

Markets for Hake

IRENE S. GENDRON

Introduction

The United States fishing industry participates in commercial fisheries for four hake species. Three of these, silver hake (whiting), *Merluccius bilinearis*; red hake, *Urophycis chuss*; and white hake, *Urophycis tenuis*; are harvested off the coasts of the New England and Mid-Atlantic states, and the fourth, Pacific whiting, *Merluccius productus*, is found off the coasts of Washington, Oregon, and California. Hakes, primarily of the *Merluccius* genus, are also imported in sizeable quantities by the United States, usually from South American, South African, and New Zealand waters.

Like other members of the Gadidae family found in the U.S. Fisheries Conservation Zone such as Atlantic cod, *Gadus morhua*; cusk, *Brosme brosme*; and walleye (Alaska) pollock, *Theragra chalcogramma*; hakes are white-flesh, mild-flavor, low-fat

ABSTRACT—Four hake species are commercially harvested by the United States: Silver hake (whiting), *Merluccius bilinearis*; Pacific whiting, *Merluccius productus*; red hake, *Urophycis chuss*; and white hake, *Urophycis tenuis*. This paper describes present U.S. domestic and export markets for these species and examines the potential for market expansion both as a substitute for imported hakes and other similar bottomfish and from new product development. The potential for market growth appears excellent for silver hake and could be substantially improved for other hakes once technological and other impediments to developing the fisheries for these species are solved.

Irene S. Gendron was with Earl R. Combs, Inc., Mercer Island, Wash. Present address: Frank Orth and Associates, 225 108th Ave. N.E., Suite 311, Bellevue, WA 98004.

demersal fish (Brand Group, Inc., 1978). Although in a broad sense there is some substitutability in the marketplace among the various white-fleshed fishes, each species, including the four U.S. hakes, has its own unique characteristics which are taken into account by processors and consumers and which influence prod-

uct form, price, market demand, and consumption patterns. In the following sections, markets for each of the four hakes are described individually and in the context of the general market for all bottomfish products.

Silver Hake (Whiting)

Silver hake, hereafter referred to as whiting in accordance with current industry usage, has been an established food fishery since the 1920's. Whiting is generally sold either round or dressed in fresh fish markets from New England south to Virginia or frozen headed and gutted (H&G) and distributed throughout the nation with the majority of sales in the Northeast, Mid-Atlantic, and Midwest states.

Table 1 shows 1976 landings, process forms, and values for whiting landed for food fish and is generally representative for the period 1971-77.

In 1978, landings were 51.1 million pounds, the highest since 1968, and the average ex-vessel price rose to a historic high of \$0.14 per pound (U.S. Department of Commerce,

Table 1.—Utilization of U.S. whiting, *Merluccius bilinearis*; food fish landings, 1976.

Landings and products	Volume (in pounds)	Value (in dollars)	Value per pound	Number of processing plants ¹
Landings²				
Maine	407,555	28,620	\$0.070	
Massachusetts	29,440,407	2,375,750	.081	
Rhode Island	7,284,065	530,174	.073	
New York	2,545,869	289,655	.114	
New Jersey	7,915,059	743,325	.094	
Other ³	73,045	5,476	.075	
	47,666,000	\$3,973,000	\$0.083	
Products⁴				
Headed & gutted				
Fresh	54,688	22,397	\$0.410	2
Frozen	9,906,323	3,547,728	.358	6
Fillets				
Fresh	30,000	22,500	.750	1
Frozen	963,771	601,868	.624	4
Frozen/cooked	61,800	33,322	.539	1
Fillet blocks				
Cured	1,065,127	804,889	.756	10
Fresh round ⁵	24,698,306	7,903,458	.320	

¹Some plants may process more than one product form and are listed under each category.

²Landings in round weight volume and ex-vessel value.

³Small amounts from Connecticut, New Hampshire, Delaware, Maryland, Virginia, and North Carolina.

⁴Products in processed weight volume and first wholesale value.

⁵Earl R. Combs, Inc. estimate from field study.

