dressed coho salmon were as follows in early April 1986: 2/4 lb, \$ 2.89 per lb; 4/6 lb, \$ 3.35; 6/9 lb, \$ 3.89. This compares with prices of \$ 4.25-4.70 per lb for drawn Norwegian Atlantic salmon.

C.7 Grouper, sea bass and closely competing species

Introduction

Species called sea bass and grouper usually belong to the Serranidae family. They tend to be fine eating fish and often large fish suitable for grilling, among other forms of preparation.

Grouper and groper

Grouper belongs to two genera of the Serranidae family: *Epinephelus* and *Mycteroperca*. They are large fish, typically growing to 10-20 lb. They are caught world-wide and the largest producers are Mexico, Indonesia, the United States, Pakistan, the United Arab Emirates and Brazil. The United States catches about 5,500 tonnes per year in the Gulf of Mexico and off Florida, mainly during the summer.

The volume of imports is not known but it is increasing, and on a round weight basis probably approaches domestic catch levels. Latin American countries, especially Mexico, are the main suppliers. Consumption is most important in the southern United States, particularly in Florida, where it has traditionally been caught. Fashionable restaurants are major users.

The different species of grouper do not show marked differences in taste and texture, all of them being noted for a flesh which is white, lean and flaky. Differences encountered by customers are mainly a function of how the fish is handled out of the water. Whilst they are traditionally sold fresh and head-on, more is now being sold as fillets, steaks or pan-dressed. Much of the imported product consists of frozen skinless fillets.

The demand for grouper is such that much of the fish sold under this name is in fact other species. New Zealand 'groper' is often sold as grouper, although it is in fact a sea bass of the genus *Polyprion*. California wholesale prices for fresh groper fillets in April 1986 were \$ 3.75 per lb, and if this is compared to

January prices of \$ 4.30 for fresh United States black grouper and \$ 3.30 for Mexican frozen fillets, it would appear that the grouper is a reasonably acceptable substitute. Less acceptable are the substantial quantities of smaller fish which are imported under the name 'grouper' from South America through Florida.

Sea bass

There are several traditionally popular fishes known as sea bass caught off United States coasts, including the striped bass from the Chesapeake Bay area, black sea bass also from the east coast, white sea bass and giant sea bass, both of the latter being caught off California. Sea bass belongs to the family Serranidae, along with weakfish, sea trout and various corvinas, with the exception of white sea bass which belongs to the family Sciaenidae (drum and croaker). Because of its high oil content, sea bass has a rich flavour which puts it among the preferred species in the United States market. Striped bass and loup ('European sea bass') are used by white tablecloth restaurants, while black sea bass is favoured by many east coast Chinese and Italian restaurants.

Apart from black sea bass (annual catches around 2,000 tonnes), commercial landings of the above-mentioned species are now very small, and this has encouraged imports, particularly of the species called Chilean sea bass. Total Chilean exports for 1985 were 3,500 tonnes, mostly to the United States. Californian imports of sea bass for 1986 were 1,846 tonnes, of which Chile supplied 1,380 tonnes, Argentina 331 tonnes, and Mexico 130 tonnes (see Table C.4). On the east coast some loup is imported, principally from France.

Chilean sea bass is a large fish ranging from 2 lb to 20 lb in weight, and is normally supplied as skinless fillets or as portion-controlled cuts of 6-8 oz. It has a high oil content, which gives it a very good flavour and has found ready acceptance in certain regions, particularly southern California. It sells principally as a retail item, although it is also used by fashionable and family restaurants.

Wholesale prices for Chilean sea bass in April 1986 were about \$ 1.60 per lb for frozen fillets and \$2.50 for fresh. Notably these were lower than prices for New Zealand grouper which belongs to the same genus, and are probably below what could be obtained if the image of the species had not been tarnished by alleged inconsistencies of quality, irregularities of supply and, on occasions, short weights. United States buyers attribute such problems to there being too many supply traders, some of whom do not handle the fish properly. Despite such comments, there are a number of serious shippers handling Chilean sea bass and demand can be expected to grow.

The scarcity of sea bass has had another important effect, namely that of stimulating research into cultured replacements. Hybrids of striped bass with white bass (*Morone chrysops*) or white perch (*M. americanus*) are now expected by some to repeat the successful history of cultured catfish. Such fish could enjoy much greater market penetration than catfish, in view of their superior eating quality. Interested parties in several states are already preparing for production.

C.8 Swordfish and shark

Introduction

Swordfish and shark are large pelagic fish, often obtained as an incidental catch to long-line fisheries. They usually weigh about 25 lb and more, although certain kinds of shark, for example dogfish, are smaller. One of their chief attractions is their lack of bones, by virtue of which they yield thick skinless steaks suitable for grilling.

Swordfish is the most popular of these fish, having flaky flesh with a good flavour and high oil content. Traditionally, swordfish was most popular in New England and the mid-Atlantic States, but it is now sold all over the United States, especially in California. Its high price to consumers, around \$ 12 per lb for fresh steaks in March 1986, limits retail sales and it is mainly sold to restaurants.

Some of the better-tasting sharks have become popular because their flesh is similar in appearance to swordfish; they have sometimes been sold to the unsuspecting consumer as swordfish.

Swordfish

Mercury accumulation is a serious public health hazard affecting swordfish, as a result of which the importation and inter-State trade of products with a mercury content exceeding 1 part per million (ppm) is prohibited. While smaller fish with carcasses under 100 lb are nearly always within the limit, this is not so true of larger fish, since these are older and have had longer to accumulate mercury. For this reason importers tend to avoid bringing the larger fish into the United States.

Until 1971, there was a thriving trade in swordfish, most of it imported, but this was destroyed by a public outcry which followed the discovery of unacceptably high mercury levels. During the 1970s the market slowly recovered as people forgot the mercury problem, and the standard was raised from 0.5 ppm to 1 ppm. Most supplies were obtained from domestic catches; however, these levelled out at about 5,000 tonnes per annum in the first half of the 1980s, and growing demand has made the market increasingly dependent upon imports.

Federal trade statistics only show separately imports of swordfish in carcass form, and not of fish which has been further processed. Imports of carcasses have grown from about 200 tonnes in 1980 to 5,400 tonnes in 1986. In the latter year, 92% of carcasses were fresh and 8% were frozen (see Table C.3). The leading suppliers were Spain, Taiwan, Canada, Chile and Ecuador in that order. Californian statistics show imports of swordfish in all forms; these grew from 2,281 tonnes in 1983 to 7,158 tonnes in 1985, remaining at roughly the same level in 1986 (see Table C.4). Japan, Taiwan and Singapore appear as the main suppliers.

From the figures for domestic landings and imports, it would appear that total consumption in carcass weight had by 1986 risen to well over 12,000 tonnes. However, due to more cases of mercury levels above the standard, all swordfish imports were 'blocklisted' (this term is explained in Section H.3, Appendix H) in April 1987, resulting in automatic detention of all shipments. Normally blocklisting is a temporary measure, and it is not yet clear how serious an effect this measure will have on public confidence and therefore long-term demand. However, the previous experience in 1971 suggests that the United States market will always be in danger of a sudden collapse due to the mercury problem.

The quality of imported swordfish is considered variable compared with domestic swordfish which is generally more expensive. Apart from mercury accumulation, there are two further quality problems of which shippers of swordfish should be aware: jelly-like flesh and parasitic worms. Jellied swordfish is a condition where the flesh is so soft that a finger can be put through it. It is a result of poor handling, especially inadequate refrigeration. Most parasitic worms are harmless but unappealing, and may cause rejection by some buyers.

Shark

There are about 300 species of shark world-wide, many of them of good eating quality. The following species of shark are reported to be good to eat: blacktip, mako, spinner, blue, sandbar, thresher (most subspecies), silky, whitetip, lemon and soupfin shark as well as dogfish. Among these species, blue shark is probably the least esteemed. Sharks that are not good to eat include bull, nurse, bigeye thresher, pelagic thresher, hammerhead, tiger and dusky sharks, though bull and dusky sharks are said to be 'acceptable'. Generally, white- or pink-fleshed sharks are good, while those with red flesh and thick skins are difficult to sell (Dore, 1984; *Seafood Leader Buyers' Guide*, 1987).

The leading types of shark landed in the United States are dogfish, mako, Pacific thresher, blacktip, lemon and sandbar. Of these, mako is the species most in demand and that most often substituted for swordfish, although it now has an important market in its own right.

Average catches for 1980 to 1986 were 6,100 tonnes for dogfish and 2,400 tonnes for the others. The dogfish resource is large and little fished. It has traditionally been rejected on the United States market because of its unattractive name, and has been exported to the United Kingdom for use in the fish and chip trade.

Import data are only available for California, where imports of shark fillets increased from 162 tonnes to 471 tonnes between 1983 and 1985, while imports of unfileted sharks grew from 842 tonnes to 3,586 tonnes in the same period. Japan, which obtains shark as a by-catch of its long-line fisheries, supplied 94% of the total, with Mexico and Ecuador also supplying small but significant quantities.

Shark is traded both fresh and frozen, and some buyers prefer frozen shark because, they say, freezing tenderizes the flesh. Proper bleeding of sharks is essential if bad smells due to ammonia build-up are to be avoided, and this also lightens the colour of the meat. Mercury can be a further problem, as with swordfish.

Market prospects for shark are good, given growing United States demand. However as they are slow-growing species, they are susceptible to over-fishing, and indefinite market expansion therefore cannot be expected.

C.9 Tuna

Apart from the established trade in canned tuna, described in Appendix D, a market has recently arisen for fresh and frozen tuna as a retail item. This can be attributed on the one hand, to the growth in demand for fresh and frozen fish in general, and on the other, to the need for United States tuna operators to find new outlets for their catches, now that canneries have closed down in California and Hawaii.

The size of the market is uncertain but very small in comparison with canned tuna consumption of about 390,000 tonnes. However it is a fast-growing market which holds promise for the future. One feature encouraging usage is that, unlike many of the species discussed in this section, supply is abundant and relatively dependable.

There are various sources of supply including landings of albacore on the west coast, fresh yellowfin tuna imported by airfreight into the west coast and Florida (imports into California were 715 tonnes in 1986), landings in the Gulf of Mexico, on the Eastern seaboard and in Hawaii, which also imports from other islands of the Pacific.

Tuna is traded in various forms, including product in the round, h.&g. with tail removed or as 15-25 lb loins. It is served raw in sushi bars and fashionable restaurants, and for this purpose has to be of sashimi quality. Tuna frozen at sea by Japanese long-line vessels is often used. The popularity of sushi/sashimi has expanded rapidly as non-Japanese consumers have become increasingly attracted to this exotic raw food. The species most used are bigeye and yellowfin tuna.

Apart from use as raw fish, tuna is mainly consumed in restaurants as grilled steaks and fillets, and for this purpose sashimi-grade fish is not required, ordinary fry-grade tuna being quite adequate. Yellowfin and albacore are mainly used. Because of increasing demand, prices for fresh tuna have risen greatly, with boneless chunks of yellowfin being quoted at \$ 3.50-4.50 per lb in September 1986. However such prices are still moderate compared to those for some alternative species which lend themselves to grilling for example, swordfish.

C.10 Red snapper

According to the FDA, only *Lutjanus campechanus* may be called red snapper. However many of the 250 snappers belonging to the family Lutjanidae are commonly called by this name, and even species such as grouper, orange roughy, atlantic ocean perch, etc., are sometimes labelled as red snapper. Dore (1984) describes this practice as 'a tribute to the popularity of snapper but not to the long-term sense and probity of parts of the fish business.'

The United States has several species including the mutton, mangrove and yelloweye snappers whose taste is close to *L. campechanus*. Some imported snappers have been allowed names which include the word red, such as Brazilian red snapper and scarlet red snapper (from Thailand and Australia), and this has aided market development. California allows 11 species of rockfish to be called Pacific red snapper, but they may not be traded under that name outside that State, except in Oregon and Washington which have similar regulations.

According to an informed source, about 9,000 tonnes of 'red' snapper fillets (excluding rockfish) are sold annually in the United States. This figure includes about 1,200 tonnes of *L. campechanus* which are produced from domestic landings. The market is heavily dependent upon imports from countries including Venezuela, Thailand, Costa Rica, Brazil, Indonesia and the Philippines. Some *L. campechanus* is imported from Caribbean countries but most imports are of other species.

True snapper is consumed throughout the United States, but to a lesser extent in the west coast states, because of the abundant supplies of the cheaper rockfish. Consumption is however constrained by supply scarcity and prices are correspondingly high. In January 1986 it was reported that fresh fillets of *L. campechanus* from the Gulf States obtained wholesale prices of about \$ 7.50-8.00 in the summer and \$ 10.00 in the winter (*Seafood Leader*, Jan. 1986). Other species sell at variable discounts on these prices, and the size of the discount depends on various factors including the potential for substitution, quality, handling, marketing, etc. Different supplies vary widely against these criteria and prices received are correspondingly variable. This can also be noted with frozen fillets, as shown by the following quotes for fillets from different origins: Thailand \$ 2.95 per lb, Taiwan \$ 1.50 and Brazil \$ 3.50 (*Seafood Leader*, Jan. 1986).

There is a good outlook for countries able to supply acceptable types of snapper, but there is scope to improve returns through improved handling and marketing.

C.11 Mahi-mahi (dolphin fish)

Mahi-mahi, found in the warmer waters of the Atlantic and Pacific Oceans, is a large fish, of up to 6 feet long and with weight varying from 2 lb to 50 lb. The meat is white when cooked and is large flaked. It is a popular sports fish in both Hawaii and south-eastern United States, and small but significant quantities are caught in both areas commercially.

Thanks largely to sports fishing and tourism, mahi-mahi has become a popular eating fish, being mainly consumed in Hawaii, California and Florida. Over 90% of the United States market is now supplied by imports, mainly frozen fish from Taiwan and Japan, which take it as an incidental catch of their long-line fisheries. Ecuador is also a significant supplier, with mahi-mahi being caught by artisanal fishermen, while Costa Rica and Peru supply smaller quantities. In terms of volume, Hawaii imported 1,449 tonnes in 1986, while California's imports have fluctuated, from 678 tonnes in 1984 to 1,920 tonnes in 1985, and then falling back to 866 tonnes in 1986 (NMFS, Terminal Island, California, pers. com.). Imports into Florida are not known but are believed to be less than for Hawaii and California. Most imported mahi-mahi is filleted, although California took 322 tonnes of unfileted fish in 1986.

Development of the market is constrained by limited supply and by histamine problems, which have affected produce from Latin America and Taiwan. Histamines cause severe food poisoning in people, and develop in the flesh of mahi-mahi as a result of the fish not being iced adequately after it is caught. It causes particular problems because it is often difficult to detect, being unevenly distributed throughout a given shipment. Mahi-mahi has frequently been detained by the FDA and, due to recurrence of the problem, the species has been blocklisted, i.e. all shipments are automatically detained and (in theory) sampled. Even when it has passed FDA inspection, there is a slight danger that produce will be recalled when cases of poisoning are discovered.

Such problems as these cause considerable inconvenience to the trade, inhibiting market development. In spite of being a highly regarded species, prices have been moderate around \$ 1.30 per lb c.&f. Florida for frozen product from Japan and \$ 0.90 for products from Ecuador, in March-April 1986. However, the market will pay much higher prices for good quality fresh mahi-mahi, as demonstrated by the case of a supermarket chain in southern California: frozen fillets from Taiwan were being retailed at \$ 1.69 per lb; then fresh fillets from Ecuador were introduced at \$ 3.89 per lb and they far outsold the frozen fish.

There is scope for suppliers substantially to improve their return from mahi-mahi by attention to the following matters: improved handling, concentration on the fresh fish market, and shipping to those areas of the United States with the greatest demand, particularly Hawaii. South American suppliers are beginning to do these things.

As with shark, the market for wild caught mahi-mahi is constrained by a limited resource base. However, it is a relatively fast-growing species with potential for farming; mahi-mahi is now being farmed in Norway using heated water (*Seafood Leader*, Sept./Oct. 1987).

C.12 Kingclip

Kingclip is caught throughout the southern oceans and are available from South America, New Zealand and South Africa. It typically weighs 6-18 lb in the round and has flesh which is lean, white and mild tasting, and is said to resemble monkfish in both taste and texture.

Four species are commonly marketed, including golden kingclip, the most abundant species of which Chile and Argentina are the leading producers, South African kingclip, red kingclip and black kingclip; the latter two are available in Chile (see Appendix K for species names). The finest eating species is the red kingclip, but this is in relatively short supply and is mainly consumed in Chile. In contrast, black kingclip is the least valued as it has darker flesh with a yellowish cast to it.

The volume of imports into the United States is unknown, but is certainly growing. Having already established a market in Spain, Chile is the principal country seeking to introduce kingclip to the United States supplying skinless boneless fillets both fresh and frozen, on a year-round basis. Black kingclip is supplied as a cheap substitute for cod with a c.&f. price of \$ 0.80 per lb frozen being quoted in April 1986. Meanwhile golden kingclip has been heralded as a possible replacement for orange roughy in supermarkets and restaurants. However, quality has been inconsistent, and the species has not established the recognition that its reputed qualities seem to merit, and like the cheaper black kingclip, has had to be marketed primarily as a cod substitute. Prices in April 1986 were around \$ 1.30 per lb for frozen fillets c.&f. Los Angeles.

C.13 Kingfish (king mackerel)

Kingfish (king mackerel) is a large fish, weighing 5-50 lb whole, and has well-flavoured flesh with a high oil content. United States catches averaged 2,900 tonnes between 1981 and 1986, being mainly caught off Florida between November and March, although Louisiana catches significant quantities. An unknown amount is also imported, chiefly from Mexico and Brazil.

Described by a Miami dealer as a 'big mover', king mackerel is a very popular item in Puerto Rico and among Hispanics living in cities of the south and the east coast, particularly Miami. Fish of 5-15 lb are preferred and are sold fresh and drawn.

D.1 Introduction

There are more than 50 species called tuna or tuna-like and these belong to the taxonomic sub-order Scombroidei. There are five species of economic importance and these are as follows: yellowfin, skipjack, albacore, bigeye and bluefin tunas. Bonito is a closely related species having flesh with similar organoleptic characteristics, but under FDA regulations it cannot be called tuna. Bonito imported into the United States must be called 'bonito' or 'bonita'.

Almost all tuna consumed in the United States is in canned form, although a small but growing proportion is now being sold fresh and frozen (see Section C.9, Appendix C), or being used in prepared meals. Only three species, namely yellowfin, skipjack and albacore, are of importance in canning. Bigeye and bluefin tuna tend not to be used as they fetch much higher prices on the Japanese sashimi market. In the United States, canned tuna is classified as 'whitemeat', which refers exclusively to products made from albacore, or 'lightmeat', which refers to other species with a colouration of between 5.3 and 6.3 on the Munsell scale.

The United States has a prominent position in the international tuna trade. It has a large tuna fleet, mainly big purse-seine vessels of up to 1,200 tonnes capacity, with catches second only to those of Japan. It has three major canning companies with procurement and canning operations throughout the world. Above all, it has the largest market, absorbing approximately 50% of world tuna supplies.

