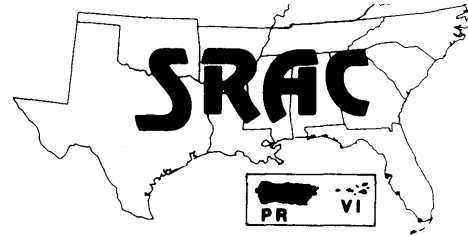


**Southern  
Regional  
Aquaculture  
Center**



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# Processed Catfish

## Product Forms, Packaging, Yields and Product Mix

Mississippi Cooperative Extension Service  
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The catfish industry in the United States has gone through tremendous growth during its 25-year history. Total water acreage for catfish production has increased from over 56,000 acres in 1980 to over 130,000 acres in 1988. Like production, the catfish processing industry has also increased dramatically to keep up with rapid changes in supply and demand. Round weight (live weight of fish delivered for processing) processed in 1980 in the U.S. was approximately 46.5 million pounds. By 1988, this number increased to over 295 million pounds, a 534 percent increase in 8 years. Producer sales (farm value) for food-size catfish totaled over \$249 million for 1988.

Initially, catfish processing developed to help alleviate problems associated with overproduction of farm-raised channel catfish. In the 1960s, most of the water acreage was used to produce catfish for fee-fishing and for live hauling to replenish other fee-fishing ponds. As the live-haul market reached a saturation

point in the late 1960s and early 1970s, established producers moved into processing. In 1987, more than 80 percent of production was marketed through commercial processors. Almost 190 million pounds of catfish were consumed in 1987 through various markets, resulting in a per capita consumption of over .75 pounds. This is a 23 percent increase from 1986 levels.

### Product forms

A traditional product form of processed catfish is the whole dressed fish. This is a catfish that has been headed, gutted and skinned (HGS). However, a growing percentage of sales is generated when the dressed fish is further processed into a variety of cuts or forms, including:

- regular fillets
- shank fillets (regular fillet with the belly flap or nugget removed)
- fillet strips
- nuggets (belly flaps and other fillet trim)
- steaks.

All these forms are marketed fresh and frozen, and many are now sold breaded. Processors also sell rounds—viscerated catfish with the head still on.

During the latter part of the 1980s, specialty products have made their way into the marketplace. Whole dressed catfish and fillets, coated or marinated with flavors and spices such as lemon-butter, cajun and mesquite, can be found in the seafood section of numerous grocery stores.

Another product favorite in certain sections of the United States is “bloody” whole dressed fish or fillets. This is whole dressed fish that does not go through the wash before it is packaged, thus giving it a bloody or “just killed” appearance.

Offal, the by-product of catfish processing, should also be considered when discussing catfish forms. Offal is sent to rendering plants for further processing into fish meal and fish oil (ingredients used in animal feed), or it is ground, cooled, and then sold to pet food companies as an ingredient in canned pet food.

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## Packaging

Catfish products are sold by processors to institutional and retail markets. The majority of catfish products are packaged and delivered fresh (ice packed), individually quick frozen (IQF) or chill packed.

The fresh product is packaged in a variety of ways to meet specifications of the customers. For example, whole dressed fish, shank fillets, regular fillets, steaks, strips and nuggets may be packaged in one or more polybags on ice in a wax-coated corrugated box. Fish, especially whole dressed fish, may be placed directly on ice and then covered with ice. When customers request ice pack, the fresh product is placed in wax-coated corrugated boxes with holes at the bottom of the side panels to allow for drainage as the ice melts. Dry pack boxes do not have drainage holes. Depending on the product form, net weight in the boxes may run 10,15, 20 or 30 pounds. However, each box is often packaged with 30 pounds of product and 20 pounds of ice. If the product is going to be placed in a retail package at grocery stores, label inserts are also included in the corrugated boxes.

The chill pack process consists of lowering the temperature of the product to between 25 and 30° F to form a crust-freezing effect. Products such as whole dressed fish, fillets (including marinated fillets), nuggets and strips are often pack-, aged and shipped chill packed and then sold through retail outlets as fresh fish. This process extends shelf life, protecting the fish until it is thawed. The product is packaged in styrofoam trays, with soaker pads on the bottom, and covered with a polyfilm. Trays are then placed in corrugated boxes without ice and stored or shipped in cold-storage form. Net weights of the boxes vary according to product form and customer requirements; however, basic net weights are 10,15, 20 and 30 pounds. The boxed trays are then placed on pallets and moved into a blast freezer for a short period of

time to achieve the crust freeze. They are then held in the cooler for shipment.