Sources: U.S. Department of Commerce, 1976. Processed fishery products. Computer print-out. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Washington, D.C. Robinson (1977). U.S. Department of Commerce (1978a,b,c,d,e).

1979). Preliminary indications are that H&G, fillet, and cured production in 1978 was approximately at 1976 and 1977 levels, thus implying an increase in fresh, round sales. Assuming a continued upward trend in landings, additional processing capacity and marketing effort would be necessary. The largest market potential appears to be in development of the fillet block market.

Fresh Whiting

Whiting is sold in the round to local fresh markets, primarily in ethnic communities existing in fishing ports and large cities of the Northeast and Mid-Atlantic states. These ethnic communities are largely populated by people of Black or Mediterranean heritage. Most New England landings not sold locally are trucked to the Fulton Fish Market in New York. When supply exceeds demand in the Fulton market, the surplus whiting are sold to markets in Delaware, Pennsylvania, Maryland, and Virginia. There is currently no market for fresh whiting south of Virginia. Indications are that existing markets for fresh whiting are saturated. New fresh markets could only come about by expensive advertising which is economically unattractive to the industry.

Headed and Gutted (H&G)

For H&G a 6- to 8-ounce headless fish is desired. It is packed in cardboard cartons holding 1½, 3, 5, or 10 pounds. Retailers often prefer 1½- or 3-pound cartons so they do not have to thaw and repackage prior to sale. Frozen H&G is an inexpensive product, retailing at approximately \$0.79 per pound, and is especially popular in Black and Spanish-speaking areas of the East and Midwest. At least one processor of H&G has recipes and labeling in Spanish as well as English on the box.

At present, domestic H&G production does not fill the U.S. demand for H&G. In 1978 approximately 6 million pounds of H&G were imported, primarily from Argentina, Peru, and South Africa (Table 2).

South American whiting often has a

few cents per pound price advantage over domestic and South African whiting. Poor quality product, especially from Peru (*Merluccius gayi*), has tended to limit the U.S. demand for South American H&G. Although some buyers still import Peruvian whiting for price considerations, many no longer do so, believing the low price does not justify the sacrifice in quality.

Conversations with retailers and wholesalers within the past year indicate that U.S. H&G is of good quality and price but is in limited supply. Several buyers indicated a willingness to purchase more domestic H&G if it were available in sufficient quantities on a sustained basis. It would appear that there is at least modest potential for expansion of domestic H&G markets, as a minimum to substitute for some of the 6 million pounds of imported product and possibly to service new markets which would open in response to a good quality, moderately priced product with steady supply.

Fillets and Fillet Blocks

The United States imported approximately 20 million pounds of whiting fillets in 1978 (Table 2). Domestic production was only about 1 million

pounds. Domestic fillets were hand cut, mostly from larger whiting. Most whiting landed domestically are under 1 pound round weight and yield fillets under 3 ounces in weight. There appears only limited potential for expanding the fillet market since most users prefer a 4-ounce minimum fillet size (Earl R. Combs, Inc., 1977). The small fillets can be used in fillet blocks, however.

Market expansion appears more feasible for fillet blocks. During the past several years an increasing amount of whiting fillet blocks have been imported for secondary processing into breaded and battered sticks and portions. United States production of whiting fillet blocks has been insignificant with only 24,000 pounds processed in 1976 (Table 1), compared with 20.6 million pounds of imported blocks (Bell and Fitz Gibbon, 1977). Table 3 shows the volume and species composition of U.S. block imports in 1977 and 1978.

United States per capita consumption of sticks and portions manufactured from blocks reached a record 2.17 pounds in 1978 and trend analysis projects future continued growth (U.S. Department of Commerce, 1979). Cod

Table 2.—U.S. imports of whiting, 1978.