As a major fishing nation, the United States has had frequent disputes with other nations over access to coastal fisheries, the reason being United States unwillingness to recognize claims by coastal nations to manage highly migratory species like tuna within their respective EEZs. These disputes have been brought to a head by the seizure of United States vessels in foreign EEZs, which has normally been followed by retaliatory trade embargoes by the United States on tuna imports from the country concerned. In 1981 there were embargoes affecting Spain, Peru, Ecuador, Mexico, Costa Rica, Senegal and Congo. Since then there has been some accommodation on both sides, and the last embargo affecting a major fishing nation, that is, Mexico, was lifted in 1987.

The rest of this appendix contains details of the market for canned tuna. Conclusions concerning the outlook for developing country suppliers are presented in Section 3, *Fresh and frozen fin fish, other than tuna*, of the main text of the bulletin.

D.2 Supply and demand

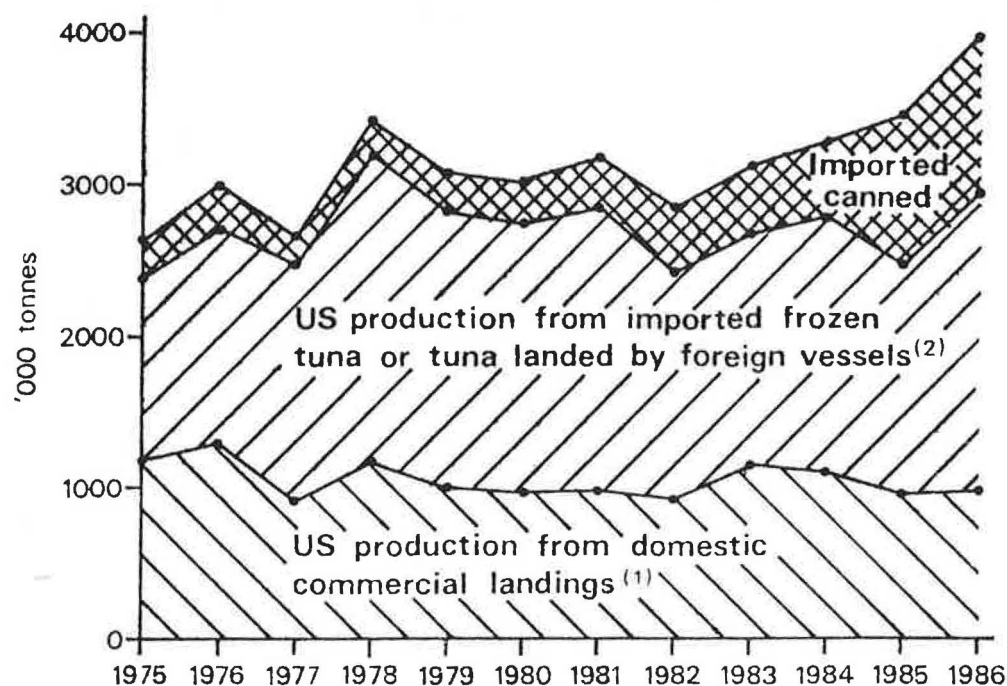
D.2.1 Consumption levels and trends

Since 1982, supply of canned tuna for United States consumption has increased by an average 9% per annum, due largely, it is believed, to falling real prices which have made tuna more competitive compared to poultry and beef. Consumption per head in 1986 was 1.6 kg, equivalent to about 390,000 tonnes for the entire population.

It can be seen that the market is supplied from three different sources: fish caught by United States flag vessels and canned domestically (approximately 25% in 1986); fish imported frozen or landed by foreign vessels and canned domestically (48%); and imported canned fish (27%). Each of these sources are now examined in greater detail.

Figure D.1

Supply of canned tuna for United States consumption



Source: US Department of Commerce, Fisheries of the United States

Notes: (1) includes pack from landings by US flag vessels in Puerto Rico and American Samoa

(2) foreign vessels are allowed to land tuna in American Samoa only

D.2.2 Production from domestically caught tuna

Over 90% of United States catches are taken in the Pacific Ocean, with two species, yellowfin and skipjack, accounting for 91.6% of the total. Up to 1980 most effort was concentrated in the eastern Pacific region, that is, off the west coast of North and South America, but in 1980 the fleet moved to the western Pacific in response to increased competition from Latin American fleets and a falling catch rate, due in part to unusual ocean currents (El Niño conditions) and restrictive United States marine mammal regulations.

However in 1985 this trend was reversed as a result of high operating costs, reduced demand for skipjack (which was prevalent in the catches) and the return of more normal ocean conditions.

Until the beginning of the 1980s, the United States tuna fleet and canning industry were based in southern California, but this situation has been transformed as a result of competition in canning from countries with low labour costs. Of 12 plants which operated on the mainland in 1982, only one remained in 1987, and United States canners have increasingly obtained their supplies from American Samoa and Puerto Rico. Not only do these territories enjoy lower labour costs, but canneries based in American Samoa are favoured by an exception in the Nicholson Act, which permits foreign flag vessels to land their catches directly in that territory.

D.2.3 Production from tuna imported in frozen form or landed by foreign vessels

Production from tuna imported in frozen form or landed by foreign vessels includes production from both imported shipments and from tuna landed in American Samoa by foreign vessels. Imported shipments declined by about 24% between 1981 and 1986 due to reduced demand from the mainland canning industry, but this has been partially compensated for by an increase in foreign

landings. As a result of this, overall production from imported frozen tuna in 1986 was only just below the record level of 1978.

Most imports consist of skipjack, albacore and yellowfin. Skipjack accounted for over half of the total up to 1984, but due to a lack of demand, this proportion was lower in 1985 and 1986. For 1986, the percentages were as follows: skipjack 40%, albacore 35% and yellowfin 24%. Albacore obtains prices of at least 75% more than those for the other two species, and average unit values of imports in 1986 were as follows: albacore \$ 1,599 per tonne, yellowfin \$ 914 per tonne and skipjack \$ 841 per tonne. There are many suppliers, most notably Taiwan, Japan, Korea, Indonesia, Panama, Brazil, Venezuela, Ecuador, Ghana, Spain and France.

D.2.4 Imports of canned tuna

Because of an anomaly in the United States tariff structure, imports consist almost entirely of tuna packed in 'water', that is, brine. Rates of duty applicable to canned tuna discriminate heavily against tuna in oil, as follows:

	Rates of duty for 'most favoured nation' countries
Tuna, in oil	35% <i>ad valorem</i>
Tuna, not in oil:	
within quota, container not over 15 lb	6% <i>ad valorem</i>
other	12.5% <i>ad valorem</i>

Imports of tuna in oil pay a very high duty of 35% which prevents more than a minimum of imports entering the country. Imports of tuna not in oil are regulated by a quota at which a reduced tariff rate of 6% is applicable. The quota is calculated annually, on the basis of 20% of the previous year's United States pack, including production in insular possessions. Those supplies exceeding the annual quota are called 'non-quota supplies' and are subject to a rate of 12.5%.

Table D.1

United States imports of canned tuna, not in oil

(a) Breakdown into quota and non-quota imports

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Under quota	49.5	34.7	42.1	41.7	43.4	42.6	36.8
Non-quota	2.3	—	—	12.8	30.9	54.3	69.4
Total	51.8	34.7	42.1	54.5	74.3	96.9	106.2

Source: *Fisheries of the United States 1986*,
United States Dept. of Commerce NMFS

(b) By country or territory of origin

	'000 tonnes						
Origin	1980	1981	1982	1983	1984	1985	1986
Thailand	2.9	4.7	8.5	18.1	40.7	55.6	69.1
Taiwan	7.2	7.2	4.9	8.5	8.1	10.6	13.0
Philippines	6.2	9.7	12.5	14.5	10.1	14.0	12.7
Japan	11.2	9.6	11.3	9.2	12.2	10.7	4.8
Venezuela	—	—	—	—	—	0.4	3.3
Malaysia	—	0.3	0.3	1.4	0.7	1.8	1.1
Ecuador	—	—	—	—	0.4	2.3	1.3
Other	1.2	0.5	2.1	3.7	1.3	1.5	1.9
Total	28.7	32.0	39.6	55.4	73.5	96.9	107.2

Source: *FT 246*, United States Dept. of
Commerce, Bureau of the Census

Note: the data in part (a) do not agree with that in part (b) because of the different sources of data used. Part (a) refers to any tuna entered for consumption or withdrawn from a warehouse for consumption during the calendar year (except for receipts from insular possessions), whereas part (b) is based on official import statistics.

While the 35% duty on tuna in oil has been effective in preventing more than a minimum entering the country, this has not been the case with the lower rates applied to tuna not in oil. Between 1980 and 1986, imports almost quadrupled to 107,200 tonnes, despite the fact that in the latter year two-thirds of imports entered at the higher rate of 12.5%. The main suppliers are Thailand, Taiwan, the Philippines and Japan. The recent upsurge in imports has been caused almost entirely by Thailand, which has rapidly outdistanced competitors and by 1986 accounted for 64% of the total.

The somewhat lower rate of increase in 1986 compared to previous years can be mainly attributed to the weakening of the United States dollar, which has had a particularly strong effect on supplies from Japan.

Competitive pricing has been the key to increased imports, and it is significant that the unit value of imports of lightmeat tuna from Thailand (within quota) fell from \$ 3,209 per tonne in 1980 to \$ 2,041 in 1986. Allowing for the rise in the United States consumer price index, the fall in unit value over the period was 52%. While this fall was largely a result of the lower cost of raw tuna, it also reflects a reduction in processors' margins. In fact margins are now so small that raw fish reportedly accounts for 75% of factory costs (Owen, 1986).

Although Asian countries are the largest suppliers, Latin American countries, free from previous embargoes, are beginning to penetrate the market. In 1986, Venezuela supplied 3,300 tonnes and Ecuador 1,300, and in 1987 the embargo on Mexican tuna was lifted. Mexico has agreed to limit its tuna supplies to 17,500 tonnes for 1987, but with catches of over 100,000 tonnes per annum and a major canning industry close to the United States, Mexican canned tuna is likely to make major inroads on the United States market at least up to 1992.

Major United States tuna interests have reacted to the flood of Asian imports by intensifying their operations in American Samoa and Puerto Rico and by seeking further tariff protection on the grounds that Asian supplies are subsidized. The latter has so far proved unsuccessful and this may be partly attributed to the present administration's trade policy which is generally non-protectionist. Moreover, the United States tuna industry has not overstressed its opposition to imports, particularly major canners who have been buying Thai tuna and allegedly making 'big profits' under their own labels (*Seafood International*, April 1986).

D.3 Market characteristics

Canned tuna is mainly consumed in the home, though 15-20% is reportedly sold to food-service users and processors (L'Hostis and Kitson, 1983). It is regularly consumed in most United States households with an overall coverage of about 85% of the population within a given year. Younger family groups with above average income tend to be heavier users. It is served mainly as an hors d'oeuvre or in sandwiches, and only rarely as a cooked main course. Demand is seasonal, with sales peaking during Lent and throughout spring, but low from December to February.

The trend towards health food and/or low calorie products has enhanced sales of tuna canned in water, including products in 'spring water', at the expense of tuna in oil. Such products were promoted by United States canners in 1979, but, as discussed above, this has had the unexpected effect of attracting a flood of similar imported products. By 1985, tuna in water accounted for approximately 64% of retail sales (SAMI, Selling Areas and Marketing Inc., quoted in *Pacific Fishing*).

Canned tuna sells in competition with canned salmon, of which per capita consumption is a mere 0.2 kg per annum, but there is more significant competition from other meat products which can be used in sandwiches; these include beef and chicken. As indicated above, demand for tuna is highly dependent on the relative prices of such foods.

D.4 Market structure and branding

The tuna canning and marketing industry is characterized by a high degree of industrial concentration and substantial brand advertising, equivalent to over 1% of sales value (L'Hostis and Kitson, 1983). The leading United States marketers are Van Camps Sea Foods, a division of Ralston Purina which markets the leading 'Chicken-of-the-Sea' brand, Starkist (a division of Heinz) and Bumble Bee Seafoods, a subsidiary of Castle and Cooke. According to an informed source, these companies' brands have 65% of the market, with private label (retailers' brands) and other brands making up the remaining 35%. These three companies have canneries in Puerto Rico and American Samoa, while also owning, and/or buying from, canneries in other countries including Thailand, Philippines, Ecuador and Peru.

About 17% of retail sales are accounted for by private label product (SAMI, op. cit.), and most of this is imported and marketed by SSC International of Hackensack, New Jersey, M.C. Foods of San Diego, California, Starkist or directly by major retail chains. SSC International and M.C. Foods are subsidiaries of the Japanese trading companies Mitsubishi and Mitsui respectively, which also have manufacturing subsidiaries in Puerto Rico.

The market structure is clearly oligopolistic, and it may be difficult for new suppliers to enter the field unless under arrangement with an established distributor or a large retail chain.

D.5 Product form and packaging

The following information was supplied by L'Hostis and Kitson (1983) and is generally applicable today; however, prospective suppliers should check their United States trade contacts for up-to-date information.

Canned tuna is presented in the following product forms: **solid** tuna is mainly composed of the whole section of whole fillets, and the presence of free broken flakes may not exceed 18%; **chunk** tuna consists of a mixture of pieces; **flake** tuna consists of smaller pieces; **grated** tuna consists of packed particles of flesh. Products are further classified into **whitemeat**, that is, albacore, and **lightmeat**, as explained in Section 4. About 90% of whitemeat is sold in solid packs, while 98% of lightmeat is chunk style. Only minimal quantities of tuna are sold as flake or grated product.

The liquid in which tuna is packed can be either vegetable oil, olive oil or water (brine), and the seasoning can be of various kinds, though salt, monosodium glutamate, hydrolysed protein, spices and lemon are commonly used.

The most popular can size has always been the half pound can, which in 1983 accounted for around 70% of the market. The net weight is not in fact 8 oz, but 6½ oz or 7 oz for solid packs, 6½ oz for chunks and 6 oz for grated tuna. The so-called quarter pound can actually weighs 3½ oz, the three-quarter pound family-size can 10 oz and the one pound can 13-14 oz. The institutional market is supplied by the four pound can weighing 66.5 oz or 1.88 kg.

D.6 Special regulations applying to tuna

Apart from regulations applicable to all canned fishery products, which are discussed in Appendix H, there are specific regulations on standards of identity and can fill applicable to canned tuna; these can be obtained from the FDA (for address see Section H.4, Appendix H). At the same time, tuna and tuna-like species fall under the jurisdiction of the Marine Mammal Protection Act, which is designed to minimize the incidental kill of porpoises during fishing. For this reason firms wishing to import frozen unprocessed tuna are first required to obtain a Tuna Certificate from NMFS.

APPENDIX E: THE MARKET FOR SHELLFISH (including discussion of frogs' legs and surimi-based products)

E.1 Trends in consumption

The main types of marine shellfish consumed are shrimp, clam, oyster, crab, scallop and lobster, with shrimp constituting over half of the total volume of these items (see Table E.1). Crawfish produced in the Louisiana swamps is the only freshwater shellfish of which output is substantial, of up to 10,800 tonnes of meat per year including both farmed and wild production (Myers, 1987). Consumption of several other lesser-known shellfish is also significant, namely squid, mussel, cuttlefish, octopus and langostino. Also of note are surimi-based imitations, consumption of which now surpasses all types of shellfish except shrimp and clam.

Table E.1

United States per caput consumption of major marine shellfish and imitation shellfish

	1980	1981	1982	1983	1984	1985	1986
Shrimp	0.64	0.67	0.69	0.78	0.86	0.90	1.00
Clam	0.21	0.26	0.24	0.25	0.28	0.31	0.31
Oyster	0.14	0.15	0.16	0.16	0.16	0.17	0.17
Crab	0.17	0.17	0.14	0.14	0.14	0.14	0.14
Scallop	0.10	0.13	0.10	0.13	0.16	0.13	0.13
Lobster	0.09	0.09	0.09	0.10	0.11	0.11	0.11
Total of items shown	1.35	1.47	1.42	1.56	1.71	1.76	1.86
Surimi-based products	0.01	0.02	0.04	0.08	0.14	0.17	0.19

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS, and private communication; surimi-based products for 1986, from *Seafood Business*, July/August 1987

The following recent market trends should be noted:

- a rapid overall increase in consumption of most items, particularly shrimp which increased by 56% between 1980 and 1986;
- a decline in crab consumption, due mainly to a collapse in the fishery for Alaska king crabs;
- the appearance of surimi-based products, mostly crab substitutes, as a major item. Consumption doubled annually or thereabouts from 1980 to 1984, although the rate of increase slowed down in 1985 and 1986;
- items which were once regional specialties, such as Louisiana crayfish, east coast mussel and blue crab, are increasingly being marketed throughout the United States;
- the marketing of an ever increasing variety of value-added products, incorporating new forms of packaging, and designed with a view to cutting costs and simplifying handling by restaurants and supermarkets.

E.2 Prices and substitution

Based on differences in price (see Table E.2), the trade is sometimes able to introduce cheaper shellfish as a substitute for more expensive items.

However, the different kinds of shellfish vary widely in the degree to which they can be substituted for one another. On the one hand, shrimp and lobster have distinctive textures which make them difficult to substitute in most uses, while locally produced oyster, clam and scallop have a traditional clientele in the eastern United States which will not easily be persuaded to accept cheaper

Table E.2

Comparative wholesale prices of different shellfish March-April 1986*

	\$ per lb
Abalone	30 (maximum)
King crabmeat, depending on grade	10-30
Blue crabmeat, depending on grade	6-17
Snow crabmeat, depending on grade	3-10
Spiny lobster, shell-on tails 6/8 oz	8.5-12
Shrimp, shell-on tails 21/25 count	6-7
Shrimp, peeled undeveined, 130/150 count	2.5
Scallop	4-6
Oyster, shelled	2-4.5
Clam, minced	1.6
Mussel, shelled	1.1†
Squid, tenderized steak	2-2.5
Surimi-based products	2-3

Source: *Seafood Price — Current, Seafood Business* and private communication from the trade

Notes: * All price data is approximate
† Converted from in-shell price of \$19 per bushel

substitutes. On the other hand, there is demand for a cheap, white, bland-tasting meat with a shellfish texture, for uses where a distinctive flavour is not too important, for example in seafood salads, breading and frying, and heavily sauced preparations. This explains how in certain markets and uses, imitation shellfish can replace crabmeat and scallop, how cheap calico scallop can replace sea and bay scallop, and how squid can be fried in strips as a substitute for clam strips. Mussel is also a cheap and plentiful item and in certain uses, such as breaded products, is used instead of more expensive oyster or clam.

E.3 Imports

United States imports of shellfish, excluding surimi-based items from Japan, have increased by 82% from 1980 to 1986.

