

Hybrid Striped Bass Production, Markets and Marketing

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Introduction

World Aquaculture

As the demand for fish and fish products continue to increase, capture production has continued to increase to a point species of fish are being depleted or near depletion all over the world. Human consumption of fish increased from 88 million tons to 99.4 million tons from 1996 to 2001. Total capture fisheries production in 2000 reached an all time high at 95.4 million metric tons, decreased to approximately 92 million metric tons in 2001. Aquaculture is and will play an important part in supplying the world's demand for fish and fish products. It is growing more rapidly than all other animal food producing sectors. More than 210 different farmed aquatic animal and plant species were reported being raised in 2001. In 2001, aquaculture production was reported at 35.48 million metric tons with a value of \$55.6 billion (excluding aquatic plants). China is the main producer, producing 71 percent of the total volume of aquaculture products. The top aquaculture producing countries was lead by China at 26,050,101 metric tons with a value of \$26 billion, followed by India with 2.2 million metric tons with a value of \$2.5 billion, Indonesia with 864,276 metric tons valued at \$2.4 billion, and Japan with 801,948 metric tons with a value of \$3.38 billion. Thailand, Bangladesh, Chile, Vietnam, and Norway rounded out the top ten with the United States ranking 10th producing 460,998 metric tons with a value of \$779 million.

United States Aquaculture

Aquaculture production in the United States rose between 1995 and 2001 to 460,998 metric tons. The top finfish species produced were catfish, trout, salmon, tilapia and hybrid striped bass. The top shellfish were crawfish, oysters, clams, and shrimp.

Hybrid striped bass production in the United States began in 1986 with only 4.53 metric tons (10,000 pounds) recorded. The following year production climbed to 183.7 metric tons (405,000 pounds). Production continued to increase until 2000 when production peaked at 5,097.02 metric tons (11,237,000 pounds). Production decreased slightly in 2001 to 4,945.52 metric tons (10,903,000 pounds) and again in 2002 to 4,757.96 metric tons (10,489,500 pounds). Research is currently being done in a variety of areas, including reproduction, broodstock, fish survival, and improved meat quality.

A hybrid striped bass is a cross between a white bass and a striped bass. The crossing of a female striped bass with a male white bass (the original cross) is called the Palmetto Bass. The crossing of a male striped bass with a female white bass is called the Sunshine Bass (the reciprocal cross). Hybrid striped bass is described as having seven or eight dark broken stripes running along the side of the silvery body with several extending to the tail. The back is dark green to black colored. Teeth at the base of the tongue are arranged in two parallel patches. Body is deep, usually measuring 1/3 of length of fish. Hybrid striped bass cannot reproduce. The flesh is mild, firm, fine grained, lean flaky and the flavor is similar to freshwater bass. Market size is desirable at 1.5 to 3.5 lbs. Hybrid striped bass are raised for food and sport.

History of Hybrid Striped Bass

Researchers developed hybrid striped bass in the mid-1960's. The cross proved to be easier to raise, grew faster, survived better and was hardier than the striped bass. Many state fish and game agencies began producing hybrid striped bass to stock in reservoirs and now can be found all through the south and southeast. Interest in the hybrid striped bass as foodfish began to emerge in the late 1970's. Around 1987, a project funded by the National Coastal Resources Research and Development Institute in North Carolina demonstrated that commercial production of the Hybrid striped bass in ponds was viable and profitable. The first harvest was sold in 1988/1989. Its popularity has continued to rise with production in 2002 reaching almost 10,500,000 pounds. Production of hybrid striped bass for foodfish now can be found in many states including Virginia, North Carolina, South Carolina, Georgia, Florida, Texas, California, and Pennsylvania.

Current Production and Sales

The hybrid striped bass industry has seen continued growth since 1987 with the estimated production for 2003 at over 11.5 million pounds. In 2002, it was the 5th largest aquaculture industry in the U.S on quantity produced (10.5 million pounds), and fourth in dollar sales (\$27.8 million farm value), following catfish (630 million pounds with \$358 million farm value), trout (54.5 million pounds with \$72.3 million farm value), salmon (39.2 million pounds with \$103.8 million farm value), and tilapia (19 million pounds with \$26 million farm value).