Frozen product forms may be individually quick frozen (IQF) by equipment such as spiral or tunnel freezers or individually frozen through a blast freeze process and ice-glazed. The majority of large processors use the IQF process. Products sold frozen include whole dressed fish, fillets, nuggets, strips, steaks and formed products.

Breaded products, such as whole dressed fish, fillets, strips, nuggets and formed products, are also sold frozen. The individually frozen products are placed in polybags and packed in corrugated boxes with net weights usually of 10 and 15 pounds. In some cases, the frozen product is placed loose in the corrugated box, and later packaged in styrofoam trays for retail outlets. Breaded products may also be packaged in 2 1/2-pound polybags and 5-pound polybags and placed in 20-pound and 40-pound master cartons, respectively. This size package is popular with frozen food retail outlets. Sealed, printed polybags containing breaded products ranging from 2 to 4 pounds are purchased by wholesale outlets for consumers. Breaded products are also sold, as are other fish products, in printed cartons in the retail freezer case.

One of the new further processed catfish items is the enrobed product. This process consists of coating a product, especially fillets with a seasoning and oil base mixture and then individually freezing it. The enrobed fillets are then packed in clear plastic trays that contain individual compartments to keep the products from touching. Trays are usually packed according to fillet size, such as 4, 5 or 7 ounces, and are then placed in a polybag in a corrugated box. Normally, there are five trays with a total of 20 fillets to the box; however, this may vary according to the processor.

## Yields and product mix

The yield from catfish processing is determined, to a large extent, by the

product forms to which the processor is keying his marketing strategy. Figure 1 is a breakdown of approximate yields and product mix of various catfish product forms based on the conversion of 10,000 pounds of live catfish to processed products. Further processing of catfish results in lower yields and more waste, so the processor's cost per pound of salable product increases accordingly. This factor, along with the marketing strategy of the processor and current consumer demands (the major factor), helps to determine the product mix for individual processors.

Volumes given in the example in Figure 1 are based on 10,000 pounds of live fish converted to several product forms. A live fish dressing yield of 62 percent is assumed. As further processing occurs, a whole dressed fish is assumed to yield 70 percent fillets or 90 percent steaks. Fifty percent of the whole dressed fish is further processed into fillets, steaks and nuggets. Of this amount, 5 percent is converted to steaks and the remaining 95 percent to fillets. The amount of fillets can further be broken down, with 20 percent remaining as regular fillets and 80 percent being further processed into nuggets and shank fillets.

Thus, from an input of 10,000 pounds of live fish, a total of 5,301 pounds, or 53 percent of the live weight, is converted into salable product. The catfish components of further processed items, such as breaded, marinated and enrobed product forms, are included in the percentages throughout the diagram.

Data in Figure 1 include fresh and frozen products. For many years, sales of fresh products exceeded frozen. In 1985 a turning point in the industry occurred when the majority of sales came from frozen products. In 1987, frozen products represented 52 percent of sales by commercial processors. In recent years sales of whole catfish have been declining, from 46 percent of total sales in 1986 to 43 percent in 1987. On the other hand, sales have increased for value-added products such as breaded pieces and nuggets.