Table E.3

United States imports of shellfish

	'000 tonnes							
	1980	1981	1982	1983	1984	1985	1986	Change from 1980 to 1986
Shrimp	99.5	101.0	122.6	154.9	155.4	163.3	181.5	x 1.82
Lobster	23.9	26.7	26.2	29.5	33.5	35.5	31.3	x 1.31
Crab	5.1	8.3	12.7	13.9	13.5	14.3	15.8	x 3.09
Scallop	9.5	11.9	9.5	15.5	12.4	19.1	21.7	x 2.28
Oyster	8.4	10.2	11.3	11.4	12.2	15.5	16.4	x 1.95
Clam	4.6	6.8	7.9	8.0	7.9	8.8	10.9	x 2.37
Abalone	1.4	1.2	1.0	1.3	1.2	1.3	1.2	x 0.86
Squid	...	...	...	...	...	...	9.6*	
Conch	...	...	...	...	...	...	0.6*	
Unspecified	11.5	14.5	16.3	23.1	25.4	29.3	15.7	
Total	163.9	180.6	207.5	257.6	261.5	287.1	310.8	x 1.90

Source: FT 246, United States Dept. of Commerce, Bureau of the Census

Note: * squid only recorded separately in 1986, conch from July 1986

Shrimp accounted for 58.4% of the total in 1986 while scallop, oyster, crab, clam and squid were also important items. The 'unspecified' category accounted for 15,700 tonnes in 1986; some indication of the items included in this category can be gleaned from data for imports into California and Arizona, which include octopus, conch, dried shrimp, langostino, New Zealand green-lipped mussel and sea-urchin roe.

Table E.4

Imports into California and Arizona of miscellaneous shellfish products*

	tonnes				
	1983	1984	1985	1986	Major origins in 1986
Conch					
Fresh or frozen	75	25	49	34	Chile
Canned	750	765	619	549	Chile, Peru
Cuttlefish					
Fresh or frozen	187	249	274	316	Korea, Japan, Hong Kong
Jellyfish					
Fresh or frozen	11	43	18	46	Malaysia, Singapore
Dried	29	44	31	69	Malaysia, China, Japan
Langostino, fresh or frozen	...	43	155	8	Argentina
Slipper lobster					
Meat	300	291	387	462	Taiwan, Thailand
Tail	449	394	442	582	Malaysia, Taiwan, Thailand, Hong Kong
Mussel, fresh or frozen	128	254	336	526	New Zealand, Canada
Octopus, fresh or frozen	810	606	1,448	1,583	Philippines, Hong Kong, Japan, Thailand
Freshwater prawn, fresh or frozen	...	...	...	726	Thailand, Burma, Bangladesh
Sea urchin roe, fresh or frozen	66	150	136	141	Mexico
Shrimp, dried	247	468	349	506	Taiwan, Japan
Squid					
Fresh or frozen	2,737	3,014	2,352	2,251	Thailand, Argentina, Taiwan
Fresh or frozen steaks	65	284	645	993	Japan, Taiwan, Singapore
Canned	8	73	81	22	Malaysia
Dried	84	174	130	109	Korea

Source: *Statistics and Market News*, NMFS, Terminal Island, California

Note: * The only products shown are those of which significant quantities are imported which are not separately classified in the Federal Trade Statistics

The remainder of this appendix contains a more detailed discussion of some of the main shellfish items. Conclusions concerning the prospects for developing country suppliers are given in Section 3, *Shellfish (including frogs' legs and surimi-based products)* of the main text.

E.4 Shrimp

E.4.1 Introduction

The following is a broad discussion of the United States market for shrimp. Readers requiring more detailed, though somewhat dated information, should consult Rackrowe *et al.* (1983).

There are three main kinds of shrimp consumed in the United States.

- (a) Cold-water species which inhabit temperate oceanic waters. These grow slowly and are small compared to warm-water species. Most supplies come from the Pacific coast of the United States and Norway.
- (b) Warm-water species, which inhabit coastal areas of the tropics, mature rapidly and often attain a large size. They are caught domestically in the Gulf of Mexico and the South Atlantic, and are imported, almost entirely from Latin America and the Far East.
- (c) Freshwater shrimp, which live in rivers and lakes, principally in tropical areas and which grow to a large size.

Of the types mentioned, warm-water species account for most of the consumption in the United States.

Shrimp is normally traded in a frozen form, usually raw but sometimes cooked. There is a relatively small market for canned shrimp, for which the smaller sizes, peeled and pre-cooked, are used. Dried shrimp is a minor item consumed by the ethnic population of Far Eastern origin.

In order to meet the requirements of different market segments, processors supply frozen shrimp in several main product forms.

- (a) *Headless, shell-on*. This is the most common form and that in which most imports are presented.
- (b) *Peeled and deveined (p.&d.)*, either block frozen or i.q.f. Processors of breaded shrimp often require that the last segment and tail of the shell be left in place; this is referred as p.&d. tail-on. p.&d. shrimp may also be butterflied, i.e. split down the middle so that the meat spreads out laterally, as an added facility to breaders.
- (c) *Peeled undeveined (p.u.d.)*, block frozen. Head, shell and tail are removed but the vein is left.
- (d) *Breaded or battered shrimp*. These are usually prepared using tail-on p.&d. shrimp, and are packed i.q.f. Breaded shrimp is sold as 'imitation breaded' (less than half the weight being shrimp), 'regular breaded' (at least 50% shrimp) and 'lightly breaded' (65% shrimp), according to federal standards. Breaded shrimp products often include extruded, minced, or small pieces of shrimp meat, with or without binders.
- (e) *Cooked shrimp*, packed i.q.f. in polythene bags.

Headless shell-on shrimp is graded by size groups, expressed as counts per pound, and when block frozen is normally packed in 5 lb waxed cartons, 10 per master carton. Shrimp in other forms is generally graded in peeled-from counts, that is to say according to their weight before shelling.

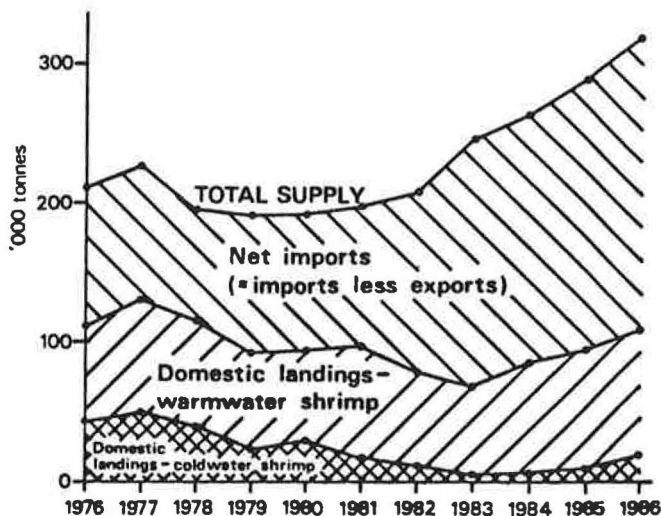
E.4.2 The supply situation

The United States is mainly supplied by catches of wild shrimp off the coasts of North and South America, but landings in this area have levelled out in recent years due to full exploitation of the resource. Increases in demand have largely been met by output from aquaculture in South America, and imports from Asian countries which have traditionally supplied the Japanese market.

Figure E.1 shows how the United States market obtained its supplies in the years 1976 to 1986. After peaking at 228,000 tonnes in 1977, supply of shrimp for domestic consumption declined to less than 200,000 tonnes in 1979, but from 1981 it increased vigorously to reach 320,000 tonnes in 1986.

Figure E.1

Supply of shrimp for domestic consumption



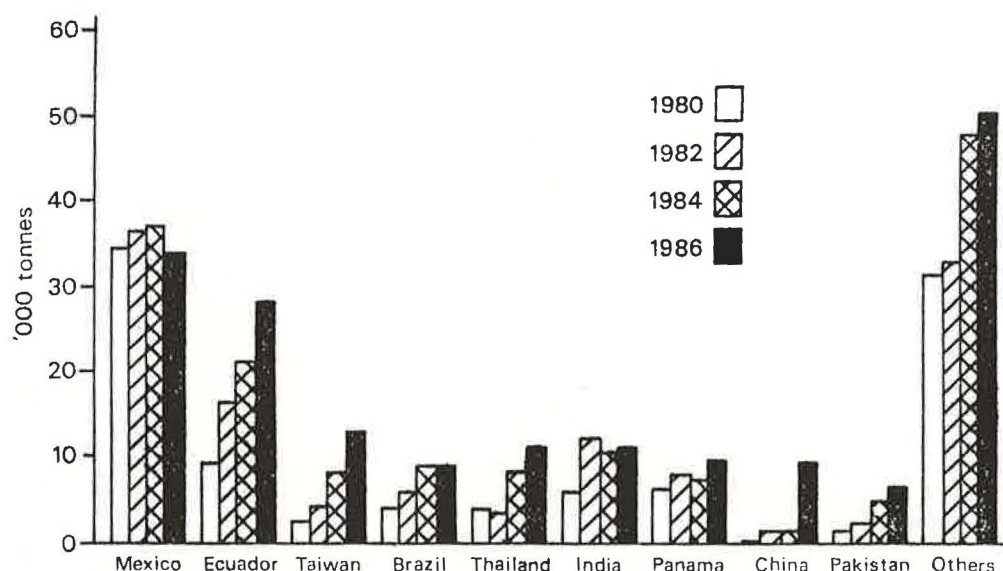
Domestic landings of cold-water shrimp fell dramatically between 1977 and 1983, but showed a partial recovery in 1985 and 1986. Warm-water shrimp accounted for most of the United States catch, but landings of these also declined until 1982, since when there has been a recovery, with 1986 being a record year. Given that United States' warm-water shrimp resources are now more or less fully exploited, sustained increases in catches are unlikely.

Imports grew by 75% in the period 1981 to 1986, to cover the gap between demand and domestic supplies, and in 1986 satisfied about two-thirds of United States requirements. This high level of imports has resulted in what United States fishermen consider to be unremunerative price levels, and they have campaigned, so far unsuccessfully, for the imposition of a tariff.

The leading shrimp suppliers, by order of importance in 1986, were Mexico, Ecuador, Taiwan, India, Thailand, Panama, China, Brazil, Pakistan and Norway. Those contributing most to the growth of imports from 1980 to 1986 were Ecuador, Taiwan, Brazil, Thailand and China.

Figure E.2

United States imports of shrimp by origin, 1980 and 1986



As already noted, aquaculture is of growing importance to the United States market, with Ecuador being the main supplier. The development of Ecuador's industry has been spectacular, with exports to the United States rising from 9,200 tonnes, largely wild caught, in 1980, to 28,100 tonnes, mainly cultured, in 1986. However, this hides the fact that supplies faltered in 1984 and 1985 owing to a shortage of wild post-larvae used to stock the ponds. Wild supplies recovered in 1986, and there was a dramatic growth in hatchery output, which by the end of that year was reported to be supplying 25% of total post-larvae requirements (Chauvin, 1986). Ecuador's supplies to the United States were forecast to grow by a further 30% in 1987 (*Seafood Business*, July/Aug. 1987).

Taiwan is the other leading exporter of cultured shrimp, producing the tiger prawn (*Penaeus monodon*). Most exports are to the Japanese market, but Taiwan now has a major foothold in the United States. Since 1983 there has been a major rise in supplies of white shrimp (*Penaeus orientalis*), mostly cultured, from mainland China and this has been acclaimed by the United States trade because of its excellent quality. Given massive potential, supplies from China are expected to continue increasing.

E.4.3 Types of product imported

About 66% of imports of shrimp are in the raw headless shell-on form, 23% raw peeled, 8% cooked and peeled, 4% canned, while imports of breaded shrimp

are negligible. Raw headless imports increased by 82% from 1980 to 1986, while peeled shrimp increased by about 60% in the same period. Up to 1985, cooked and peeled shrimp showed much faster growth than raw peeled. About 60% of cooked and peeled product is cold-water shrimp from Norway and other countries, and imports from these origins compensated for falling domestic output. However in 1986, cooked and peeled supplies from Norway fell greatly due to poor catches, while imports of raw peeled shrimp increased substantially, by 6,500 tonnes.

Table E.5

United States imports of shrimp, by product type

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	99.5	101.0	122.6	154.9	155.4	163.3	181.5
of which:							
Raw, headless, shell-on	62.9	63.9	82.2	98.4	102.4	105.5	118.9
Raw, peeled	30.1	29.7	29.4	37.0	34.3	35.2	41.7
Cooked, peeled	4.5	4.0	6.8	12.3	12.4	14.5	13.7
Breaded	0.1	1.4	1.8	1.2	0.1	0.3	0.1
Canned	1.9	2.0	2.4	6.0	6.2	7.8	7.1

Source: FT 246, United States Dept. of Commerce, Bureau of the Census

Latin American suppliers have generally specialized in raw headless shell-on shrimp while Far Eastern countries have supplied most of the peeled and canned product. There are several causes for this, as follows:

- (a) United States buyers have established a strong position in Latin American countries, while Japanese buyers tend to dominate the Asian market;
- (b) the food-service trade requires high quality raw headless shrimp, which is mainly supplied by domestic landings and Latin America. By contrast, retailers and price-conscious manufacturers making cooked, breaded and other products, often seek the relatively cheap peeled shrimp from India, Taiwan, Thailand, Pakistan and other Far Eastern exporters. Here it is relevant that labour costs for peeling are lower in most of Asia;
- (c) the black tiger shrimp is the main species cultured in the Far East and has met some resistance in the United States, because of its dark appearance and the thickness of its shell, which makes it difficult to peel. However the degree of resistance appears to be diminishing as United States users become more accustomed to this species.

E.4.4 Market profile of consuming segments

The United States market does not classify tropical shrimp by species but refers to its colour (white, brown or pink) and to its country of origin. Generally, white shrimp is preferred, though there are regional colour preferences.

Of the several product types traded, the most important is the headless shell-on block, which is mainly bought by restaurants. Besides this, processors, using domestic or imported shrimp, pack large quantities of breaded and peeled shrimp, either raw or cooked, and these products are sold to both food-service and retail users. Popularity of breaded shrimp peaked in the 1970s when domestic output reached 50,000 tonnes (in 1973 and 1978), but since then demand has stagnated as a result of the general trend away from breaded items; output for 1986 was 48,000 tonnes. Breaders prefer counts from 26/30 to 41/50, though some 61/70 and 71/80 are also used.

Peeled shrimp is used by restaurants in cocktails, salads and other dishes, with smaller sizes going to retail outlets. Products may be either p.&d. or p.u.d., cooked or uncooked, i.q.f. or block-frozen.

Although not borne out by all surveys, it is widely believed in the trade that 80% of shrimp is sold to the food-service sector, where it is mainly used by fashionable and family restaurants.

In the past, shrimp has been considered too expensive by the fast-food trade, but this situation is changing as several major chains have introduced or started test-marketing shrimp-based dishes. Sizes of shrimp used by restaurants range from the very largest, used in the entrées of white table-cloth restaurants, to the smallest peeled counts, used in salads. Development of the fast-food market should increase demand for small peeled shrimp.

Portion-control is basic to a successful restaurant operation, which will usually buy only one or two sizes of shrimp, selected according to cost and the type of clientele being served.

Most of the remaining sales go to the retail sector, where price competitiveness is a dominant consideration in sales, and counts from 21/25 and smaller are generally used. For frozen products, branding and promotion is of the greatest importance, but a growing proportion of product, mostly thawed, is sold over the counter without brand identification. The increasing popularity of frozen meals is also stimulating demand for shrimp at retail level, and manufacturers of such products mainly use p.&d. blocks in the range 16/20 to 81/90. Overall, the retail sector is seen to offer great opportunity for increased sales of shrimp.

An important factor contributing to market development, particularly in the food-service sector, is the increasing importance of aquaculture. Year-round availability and more consistent quality and grading encourage manufacturers and restaurateurs to establish new product and menu items. Aquaculture presently supplies counts in the range 20-50 per lb, which are those giving the best return to the farmer, though now it is reported that farmers in Central America and China are preparing to produce 71/80s and smaller sizes.

E.4.5 Quality issues

Most imported shrimp is of good quality, as foreign suppliers have striven to improve handling and thereby meet the requirements of their United States customers and the FDA. This is particularly the case of the Latin American countries, where local initiative has been complemented by extensive United States involvement in the domestic industries. Aquaculture has contributed to improved quality, because the cultured product is normally packed within a few hours of harvesting, and size grading tends to be better. As a result of the high standards achieved, shrimp from this region generally sells at a par, and sometimes at a premium to domestic supplies. Asian shrimp tends to be regarded as of lower quality, reflecting the less organized state of the producing industries, and reportedly greater environmental pollution compared to Latin American waters.

Quality problems of imported shrimp often result in FDA rejections, and some of the major causes are: high bacteriological counts, decomposition, the presence of undeclared or prohibited additives (e.g. sulphites and borates), filth, incorrect weights and counts, and overglazing. However due to the FDA inspection programme, serious problems of this kind tend to be corrected promptly.

E.4.6 Prices

There is a remarkable uniformity between prices of shrimp from different origins, particularly among countries on the American continents. The main factors accounting for those differences which do exist are size, type and reputation, this is demonstrated by the data in Table E.6.

Generally, the lower the shrimp count, the higher the price, although shortages of certain counts may temporarily alter this relationship. The importance of the type of shrimp explains the variable discounts between white, brown and black tiger shrimps, and between salt-water and freshwater shrimp.

Table E.6

Shrimp prices ex-warehouse, New York, 16 April 1986

		US\$ per lb											
Headless shell-on block	Un/5	Un/10	Un/12	Un/15	16/20	21/25	26/30	31/35	36/40	41/50	51/60	61/70	71/80
US Gulf of Mexico													
White				6.70	6.40	6.30	5.80	5.30	4.75	4.25		3.10	2.60
Brown				6.60	6.15	6.05	5.75	5.30	4.70	4.30		3.00	
Mexico*													
White	8.10	7.10	6.90	6.90	6.90	6.10	5.80	4.70	4.30	3.70	2.85	2.00	
Brown	7.50	6.90	6.30	6.30	6.30	5.50	5.20	4.50	4.00	3.50			
Ecuador													
White	8.40		7.10		6.65	6.45	5.80	5.40	4.70	4.15	3.55	3.05	
Brown					6.40	6.20	5.55	5.15	4.45	3.90	3.30	2.80	
Philippines/Thailand/Taiwan													
Black tiger				6.50-6.60	5.80-5.85	4.75-4.80	4.40-4.50						
China													
White (AAF)						6.10	5.55	4.55			3.40	2.80	2.45†
Burma													
Freshwater	7.75	7.50 ⁺	6.75	5.65	5.35	4.60	4.30	3.95		3.50	3.05	2.70	2.25†
Bangladesh													
Freshwater					5.30	4.60	4.30						
Peeled meat blocks													
		91/110	110/130	130/150	130/200	150/200	200/300	300/500					
US Gulf of Mexico, PUD													
		3.40	2.80	2.50	2.20								
India, P&D													
					2.45	2.25	2.10						

Source: INFOFISH Trade News

Notes: * FOB Los Angeles

+ Un/8 count

† 71/90 count

Not shown in Table E.6 is the pink shrimp from northern Brazil and Guayana, normally sold at a premium over white shrimp.

Shrimp prices tend to follow a seasonal pattern, with the price of each size dropping as domestic production of that size increases. Generally, the highest prices are paid early in the calendar year. The Gulf of Mexico season starts in May/June, and shrimp sizes increase as the season advances; this has the effect of successively depressing prices for each larger count. Other countries whose supplies significantly affect price movements are Mexico and Ecuador.