Hybrid striped bass production in the United States is divided into four regions: the West, Mid Atlantic, Southeast, and Northeast. The West region consisting of the states west of the Mississippi River produced almost 50 percent or 4.6 million pounds of the U.S. produced hybrid striped bass in 2002. The Mid Atlantic region, Georgia, South Carolina, and North Carolina, was second in production with 2,652,500 pounds. The Southeast region consisting of Mississippi, Arkansas, Alabama, and Tennessee produced 2.1 million pounds and the Northeast region produced 1.04 million pounds of hybrid striped bass. Three producers produced over 60 percent of the total national hybrid striped bass production in 2002: Kent Sea Tech of California, Natures Catch of Mississippi and Silver Streak Bass Company of Texas. In 2002 there were 60 producers of hybrid striped bass in the U.S. down nine from 2000. Several U.S. producers not raising hybrid striped bass anymore gave too high production costs with the low prices as their main reason for quitting.

Pond, tank and cage culture are the three systems that hybrid striped bass are raised in. Of the total production in 2002, 57 percent (5.98 million pounds) was produced from pond culture systems, 42 percent (4.47 million pounds) was produced by tank culture methods, and .002 percent (22,500 pounds) was produced by cage production methods. In 1998 pond production surpassed as the favored type of production method and continued to increase until 2001. Tank production remained fairly stable from 1997 to 2002. Cage production increased until 1996, then decreased until 2000.

Table 1. Total hybrid striped bass production and sales - fresh and live in 2002. Source: Kent Sea Tech Corporation.

	West	Mid Atlantic	Southeast	Northeast
Production (lbs)	4,666,000	2,652,500	2,127,000	1,044,000
Sales (lbs)				
Fresh	4,317,000	1,692,500	2,119,000	590,000
Live	349,000	960,000	8,000	454,000
Total	4,666,000	2,652,500	2,127,000	1,044,000

Hybrid striped bass are sold as live, or as fresh in a variety of forms. In 2002, 17 percent of the hybrid striped bass sold by producers in the U.S. were sold live (1.77 million pounds). Live sales consisted of deliveries to large Asian retail markets in Canada and the United States, and delivered to stocking recreational pond fishing operations. The Mid Atlantic region sold the most live hybrid striped bass at 960,000 pounds or 54.2 percent of total live sales. The Northeast region sold 454,000 pounds or 25.6 percent of total live sales, followed by the West region at 349,000 pounds 19.7 percent. The Southeast region only sold 8,000 pounds as live or .45 percent.

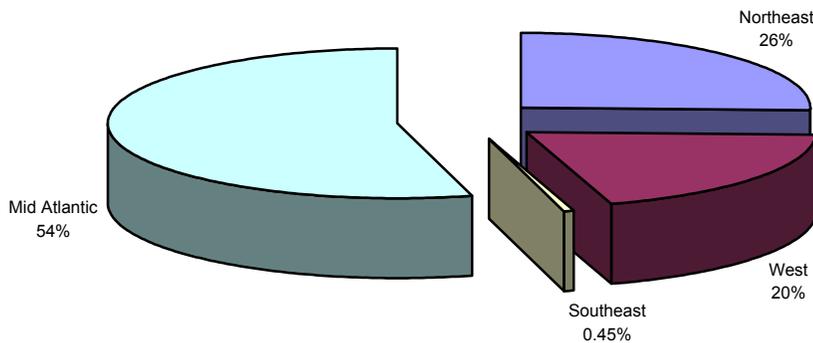


Figure 1. Total U.S. hybrid striped bass live sales by region. Source Kent Sea Tech Corporation.

Total fresh product sold in 2002 was 8.7 million pounds. The West region sold 4.3 million pounds or 50 percent of the total fresh product sold. The Southeast region sold 2.1 million pounds or 24 percent. The Mid Atlantic region sold 1.69 million pounds or 19 percent, followed by Northeast region with 590,000 pounds or 7 percent.

A 1996 survey revealed most of the fresh product was sold in the round (whole) to wholesale seafood distributors, who in turn sold whole fish and processed products to white tablecloth restaurants. The survey found most wholesalers preferred a 1.5 to 2 pound fish, because it yielded two 6 to 8 ounce fillets suitable for sale in restaurants and