Country	Imports (1,000 pounds)					Total
	Block	Fillet	Minced	Dressed		
Argentina	17,443	11,786	146	1,022		30,397
Brazil	1,125	524				1,649
Canada	14	5				19
Chile	1,247	2,603		98		3,948
Denmark	205					205
Faroe Islands	394					394
Iceland	1,260	46				1,306
Japan	2,532	187	37			2,756
Korea	3,092					3,092
Peru	1,422	400		1,165		2,987
Scotland	721	86				807
Singapore		2				2
South Africa	2,861	2,805	1,156	3,164		9,986
Spain	220	129				349
Sweden	62					62
Uruguay	3,232	1,422	36	299		4,989
West Germany	441					441
Total	36,271	19,995	1,375	5,748		63,389

Source: L. Chaves-Michael, Northwest Regional Office, NMFS. Compiled from imports in all Fishery Market News Reports.

Table 3.—U.S. imports of regular and minced fish blocks and slabs, by species and type, 1977 and 1978.

Species and type	1977 Imports		1978 Imports	
	1,000 lb	\$1,000	1,000 lb	\$1,000
Regular blocks & slabs				
Cod	204,872	183,371	204,696	190,971
Flatfish				
Turbot	4,594	2,944	4,352	2,684
Other	10,496	11,274	12,425	12,347
Haddock	30,815	27,023	27,026	26,101
Ocean Perch,				
Atlantic	2,291	1,516	3,084	2,405
Pollock	82,960	41,680	81,294	50,560
Whiting	22,402	11,137	39,817	22,885
Other	8,091	6,063	14,231	9,730
Total	366,521	285,008	386,925	317,683
Minced blocks & slabs ¹	18,617	6,686	19,361	7,684
Grand total	385,138	291,694	406,286	325,367

¹Most of the shipments were from Canada, Iceland, and Denmark.

Source: U.S. Department of Commerce, (1979).

is still the preferred species for battered portions, especially for restaurant use, but demand for whiting is growing, both as a cod substitute and to service new demand for whiting as a unique product in itself. Increasing numbers of buyers are reportedly asking for whiting by name rather than settling for whiting only when cod is not available.

It is estimated that almost one-half of 1978 whiting block imports were defatted whiting (*Merluccius hubbsi*) from Argentina. Defatted whiting is preferred by many buyers because removing the layer of fatty tissue leaves a pure white fillet comparable in appearance to cod and reduces the incidence of rancidity. Defatted whiting is significantly lower-priced than cod although more expensive than regular whiting and pollock blocks. In 1978 defatted whiting blocks were wholesaling FOB Boston for an average \$0.80 per pound versus \$1.00 for cod, \$0.60 for regular whiting, and \$0.69 for Alaska pollock.

The New England whiting industry, in conjunction with the National Marine Fisheries Service, has already begun limited machine processing of whiting fillet blocks. There is a production-scale demonstration project supported by the New England Fisheries Development Program scheduled for this year. Assuming favorable economic results and good quality production, there appears to be excellent opportunity for U.S. whiting to substitute for imported blocks as well as to service new market growth.

Cured

Total U.S. cured production of all species in 1976 was 54.5 million pounds with salmon and herring combined composing 69 percent of the total and whiting only 2 percent.¹ Production of cured (smoked) whiting has been stable over the past decade at approximately 1 million pounds annu-

¹U.S. Department of Commerce, 1976. Processed fishery products. Computer print-out. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Washington, D.C.

ally, and significant increase is not projected in market size.

Industrial

In 1974, 4.7 million pounds of whiting were landed for reduction into fishmeal (Bell and Fitz Gibbon, 1977). In addition to the whiting caught specifically for industrial processing, a much larger amount is landed as part of the mixed industrial loads generally selling for \$0.02 per pound ex-vessel. In 1977, 5.9 million pounds of mixed industrial fish were landed in Maine and 12.9 million pounds in Rhode Island (U.S. Department of Commerce, 1978c, d). It has been estimated that whiting constitute a large portion of these mixed industrial fish (Olsen and Stevenson, 1975).