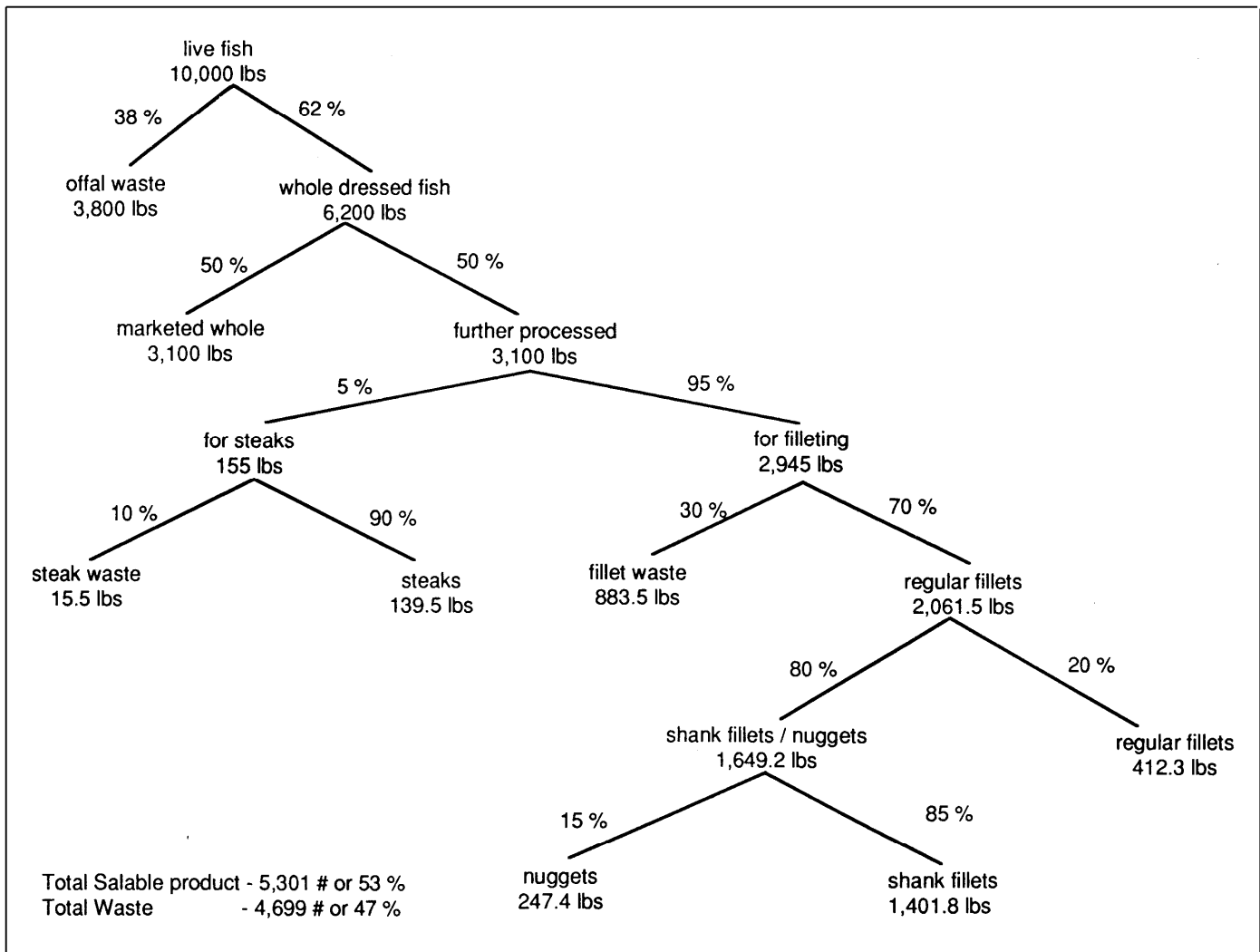


Figure 1. Catfish processing input-output chart illustrating hypothetical product mix.

Sales volume for whole dressed fish, fillets and "other" catfish products sold in 1988 is shown in Table 1.

### Consumption increases

Per capita consumption of catfish products has increased significantly over the last decade. A share of this increase has resulted from intensive marketing efforts within the industry. But rapid changes in consumption patterns and an apparent desire for new and exciting food products have been equally important. This is evidenced by the introduction of over 8,000 new food products each year. The catfish industry has recognized these trends

and has introduced value-added products to keep abreast of consumer demands.

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**Table 1. Sales volume of various product forms sold by U.S. catfish processors in 1988.**

	<b>Ice Pack (000 lb)</b>	<b>Frozen (000 lb)</b>	<b>Total Sales (000 lb)</b>	<b>Ice Pack % of Total</b>	<b>Frozen % of Total</b>
<b>Whole Dressed<sup>1</sup></b>	<b>37,874</b>	<b>17,626</b>	<b>55,500</b>	<b>25.32%</b>	<b>11.79%</b>
<b>Fillet<sup>2</sup></b>	<b>23,365</b>	<b>40,827</b>	<b>64,192</b>	<b>15.62%</b>	<b>27.30%</b>
<b>Other<sup>3</sup></b>	<b>5,006</b>	<b>24,862</b>	<b>29,868</b>	<b>3.35%</b>	<b>16.62%</b>
<b>Total</b>	<b>66,245</b>	<b>83,315</b>	<b>149,560</b>	<b>44.29%</b>	<b>55.71 %</b>

Figures based on data from USDA, Agricultural Statistics Board, "Catfish," 1988 publications.

<sup>1</sup> Head, viscera and skin removed

<sup>2</sup> Includes regular, shank and strip fillets; excludes any breaded product

<sup>3</sup> Includes all products not already reported, including weight of breading and added ingredients

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