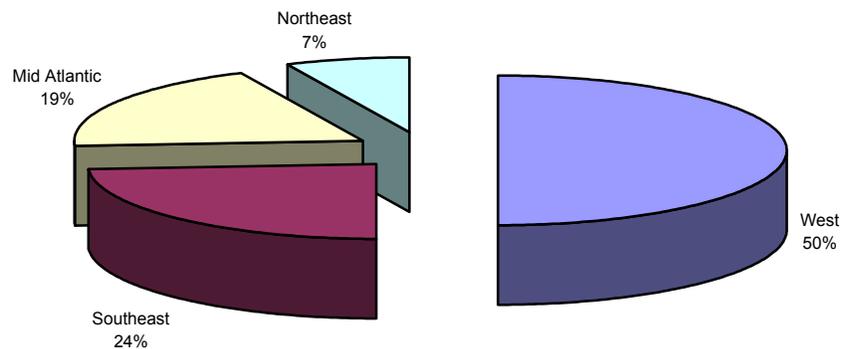


Figure 2. Total U.S. hybrid striped bass fresh sales by region. Source: Kent Sea Tech Corporation.

retail markets. Another study showed retailers preferred fresh, skin-off fillets, while wholesalers preferred fresh gutted, whole fish, and skin-off fillets. The study said that of those responding to the survey 92 percent of the wholesalers of hybrid striped bass sold directly to restaurants or to other retail firms such as supermarkets or fish markets. To increase marketing opportunities for hybrid striped bass wholesalers suggested lowering the price and achieving a more consistent year-round supply.

Cost of Production

In the aquaculture industry investment costs can vary greatly and costs can be site specific. In order to estimate the cost of a possible operation one must look at examples with similar variable costs. Production costs are typically divided between variable costs and fixed costs. Variable costs depend on the level of production and can include seed (eggs or fish you begin with) and food to grow fish to market size. Fixed costs must be paid regardless of the level of production. These can include labor, capital costs, interest and depreciation.

There are several publications found on the Internet that can be helpful when figuring out cost of production. Some of these include:

- A publication written by North Carolina Department of Agriculture is a workable spreadsheet that one's own specific production cost information can be filled in. This spreadsheet can be found on the Internet at: <http://www.agr.state.nc.us/aquacult/HSBTemplate.xls>.
- Another excellent publication, Maryland Sea Grant Extension: Finfish Aquaculture Fact Sheet #4, guides the producer through a simplified example of figuring out production costs. This workbook enables the producer to estimate using the major production costs that aquaculture operations require - buying,

- feeding, maintaining the fish, labor and capital costs. The publication can be found on the Internet at: <http://www.mdsg.umd.edu/Extension/finfish/FF4.html>.
- North Carolina Department for Agriculture and Consumer Services published a study that looked at production costs for a 33-acre pond culture system farm in North Carolina. It goes over the inputs and the outputs of the operation. The inputs included water, land, fingerlings, feed, oxygen, medication & chemicals, electricity & fuel, labor, and equipment use. The outputs included hybrid striped bass, and effluent (water release). The study went over the economics of the operation mentioning initial investment, operating costs and returns, purchasing phase two fish, financing, fish size, insurance, permits and licenses, alternative uses of hybrid striped bass ponds, markets and research. The breakeven point for a hybrid striped bass facility of \$1.90 per pound was the finding of the 2001 study.

Researching Your Market

Prior to entering any business, one should thoroughly research the possible marketing opportunities for the product being raised. Raising a product like hybrid striped bass will take more extensive research, as the demand is small, and there needs to be promotion and marketing to find potential buyers. Raising a commodity that is perishable adds to the risk. The producer will need to have a buyer lined up when the product is ready for market. The chain for marketing fish goes from producer - wholesaler/processor - distributor - retailer.

Ethnic Markets

Several studies have indicated the majority of hybrid striped bass sales are to Asians (mainly Japanese and Chinese). In one study wholesalers indicated that 80 to 100 percent of their hybrid bass sales were destined for Asian markets. Asian markets prefer live fish since it guarantees freshness. This ethnic group knows how to handle and prepare live fish. The live fish market has seen increases in demand as sales of live fish have been increasing especially in the Mid Atlantic States. According to one study, Americans are used to buying fillets and are less knowledgeable to handling live fish once home.

It is important to know where these ethnic populations are located not only in the United States, but also in Canada since Canada is an importer of U.S. raised hybrid striped bass. The U.S. Census population map shows the largest concentration of Asians is in mid to southern California, southern Arizona, along the coastal area of the Northeast from Washington D.C. to Boston, MA, and in the urban areas of Minneapolis, Chicago, Seattle, Dallas, and Houston. The areas that increased 200 percent or more of Asian populations, from 1990 to 2000, are Georgia, South Carolina, North Carolina, and Florida. Hispanic/Latino populations have also shown an interest in hybrid striped bass. The largest concentrations of Hispanic/Latinos are mid to southern California, southern Arizona, New Mexico, southern half of Texas, southeastern Florida, the area from Washington D.C. to Boston MA, and urban areas including Chicago, IL, Detroit, MI, Atlanta, GA, Oklahoma City, OK, Salt Lake City, UT, Dallas/Fort Worth, TX, and Seattle/Tacoma, WA. The areas that increased 200 percent or more of Hispanic/Latino

populations from 1990 to 2000, were the southern and mid Atlantic states, the southern tip of Utah, northwest area of Arizona, Kansas, Florida, central Colorado, Minnesota, Iowa and eastern Nebraska.