In general, a large catch of whiting over several days causes an oversupply on the fresh fish market which results in a decline in the ex-vessel price. Fishermen often do not feel it is economically justifiable to sort fish for the food market when the ex-vessel price falls below \$0.04 or \$0.05 per pound. Under these conditions they will pack the hold with as much unsorted fish as possible hoping that the large quantity will compensate for the low price they will receive in the industrial market. There is little motivation to expand the whiting industrial fishery. Generally fishermen will land whiting for industrial use when food fish ex-vessel prices are low in an attempt to salvage a day's fishing effort. Increased markets and processing capacity for food fish would be much preferred by fishermen (Earl R. Combs, Inc., 1977).

Export Markets

At present export markets for U.S. whiting do not exist. There has been increased interest in the United States to export whole fish to Nigeria and other African nations, but it appears likely that the offered price will not be sufficient to attract industry to produce a whole-frozen product from whiting currently selling ex-vessel at about \$0.14 per pound.

In southern Europe, especially Italy, there are markets for whiting estimated at over 100,000 t per year. Demand is highest, however, for larger headed and gutted weight whiting (over 9 ounces, finished weight). Most U.S. whiting are not large enough to produce this size of product. Although demand exists in Southern Italy for a 5- to 9-ounce fish with only the tail and fins removed, tariffs, taxes, and shipping and handling charges do not make export of these smaller fish profitable (Fisheries Development Ltd., 1975).

Red Hake

United States red hake, *Urophycis chuss*, landings in 1978 were only 4.8 million pounds with an average ex-vessel price of \$0.11 per pound (U.S. Department of Commerce, 1979). Only 10,000 pounds were reported as processed into fresh fillets in 1976 at a wholesale price of \$0.98 per pound (see footnote 1). The remaining fish were sold whole to fresh fish markets including the Fulton Market in New York and the Baltimore Wholesale Market.

Most red hake is white-fleshed although occasionally ruptured blood vessels can cause a pink hue to the flesh. It is often prepared in the traditional New England method of corned hake with pork scraps and is also used for chowder and fish salad.

There are several problems that tend to limit red hake's marketability. It has softer flesh than whiting or cod (Brand Group, Inc., 1978). Also, the name "hake" is not as familiar to consumers as the "whiting" nomenclature used for silver hake. At present, fillet blocks prepared from red hake have been of unsatisfactory quality because the flesh develops a rubbery texture. Research is currently underway to try to see if an acceptable red hake block can be produced.

Red hake is also a component of the mixed industrial fishery described in this paper for silver hake. As is the case for silver hake, use of red hake for food fish is economically preferable to increased industrial use.

White Hake

In 1976, 9.1 million pounds of white hake were landed in New England at an average ex-vessel price of \$0.133 per pound (Robinson, 1977). Seventeen firms processed a total of 803,172 pounds of fresh fillets at an average wholesale price of \$0.93 per pound; two firms processed a total of 614,990 pounds of frozen fillets at an average wholesale price of \$0.50 per pound; three firms processed a total of 76,800 pounds of cured products at an average wholesale price of \$0.51 per pound (footnote 1). The remainder of white hake was sold to fresh fish markets, primarily in New England, New York, and Baltimore.

Even though white hake is white-fleshed and mild-tasting, its market potential is limited at present. As in the case of red hake, white hake is softer fleshed than whiting and consumers are often unfamiliar with the product name "hake."

Canadian fishermen landed 23.3 million pounds of white hake in 1977. Approximately 1.7 million pounds of cured white hake were exported to the United States as well as fresh and frozen fillets and fillet blocks of an unavailable amount (Government of Canada, Fisheries and Oceans, 1977). Estimates from NMFS for 1978 show 1.3 million pounds of fresh and frozen hake imports from Canada (U.S. Department of Commerce, 1978f). It would appear that if U.S. industry could process white hake at a competitive price there could be some opportunity to substitute U.S. white hake for some portion of Canadian hake imports.

Pacific Whiting

Pacific whiting, *Merluccius productus*, like whiting (silver hake) and other species of the genus *Merluccius*, is a white-fleshed, mild-tasting fish. Historically, Pacific whiting has been landed by U.S. fishermen primarily for the industrial meal fishery with only small amounts being headed and gutted or filleted for human consumption. For example, in 1974 5.3 million pounds were landed of which 1.6

million pounds were used for frozen animal food, 35,000 for canned animal food, 3.6 million pounds for meal and oil, and only 27,000 pounds for human consumption (Bell and Fitz Gibbon, 1977).