Increasing supplies of cultured shrimp are tending to depress the prices of middle-sized shrimp *vis-à-vis* large shrimp. Due to this, the price gap between 16/20s and 21/25s was more than \$ 2.00 in mid-August 1987, the biggest spread in memory.

E.4.7 Market prospects and opportunities for developing countries

The supply situation. The United States market will continue to rely increasingly on imports, and imports will include a growing proportion of cultured shrimp. In the past a single country, Ecuador, has been the main source of cultured shrimp, but major increases in output are now expected from a number of exporters including China, Mexico, Philippines, Taiwan, Indonesia and Ecuador itself (Chauvin, 1986). A large part of this production will be marketed in the United States, which along with Japan, accounts for about three-quarters of world imports.

Demand. Personal disposable income (PDI) is a major determinant of demand, while price does not appear to be important. This was demonstrated by Rackowe *et al.* (1983), who found that a 10% increase (or decrease) in per caput PDI brought about an 11.7% increase (or decrease) in consumption, while a 10% increase (or decrease) in prices caused a 1.9% decrease (or increase) in consumption. Prices of meat, fish and poultry were found not to have a statistically significant effect on demand.

Being largely a function of PDI, one may expect demand to grow in the long term, with peaks and troughs resulting from cyclical fluctuations in the economy. Other factors likely to stimulate demand are increasingly favourable attitudes towards seafood, product development and aquaculture. The regular supply and consistent quality of cultured shrimp is a spur to increased offtake.

Outlook for prices and consumption. In 1986 and the first half of 1987, shrimp prices were high by historical standards, between \$ 6.00 and \$ 8.20 per lb wholesale New York for 21/25 shell-on Gulf of Mexico shrimp. However, because of greatly increased aquaculture supplies, the long-term trend is likely to be downwards, at least in constant price terms. It is unlikely that shrimp will enjoy a sellers' market as it has in the past, and competition among suppliers will intensify both in terms of price and quality.

It is uncertain to what degree the United States market will expand to absorb the increased supplies. While the study by Rackrowe *et al.* (1983) indicates that the market is not very price-sensitive, this is not necessarily true of particular segments with untapped potential, notably fast-food restaurants and the retail sector. It remains to be seen whether the combination of reduced prices, changing attitudes towards seafood and promotion will open major new markets for shrimp.

Opportunities for value-added products. Apart from increasing their supplies of products traditionally exported to the United States, producing countries can supply more value-added products, particularly raw and cooked peeled shrimp. Opportunities are not so bright for breaded products, for sanitary reasons, since breading tends to pick up moisture and thereby become contaminated during transit from the country of origin. However there is no doubt that Mexico, having direct land-routes to the United States, could supply more breaded products. Generally, Asian countries are better placed than Latin America to supply peeled products, as their shrimp tends to be less acceptable in the headless shell-on form.

It has been noted that, in recent years, imports of canned products (from Thailand and other countries) have grown very fast, but this has been at the expense of domestic production. As an estimated two-thirds of canned shrimp consumed in the United States is now imported, and overall demand is more or less static, future growth in demand is likely to be more limited than in the past.

E.4.8 A note on freshwater shrimp

Frozen blocks of headless shell-on freshwater shrimp are imported from several Asian countries and territories including Burma, Bangladesh, India, Thailand and Taiwan. As freshwater shrimp is not classified separately in official trade statistics, the quantity imported has to be estimated. One well-informed source puts current (1986/7) imports at 1,800 tonnes per annum, but according to another party, the figure for 1982 and 1983 could have been four times this level.

Whatever the true figure, there is a healthy market for freshwater shrimp as an economical product to be used where size and appearance are important, but flavour and texture are not. Freshwater shrimps are very large, with counts up to Un/5, but their texture is considered soft and watery, lacking the typical 'bite' of other shrimps. They are unsuitable for boiling, but may be grilled, for example as a scampi-type preparation. Compared to white warm-water shrimp, they sell at a variable discount ranging up to \$ 2.00 depending on count.

As they are both cheap and decorative, freshwater shrimp are extensively used by the food-service establishments ranging from fashionable restaurants to small ethnic users. Demand is strong and expected to increase, and the main obstacles to increased sales are problems of quality and continuity of supply.

E.5 Spiny lobster

Introduction

Spiny lobster, also known as rock lobster and crayfish, are harvested throughout the world in tropical and subtropical waters. They can be classified for commercial purposes into two types: cold-water and warm-water. Being considered firmer-fleshed and tastier, the former are preferred, but it is unclear how much this is due to the inherent qualities of the species concerned, and how much to the better handling of cold-water tails and to prejudice among buyers who automatically assume that they are better.

Spiny lobster was originally introduced as an off-season substitute for New England lobster, but as the supply of the latter declined it became an established year-round item. It is mainly marketed as i.q.f. shell-on tails.

Supply and demand

Total United States supply of spiny lobster, in all product forms, was 23,800 tonnes in 1985, measured in tail weight. The long-term trend in supply seems to be fairly static, reflecting a limited resource base. While Florida packs some warm-water tails, part of which come from the Bahamas, 96% of supplies are imports. Imports of frozen tails are around 13,000 tonnes per annum (see Table M.8, Appendix M) and the ratio between cold- and warm-water origins is about 55:45. Cold-water tails come principally from Australia, South Africa and New Zealand. Brazil is the leading supplier of warm-water tails, and most of the remainder comes from countries in or around the Caribbean.

Spiny lobster is also imported as frozen meat under the category 'lobster, not elsewhere specified, fresh and frozen', which includes slipper lobster from Far Eastern countries. Developing country and territory suppliers under this category are Honduras, the Bahamas, Mexico, Taiwan, and Thailand (see Table M.9, Appendix M).

Quality aspects

The leading suppliers of cold-water tails all have reputations for good and consistent quality with little variation in appearance and flavour. Brazil's exports are now mainly handled by a co-operative, under a single national brand, and have gained an excellent reputation for quality, grading and consistency of supply. However, some of the lesser origins do not maintain the same high standards on a consistent basis, the main problems being overglazing, poor grading, yellowing and dirt.

Overglazing is a means by which shippers seek to increase their return from a given weight of lobster, and in some cases takes the form of injecting water between the shell and the tailmeat. In the long term it is highly counter-productive for the shipper, as it undermines customer confidence. Yellowing, on the other hand, is a symptom of dehydration which results from underglazing. Shippers should follow Brazil's example of supplying tightly graded tails, using 1 oz intervals, with an even light glaze, taking special care to properly glaze the large end where the meat is exposed, as this will greatly assist portion control.

Price

Australia is generally regarded as price leader, selling at a premium to other origins. Australian prices for 8/10 oz tails in 1986 were \$ 11-15 per lb, while Brazilian tails of similar size were \$ 10-11 per lb. Caribbean tails sell at a discount to Brazilian tails, selling at \$ 8.55-8.80 in April 1986, and there are tails of some origins which sell at even lower prices, for example, Haitian tails at \$ 7.25-7.30. The premiums which Brazil earns over other warm-water origins appear to vindicate its approach to marketing.

E.6 Crab and crab meat

Introduction

The most important domestically exploited crab are the following: blue crab, snow (or queen) crab, king crab, Dungeness crab, stone crab, red crab and rock crab. The name soft-shell crab, much used in restaurants, applies to blue crab which has recently moulted. The most popular of the types mentioned is the Alaska king crab; it is also the largest, typically weighing 7 lb when caught.

Crabs are sold in many different forms: live, cooked and fresh, frozen, pasteurized and canned.

Snow and king crabs are usually marketed frozen as clusters or sections (that is, packs of shoulders, legs and claws), legs, claws, legs and claws, and meat. Most is sold as clusters. Meat is frozen in 5 lb blocks and is classified into quality grades according to the parts of the crab it comes from, with names such as: *merus meat*, *fancy meat*, *salad meat*, *tail meat* and *ricemeat*.

By contrast, blue crab meat is mostly pasteurized and chilled, as this better retains the texture and flavour than does freezing. Meat is classified as *jumbo lump*, *flake* or *body meat*, *claw meat*, and *cocktail claws* (see Dore, 1982 for further details).

Supply and demand

Crab stocks are in general vulnerable to overfishing and this is particularly true of the highly valued king crab, whose fishery has a history of boom and bust. Estimated consumption of crabmeat peaked at about 39,500 tonnes in 1981, but following the demise of the Alaskan king crab fishery from that year onwards, has fallen to a level of 33,000-34,000 tonnes per annum.

Table E.7

Estimated United States consumption of crab

'000 tonnes (meat weight)

Year	Hard blue crab	Dungeness crab	Snow (Queen)	King crab	Other domestic crab	Other imported crab	Total natural crab	Imitation crab	Grand total
1980	10.4	4.6	8.8	10.8	1.3	2.7	38.6	1.4	39.9
1981	12.4	3.9	8.9	9.4	1.8	3.1	39.5	2.5	42.0
1982	12.4	3.5	8.6	4.0	1.3	3.6	33.3	7.7	41.0
1983	12.2	3.1	8.3	2.4	0.9	6.4	33.3	15.9	49.2
1984	12.8	2.9	9.7	0.2	1.9	6.3	33.8	29.9	63.7
1985	12.1	3.1	10.0	2.3	1.6	5.3	34.4	37.6	72.0
1986	11.7	2.4	8.9	1.9	1.2	7.5	33.6	...	...

Sources: For data up to 1984, Vondruska (1985). For 1985 and 1986: *Fisheries of the United States*, United States Dept. of Commerce NMFS; *FT 246*, United States Dept. of Commerce, Bureau of the Census; Vondruska (private communication); author's calculations

The decline in domestic catches has been more than offset by a massive increase in consumption of imitation crab meat, reaching about 46,000 tonnes in 1986. However it should be noted that imitation crab meat has become popular as a seafood in its own right as well as being a substitute for true crab meat in certain uses.

Imports of crab and crab meat have partly made up for lower domestic output, climbing from 5,100 tonnes in 1980 to 15,800 tonnes in 1985 (these figures are in product weight, not in meat weight as the consumption data above).

King crab products are imported from the Soviet Union, Japan and Chile, and those of snow crab principally from Canada, Korea and Japan. Canned pasteurized crab meat is imported from Venezuela, both fresh and frozen, and this product supplements supplies of domestic blue crab. Thailand and Malaysia

Table E.8

Crab and crab meat, imports into the United States

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	5.1	8.3	12.7	13.9	13.5	14.3	15.8
of which:							
Crab, fresh and frozen	0.7	1.6	4.7	3.2	4.7	4.5	4.9
Crab meat							
Fresh, chilled or frozen	1.5	3.2	4.4	6.5	5.4	5.9	6.6
Canned							
Snow crab	0.3	0.3	0.3	0.3	0.5	0.6	0.5
Other	1.9	2.0	2.3	2.6	2.4	2.8	3.5
Prepared or preserved							
Not canned	0.6	1.2	1.0	1.2	0.5	0.4	0.4

Source: FT 246, United States Dept. of Commerce, Bureau of the Census

supply canned crab meat in consumer packs. Imports of these have been mainly at the expense of domestic output, which declined from 2,100 tonnes in 1980 to less than 500 tonnes in 1986. Imports of crab meat by origin are shown in Appendix M, Tables M.10 and M.11.

Prices

Alaskan king crab is the most expensive, with wholesale prices well above those of imported substitutes. For example, wholesale prices on 25 March 1986 were \$ 17-18 per lb for frozen Alaskan *bulk fancy* meat, but only \$ 8.25-8.60 for the same grade from Chile. The cheapest grade available was Canadian snow crab *salad meat* at \$ 3.05-3.25. Prices of Venezuelan canned pasteurized product varied from \$ 3 per lb to \$ 14 per lb according to the type of meat. Imported canned crab meat in retail packs cost between \$ 15 and \$ 42 per 12x6 oz case (\$ 3.30-9.30 per lb) c.&f., depending on quality.

The substantial increase in supplies of imitation crab meat seem to have had a much greater effect on prices of king and snow crab meat than on blue crab meat, but this situation may change as better substitutes for blue crab are marketed.

Prospects

A major recovery of the Alaskan king crab fishery is not likely, and overall domestic output of crab is expected to fall increasingly short of demand. The prospects for imported frozen or chilled products is therefore good. In contrast, prospects for increased imports of canned retail packs are likely to be limited by slow-growing demand.

E.7 Scallop

Introduction

There are more than 400 species of scallop in the world, but in the United States basically three types are harvested: sea scallop, bay scallop and calico scallop. Sea scallop is the largest of the three, and in the past most catches have been of this type, which is dredged from the north-west Atlantic by United States and Canadian fishermen. Bay scallop is the best flavoured type and is hand-dredged in much smaller quantities in estuaries and bays along the north-east coast. Calico scallop is inferior in flavour to both bay scallop and sea scallop, but being of similar size to bay scallop is sometimes substituted for it. It has been caught in large quantities off Florida and the Carolinas, but has been subject to considerable overfishing and therefore variable catches.

Scallop is imported from a number of countries, and is frequently sold under names indicating the country of origin, for example, Icelandic scallop, Panamanian scallop. Canada supplies sea scallop from the same fishery used by New England fishermen.

United States citizens only eat the adductor muscle, or the 'eye', of the scallop; the roe is not eaten and the 'skirt', that is, the membranes attached to the meat, have to be fully trimmed off. Fresh scallop meat is typically packed in gallon plastic containers or 40 lb bags, the latter being usual with sea scallop. Frozen meat is sold in block form or i.q.f. and is size graded in counts per pound. Counts are typically 70/90 for bay scallop, 60/240 for calico scallop and an average of 40 for sea scallop, but the size of sea scallop has been depressed in recent years, apparently due to overfishing. Japanese scallop tends to be large, up to 10/20 count, while Peruvian and Panamanian scallops are largely within the 60/100 range.

Scallop has a delicate, slightly sweet flavour and is popular in sauced dishes and seafood salads, being easy to combine with other ingredients. Increasing demand may be partly attributed to its reasonable price in relation to most other shellfish. Though mainly consumed in restaurants it is also increasing in popularity in the retail sector.

Supply and demand

Because of variable domestic harvests, supply of scallop for United States consumption have been variable, peaking at 39,400 tonnes meat weight in 1984, then falling back to 31,900 tonnes in 1986.

Table E.9

United States supply of scallop meats for domestic consumption

Year	United States commercial landings				Imports	Total
	Bay	Calico	Sea	Total		
	1980	0.4	—	13.0		
1981	0.3	6.6	13.7	20.7	11.9	32.6
1982	0.8	5.0	9.7	15.5	9.5	24.9
1983	1.0	4.4	9.3	14.7	15.5	30.3
1984	0.8	17.8	8.4	27.0	12.4	39.4
1985	0.6	5.7	7.2	13.5	19.0	32.5
1986	0.3	0.7	9.1	10.1	21.7	31.9

'000 tonnes

Source: Fisheries of the United States, United States Dept. of Commerce NMFS

Developments in fishing technology have put increasing pressure on stocks of sea scallop and output has fallen by over 30% since 1981. Since then the calico scallop harvest has collapsed and there has been a major surge in imports. Imports of scallop by origin are shown in Table M.12, Appendix M. Most come from developed countries including Canada, Japan, Iceland and the United Kingdom, although two developing countries, Peru and Panama, have also been important sources. Peru's supplies reached over 5,000 tonnes in 1985, but fell to less than 2,000 tonnes the following year. However, this was offset by imports of 3,500 tonnes from Panama, where virgin beds have been exploited.

Prices

There is a price hierarchy, with bay scallop at the top and calico scallop at the bottom. At the end of 1986, frozen Canadian 10/30 sea scallop was United States \$ 6.50-7.00 per lb f.o.b. New York, Japanese, Icelandic and Peruvian 30/40s was \$ 5.10-5.45 and United States calico scallop approximately \$ 2.90-3.70 per lb (*Seafood Leader*, 1/87). It should be noted that prices of middle-range imported scallop like that from Iceland, Japan, Peru and Panama are very sensitive to the calico scallop harvest, and a bumper harvest as in 1984 may result in prices in the \$ 3-4 per lb range.

Outlook

The long-term trend to increasing dependence on imports is likely to continue,

although requirements will be reduced in years of good calico scallop harvests. Prospects are good for countries practising scallop culture, providing they can maintain adequate supplies of seed, avoid major problems with disease, parasites, etc.

E.8 Clam

Introduction

The United States is the world's second largest producer of clam. Many species are harvested but most commercial supplies come from the east coast where there are three main categories: hard shell, soft shell and sea clam. Sea clam is the largest commercial fishery product; it consists of two main types: surf clam and ocean quahog.

Being the most abundant and economical type of clam, sea clam is sold as frozen meat, either breaded or unbreaded. The mantle of this clam is also used to make clam strips, while the rest is used to make frozen or canned chopped clam meats which are used in chowders and other prepared foods. Many speciality products are also available and the juice is widely marketed for use in chowders. Surf clam obtains higher prices than ocean quahog because its meat is lighter and more tender.

Clam chowders are thick soups, traditionally consumed in north-east United States, and there are many recipes, incorporating ingredients such as milk, cream and tomato juice. Clam strips are made by slicing the clam's mantle into pieces typically 4" long x ¼" wide x ⅛" thick, while 'minced clams' are made from the edges of the mantle and other meat of the clam, passed through variable-sized grinders (often ½"). Smaller clams unsuitable for making strips are minced entirely. Frozen clam products (minced, chopped or strips) are normally packed in 12/ 1/2 gallon plastic containers or in 10/5 lb blocks. Containers are sold by the meat-to-juice ratio, for example, 60/40 means 60% meat, 40% juice.

Hard-shell clam and soft-shell clam are top-of-the-market items, but in relatively short supply. They are mainly marketed live in the shell, although they are also sold frozen, usually as value-added prepared products. Hard-shell clam is often used to make 'stuffed clams' and soft-shell clam is sold as breaded meat; both of these products are in an i.q.f. form. Readers requiring further information on the quite complex trade in live clam are referred to *Seafood Leader Buyers' Guide 1987* and Dore (1984).

Supply and demand

Total supply of clam for United States consumption has increased by 60% from 46,400 tonnes to 73,600 tonnes meat weight since 1980.

Table E.10

United States supply of clam meats for domestic consumption

Year	United States commercial landings				Total	Imports	Total
	Hard	Soft	Surf	Other			
1980	6.1	4.1	17.1	16.0	43.2	3.1	46.4
1981	8.0	3.7	20.9	21.9	54.7	4.3	59.0
1982	5.8	3.6	22.6	17.1	49.1	5.0	54.2
1983	6.4	3.8	25.4	16.7	52.4	5.0	57.3
1984	6.7	3.6	31.9	18.1	60.3	5.0	65.3
1985	7.6	3.6	32.9	24.2	68.2	5.9	74.2
1986	5.3	2.7	35.7	22.2	65.9	7.7	73.6

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS

Most of the increase in demand has been met by rising output of surf clam, but imports have also risen, from 3,100 tonnes in 1980 to 7,700 tonnes in 1986 (meat weights). Imports by product type are given in Table E.11.