Canadian population statistics showed a large concentration of Chinese and Japanese in Toronto, Vancouver, Calgary, Edmonton, and Montreal. The 2001 Census of Canada showed Toronto having a Chinese population of 409,530, up almost 60,000 people from the census of 1996 and a Japanese population of 17,415. The Latin American population in 2001 in Toronto was 75,910 people. In 2001 Vancouver had a Chinese population of 342,665 people, a Japanese population of 24,025 people and a Latin American population of 18,715 people. Montreal’s Chinese population was 52,110 in 2001 increasing from 46,111 in 1996. The Japanese population was 2,295 in 2001 and the Latin American population was 53,155 people. Calgary follows Montreal in size of their Chinese population in the 2001 Canadian Census with 51,850 people, 3,845 Japanese people and 8,605 Latin American people. Edmonton’s Chinese population was 41,285 in 2001, and their Japanese population was 7,510 people.

Price

Price of hybrid striped bass has fluctuated downward since 1984. In 1984 the farm gate price of hybrid striped bass was \$5.00 per pound with a supply of only 1.5 million pounds. Since then the average national price has decreased almost every year to \$2.56 per pound (FOB fresh) in 2002. The supply has increased over the years to an estimated high of almost 11.5 million pounds.

Prices differ depending on the region, and whether the fish was sold from the farm or delivered. According to a survey done by Kent Sea Tech Corporation, the average wholesale FOB farm price for fresh product in 2002 was \$2.56 per pound, a 1-cent decrease from the average the prior year. The West region had the highest wholesale fresh FOB farm price of \$2.69 per pound and the highest delivered fresh price of \$2.72 per pound. The Northeast had the highest price at \$3.40 per pound for live (FOB farm) and the highest live delivered price at \$3.67 per pound. The hybrid striped bass price received by producers ranged from \$2.50 per pound to \$3.41 per pound in 2002.

Table 2. Price per pound received by farmers in 2002 for hybrid striped bass by region. Source: Kent Sea Tech Corporation.

2002	Fresh (FOB farm)	Fresh (delivered)	Live (FOB farm)	Live (delivered)
West Region	\$2.69	\$2.82	\$3.13	\$3.49
Mid Atlantic	\$2.47	\$2.62	\$3.00	\$3.26
Northeast	\$2.42	\$2.60	\$3.40	\$3.67
Southeast	\$2.50	\$2.70	\$2.75	\$3.00
Average	\$2.56	\$2.72	\$3.12	\$3.41

The Fulton Fish Market fresh fish price reports from 1990 - 2003 showed prices paid for fresh hybrid striped bass were also different by state. States included in this information were Alabama, California, Florida, Louisiana, Mississippi, North Carolina, (Not every state had price information for all the years and only states with enough data were included on the chart.) The chart shows the price received by California producers were consistently higher for all the years but 1999. The highest price received by California producers was approximately \$4.10 per pound in 1996. Mississippi producers received the lowest prices until 1999 when Florida received approximately \$2.25 per pound. North Carolina has seen a steady increase in prices their producers have received since 1994.