Only in 1978 have significant quantities of Pacific whiting been marketed for human consumption. During that year U.S. landings were 7.3 million pounds (U.S. Department of Commerce, 1979). Assuming 1974 levels for industrial use, some 2 million pounds were processed into fillets and headed and gutted product for human consumption.

The ex-vessel price averaged only \$0.03 per pound for all uses of hake. The first wholesale price for H&G was about \$0.39 per pound and for fillets about \$0.79 per pound. Pacific whiting is presently very competitively priced with other hake and bottomfish products. As the fishery develops, ex-vessel prices can be expected to rise but the addition of large-scale, mechanical processing should be more efficient than current smaller-scale hand processing operations and wholesale prices should remain about constant.

The west coast fishing industry is showing strong interest in developing large-scale markets for Pacific whiting. Current optimum yields for the stock have been set at 175,000 t. Most of this resource is currently allocated to foreign fisheries (Earl R. Combs, Inc., 1979b).

Fillets, fillet blocks, and H&G forms are produced from Pacific whiting. Several impediments to market development do exist, however, and need to be dealt with before development of the fisheries can proceed.

Impediments to Market Development

The skin of Pacific whiting tends to be thinner than other commercially harvested species and the flesh is tenderer. Pacific whiting also exhibits a substantial incidence of a myxosporidian parasite in the flesh. This parasite releases an enzyme upon death of the fish that breaks down the muscle tissue and causes the flesh to become mushy

and, thus, unacceptable to consumers (Earl R. Combs, Inc., 1979b).

Laboratory research has already been able to chemically neutralize the parasitic action in minced Pacific whiting but until a method is commercially available which is economically competitive with other product forms and approved by the U.S. Food and Drug Administration (FDA), marketing efforts will need to work with this problem.

Apparently the parasitic action can be curtailed if Pacific whiting is deep-fried quickly at high temperatures. Institutional users generally cook breaded and battered fish this way whereas retail consumers often do not. Processing Pacific whiting into fillet blocks and targeting on the institutional market for sticks and portions may be one method of entering the market with a quality product (Earl R. Combs, Inc., 1979b).

Concerns have also been voiced by buyers about the fragility of Pacific whiting fillets which often break apart upon handling before cooking. Processing fillet blocks rather than individual fillets could also solve this problem.

There is another problem relating to the large-scale development of H&G Pacific whiting in addition to those caused by soft flesh and nomenclature. Consumers are generally used to buying New England and imported H&G which measure about 6-8 inches and are packaged in 10-inch cartons. Pacific whiting are generally about 14 inches, H&G, and do not fit readily into the traditional size carton. In addition to recipes for deep-fry cooking methods and consumer education as to the similarity of Pacific whiting to whiting, it will also be necessary to develop innovative packaging to aid in marketing Pacific whiting.

New Product Development

Some Pacific whiting is currently being minced and combined with shrimp in a breaded product called "Shrimbos²." Currently marketed only

²Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

near Astoria, Oreg., this product is similar to one introduced by a major nationwide fish processor and shows good marketing promise. Consumers are less apt to read labels in mixed species or breaded products sold as "fish" which should lessen the possible resistance to the name Pacific hake, the name formerly used for Pacific whiting. Also, products with many ingredients such as Shrimbos or chowders could lessen the consumer's notice of any slight mushiness in the flesh which might be unacceptable in a pure Pacific whiting product. Further developmental work is needed to find new products where the fragile characteristics of the Pacific whiting flesh are not a deterrent to consumer satisfaction.