Table E.11

Clam products, imports into the United States

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total*	4.6	7.9	7.9	8.0	7.9	8.8	10.9
of which:							
Canned boiled clam ⁺							
(a) Containers not over 24 oz	(2.4	2.4	2.9	2.6	2.6	2.8	3.5
(b) Containers over 24 oz	(0.6	0.6	0.7	0.7	0.9	1.6	2.7
Fresh, frozen, prepared or preserved other than by canning	2.1	3.8	4.3	4.6	4.3	4.4	4.6

Source: FT 246, United States Dept. of Commerce, Bureau of the Census

Notes: * The total includes small quantities of canned razor, clams and clam juice which are not shown separately
⁺ For imports of canned clams by country of origin, see Appendix M, Tables M.13 and M.14

Fresh and frozen clam which mainly come from Canada have shown very little market growth since 1982. Developing countries have supplied only very small quantities, and this may be due to the fact that all these countries, with the exception of Mexico and Korea, are outside the National Shellfish Sanitation Program (see Section H.5, Appendix H).

Canned clam is supplied mainly by Thailand, Malaysia and Korea, and accounts for an estimated 37% of United States consumption. The product imported is mainly 'whole baby clam' (in 10 oz and 28 oz cans), as opposed to domestic products which are larger clam in minced or chopped form. Retail packs are used by housewives to make chowders, dips, sauces and a variety of other dishes and are particularly popular around Thanksgiving, Christmas and Lent. The leading retail brands are Gortons and Doxsee, and these dominate the important north-east market where imported products are less acceptable.

Imports of these smaller packs were fairly stable at 2,600-2,900 tonnes between 1982 and 1985, reflecting a lack of growth in the market as a whole. In 1986 there was a significant increase to 3,500 tonnes. However, most of the growth in imports has been in institutional packs, with the volume nearly quadrupling from 1983 to 2,700 tonnes.

Other important canned clam products are chowders and juices, of which United States output was about 37,000 tonnes in 1986 (Anon., 1987). Leading manufacturers include Gortons and Campbells Soups, and there are no significant imports.

Prices

Frozen, chopped or minced surf clam sold at around \$ 1.50-1.70 f.o.b. east coast in mid-1986, while similar products of ocean quahog sold for less than \$ 1 per lb. Surf clam strips were in the range of \$ 1.80-2.05.

Trends in prices for imported canned clam has paralleled those for several other canned products also imported predominantly from Thailand. In 1980, prices of Thai 24x10 oz baby clam was \$ 16 c.&f. However, because of competition between Thai canners, prices fell and reached a low of \$ 10 per case in late 1985, after which there was a minor recovery to \$ 11-12 in April 1986.

Prospects for developing country suppliers

The United States is likely to remain generally self-sufficient in clam, although because of the size and the heterogeneity of the market, there are opportunities for foreign shippers who can compete price-wise or supply speciality products for which demand can be created. After several years of conservative management and the recent discovery of huge new clam beds, the outlook for supplies of surf clam and ocean quahog is good. Hard-shell clam is presently in good supply and will remain so as long as unharvested beds in Florida remain productive. Outlook for soft-shell clam is not so good and there will probably be a need for further imports to supplement those already arriving from Canada.

The duty-free status and low production cost incurred by developing country suppliers give them a good opportunity to increase their share of the canned clam market, in competition with domestic producers. Canned products for retail use should be marketed under a major known brand or private label. It may be possible to sell under the brand of a leading United States manufacturer, although it should be remembered that imported canned clams are a low-priced, low profit-margin commodity.

There may be openings for frozen clam products, but standards of handling will have to be higher than for canned products, and supplying countries must be participants in the NSSP.

E.9 Oyster

Introduction

The main types of oyster produced commercially in the United States are the eastern oyster grown mainly in the Chesapeake Bay on the east coast and in Louisiana, and the Pacific oyster grown on the west coast. These species are similar in appearance and taste, but the Pacific oyster, originally introduced from Japan, is somewhat larger. The eastern oyster accounts for 80-90% of United States production, the Pacific oyster accounts for most of the remainder. In addition, small quantities of the Olympia oyster are produced in Washington State, and attempts are being made on the east coast to farm the European flat oyster. Both are expensive gourmet items. About half United States production is farmed.

Most eastern oyster is sold fresh in the shell for opening by restaurants, and served raw on the half shell as an appetizer. The remainder and all the Pacific oysters are shelled and the meats are sold in gallon cans for institutional use and in small containers down to half-pints for retail sale. Most meats are sold fresh rather than frozen and some retail packs are pasteurized, as this lengthens shelf-life up to a maximum of six months.

Frozen oyster is usually packed as i.q.f. meat, i.q.f. breaded meat, meat with juice (in gallon containers) and meat on the half shell. Frozen i.q.f. meats are imported by breaders to ensure that their raw material is available all the year round.

Oyster, both in-shell and shelled, is graded by count, with the smaller oysters frequently being more expensive (see Dore, 1984, for details). It should moreover be noted that the FDA has legally binding definitions of sizes for oyster meats (see Title 21, Code of Federal Regulations, 161.131).

Supply and demand

Total supply of oyster for United States consumption, in meat weight, peaked at 38,500 tonnes in 1978, then fell to 32,100 tonnes in 1980, since when it has grown steadily to 41,100 tonnes in 1986.

Demand for oyster is currently growing, due partly to the proliferation of oyster bars. Domestic output has failed to respond to the increasing demand, because of growing pressure on the resource from pollution, diseases and pests, and this has resulted in more imports.

Table E.12

United States supply of oyster

Year	United States commercial landings			Imports	Total for United States consumption
	Eastern	Pacific	Total		
1980	19.3	3.0	22.3	9.9	32.1
1981	20.2	2.5	22.7	11.7	34.4
1982	22.0	2.6	24.6	12.5	37.1
1983	20.3	2.5	22.8	14.0	36.7
1984	19.0	2.9	21.9	16.4	38.3
1985	16.6	3.4	20.0	20.8	40.9
1986	15.9	2.5	18.4	22.7	41.1

Source: *Fisheries of the United States*, United States Dept. of Commerce NMFS

Imports have more than doubled since 1980, as can be seen in Table E.13.

Table E.13

Oyster, imports into the United States

	1980	1981	1982	1983	1984	1985	1986
Total	8.4	10.2	11.3	11.4	12.2	15.5	16.4
of which:							
Canned, not smoked*	4.1	4.3	4.9	6.3	7.7	9.7	10.9
Canned, smoked*	1.8	2.2	2.3	2.2	2.5	3.2	3.6
Not canned	0.7	1.0	1.2	1.6	1.7	2.4	1.8
Oyster juice	1.8	2.7	3.0	1.3	0.2	0.2	—

Source: FT 246, United States Dept. of Commerce, Bureau of the Census. Note: * For imports of canned oyster by origin see Appendix M, Tables M.15 and M.16

Imports of all the items shown in Table E.13, except juice, have increased considerably.

Unsmoked canned oyster is the most important item with 10,900 tonnes in 1986, consisting of bulk institutional packs and boiled oyster for retail use typically packed as 24x8oz. Smoked oyster is usually imported in small cans packed as 24x3 ¾oz. Fresh and frozen oyster is imported mainly from Korea (1,100 tonnes in 1986).

Total supply of canned oyster in 1985 is estimated at 14,600 tonnes, of which 5,000 tonnes were for retail consumption and 9,600 tonnes for institutional use (Source: based on data from SAMI, op. cit.). As with canned clam, almost all growth is in institutional use, while the level of domestic consumption is more or less static. At the same time, the market share of different product types sold at retail level has varied greatly, with smoked oyster gaining in popularity at the expense of the boiled product.

Prices

An idea of relative wholesale prices for fresh, frozen and canned oyster can be obtained from the following quotations for late March 1986:

Eastern oyster	fresh shelled	Virginia/Md.	\$ 3.20-3.66 per lb
	frozen shelled	mid-Atlantic	\$ 3.43-4.11 per lb
Pacific	fresh shelled		\$ 2.97-3.20 per lb
Olympia	fresh shelled		\$ 13.20-14.00 per lb
			in 4oz jars
Boiled oyster	canned 24x8oz	Thailand	\$ 19.45 per case
Smoked oyster	canned 25x3 ¾oz	Thailand	\$ 15.94 per case

Note: Prices of shelled oyster have been converted from prices per gallon by dividing by 8.75

Outlook

It has been forecast that output of Pacific oyster will grow by 30% by 1990, largely as a result of better availability of larvae and genetic improvements which will boost cultured output (*Seafood Leader*, 1/87). However, the long-term outlook for eastern oyster is poor because of pollution and natural sources of contamination, and imports of fresh or frozen products will be needed. As with clam, Chile and New Zealand are likely to become significant suppliers.

E.10 Squid

Introduction

There are hundreds of species of squid world-wide but only members of two families, Ommastrephidae and Loliginidae, are harvested to any extent. Species consumed in the United States include: Atlantic long-finned squid (*Loligo pealei*), Atlantic short-finned squid (*Illex illecebrosus*) and California squid (*Loligo opalescens*), all caught off United States coasts; Japanese squid (*Todarodes pacificus*) and giant squid (*Dosidicus gigas*) caught off the Pacific coasts of Mexico, Central America and South America; squid caught in the South Atlantic (*Illex argentinus* and *Loligo patagonicus*) and arrow squid (*Nototodarus sloani*) from New Zealand.

Generally, squid of the Loliginidae family are smaller and have softer flesh than those of the Ommastrephidae family, which tend to be tougher and easy to over-cook. This largely explains why there is a strong preference for the local long-finned squid in the north-east United States. However the use of tenderizers is diminishing the importance of toughness in raw squid.

The squid has tentacles, wings and a mantle, all of which are edible, but the skin is usually removed before cooking. Processing of squid into cleaned product suitable for immediate use is a labour-intensive operation, which is usually not done in the United States. This explains why the United States is an importer of squid products while being an exporter of whole squid. This situation may change as a result of the development of suitable machines for processing.

The quality of squid scarcely suffers from freezing, and most of the product sold in the United States is sold in this form, although fresh squid is seasonally available in coastal areas. United States catches are mainly sold whole, either for export or domestic consumption, in metric boxes, of typically 10 kg or 20 kg. Imported cleaned products include skinless tubes and tentacles (normally packed in the ratio 70:30), tubes, rings, strips and steaks. Tubes are graded by length, typical packs containing tubes 3" to 5", 5" to 8" and 8" to 12" long, with longer tubes having the higher prices. Rings and steaks are often breaded and steaks are tenderized.

Supply and demand

United States catches of squid averaged 22,900 tonnes from 1981 to 1986, about equally distributed between the Atlantic and the Pacific coasts. However these figures hide a great variability in catches: Pacific landings were abnormally low in 1983 and 1984 as a result of abnormal ocean currents (*El Niño* current), whilst Atlantic landings reached a high in these two years. Landings were exceptionally high on both coasts in 1986, with a combined catch of 34,200 tonnes, as a consequence of greater exploitation of the EEZ resource by the domestic fleet. At the same time the quantity allocated to foreign fleets was reduced from almost 20,000 tonnes in 1985 to 5,100 tonnes in 1986.

The United States squid market is small compared with those of Japan, Korea and southern Europe, but is growing fast. At the federal level, imports only started being recorded separately in 1986, when they were 9,600 tonnes, of which 8,680 tonnes were Ommastrephidae and 920 tonnes Loliginidae. The main suppliers were Argentina, Taiwan, Thailand, Uruguay, Korea, Japan and Mexico. In the same year, United States exports were 6,520 tonnes.

Imports of squid into California and Arizona have by contrast been separately recorded for several years. Imports of all squid products were 3,375 tonnes in 1986, an increase from 2,894 tonnes in 1983. Most notable were the increased imports of squid steaks from 65 tonnes to 993 tonnes (see Table E.4). Hawaii is also an important market, taking 517 tonnes of imports in 1986.

Previously a specialist item used in ethnic cuisine, squid has become widely used by restaurants throughout the United States, largely as a result of the marketing efforts of Ocean Garden Products Inc., which made squid popular under the name 'calamari', and the American fisheries foundations. California has become an important market, having served as a testing ground for new uses.

Market development of squid has been facilitated by processing into added-value products (steaks, rings, etc.) and the use of tenderizers. It is proving very popular in restaurants, for several reasons: it is white, bland and boneless; it is cheap, while tasting similar to abalone; it can be breaded like clam strips, while having a less pronounced flavour; it can be prepared in many ways, sautéed, fried, grilled, boiled, etc.

Prices

The following wholesale quotations are for late July 1986: whole squid, Atlantic long-finned \$ 0.50-1.00 per lb, West Coast \$ 0.35-0.45, imported South American *Illex* \$ 0.40-0.50 depending on size; steaks from Far East and New Zealand \$ 2.00 per lb; breaded and battered rings from Spain \$ 1.50-2.00 per lb.

Outlook

Demand and imports are expected to continue their upward trend, despite variable domestic catches. There is much scope for suppliers of value added products.

E.11 Frogs' legs

Introduction

Frogs' legs are sold throughout North America, mainly to the restaurant trade, and are especially popular in areas of French influence, notably Quebec Province in Canada, northern Michigan and Louisiana. Domestic United States production is minimal, so frogs' legs have to be almost entirely imported from India, Bangladesh and Japan, with some small quantities coming from Indonesia and Taiwan. It is reported that frog farming is being attempted in Ecuador.

The product consists of the hind legs of the edible frog, with skin removed, and attached at the top. These are frozen and packed in polythene bags, generally within 5 and 10 lb cartons.

Table E.14

Frogs, fresh and frozen, imports into the United States

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	1.8	3.2	3.2	2.4	3.7	4.0	3.7
of which from:							
India	0.9	1.8	1.9	0.9	1.9	1.7	1.2
Bangladesh	0.6	1.0	1.0	1.3	1.4	1.9	2.1
Japan	0.1	0.3	0.1	0.1	0.1	0.1	—
Taiwan	—	—	0.1	—	0.1	—	0.2
Netherlands and Belgium	—	—	—	0.1	0.1	—	0.1

Source: FT 246, United States Dept. of Commerce, Bureau of the Census, TSUSA code 1166000

Supply and demand

Imports of frogs' legs into the United States jumped to 3,200 tonnes in 1981, climbed slowly to 4,000 tonnes in 1985, then fell back to 3,700 tonnes in 1986.

Most of the increase in demand has been satisfied by Bangladesh, as the Indian Government has limited supply for ecological reasons. Frogs have an important role in controlling the insect population and their wide-scale slaughter is considered to result in greater crop infestation and losses. As a result, India banned frog trapping during the period May to August, and in March 1987 went on to ban exports.

Generally the United States imports the larger frogs of 2/4, 4/6 and 6/8 count, while medium and smaller counts are sent to France, which is a major frog market. Salmonella contamination is a problem with the wild frogs from India and Bangladesh, due to poor post-harvest handling; this has resulted in rigorous inspection by the FDA at the point of entry.

Prices

In late March 1986, wholesale prices for frogs' legs from India and Bangladesh ranged from \$ 2.30 per lb to \$ 3.10 per lb. Generally the medium sizes, 6/8 and 8/12 counts, are the most expensive.

Outlook

Demand for frogs' legs is strong and increasing, but development of the United States market is hindered by supply limitations and quality problems. Both of these could be overcome if frogs were produced by farming.

E.12 Surimi-based products

Introduction

Surimi is an intermediate fishery product that is used to manufacture finished consumer products, in particular imitation shellfish. It is a colourless and odourless substance produced from minced fish meat that has been washed, refined to remove impurities and mixed with cryoprotectants (sugar and sorbitol) to maintain essential physical properties of the protein during frozen storage. At present almost all surimi made for the North American market is produced from Alaska pollack, a species caught principally within the EEZs of the United States and the Soviet Union.

The Japanese have made surimi for centuries, but it was only in 1959 that cryoprotectants began to be used, allowing a frozen product to be manufactured, and leading to sea-based processing and market expansion. The product is generally sold in 10 kg blocks and there are several grades and prices, the surimi made at sea being preferred to that manufactured on land.

Surimi can be processed into a wide variety of products, but in the United States it is almost entirely consumed in the form of imitation shellfish. Such products contain other ingredients such as egg, starch, sorbitol, real shellfish and breadcrumbs. Surimi's main contribution to products is textural; because of its high concentration of myofibrillar protein, it produces an elastic and chewy texture which can be made to resemble that of shellfish. Apart from imitation shellfish, food scientists have developed a variety of red-meat substitutes including hot dogs and other cooked sausages, luncheon meats and other foods, but it remains to be seen if they can compete with red meat and poultry counterparts.

Labelling of surimi-based foods has caused much controversy, particularly over the FDA guidelines issued in 1985 to the effect that the word 'imitation' be used when the products are not nutritionally equivalent to any natural seafoods they emulate — in reality their protein content is lower than that of natural seafoods. Given the negative connotations of the word 'imitation', the industry has unsurprisingly pressed for changes in these guidelines.

Supply and demand

Total consumption of surimi-based foods approximately doubled each year from 1981 to 1984, but only increased by about 30% in 1985 and 13% in 1986.

Table E.15

Estimated United States supply and consumption of surimi-based foods

'000 tonnes, cooked edible weight

Year	Supply			Consumption			
	Imported		United States Processed	Imitation crab	Other products	Total	Per caput (kg)
	From Japan	From Korea					
1980	1.4	—	1.4	1.4	1.5	2.9	0.013
1981	2.6	—	1.6	2.5	1.7	4.2	0.018
1982	7.3	—	2.2	7.7	1.8	9.5	0.042
1983	15.0	—	3.4	15.9	2.5	18.4	0.079
1984	27.1	—	4.6	29.5	2.2	31.7	0.135
1985	32.1	1.0	8.0	37.7	3.4	41.1	0.173
1986	---	---	---	---	---	46.0	0.190

Source: Vondruska (1985b and private communication); estimates are based mainly on Japanese export statistics. Figure for 1986 is approximate, and is based on a report in *Seafood Business*, July/August 1987

Traditionally, the market for surimi has mostly been supplied by imports from Japan, but United States fishing companies and processors have sought to catch and process a larger proportion of the Alaska pollack within the domestic EEZ. The Alaska-based industry has a growing fleet of factory-trawlers and barges as well as three shore-based plants, all making surimi, and there are about 15 plants in Alaska and other States producing imitation shellfish products, probably exceeding 50% of domestic requirements by the end of 1987.

The gradual exclusion of Japanese vessels from fishing the United States EEZ has led to a frantic search for new sources of raw material in countries as far apart as New Zealand, Chile and the Farøe Islands. Hoki, a previously little-known ground fish from New Zealand waters, has been found particularly suitable and is now being processed by Japanese factory-trawlers. A joint venture has also been signed to produce surimi from Chilean jack mackerel.

The amazing success of imitation shellfish has been attributed to the following factors: low cost compared to natural crab products; shortage of domestic king crab and snow crab from 1982 onwards; reliable supply; a high degree of product acceptance; growing consumer interest in seafood in general. The versatile nature of these products has fitted in well with new trends and product concepts in the United States, particularly salad bars selling *seafood salads*, low calorie prepared entrées, *finger foods* and *nuggets*. However it should be noted that most imitation shellfish is sold retail, and that usage in the food-service sector has been mainly in salads which mask the distinctive taste of the product.