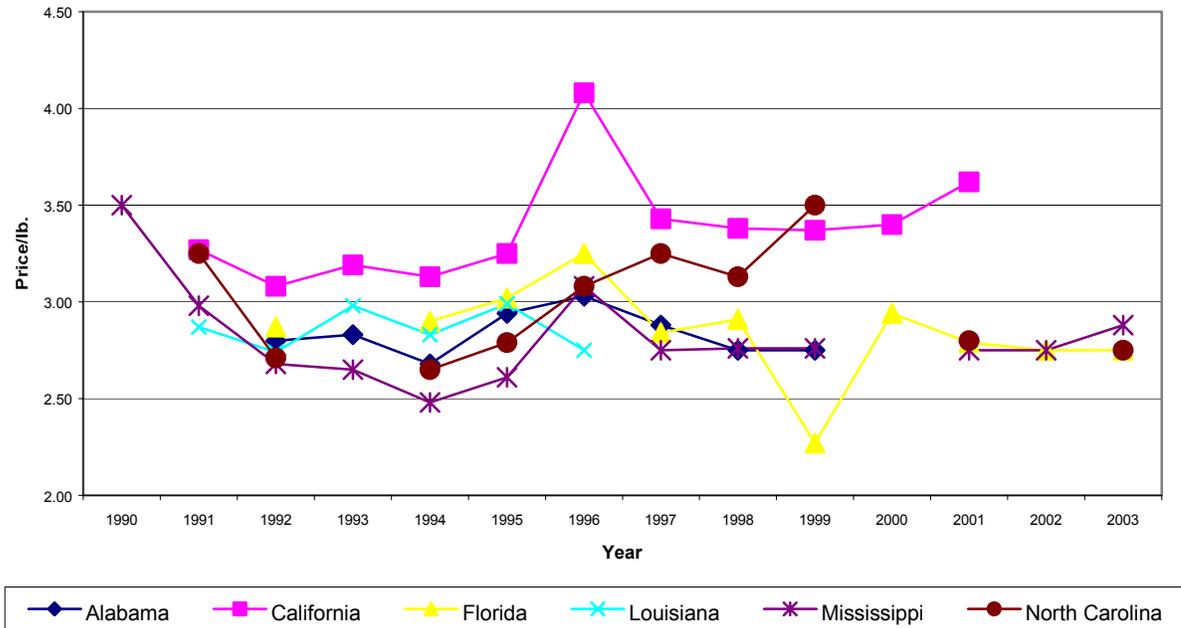


Figure 3. Hybrid striped bass fresh prices from different areas from 1990-2001. Source: Fulton Fish Market.

To understand how the price for the fish increases as it moves from producer to consumer one study compared the difference in price between the retail and the food service establishment through the channel to the producer. When the product ownership changes the price of the product increases due to the changes done to the product. The difference in purchase price of the product and the selling price is called the “return for adding value”. In this example the producer sold his fish for \$ 2.50 per pound to the processor/wholesaler. The fish was processed into fillets and a 97 percent markup was added bringing the price per pound sold to the second distributor to \$4.93 per pound. The second distributor marked up the product 23 percent and sold the product to the food service retailer for \$6.06 per pound. The food service marked up the product by 178 percent and sold the product to the final consumer for \$16.84 per meal. The second distributor sold the product to the retail market for \$6.06 and the retail market marked up the product 32 percent to sell the product to the final consumer for \$8.00 per pound.

Table 3. Hybrid striped bass costs from producer to retail. Source: Finfish Aquaculture Fact Sheet #5.

	Hybrid Striped Sold	Purchase Price	Mark Up
Retail Market	\$8.00	\$6.06	0.32
Food Service*	\$16.84	\$6.06	1.78
Second Distributor	\$6.06	\$4.93	0.23
Processor/wholesaler**	\$4.93	\$2.50	0.97
Producer ***	\$2.50		
*The mark up is explained by the fact that the price margin is significantly higher in the food service industry.			
**Changed to fillets			
***Average price in 2002			

Competition

Competition in this market comes from commercial fishery landings of striped and white bass – foreign and domestic, foreign competition of hybrid striped bass growers and other hybrid striped bass producers, and producers of other finfish (mainly catfish and tilapia) - foreign and domestic.

Domestic Landings of Striped Bass

Commercial landings of striped bass increased 400% from 1994 to 1998. From 1998 to 2002 landings leveled off to around 6.5 million pounds annually. Experts feel commercial landings of striped bass has reached its maximum yield.