Export Markets

The presence of parasites eliminates major European markets for Pacific whiting (Fisheries Development Ltd., 1975), but other possibilities exist for export. Further developmental work could perhaps establish export markets for dried Pacific whiting ("stockfish") and cured, salted Pacific whiting. Africa, the Caribbean, and South America currently consume substantial stockfish quantities of these products. Although cod is the traditional stockfish species, hake is increasingly utilized as a low-priced substitute (Food and Agriculture Organization of the United Nations, 1978). Nigeria, for example, imported 101,956 t of stockfish in 1976 (Earl R. Combs, Inc., 1979a). Parasitized Pacific whiting, where enzyme action has already caused flesh changes, is probably not suitable for quality dried products and quality control will need to be stringent.

Other nations, primarily the Soviet Union, Poland, Bulgaria, and the German Democratic Republic, harvest substantial quantities of Pacific whiting. In 1976 the world harvest of Pacific whiting was 237,012 t (Food and Agriculture Organization of the United Nations, 1977). Since these nations engage in limited trade and information exchange on markets with the United States, it is not known how or whether they neutralize the parasite problem in Pacific whiting. Although some ar-

rangements are already in effect between the U.S. and the U.S.S.R. for transfer at sea of U.S. landed Pacific whiting, more work would be necessary by the Pacific whiting industry to fully evaluate the potential of exporting Pacific whiting to those nations currently harvesting it.

Conclusion

As United States usage of bottomfish fillet blocks increases, there are opportunities for U.S. processed hake blocks to substitute for imported blocks and supply new market demands. Although all U.S. hakes are white-fleshed and mild-tasting, only silver hake has a consistently firm flesh texture which makes it comparable with most imported whittings and cod. More technological research in improving flesh consistency is necessary before Pacific whiting, red hake, and white hake blocks can become fully developed markets.

There is also potential to substitute for imported products and develop new markets in the United States and abroad for headed and gutted, filleted, cured, minced, and chowder products. However, impediments caused by variations in species size, texture, and nomenclature will need to be counteracted by innovative marketing techniques before full market potential is realized.

Literature Cited

- Bell, T. I., and D. S. Fitz Gibbon (editors). 1977. Fishery statistics of the United States, 1974. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Stat. Dig. 68, p. 31-32.
- Brand Group, Inc. 1978. A model retail information plan for seafood species. Chicago.
- Earl R. Combs, Inc. 1977. Venture analysis and feasibility study relating to whiting and Atlantic mackerel. Mercer Island, Wash.
- _____. 1979a. Export and domestic market opportunities for underutilized fish and shellfish, export market summaries—Japan, Korea, Taiwan, Nigeria. Mercer Island, Wash.
- _____. 1979b. Study of the economics of the Pacific hake fishery. Mercer Island, Wash.
- Fisheries Development Ltd. 1975. The market in Western Europe for dogfish, squid, mussels, skate, monkfish, and whiting. Natl. Mar. Fish. Serv., NOAA, Gloucester, Mass.
- Food and Agriculture Organization of the United Nations. 1977. Catches and landings, 1976. FAO Yearb. Fish. Stat. 42:49-50.
- _____. 1978. Latin American hake: Products and markets. Supplement I to the report of the technical consultation of the Latin American hake industry, p. 196-208.
- Government of Canada, Fisheries and Oceans. 1977. Annual statistical review of Canadian fisheries, vol. 10, p. 41, 95. Ottawa.
- Olsen, S. B., and D. K. Stevenson. 1975. Commercial marine fish and fisheries of Rhode Island. Univ. Rhode Island, Mar. Tech. Rep. 34, p. 81-82.
- Robinson, L.A. (editor). 1977. Fisheries of the United States, 1976. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7200, p. 1, 2, 32.
- U.S. Department of Commerce. 1978a. New York landings, December 1977. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7457, 3 p.
- _____. 1978b. New Jersey landings, December 1977. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7458, 4 p.
- _____. 1978c. Maine landings, December 1977. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7454, 4 p.
- _____. 1978d. Rhode Island landings, December 1977. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7456, 3 p.
- _____. 1978e. Massachusetts landings, December 1977. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7455, 6 p.
- _____. 1978f. U.S. imports of whiting, hake, and pollock. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Seattle, Wash.
- _____. 1979. Fisheries of the United States, 1978. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Stat. 7800, 120 p.