The lesser increase in consumption experienced in 1985 can be largely attributed to the FDA regulations on labelling (see above) and a three-month embargo on certain products containing sugar, including some of the surimi-based products. To this was added in 1986 the scarcity and high prices of raw material created by the world ground fish shortage which has caused Alaska pollack to be increasingly used as a substitute for cod, and surimi prices to increase by as much as 60% throughout the year. By the end of 1986, Japanese made-at-sea surimi cost \$ 1.60 per lb, while good quality United States product cost \$ 1.25 per lb.

Over 90% of surimi-based products have been substitutes for imitation crabmeat, with the rest consisting of imitation scallops, peeled and breaded

shrimp, and lobster. Up to the end of 1986, the latter items had made limited headway in the market-place. Shrimp and lobster substitutes were widely considered to lack the texture of the natural shellfish, while both shrimp and scallop substitutes suffer the disadvantage of competing with natural foods which are not excessively expensive. With better quality products, lobster substitutes may make headway in the market, given the high price of the natural shellfish. In order to reproduce the characteristics of the natural shellfish, quality is of the utmost importance, but heavy price-competition is causing this aspect to be neglected by some processors to the detriment of the trade in general.

Outlook

The availability of suitable raw material is a major constraint on the future growth of this industry. Alaska pollack is already being harvested at near full potential, but this species as well as other formerly underutilized ground fish such as hake and hoki are in increasing demand as cod substitutes.

A major challenge for the surimi industry is to make use of the vast catches of small oily pelagic fish, such as menhaden and Chilean pilchard, which are presently used in making fish meal. While such species can be used to make surimi with acceptable functional properties, there are some difficulties. Oils have to be removed from the pelagic fish and this means that yields are lower and processing costs higher than for ground fish. Besides this, colour and odour are likely to hinder incorporation into imitation shellfish. Surimi from such sources may be of use in red-meat substitutes and other applications where whiteness is not important. Despite this, the prospect of using menhaden in making surimi has been sufficiently attractive to induce NMFS to fund, in co-operation with a private firm, a commercial-scale evaluation.

In view of the current supply situation and recent trends in consumption, it is not expected that sales of surimi-based foods will grow at more than 10-15% per annum up to 1990. The main implications of this trade for developing countries are as follows: (a) probable markets for surimi manufactured from underutilized ground fish, such as South American hake; and (b) possible markets for surimi manufactured from small pelagic fish.

APPENDIX F: GAINING ACCESS TO THE UNITED STATES SEAFOOD MARKET

F.1 Fresh and frozen seafood

Procedures and terms of importing

Seafood is normally imported into the United States by one of the following procedures:

- (a) outright purchase: the full amount of the negotiated price is paid by letter of credit; payment is often subject to passage by the FDA;
- (b) consignment: an advance is made to the producer by means of 60-80% of the estimated value of the product at the time of shipment; the remainder of the price is remitted to the producer after the product has been sold in the United States; costs and the agent's commission are deducted from the proceeds;
- (c) agency: the sale is made by an agent in the United States to a customer who opens a letter of credit in favour of the producer; the agent's commission may be paid by either the buyer or the seller.

Of these procedures, outright purchase by the importing company is the most common. Sometimes imports are made directly by large users, but as a rule such customers feel they are better served by established importers or import agents, who reduce the risks involved in importing. The risks of irregular supply and inconsistent quality have sometimes induced importers to 'integrate backwards', for example by setting up packing houses at origin. By combining the functions of packer and importer, some United States traders have been able to make handsome profits, though others have been reported to have lost money through such initiatives. Even when importers do not invest in supply facilities, they may appoint quality control personnel to inspect plants and check out shipments before dispatch.

The importer usually buys c.&f. or c.i.f. United States port, and sells either ex-cold store or delivered to his customer. His gross profit must first of all cover a number of direct selling costs including marine insurance (depending on his terms of purchase), rejection insurance, drayage, that is, carriage from dock or airport to cold store, cold storage and if applicable, inland freight, while leaving a margin to cover interest on capital, overheads, and his expected profit. Rates for rejection insurance are variable and will depend on the country of origin, the producer's reputation and the FDA's experience with the producer. The producer's plant must be approved each year by a Lloyds surveyor, and rates are often so high that self-insurance is preferred. If on the other hand the product is sold subject to passage by the FDA, then the producer must consider obtaining coverage against the risk of rejection.

Importers' mark-ups are exceedingly variable and generalization is very difficult. However according to one shrimp importer 'a margin of less than 7½% on cost is unlikely to be profitable, while much in excess of 10% is likely to attract the attention of competing importers'.

Distribution

An importer will sell directly or through brokers to processors, distributors and wholesalers, as well as to the larger restaurant and supermarket chains. Outside the importer's own geographical area, he will generally use a broker, who earns a commission typically in the range of 2-4%. The broker looks after inventories in local warehouses and keeps the importer informed about market conditions.

With fresh seafood, the limited shelf-life requires a more direct distribution system, and brokers are rarely used. Importers supply their customers, who are normally distributors, by truck and by air, often dispatching shipments on arrival, directly from the airport. Distributors frequently re-pack fish in a more

convenient form, particularly for their retail customers. They may also have wholesale stores with which to service smaller customers.

It should be noted that wholesalers differ from distributors in that they only sell from their stores and do not provide a delivery service. Among distributors there is some specialization, depending on the kind of outlet to which they are selling (that is, retailers, restaurants and other 'primarily public' food-service outlets, schools and other 'primarily captive' outlets).

Terms of payment vary according to whether the product is fresh or frozen. Fresh fish is customarily sold on seven-day terms, or at the end of a week, while frozen seafood normally has to be paid within 30 days of invoice.

F.2 Canned seafood

The trade in canned tuna is discussed separately in Appendix D (Section D.4). As with tuna, the structure of trade in other canned fish is generally oligopolistic, and there are a few major brands. Private label products, that is, retailers' brands, are quite common with canned tuna and salmon, but are less so with other canned seafoods, accounting for only 6% of retail sales (SAMI, quoted in *Pacific Fishing*, February, 1986).

Gortons and Doxsee are market leaders for United States clam and oyster from the east coast. Leading importers of these and other canned seafoods include: SSC International Inc., a Mitsui subsidiary based at Hackensack, New Jersey; M.C. Foods, a Mitsubishi subsidiary at San Diego, California; Nozaki Associates Inc., New York; Norwegian Fish Importers, at Pico Rivera, California; Milky Way International Trading Corp., at Santa Fe Springs, California. Some leading retail chains also import under private labels. Prospective new suppliers will probably need to establish co-packing or other arrangements with established canners or distributors.

APPENDIX G: PACKAGING OF SEAFOOD

G.1 Introduction

As explained in the introduction, this bulletin does not seek to provide a comprehensive coverage of this subject. The following discussion outlines the main forms in which fresh and frozen seafood are packed, while further details can be obtained from Dore (1982 and 1984). Information on the packaging of canned tuna is given in Appendix D, Section D.4, but for more detailed information on the packaging of this and other canned seafood, interested parties should contact United States importers. Section G.4 contains a short discussion of some common pitfalls to avoid in packaging.

G.2 Packaging of frozen seafood

Frozen seafood is packed in the following main forms: block-frozen, frozen in plastic containers, layer or shatter-packed, cello-wrapped or individually quick frozen (i.q.f.).

Seafood is *block frozen* in a form or carton, a system which is used with shell-on shrimp, most peeled shrimp, scallop, crab meat and cheap fish such as herring and Pacific whiting (hake). The 5 lb block is the standard block used with shrimp. The most commonly consumed mollusc meats are often frozen in *plastic containers* of 1 United States gallon capacity, and this presentation is popular with restaurants because of ease of handling.

Fish is said to be *cello-wrapped* when wrapped together in cellophane or polythene film. The standard 5 lb pack usually contains 6 wraps of approximately 14 oz each, packed 10/5, that is, ten five-pound inner cartons are packed inside one outer carton. The cello-pack is cheap because the inner packs do not have to be weighed and the contents are ungraded. If a size grade is quoted, it will normally be in terms of the number of pieces per wrap (e.g. 2/4 count), and the pieces may be of quite unequal size. Cello-packs are widely used for retail sale of fillets where portion-control is not required.

Layer packs or shatter packs refer to products, normally fillets, put into a carton in layers with a sheet of polythene between each layer. This system is advantageous in comparison with block-freezing because it allows individual pieces to be used separately without thawing a large block, and in comparison with i.q.f. packaging (see below), because it provides greater physical protection from dehydration and is easier for stacking.

Packs are commonly 10 lb or 15 lb or close metric equivalents, and are long flat boxes with no more than four layers of fillets. They are usually packed three or four to a master carton.

A good layer pack has the fillets so placed that their edges are barely touching, so that they can be easily separated. It is a relatively expensive form of packaging, and is used by food-service operators requiring good quality fish which is portion controlled and consistently graded.

Individually quick frozen (i.q.f.) products are particularly advantageous for retail sale, as they facilitate repackaging, and in certain food-service uses, as only the amount immediately required has to be taken from the package. A wide variety of products are frozen in this form including fillets, peeled and breaded shrimp, dressed or whole fish, crab products in the shell, scallop and frogs' legs.

G.3 Packaging of fresh seafood

Most fresh fish shipped from developing countries to the United States, and a large part of that shipped within the United States, has to be carried by air. A country's ability to supply fresh seafood will depend on there being airlines able and willing to handle this rather messy merchandise. It is therefore the airlines which determine which merchandise can or cannot be used.

Fish may be chilled with wet ice, gel-packs or even by using dry ice. However all domestic airlines and many international carriers ban wet ice because of the danger that water and fish slurry will leak, causing corrosion and bad odours in the aeroplane. In practice, wet ice *is* used, typically triple-wrapped, and it is accepted as long as it remains undeclared and there is no leakage (Matsen, 1985). The most important consideration to remember when shipping fresh fish is to chill it before boxing, particularly when using gel packs as these are less efficient than wet ice in extracting heat.

There is a multiplicity of containers available, and these are discussed at some length by Matsen (1985), whose main points are briefly summarized below:

(a) structural containers or cans are used for economical transport of large shipments (3,500 to 13,000 lb) aboard Boeing 707 all-cargo jets or wide-bodied jets. Containers may belong to the airlines or they may be leased or even purchased from specialist companies. One of the most common containers is the LD3 which holds 3,500 lb, but after allowing for packaging, gel packs, etc., can carry about 2,800 lb of fish;

(b) medium-sized and smaller containers are made from a variety of materials (corrugated cardboard, polystyrene, fibreglass, etc.) and may either be reusable or disposable. The most commonly used size is the E-series container holding 500 lb. A half-E or EH container has half the capacity of an E, a quarter-E or an EO holds 125 lb, and there are a variety of even smaller containers. The E and EH sizes are becoming increasingly unpopular because they are difficult to handle within aircraft, and there is consequently a trend to smaller lighter containers;

(c) containers offering special features include some which are watertight and one which is collapsible.

While different priorities have so far prevented the fisheries industry and the airlines reaching a consensus over packaging systems, there are clearly evident trends in favour of smaller leak-proof containers. Where containers are not leak-proof, plastic liners with combined thicknesses of at least 0.1 mm (100 μ m) should be used.

Shippers in developing countries are advised to spend on good-quality packaging, and should be aware of the technical developments. It is also important that the shipper keep a close working relationship with the airlines and keep a close watch on consignments in order to iron out any difficulties arising.

G.4 Some pitfalls to avoid

Exporters shipping merchandise to the United States should have a clear understanding of how it is to be handled and used at every step in the distribution chain. This will help him to avoid some of the following problems which the United States trade sometimes encounters with seafood, particularly imported seafood.

Packages of unfamiliar sizes and shapes

Overseas packers should seek to supply packages of the standard dimensions used in the United States. For example shrimp should be supplied in 5 lb cartons, and not 2 kg cartons, because although many users may accept the latter, others may find that they complicate portion control, confuse customers, etc. At the same time cases of unfamiliar size may pose problems for palletizing.

Clear labelling and printing of cases

Cases should be clearly printed in a manner understandable to warehouse workers. In particular, letters should be large enough to be readable.

Correct can codes

These should indicate country of origin, packer, and date of packaging. At the same time, the date code stamped on the box must identify dates of cans packed inside, and the packing list should list the number of cases of each date code. For sales to the United States military, a list of date codes must be provided with an explanation of how to read the codes.

Overglazing and short weight

Although a supplier may be able to carry out these practices for a time, it will be of little gain as his produce will eventually be discounted to take account of the customers' loss. At the same time such practices create problems for the retailer or the food-service outlet, playing havoc with portion control.

Other problems often encountered are inaccurate grading and the mixing of species within single packs. Shippers must strive to overcome all such problems in order to develop confidence in the product and the source of supply.

APPENDIX H: TECHNICAL REGULATIONS APPLYING TO IMPORT OF FISHERY PRODUCTS

H.1 Laws and regulations

The Federal Food and Drug Administration (FDA) of the United States is responsible for assuring that foods, including shellfish, imported into the United States are safe to eat. Imported foods are subject to the provisions of the Federal Food, Drug and Cosmetic Act and the regulations promulgated under the authority of the Act. If the imported foods are in consumer-sized packaging, the Fair Packaging and Labelling Act also applies.

Under the Food, Drug and Cosmetic Act, regulations have been prescribed in eight areas: misbranding, definitions and standards of identity, food additives, adulteration, tolerances for poisonous and deleterious substances, pesticide residues, defect action levels and good manufacturing practices.

The main points of these regulations are summarized in Section H.2, below. It should be noted that the FDA offers advice to exporters and sometimes organizes familiarization or in-service training programmes for officials from developing countries in order to acquaint them with FDA inspection practices. Section H.4 shows how readers may obtain copies of regulations and other information.

In addition to the above-mentioned Acts, there is a National Shellfish Sanitation Program which regulates the trade in fresh or frozen oysters, clams and mussels (see Section H.5 below).

H.2 The main points of the United States Food and Drug Administration (FDA) regulations

Marking and identification

For marking and identification, labels are required to be marked in English showing the country of origin. All text written in foreign languages must also be translated into English. The name, address, city, and state of manufacturer, packer or distributor have to appear. If the product is not manufactured by the person or company whose name appears on the label, the label must be qualified by 'manufactured for', 'distributed by' or a similar expression. The net amount of the product must be listed in the avoirdupois weights and measures system, that is in ounces, pounds and short tons (of 2,000 pounds). The common name of the product must be displayed (see Section 4, *Naming the species*, of the main text for discussion of nomenclature).

Ingredients

Ingredients used in the product, as well as any artificial flavouring, artificial colouring, or chemical preservative, must be listed by common name in order of their predominance by weight. Foods that are adulterated in any way or contain inferior or impure materials or additives are strictly prohibited. Imitations, like surimi-based crabs' legs, must be labelled as imitations.

Poisonous and deleterious substances

Products that contain any poisonous or deleterious substance are prohibited unless (1) such substance is required in the production of the food or cannot be avoided by good manufacturing practices, or (2) a tolerance has been established for a particular poison in a particular food and the residual amount does not exceed the established tolerance. Allowable tolerances, called *defect action levels*, are as follows:

Substance	Commodity	Action level (parts per million)
Aldrin and dieldrin	Fish, shellfish, raw, smoked, frozen, canned	0.3 ppm
Benzene hexachloride (BHC)	Frogs' legs, fish, raw	0.3-0.5 ppm
Chlordane	Fish, raw, smoked, frozen, canned	5.0 ppm
DDT, TDE, DDE	Fish, shellfish, raw, smoked, frozen, canned	0.3 ppm
Endrin	Fish, shellfish, raw, smoked, frozen, canned	0.3 ppm
Heptachlor and heptachlor Epoxide	Fish, shellfish, raw, smoked, frozen, canned	0.3 ppm
Kepone	Crab, fish, shellfish, raw, smoked, frozen, canned	0.4 and 0.3 ppm
Mercury	Fish, shellfish, crustaceans, other aquatic animals, fresh, frozen, or processed	1.0 ppm
Mirex	Fish	0.1 ppm
Paralytic shellfish toxin (PSP)	Clam, mussel, oyster, fresh, frozen, canned	80 micrograms per 100 grams meat
Toxaphene	Fish, raw, smoked, frozen, canned	5.0 ppm
PCB (polychlorinated biphenyls)	Raw fish	5.0 ppm
PCB	Fishmeal	2.0 ppm

Source: US Food and Drug Administration, Department of Health and Human Services.

Sulphites, used by suppliers of raw shrimp in the prevention of black discoloration (melanosis), have recently caused concern among United States consumer groups, as a result of reports of allergic reactions among hyper-sensitive asthmatics. This has led the FDA to set standards for *current good manufacturing practices* when treating shrimp with sodium metabisulphite, and to stipulate that imported shrimps should contain a maximum sulphiting residue (calculated as sulphur dioxide) of 100 ppm on the edible portion.

Packaging regulations

Packaging standards pertain to the size and weight of allowable packages, preservation of the product within the package, and acceptable packaging materials. Where fish are packed in a medium (for example, tuna in oil), the container should hold as much fish and as little oil as possible. Failure to declare the presence of added salt or the kinds of oil used as the packing medium for canned fish has resulted in the detention of fish product imports to the United States. Staples should not be used on cartons.

Regulations concerning canned and similarly processed foods

There are certain regulations concerning the manufacture of thermally processed foods which are packaged in hermetically sealed containers, and which affect suppliers of canned seafood. These regulations are particularly important in the case of low-acid foods, which is the category to which most canned seafood belongs. All processing establishments supplying the United States market, whether located in the United States or abroad, must register and file their scheduled processes with the FDA.

Regulations referring to specific product types

Apart from the general provisions of the Food, Drug and Cosmetic Act referred to above, the FDA has issued regulations concerning standards of identity, fill of container and other matters, for the following individual product types: oysters, canned Pacific salmon, canned shrimp, canned tuna and frozen raw breaded shrimp.

H.3 Enforcement of FDA regulations

The FDA applies these regulations by examining products entering the United States, and products found not to comply with regulations are impounded. Importers then have up to 30 days to appeal the notice of detention and to justify how the product complies with the regulation in question. In the event that the appeal is denied the product is destroyed, re-exported or reconditioned at the exporter's expense.

Reconditioning is sometimes permitted (for example, for salmonella rejections) and the reconditioned merchandise is released only if a sample is found passable. Assuming it is carried out within the United States, reconditioning has to be authorized by the FDA and must be done under its supervision.

It should be noted that the FDA issues monthly detention lists, in which the name and address of the manufacturer or shipper as well as the supplying country, are specified. Of course frequent detentions not only spoil the reputation of the individual exporter in the United States, but will often tarnish the image of the country. In recent years the blacklisting of individual exporters in developing countries has led to the *blocklisting* by the FDA of the exporting country in question. All products of the specified category from the blocklisted source are automatically detained on entry until the importer can prove to the FDA that the shipment meets United States requirements.

In addition to FDA examination, United States' customs officials often inspect imported products to ensure that labelling and packaging requirements are met. If labels or weights are found to be incorrect but the product itself is acceptable, relabelling of the product is permitted.

H.4 Obtaining federal regulations

Relevant regulations are codified under title 21 Code of Federal Regulations (CFR). The following parts are particularly relevant to imported seafood.