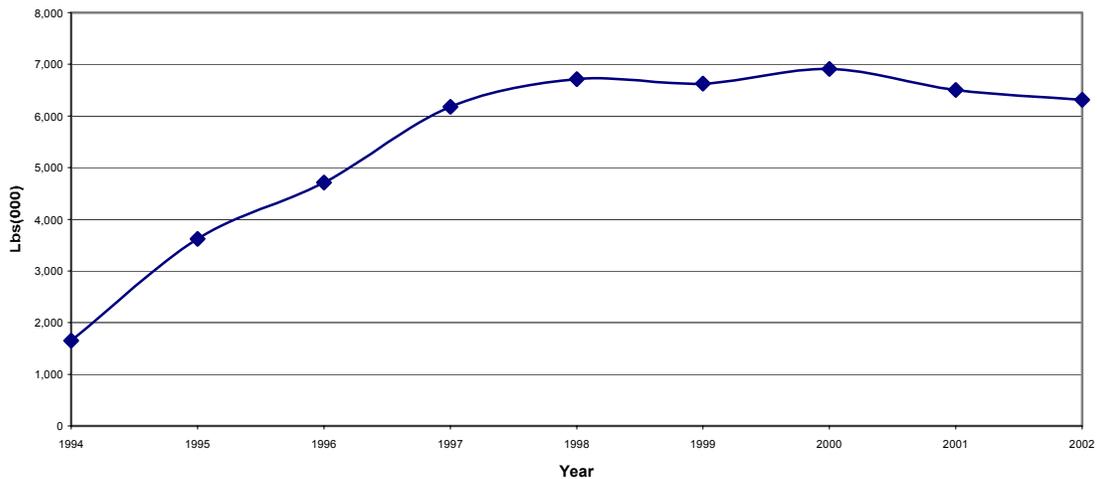


Figure 4. U.S. domestic landings of striped bass - 1994-2002. Source: NOAA Fisheries.

Certain regions in the United States are more receptive to consuming hybrid striped bass because they recognize the name of striped bass. The striped bass is native along eastern U.S., especially the Chesapeake Bay on the Atlantic Coast.

Commercial Landings of White Bass

White bass are found throughout central and eastern United States, and the Great Lakes areas. White bass are commercially landed in several lakes, including Lake Erie. White bass landings on Lake Erie totaled 161,664 pounds in 2002, down from 226,664 pounds landed in 2001. Prices for white bass in 2002 were the lowest in 10 years due primarily to the Canadian market.

Foreign Competition

Foreign countries are slowly developing their hybrid striped bass industry including Canada, Mexico, Israel, Spain, Turkey, Taiwan, and China. The United States currently has strong markets in Canada especially the Toronto area. Foreign production of hybrid striped bass is a threat as foreign countries have abundant supplies of water, lower labor costs, and less regulation of drug usage. Countries in Europe and Asia can produce their fish much cheaper than the United States even though shipping overseas is costly.

Other Finfish and Fish Products

The greatest sources of market competition for hybrid striped bass are other finfish that are lower-cost, high quality, white meat fish from aquaculture and commercial fisheries landings. Fish competing for market share with similar characteristics as hybrid striped bass include striped bass, catfish, tilapia, cod, sturgeon, carp and walleye. Many of these can be brought to market much cheaper than hybrid striped bass. Foreign countries can produce a variety of finfish much cheaper than the United States. One fish that is being imported is fresh/frozen catfish from China and Vietnam. Their cost of producing catfish is less than our cost of producing fresh/frozen catfish.

Factors Effecting Supply

The hybrid striped bass industry has seen large growth throughout the 1990's. Supply has continued to increase in past years even though the number of producers has decreased.

To increase supply:

- Existing producers as well as producers who wish to start production should have opportunities to access current information about production through training, workshops, assistance in developing business plans, and obtaining financial assistance.
- Expected survival rate of stock fry is about 20 percent, phase one fingerlings is 85 percent, and phase two fingerlings to grow out is about 80 percent according to a study done 2001 by the North Carolina Department of Agriculture and Consumer Services. Research is being done to increase the survival rate at the three stages.
- Currently there is research being conducted, and more will continue on developing brood stock, and improving the species through genetic research.
- Research is also being conducted to find more drugs that can be approved and used on hybrid striped bass.
- Retailers want a fish that can be supplied year round. This is possible now through research that has been done. Some producers are now offering year round

- supply of hybrid striped bass, but more producers are needed to provide year round production to satisfy this demand.
- Nutrition and feeding of the hybrid striped bass is also being researched to increase supply and cut costs. The cost of feed to raise hybrid striped bass to market size is the largest single variable cost accounting for about 40 percent of total variable costs.
 - Other factors influencing supply are state and federal regulatory policies, shipping costs, logistics and other technological constraints including high mortality rates of live product during transport, insufficient knowledge of individual species' physiological requirements, water quality management, and inadequate transport and holding facilities for live product.

Factors Effecting Demand

Demand for U.S. hybrid striped bass is mainly fresh product to Asian markets in the United States and Canada. These markets are concentrated in larger cities as New York, Boston, Los Angeles, and Toronto. The Census maps of population increases over the last ten years shows other areas in the United States where the population of Asians have increased. These areas need to be looked into for new or increasing markets for hybrid striped bass. Other ethnic groups have shown an interest in hybrid striped bass according to various studies. These include Hispanic/Latinos, and African Americans.