Parts 1–99. General regulations for the enforcement of the Federal Food, Drug and Cosmetic Act and the Fair Packaging and Labelling Act. Colour additives.

Parts 100–169. Food standards, good manufacturing practice for food, low-acid canned foods, and food labelling. Of particular interest will be the provisions applicable to labelling (Part 101), the naming of non-standardized foods (Part 102), the registration and the process filing regulations for thermally processed low-acid foods (Part 108.35) and standards of identity for fish products (Part 161).

Parts 170–199. Food additives.

Proposed regulations and changes in existing regulations are published in the *Federal Register*, which appears daily from Monday to Friday.

Both *Federal Regulations* and the *Federal Register* may be obtained from: Superintendent of Documents, Government Printing, Washington, DC 20402. The following publication, which summarizes FDA regulations, is also available from the same source: *Requirements of Laws and Regulations Enforced by the US Food and Drug Administration*.

For *thermally processed low-acid foods*, a supply of the required registration and process filing forms with complete instructions can be obtained by writing to: Food and Drug Administration, Center for Food Safety and Applied Nutrition, Industry Programs Branch (HFF-326), 200 C Street, S.W., Washington, D.C. 20204.

Enquiries on other matters can be addressed to: Food and Drug Administration, Office of Compliance, Division of Regulatory Guidance, 200 C Street, S.W., Washington, D.C. 20204.

H.5 The National Shellfish Sanitation Program

The importation of fresh or frozen molluscan shellfish (oyster, clam and mussel) are subject to the National Shellfish Sanitation Program (NSSP), which is administered through the shellfish control authorities of individual states and other co-operating food control authorities. State laws commonly require that such molluscs, whether domestically produced or imported, be certified under the procedures of the NSSP. Even though the FDA may admit uncertified

molluscs through a United States port of entry, state officials are likely to prohibit their sale.

Bivalve molluscs, excluding scallop, are subject to these special sanitary controls because they are filter feeders, which live on algae which they trap by pumping water through their bodies. Humans may suffer poisoning after eating these shellfish when they have consumed certain kinds of algae, particularly red tide which produces a toxin causing *paralytic shellfish poisoning* (PSP). The molluscs absorb bacteria with the algae, and if the water is polluted, the bacterial concentration is likely to be high and harmful to humans. The NSSP exists to protect consumers from these hazards.

Those states and foreign countries that satisfactorily apply the NSSP controls are entitled to certify their shellfish products. For a foreign country to become a NSSP participant requires that an official agency of that country agree to the general terms of the NSSP through the means of a memorandum of understanding (MOU) with the FDA. Currently, the countries of Canada, Japan, Korea, Iceland, Mexico, the United Kingdom, and New Zealand have effective shellfish MOUs. In order to participate in the programme, a foreign government must have both suitable laws, rules or regulations, and the necessary trained personnel, laboratory facilities and other resources that may be necessary to control the country's exports.

In the event of a foreign country wishing to participate in the NSSP, a responsible government official of that country should write to: Director, Center for Food Safety and Applied Nutrition, Food and Drug Administration, 200 C St., S.W., Washington, D.C. 20204.

H.6 Voluntary standards

Under the provisions of the Agricultural Marketing Act of 1946, the NMFS has developed a set of standards for fishery products, and these provide for quality grades, generally designated A, B and C.

These standards are not mandatory on any product, whether domestically produced or imported. They do not actually determine whether or not a product is admitted to the United States, and should not be confused with FDA standards. However the voluntary standards may be useful to a foreign supplier in developing customer confidence and thereby promoting his product on the United States market. Inspected products carry a United States grade sticker or shield guaranteeing good quality.

Inspection is carried out by NMFS on a fee-paying basis, with individual consignments of imported products being inspected at the port of entry. Details of standards may be obtained by writing to: National Marine Fisheries Service, National Seafood Inspection Laboratory, P.O. Drawer 1207, Pascaquola, MS 39567. Tel: 601-762-4591. The relevant standards are contained in Title 50, Code of Federal Regulations, parts 260 to 266.

APPENDIX I: SOURCES OF INFORMATION ON THE UNITED STATES MARKET

The following paragraphs list publications and other sources of information on the United States market. The relevant addresses are given at the end of this appendix.

- (a) **Current information on prices, cold storage holdings, etc.** The main source for such matters are the market sheets compiled by NMFS Market News offices in Boston, New York, New Orleans, Terminal Island (southern California) and Seattle. Unfortunately obtaining the sheets overseas can be difficult as NMFS will only mail to customers within the United States, Canada, Mexico and other countries where postage does not exceed the United States first class rate. NMFS also has telephone message centres with recorded current market information.

Similar information, sometimes drawing on NMFS data, can be obtained from private sector services, including Urner Barry Publications (which has a remote data-base service) and the *Erkins Seafood Letter*. *Infofish Trade News* and similar *Infopesca/Infopeche/Infosamak* publications also contain a wealth of information on the United States market, particularly for shrimp and tuna. An important information source on shrimp is the monthly bulletin *Shrimp Notes*.

- (b) **Information on longer-term developments, distribution, retailing and food-service use.** *Seafood Business* and *Seafood Leader* cover these areas. Suppliers to the United States market and foreign institutions regulating and advising on international trade matters may wish to subscribe to both publications, which are inexpensive, informative and highly readable. *Seafood Leader's* annual buyers guide contains detailed profiles of particular species and types of seafood, while *Seafood Business* devotes considerable space to the analysis of trends and issues facing the industry.
- (c) **Statistics on the United States fisheries, manufacture of fishery products, trade and consumption.** For this data, the most useful source is *Fisheries of the United States*, published by NMFS. Various other publications in the *Current Fishery Statistics (CFS)* series are also available from NMFS.
- (d) **Product specifications, packaging and shipping.** Detailed information about fresh and frozen seafood can be obtained from *Frozen Seafood, the Buyer's Handbook* and *Fresh Seafood, the Commercial Buyer's Guide* (Dore, 1982 and 1984). A good general guide to the air-shipment of seafood is *Guidelines for the Air Shipment of Seafood*, published by NFI. *Seafood Leader* (Summer 1987, page 187) lists several other sources of information on shipping.
- (e) **Importers and other trade contacts.** Because there are so many importers, a list is not provided in this bulletin, but readers are referred to the following sources of information: *The Infofish Directory of Importers*, the *Seafood Business Report Seafood Catalogue* and the Urner Barry publication *Who's Who in the Fish Industry*.
- (f) **Credit ratings on importers.** These can be obtained from companies including Dun and Bradstreet or Seafood Credit Corporation. According to Dore (1982) the latter had the most timely and detailed information on seafood buyers.

The above-mentioned information as well as some other publications can be obtained from the following addresses:

The Erkins Seafood Letter, P.O. Box 108, Bliss, Idaho 83314

The FAO fisheries information service including the following publications: *Globefish Highlights*, *Infofish Trade News*, *Infofish Marketing Digest*, *Infofish Directory of Importers*. Relevant addresses are as follows:

INFOFISH (Editorial office and regional office for Asia and Pacific), 50728 Kuala Lumpur, Malaysia. Tel. 2914466/2914614/2914794. Telex: INFISH MA 31560. Fax: (603) 2916804.

INFOPECSA (Regional Office for Latin America and Caribbean), Apartado 6-4894, Estafeta El Dorado, Panama R P. Tel. 693477. Telex: 2582 INFPECSA PG. Fax: (507) 646589.

INFOPECHE (Regional Office for Africa), BP 1747, Abidjan 01, Côte d'Ivoire. Tel: (225) 323198. Telex: 22989 INFOPE CI. Fax: (225) 32-80-54.

INFOSAMAK (Regional Office for Arab Countries), P.O. Box 26629, Manama, Bahrain. Tel: 727693. Telex: INFSAK 7716 BN. Fax: (973) 727587.

Frozen Food Age, Frozen Food Age Publishing Corp., 230 Park Avenue, New York, N.Y. 10017.

National Fisheries Institute Inc. (a national trade association representing importers, exporters, wholesalers and distributors of fishery products), 2000 M Street, N.W. Ste. 580, Washington D.C. 20036. NFI's Science and Technology Department have published *Guidelines for the air shipment of seafood* mentioned above.

National Marine Fisheries Service (NMFS). Publishes *Fisheries of the United States*, *Fishery Market News* (blue, green, goldenrod, buff and pink sheets), and other reports. Relevant addresses:

Central Office: NMFS — NOAA, US Dept. of Commerce, Washington, DC 20235.

Boston (blue sheet): 470 Atlantic Ave., 1st Floor, Boston, MA 02210-2298. Tel: 617-542-6070.

New York (green sheet): 201 Varick Street, 11th Floor, New York, NY 10014-4897. Tel: 212-620-3405.

New Orleans (goldenrod sheet): Room 1046, F. Edward Herbert Federal Building, 600 South Street, New Orleans, LA 70130-3423. Tel: 504-589-6151.

Terminal Island (buff sheet): 300 South Ferry Street, P.O. Box 3266. Terminal Island, CA 90731-0356. Tel: 213-548-2572.

Seattle (pink sheet): 7600 Sand Point Way NE, Bin C 15700, Seattle, WA 98115-0070. Tel: 206-527-6128.

Osprey Books, P.O. Box 965, Huntington, New York 11743.

Pacific Fishing, 1515 NW 51st Street, Seattle, Washington 98107

Seafood Business, Journal Publications, 21 Elm Street, Camden, Maine 04843.

Seafood International, AGB Heighway Ltd., Cloister Court, 22-26 Farringdon Lane, London EC1R 3AU.

Seafood Leader, Waterfront Press Co., 1115 N.W. 46th St., Seattle, WA 98107.

Shrimp Notes, William Chauvin, 417 Eliza Street, New Orleans, Louisiana 70114. Tel: (504) 368-1571.

Urner Barry Publications Inc. (for *Seafood Price-Current*, *Who's Who in the Fish Industry*, *Weekly Statistical Fishery Report*), P.O. Box 389, Toms River, New Jersey 08754-0389.

APPENDIX J: TRADE FAIRS

Trade fairs are a good way for suppliers and for supplying countries to exhibit their products and keep up with developments in the United States seafood industry. In 1987, there were three fairs serving different areas of the United States, including Sea Fare '87 held in Long Beach, California (in February), the Boston Seafood Show (March) and Sea Fare Southeast in Orlando, Florida (November). A new show is now to be held at New York on October 18 and 19, 1988. Addresses of the fair organizers are as follows:

Sea Fare Expositions, 3510 1st Avenue NW, Seattle, WA 98107. Tel: 206-547-6030. Telex: 298558 SFE UR.

National Fisherman Expositions, 5 Milk Street, P.O. Box 7437 DTS, Portland, ME 04112. Tel: 207-772-3005. Telex: 322721 (Organizes the *Boston Seafood Show*).

Shoreside Co., P.O. Box 1070, Boston MA 02205. Tel: 617-542-2858. Organizer of the 1988 New York show.

APPENDIX K: LIST OF SCIENTIFIC NAMES OF FISH AND SHELLFISH SPECIES MENTIONED IN THIS BULLETIN

English names	American names not used in all English-speaking countries	Scientific names
(a) Fin fish		
American plaice, dab, sandab		<i>Hippoglossoides platesoides</i>
Anchovy		<i>Engraulidae</i>
Atlantic ocean perch		See under redfish below
Bonito		<i>Sarda</i> spp.
Catfish, freshwater		<i>Ictalurus</i> spp.
Channel catfish		<i>Ictalurus punctatus</i>
Marine catfish, wolffish		<i>Anarhichas</i> spp.
Chub, lake herring		<i>Coregonus artedii</i>
Cod		<i>Gadus</i> spp.
Corvinas (Spanish nomenclature)		<i>Cynoscion</i> spp.
Black drum		<i>Pogonias cromis</i>
Red drum	Redfish	<i>Sciaenops ocellata</i>
Flounder		<i>Platichys flesus</i> , <i>Pleuronectidae</i> and <i>Bothidae</i>
Yellowtail flounder		<i>Limanda ferruginea</i>
Grouper		<i>Epinephelus</i> spp. and <i>Mycteroperca</i> spp.
Groper		<i>Polyprion</i> spp.
Haddock		<i>Melanogrammus aeglefinus</i>
Halibut		<i>Hippoglossus hippoglossus</i> (Atlantic), <i>H. stenolepsis</i> (Pacific)
Hake	Whiting	<i>Merluccius</i> spp. and <i>Urophycis</i> spp.
Herring		<i>Clupea harengus harengus</i>
Hoki		<i>Macruronus novaezealandiae</i>
John Dory, St. Peter's Fish		<i>Zeus faber</i>
Jack mackerel		<i>Trachurus</i> spp.
Kingclips		<i>Genypterus</i> spp.
Golden		<i>G. blacodes</i>
Red		<i>G. chilensis</i>
Black		<i>G. maculatum</i>
South African		<i>G. capensis</i>
Mackerel:		
Atlantic		<i>Scomber scombrus</i>
Chub, Pacific		<i>Scomber japonicus</i>
King, kingfish		<i>Scomberomorus cavalla</i>
Mahi-mahi, dolphin fish		<i>Coryphaena hippurus</i>
Petrale sole		<i>Eopsetta jordani</i>
Atlantic pollock, saithe		<i>Pollachius virens</i>
Alaska pollock		<i>Theragra chalcogrammus</i>
Pompano		<i>Trachinotus carolinus</i>
Orange roughy		<i>Hoplostethus atlanticus</i>
Redfish	Atlantic ocean perch	<i>Sebastes marinus</i>
Rockfish	Pacific red snapper (1)	<i>Sebastes</i> spp.
Sablefish		<i>Anoplopoma fimbria</i>
Salmon:		
Atlantic salmon		<i>Salmo salar</i>
Pacific salmon		<i>Oncorhynchus</i> spp.
Chum salmon		<i>O. keta</i>
Coho salmon		<i>O. kisutch</i>

Sardine	In the United States the name sardine refers to several species of the clupeid family used in canning
Sea basses:	
Black sea bass	<i>Centropristis striata</i>
White sea bass	<i>Cynoscion nobilis</i>
Giant sea bass	<i>Stereolepis gigas</i>
Striped bass	<i>Morone saxatilis</i>
Loup (French nomenclature), European sea bass	<i>Dicentrarchus labrax</i>
Chilean sea bass	<i>Polyprion yanezei</i>
Sea bream	<i>Sparidae</i>
Sharks:	
Common thresher	<i>Alopias vulpinus</i>
Bigeye thresher	<i>A. superciliosus</i>
Blacktip	<i>Carcharhinus limbatus</i>
Blue	<i>Prionace glauca</i>
Bonito	<i>Isurus glaucus</i>
Bull	<i>Carcharhinus leucas</i>
Dogfish	<i>Mustelus</i> spp. and <i>squalidae</i>
Dusky	<i>Carcharhinus obscurus</i>
Hammerhead	<i>Sphyrnidae</i>
Lemon	<i>Megaprion brevirostris</i>
Mako:	
Longfin	<i>Isurus paucus</i>
Shortfin	<i>Isurus oxyrinchus</i>
Nurse	<i>Orectolobidae</i>
Pacific angel	<i>Squatina californica</i>
Sandbar	<i>Carcharhinus plumbeus</i>
Silky	<i>Carcharhinus falciformis</i>
Soupfin	<i>Galeorhinus zyopterus</i>
Spinner	<i>Carcharhinus brevipinna</i>
Tiger	<i>Galeocerdo cuvieri</i>
White	<i>Carcharodon carcharias</i>
Whitetip	<i>Carcharhinus longimanus</i>
Snappers	<i>Lutjanus</i> spp.
Red snapper	<i>L. campechanus</i>
Lane snapper	<i>L. synagris</i>
Mangrove, grey snapper	<i>L. griseus</i>
Mutton snapper	<i>L. analis</i>
Yelloweye snapper	<i>Ocyurus chrysurus</i>
Smelt	<i>Osmeridae</i>
Swordfish	<i>Xiphias gladius</i>
Tilapia	<i>Oreochromis, Sarotherodon</i> or <i>Tilapia</i> spp.
Nile tilapia	<i>O. niloticus</i>
Trout (rainbow)	<i>Salmo gairdnerii</i>
Tunas:	
Albacore	<i>Thunnus alalunga</i>
Bigeye	<i>Thunnus obesus</i>
Bluefin	<i>Thunnus thynnus</i>
Yellowfin	<i>Thunnus albacares</i>
Skipjack	<i>Katsuwonus pelamis</i>
Wolf fish	See under marine catfish
Yellowtail, amberjack	<i>Seriola</i> spp.
(b) Shellfish	
Abalone	<i>Haliotidae</i>
Clam:	
Atlantic hard clam	<i>Mercenaria mercenaria</i>
Soft clam	<i>Mya arenaria</i>

Surf clam	<i>Spisula solidissima</i>
Ocean quahog	<i>Arctica islandica</i>
Crayfish	<i>Procambarus</i> spp.
Crabs:	
Snow	<i>Chionoecetes</i> spp.
Blue	<i>Callinectes sapidus</i>
Dungeness	<i>Cancer magister</i>
King	<i>Paralithodes camchaticus</i>
Rock	<i>Cancer irroratus</i>
Stone	<i>Menippi mercenaria</i>
Lobster:	
Spiny	<i>Palinurus</i> and <i>panulirus</i> spp.
American	<i>Homarus americanus</i>
Mussels	<i>Mytilidae</i>
Sea snail, Chilean locas	<i>Concholepas concholepas</i>
Oysters:	<i>Ostreidae</i>
Eastern	<i>Crassostrea virginica</i>
Pacific or Japanese	<i>Crassostrea gigas</i>
Olympia or western	<i>Ostrea lurida</i>
European flat	<i>Ostrea edulis</i>
Scallops	<i>Pectinidae</i>
Bay	<i>Argopecten irradians</i>
Sea	<i>Pecten magellanicus</i>
Calico	<i>Aequipecten gibbus</i>
Shrimp:	
Marine, warm-water	<i>Penaedae</i>
Freshwater	<i>Machrobrachium</i> spp.
Cold-water	<i>Pandalus borealis</i> and <i>Crangon crangon</i>
Squid	Ommastrephidae and Loliginidae — see Section E.10, Appendix E for names of individual species

Note: (1) In the State of California, the name Pacific red snapper may be applied to 11 species of rockfish (*Sebastes* spp.).

(2) While the above common names are correct to the best of the author(s) knowledge, inclusion in this list does not guarantee acceptance by FDA for commercial usage in the United States. Where in doubt the shipper should check with the Division of Regulatory Guidance, 200 C Street, S.W., Washington, D.C. 20204.

APPENDIX L: GUIDELINES FOR THE NAMING OF AN UNFAMILIAR SPECIES OF FISH

FDA and NMFS apply seven criteria in determining whether or not a fish or shellfish is named appropriately. These are listed below in order of importance.

(a) Common or usual name established by law or regulation. These are contained mainly in Title 21 (FDA) and Title 50 (NMFS) of the Code of Federal Regulations, and can be checked through the NMFS laboratory at Pascagoula (address in Appendix H, section H.6).

(b) Name listed in the American Fisheries Society's *Common and Scientific Names of Fishes from the United States and Canada*.