Consumers are looking for several main factors when buying:

- Availability - consumers want a product to be available year round
- Quality – consumers want the highest quality product. Aquaculture not only can offer healthy product but similar sized product as well.
- Price – the product must be affordable to the consumer.
- Packaging – hotels prefer 10 lb packages, where as consumers may prefer to buy only enough for one meal.
- Product easy to prepare – many consumers are unfamiliar with preparing fish. Recipes and tips could be on the package to help in preparation.

Other influences on demand:

- Value of dollar: The value of the dollar has continued to decrease over the past few years. The declining value of the dollar could open new markets for U.S. fish products including hybrid striped bass in European countries, Asian countries, Canada and Mexico. In December of 2003 the euro rose as high as \$1.25 against the dollar.
- Mad cow disease: The discovery of Mad Cow Disease in the United States could increase the demand for fish including hybrid striped bass as consumers look to substitute other meat to replace beef.
- Competition from similar finfish species including catfish, striped bass, white bass, and tilapia, domestic and foreign.
- Retail prices of beef, pork, and chicken. Consumers who buy meat according to price are influenced by increases in these meat products. Higher prices in any of these three could encourage an increase buying of fish and fish products if their prices are lower than the prices paid for beef, pork or chicken.

- Retail prices for beef from September to November 2003 rose \$.28 a pound to \$3.62 on the average. Prices of beef varied from \$2.28 for ground beef, to \$9.79 for Rib eye steak.
- Retail prices for pork decreased from September to November 2003 \$.10 a pound to \$2.62 on the average. Prices varied from \$2.27 for miscellaneous ham to \$3.92 per pound for boneless chops.
- Retail prices for chicken from August to November 2003 stayed level at around \$1.80 per pound on the average. Fresh whole chicken slightly decreased from August 2003 to November to \$.97. Chicken breast bone-in rose from August to October by \$.24 and decreased to \$2.18 per pound in November. If retail prices for beef, pork or chicken show an increase in price, consumers could increase their purchase of fish as a substitute.

Note: Prices received by farmers for hogs, have seen a decline in prices since the middle of 2003. Prior to that prices had reached bottom in late 2002 and has since increased. Prices for broilers have fluctuated, but increased since mid 2002. Prices for all beef cattle saw an increase since 1996 with slight downward fluctuations in late 1998. Beef prices paid to farmers increased approximately \$55 per hundred weight in 1996 to approximately \$113 per hundred weight in late 2003.

Farm Fish Cooperatives

There are several types of cooperatives that could fit into the aquaculture industry: Purchasing, Marketing, Processing & Marketing, New Generation Processing & Marketing. The more common types are Marketing Cooperatives and Processing & Marketing Cooperatives.

Table 4. Explanation of several types of Cooperatives. Source: University of Wisconsin Center for Cooperatives: Cooperatives in Aquaculture.

	Simple Marketing Cooperatives	Processing and Marketing Cooperatives (Traditional)	Processing and Marketing Cooperatives (New Generation)
What Their Role Is	Negotiate prices; coordinate distribution	Process & market members' raw products	
Capital Requirements	Moderate Start-up costs	Typically involved significant start-up costs and requires regular reinvestment to upgrade equipment & expand marketing	
How They Are Capitalized	The co-op may borrow from members, from lenders, or sell stock or capital certificates to cover start-up costs. There after, check-offs or "capital retains" may be assessed members per unit of their raw product		Limited number of preferred shares sold to qualifying farmers at a price that reflects overall capital needs

Marketing Cooperatives – members individually raise their product, and share with other members the costs and benefits of cooperatively marketing all members' products. This

type of cooperative involves relatively minor capital requirements. Simple marketing cooperatives can perform important functions that individuals cannot perform as well on their own. These include coordinating supply among many producers to meet larger buyers' demands for quantities and service, provide the economies of scale to break into new markets and establish high quality standards for all members to follow. By pooling their resources, producers can spread the costs of running effective promotions and hiring competent managers and sales people to market their products. These cooperatives can often secure higher and/or more stable prices than members could achieve individually. They do not usually handle or process their members' raw product.

Processing Cooperatives – Traditional vs. New Generation - These cooperatives transport, process, and market members' raw products. This takes significant levels of capital. This capital can be acquired through equity drives of prospective members. This usually is enough to secure a loan for the remaining start-up expenses. Many cooperatives also apply for government and state grants to help raise the needed capital. The NGC has three distinguishing characteristics: 1) marketing rights are allocated as "delivery shares". Each share guarantees and obligates a member to deliver a set quantity of raw product to the cooperative. 2) limited membership, 3) appreciable/depreciable and transferable equity.