(c) The common name most often cited by authoritative literature sources, particularly *Multilingual Dictionary of Fish and Fish Products* (Fishing News Books or Osprey Books) and *Fishes of the World* by Joseph Nelson (Wiley-Interscience).

(d) For foreign species, the name most used in international marketing; or the common name cited in the FAO Yearbook of Fishery Statistics. If the name is not in English, a translation into English is acceptable.

(e) A market name most often used by the industry.

(f) Where there is no established market name, a suggested name that describes the species but does not trade on the established name of another species.

(g) The market names for other, similar members of the genus.

To ensure that a name selected will be accepted when the product is presented for import clearance, the prospective shipper should write to the Division of Regulatory Guidance, FDA (address in Appendix H, section H.4), providing appropriate information i.e. the correct scientific name, details of origin, local names in country of origin (with translation if necessary), whether the species has been sold before in the United States and whether quantities sold have been significant, the name under which it was sold and a suggested name for future use. Potentially helpful information about size, weight, appearance, edibility characteristics, and abundance should be provided, and this can be supported with photographs and drawings. Similarities to other species as well as dissimilarities to other species with similar scientific names should also be pointed out.

If local experts have difficulty identifying the taxonomy of the species, the American Museum of New York or the Smithsonian Institution in Washington may be able to assist. Arrangements should be made ahead of time, and frozen samples of the whole fish should be provided.

The name suggested should make sense against the scientific and legal background, should have marketing appeal, and should not conflict with anything else in the marketplace. Once it has been accepted, the shipper should advise the FDA of the port of entry so that the appropriate regional office can be advised that it is acceptable. To facilitate entry, a copy of the acceptance letter can also be included with the shipping documents.

Source: Based on an article by Dore, in *Seafood Business*, July/August 1987.

APPENDIX M: ADDITIONAL IMPORT STATISTICS

Table M.1

United States imports of other marine fish, fillets and steaks

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	22,054	21,898	23,485	31,010	35,756	57,139	67,362
of which from:							
(a) Developing countries and territories							
Mexico	556	53	308	250	388	338	704
Nicaragua	30	36	—	—	—	—	—
Ecuador	896	562	569	—	42	332	578
Peru	1,387	2,303	867	72	482	1,172	1,698
Chile	677	768	852	1,184	1,582	2,966	4,438
Brazil	1,747	2,103	1,680	1,534	1,366	1,281	1,537
Uruguay	3,004	3,756	4,476	4,793	5,139	6,809	6,726
Argentina	2,783	2,370	2,962	4,631	4,076	7,668	9,454
Thailand	454	864	655	851	1,193	1,400	2,192
Korea	305	348	95	584	1,896	2,296	3,449
Taiwan	4,144	2,936	2,826	4,186	2,345	4,891	4,673
Costa Rica	20	87	—	245	595	542	854
Surinam	—	—	—	67	197	152	18
Singapore	—	70	228	115	255	493	789
Philippines	38	—	27	148	147	321	1,207
Hong Kong	54	—	30	34	112	210	233
China	54	56	82	84	60	136	109
(b) Other countries							
Canada	2,333	2,413	1,886	2,047	2,645	2,808	3,899
Japan	1,458	1,247	2,063	2,826	3,421	9,117	8,074
New Zealand	177	259	1,681	4,694	7,722	10,227	12,768
South Africa	1,172	1,170	1,253	1,286	661	652	665
Netherlands	80	52	149	263	406	1,353	1,061
Denmark	—	80	202	346	140	519	206
Germany, Fed. Rep. of	—	—	—	140	—	43	22
Iceland	36	—	—	78	154	139	48
Portugal	82	—	—	81	107	62	129
Australia	—	—	105	99	80	652	179

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1107080

Table M.2

United States imports of other marine fish, fresh and chilled

	'000 tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	5,200	5,006	9,987	10,199	12,343	14,472	25,773
of which from:							
(a) Developing countries							
Mexico	1,802	1,089	2,376	3,828	3,131	2,201	4,406
Costa Rica	149	497	1,089	1,241	765	1,288	2,667
Peru	—	175	—	—	92	166	103
Nicaragua	134	140	57	—	—	—	—
Panama	51	108	52	81	140	483	674
Dominican Republic	—	281	163	41	238	393	408
Uruguay	—	—	101	137	—	162	34
Argentina	—	—	694	—	380	291	85
Venezuela	—	—	—	129	1,011	1,880	1,896
Brazil	—	—	—	111	221	186	125
(b) Other countries and territories							
Canada	2,525	2,080	4,270	3,663	4,445	5,241	11,274
Azores	—	—	—	21	—	—	—
Portugal	69	65	70	178	205	119	107
New Zealand	139	122	180	205	305	332	383
South Africa	108	—	375	—	—	47	8
Netherlands	—	13	75	148	302	274	329
Norway	—	—	—	—	232	92	8
France	15	53	33	37	112	95	57

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1103570

Table M.3

United States imports of other marine fish, frozen

tonnes

	1980	1981	1982	1983	1984	1985	1986
Total	10,827	13,994	12,701	15,005	13,089	17,069	16,698
of which from:							
(a) Developing countries and territories							
Mexico	593	371	299	535	189	144	409
Costa Rica	463	285	260	162	—	114	143
Dominican Republic	333	141	354	190	193	269	63
Peru	2,287	4,532	2,970	2,804	486	1,167	682
Brazil	316	233	191	340	448	511	269
Uruguay	94	129	286	742	1,122	810	1,160
Argentina	808	1,599	2,092	3,176	2,463	3,601	3,010
Philippines	808	584	762	1,105	1,146	1,464	1,355
Hong Kong	277	467	548	459	961	1,244	1,494
Taiwan	83	358	127	233	119	496	1,655
Bahamas	—	110	75	99	35	17	14
Korea	—	63	85	181	97	267	228
Thailand	—	88	186	163	168	542	1,077
China	535	1,119	938	602	994	1,354	825
(b) Other countries							
Canada	380	637	700	223	153	217	962
Netherlands	73	159	229	50	82	76	126
Portugal	240	315	211	362	497	295	429
Japan	292	431	728	1,179	1,087	1,574	1,339
New Zealand	284	176	95	141	175	219	119
South Africa	1,806	1,651	967	1,675	1,348	752	173
Norway	—	—	111	344	840	1,390	246
Belgium	—	61	176	—	91	74	84

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1103575

Table M.4

United States imports of shrimp, raw, headless, shell-on

tonnes

	1980	1981	1982	1983	1984	1985	1986
Total	62,936	63,935	82,249	98,407	102,374	102,525	118,861
of which from:							
(a) Developing countries and territories							
Mexico	26,158	22,456	28,048	29,627	28,996	26,229	27,110
Ecuador	8,222	10,717	15,604	22,465	20,699	19,325	27,526
Panama	5,945	6,689	7,917	6,962	7,102	8,480	9,336
Brazil	1,506	2,050	2,701	2,928	5,588	7,404	5,913
Costa Rica	946	1,481	1,984	1,126	2,375	3,349	2,120
Venezuela	1,756	722	919	934	2,226	3,030	4,008
Taiwan	279	344	814	2,412	2,610	3,025	4,760
El Salvador	2,073	2,755	3,271	2,135	3,857	2,813	3,454
Thailand	195	157	338	1,466	1,748	2,687	2,515
China	26	932	457	406	996	2,630	6,401
Honduras	2,047	2,724	2,940	3,025	2,407	2,354	2,504
Peru	669	866	1,338	4,141	2,487	1,925	1,615
Philippines	144	65	129	976	994	1,781	1,742
Bangladesh	398	857	1,090	1,060	1,214	1,778	1,687
Guatemala	1,508	1,954	1,998	1,389	1,693	1,687	1,274
Pakistan	275	685	578	938	1,330	1,642	1,807
India	167	145	749	1,558	1,113	1,518	1,067
Argentina	—	20	417	1,107	1,775	1,408	132
Colombia	1,016	1,112	1,146	1,100	1,478	1,377	1,761
Guyana	1,894	764	914	1,872	1,575	1,041	2,255
French Guiana	1,698	1,099	1,285	1,941	1,356	955	1,543
Indonesia	90	83	116	485	792	827	821
Burma	249	359	1,129	186	368	678	470
Surinam	423	633	872	587	966	592	195
Singapore	18	20	78	232	370	490	800
Hong Kong	48	96	332	544	185	350	310
Nicaragua	2,396	1,633	1,274	799	524	350	—
Kuwait	320	302	143	451	534	346	119
Malaysia	90	74	29	228	167	339	383
Saudi Arabia	—	21	75	102	141	264	28
Macao	—	—	228	90	123	252	510
Sierra Leone	—	100	501	445	397	182	18
Sri Lanka	84	26	60	198	122	123	142
Liberia	—	—	140	298	364	52	—
Trinidad	162	193	91	67	122	5	58
(b) Other countries							
Iceland	—	63	—	65	349	831	353
France	—	139	—	—	78	561	30
Canada	319	462	836	661	295	400	378
Australia	497	390	650	1,118	1,583	332	689
Denmark	—	—	9	125	126	307	141
Norway	—	69	233	237	175	289	192
Soviet Union	—	87	—	1,494	83	182	250
Spain	200	96	91	163	34	143	111
Greenland	255	29	160	34	23	71	—

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144545

Table M.5

United States imports of canned shrimp

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	1,916	1,988	2,418	5,976	6,160	7,751	7,147
of which from:							
(a) Developing countries and territories							
Thailand	977	826	1,011	3,184	3,528	4,737	3,894
Pakistan	86	161	274	671	1,054	758	1,080
Taiwan	222	151	45	143	243	386	307
Malaysia	—	—	—	57	19	385	1,033
India	168	555	669	796	315	219	275
Hong Kong	35	32	135	93	105	78	140
China	—	—	11	490	144	10	12
(b) Other countries							
Norway	62	—	18	107	85	331	37
Canada	100	37	45	77	—	53	57
Japan	77	52	95	60	148	39	20

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144550

Table M.6

United States imports of raw peeled shrimp, fresh and frozen

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	30,060	29,729	29,433	36,996	34,320	35,168	41,459
of which from:							
(a) Developing countries and territories							
Mexico	8,305	8,389	6,623	7,373	1,989	—	—
Guatemala	115	108	—	71	350	33	27
El Salvador	740	221	26	—	—	—	—
Panama	263	518	32	360	281	364	403
Guyana	472	333	—	—	23	57	—
Ecuador	935	502	648	625	354	440	527
Colombia	472	139	155	147	106	110	205
Brazil	2,378	2,814	2,795	3,594	3,114	3,443	2,360
India	4,383	6,831	8,150	8,573	6,755	7,056	7,227
Pakistan	1,100	1,134	1,453	1,375	2,384	2,657	3,485
Sri Lanka	671	258	241	342	378	103	234
Thailand	2,308	1,725	1,984	3,526	2,600	3,235	4,012
Malaysia	396	384	77	259	209	296	326
Singapore	100	97	172	268	534	569	1,439
Indonesia	1,790	246	353	220	47	69	155
Philippines	63	58	107	109	108	162	81
Hong Kong	691	823	740	589	266	138	385
Taiwan	1,593	1,705	2,787	5,343	4,771	8,497	7,826
China	355	1,161	668	254	334	422	2,798
Sierra Leone	259	124	104	20	—	1	—
Bangladesh	24	36	369	513	259	126	1,035
Burma	31	48	306	16	—	66	147
Macao	16	—	430	125	213	275	745
Peru	—	—	—	100	475	124	75
Argentina	—	—	—	323	595	374	136
(b) Other countries							
Canada	176	200	364	186	123	153	132
Norway	240	—	170	913	780	1,243	691
United Kingdom	562	162	179	420	398	323	282
Japan	64	35	58	101	41	134	39
Australia	129	72	145	162	107	46	39
Soviet Union	—	406	—	671	42	19	—

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144557

Table M.7

United States imports of cooked and peeled shrimp

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	4,487	4,032	6,766	12,273	12,356	14,536	13,711
of which from:							
(a) Developing countries and territories							
Brazil	93	96	263	111	222	427	730
India	1,172	1,087	2,644	2,745	2,312	2,077	2,518
Pakistan	62	73	21	86	121	77	119
Thailand	516	226	207	594	397	431	506
Malaysia	425	178	34	103	44	89	110
Singapore	98	77	268	225	252	270	320
China	43	140	135	176	115	80	166
Hong Kong	121	236	—	164	70	60	64
Taiwan	350	304	579	1,129	672	1,509	2,789
(b) Other countries							
Canada	472	396	425	1,093	820	1,185	1,027
Norway	421	469	869	3,671	478	5,333	2,162
United Kingdom	82	236	27	437	323	517	1,284
Japan	48	86	76	176	110	181	120
Iceland	—	42	—	212	650	1,028	339

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144562

Table M.8

United States imports of spiny lobster tails

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	12,450	12,759	11,567	11,980	13,345	13,428	12,454
of which from:							
(a) Developing countries and territories							
Mexico	273	242	346	126	370	247	288
Belize	138	244	238	230	189	244	179
Honduras	664	440	350	223	757	724	858
Nicaragua	731	454	302	379	321	187	—
Bahamas	362	328	289	278	532	432	499
Turks and Caicos Islands	109	132	106	109	122	53	100
Brazil	2,113	2,582	2,208	1,435	2,258	2,330	1,573
India	175	182	164	119	204	360	204
Haiti	90	143	127	75	76	69	81
Ecuador	17	181	93	57	123	53	210
Singapore	92	137	54	95	136	117	13
Chile	—	31	62	290	338	30	1
Cayman Islands	—	—	—	24	126	285	444
El Salvador	15	31	33	44	10	221	307
Costa Rica	19	—	20	24	44	187	203
Colombia	—	7	15	45	42	126	221
(b) Other countries							
Iceland	283	325	251	304	259	336	299
Japan	81	143	124	54	61	49	33
Australia	4,383	3,899	4,109	5,245	4,265	4,187	3,513
New Zealand	1,187	1,136	1,149	1,148	1,218	270	1,308
South Africa	1,162	1,141	866	1,068	1,322	1,133	1,084

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144525

Table M.9

United States imports of other lobster not in airtight containers

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	4,949	5,496	5,369	7,732	9,214	9,213	10,125
of which from:							
(a) Developing countries and territories							
Mexico	713	791	933	526	515	438	564
Honduras	195	545	583	1,250	1,437	1,534	1,558
Bahamas	224	204	211	482	442	660	620
Haiti	15	34	20	99	102	47	36
Chile	158	360	119	330	107	41	138
Brazil	326	136	517	213	730	247	250
India	183	197	157	148	143	185	149
Thailand	306	310	343	353	354	420	389
Singapore	109	105	78	20	35	19	47
Philippines	40	36	44	71	45	90	94
Hong Kong	68	68	50	92	192	193	157
Taiwan	454	441	420	461	500	567	443
Panama	221	235	9	17	8	10	83
Oman	—	—	—	—	—	118	159
(b) Other countries							
Canada	1,053	1,165	925	2,334	3,104	3,036	3,618
Iceland	68	32	32	65	142	63	—
United Kingdom	93	78	107	78	164	110	137
Japan	128	113	93	156	157	130	177
Australia	137	307	215	279	280	250	453
New Zealand	68	51	136	399	272	—	375

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144530

Table M.10

United States imports of crab meat, fresh, chilled or frozen

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	1,498	3,220	4,381	6,521	5,440	5,867	6,581
of which from:							
(a) Developing countries							
Chile	17	—	86	285	376	266	299
Korea	72	118	323	648	864	802	1,304
Mexico	—	—	—	373	204	75	1
(b) Other countries							
Canada	1,124	2,766	3,511	4,015	3,479	4,230	4,045
Japan	51	238	407	1,137	391	464	562

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1141500

Table M.11**United States imports of crab meat, except snow crab, canned**

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	1,930	1,963	2,318	2,646	2,375	2,844	3,482
of which from:							
(a) Developing countries and territories							
Venezuela	207	162	198	244	357	510	517
Thailand	1,125	1,034	1,167	1,262	1,176	1,230	1,250
Taiwan	403	505	554	581	395	292	444
Malaysia	—	142	56	334	343	559	789
China	—	—	—	—	—	129	174
(b) Other countries							
Canada	42	61	297	170	48	19	29

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1142040

Table M.12**United States imports of scallop, fresh or frozen**

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	9,473	11,896	9,457	15,549	12,370	19,067	21,734
of which from:							
(a) Developing countries							
Panama	—	26	—	—	—	41	3,567
Brazil	785	434	—	—	—	7	—
Thailand	24	12	50	79	126	61	100
Peru	—	—	—	928	1,319	5,154	1,974
Chile	—	—	12	86	382	156	270
Argentina	—	—	—	193	285	137	27
(b) Other countries							
Canada	6,929	8,666	6,796	6,266	3,940	5,254	6,085
Iceland	711	889	1,215	1,542	1,472	1,831	2,091
Denmark	128	193	60	208	209	191	196
United Kingdom	615	813	391	1,020	554	478	413
Australia	196	474	438	1,442	546	310	30
Japan	26	292	382	3,368	3,266	4,936	5,281

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1144537

Table M.13**United States imports of boiled clam, whole, minced, chopped, in airtight containers, not over 24 oz gross weight**

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	875	2,356	2,860	2,614	2,597	2,792	3,468
of which from:							
(a) Developing countries							
Thailand	565	2,007	1,346	1,253	1,656	1,553	1,670
Korea	168	191	1,236	602	213	96	178
Malaysia	78	45	71	539	511	904	1,360
Taiwan	—	—	51	—	—	27	45
(b) Other countries							
Japan	33	59	72	63	42	78	48
Italy	—	—	—	36	63	20	5

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1140400

Table M.14

United States imports of boiled clam, whole, minced, chopped, in airtight containers, over 24 oz gross weight

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	520	645	699	739	937	1,638	2,711
of which from:							
(a) Developing countries							
Thailand	115	175	96	148	348	784	1,424
Malaysia	42	—	—	40	—	67	349
Korea	246	292	382	331	368	400	376
(b) Other countries							
Japan	73	61	73	72	54	53	41
Canada	—	—	43	73	59	133	81

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1140600

Table M.15

United States imports of oyster, in airtight containers, smoked

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	1,769	2,248	2,262	2,207	2,535	3,208	3,577
of which from:							
(a) Developing countries							
Korea	1,339	1,958	2,021	1,952	2,205	2,762	3,347
Taiwan	27	—	45	23	—	32	36
(b) Other countries							
Japan	402	274	180	222	316	402	193

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1143400

Table M.16

United States imports of oyster, in airtight containers, not smoked

	tonnes						
	1980	1981	1982	1983	1984	1985	1986
Total	4,090	4,252	4,895	6,333	7,727	9,693	10,922
of which from:							
(a) Developing countries							
Korea	1,850	2,629	3,826	3,870	2,918	3,323	4,406
Hong Kong	300	123	107	1,841	4,000	5,021	5,384
Taiwan	36	—	—	36	45	37	61
China	—	—	37	25	130	24	211
(b) Other countries							
Japan	1,887	1,478	906	556	626	1,247	768

Source: FT 246 US Dept. of Commerce, Bureau of the Census, TSUSA code 1143600