Farmers are finding there are advantages in belonging to an aquaculture cooperative. There are several fish farm cooperatives in the United States. Some advantages to joining a cooperative for a smaller producer is the ability to fill orders of larger amounts of hybrid striped bass to distributors and retailers, jointly hiring people only involved in marketing your product, to offer buyers more yearly supply of product, being able to add value to the product and get a higher return, and financial assistance by government being offered to cooperatives.

- **Delta Pride Catfish, Inc.** is a farmer owned cooperative that now employs 500 people and processes over 70 million pounds of catfish a year. Located in Indianola, Mississippi, the processing and marketing cooperative was started in 1981 when a group of fish farmers decided to stop competing with each other. The fish are processed for immediate freezing or to ice packed containers and shipped to foodservice and retail customers nationwide. www.deltapride.com
- **MinnAqua Fisheries Cooperative** is a farmer owned cooperative located in Renville, MN that raises and sells live tilapia. The 350 members of this cooperative deliver their soybeans to an independent soybean processing plant, which is then delivered to a feed milling operation to be made into feed for the fish. The fish are marketed live to Asian-American markets and restaurants. MinnAqua changed to live tilapia, as they couldn't compete with the fresh/frozen suppliers from China, etc.
- **Nebraska Sandhills Yellow Perch Cooperative** is located in Whitman County. The Cooperative markets both yellow perch fingerling fish and adult fish for fillet

markets. They are a group of 25 producers in 15 counties throughout western and central Nebraska.

- **North American Fish Farmers Cooperative** – Marketing Cooperative. Markets tilapia for MinnAqua Fisheries Cooperative.
- **Purchase Area Aquaculture Cooperative** located in Farmington Kentucky has 50 members. It was started in 2000, to produce, process, and market fresh catfish. The processing plant began operation a year later. Each member is required to purchase shares of stock and then purchase processing rights based on cents-per-pound of catfish produced. The products offered by the cooperative are fillets, steaks, fiddlers, nuggets whole fish, fingerlings and live catfish. They have been having several marketing success stories. In 2002 they became the supplier of catfish to a restaurant in southern Illinois, followed by selling to several Missouri retailers, including E.W. James and Sons, and Food Giant Stores. PAAC catfish can also be found in supermarkets and restaurants in Western Kentucky including three Captain D's restaurants, and in Kentucky state parks. They successfully landed Kroger, the largest supermarket chain in the U.S., as a customer. Kentucky Department of Agriculture marketing specialists were instrumental in bringing the two parties together to work out details of Kroger's purchase of PAAC catfish. Kroger started out with an initial order of 12,000 pounds a week and has escalated to 48,000 pounds. During Lent Kroger placed an order for 84,000 pounds. In Mid 2003 the Cooperative started processing and marketing shrimp also. PAAC will process, freeze and package the shrimp and they will be sent to a selected number of Kroger stores.
- **Southern States Cooperative** is a 300,000 member cooperative involved in many farm products. The co-op is already marketing tilapia under the Farmer's Catch brand name, and markets are expanding. So far, except for test marketing, tilapia has been sold only to white-tablecloth restaurants or live in ethnic markets. They have been doing marketing studies on tilapia and are predicting 10 plus farms to participate in raising tilapia. Southern States' testing of value-added tilapia products in the Richmond, Va., area proved successful. The cooperative is planning to raise the feed that will be fed to the fish.
- **Texas Aquaculture Cooperative** broke ground for a processing plant at Clemville, Texas in 2003. This 26-member cooperative started in 2001. The farmers primarily raise catfish, but some produce hybrid striped bass, redfish, shrimp, and crawfish. Prior to starting the cooperative, the members individually farmed and marketed their product with no organized effort with no or little profit. They realized they needed a processing plant to add value to their product and increase profit. This led the farmers to organize as a cooperative and started leasing space at a nearby processing plant. They are processing 60,000 pounds a week, and when the new plant comes online, processing will increase to 150,000 pounds a week. Working as a cooperative, the farmers have been able to build the plant, market jointly and are able to serve customers with larger orders and a

larger market area. Already, the Texas Aquaculture Co-op has grown from \$6,000 in sales during its first month of production to more than \$100,000 in January 2003. Because of the new plant, sales for 2004 are projected to reach \$4.5 million.

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