
U.S. Aquaculture – Current Status and Future Potential

Prepared by David Harvey
Agriculture Economist
Economic Research Service
U.S. Department of Agriculture

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Preface

The intent of this report is to provide interested individuals an overview of the current status and future outlook of aquaculture in the United States.

Information contained in this report was gathered, in part, from: “Aquaculture: Situation and Outlook Report” and “Aquaculture Outlook,” produced by the Economic Research Service, U.S. Department of Agriculture.

Aquaculture's Forecast

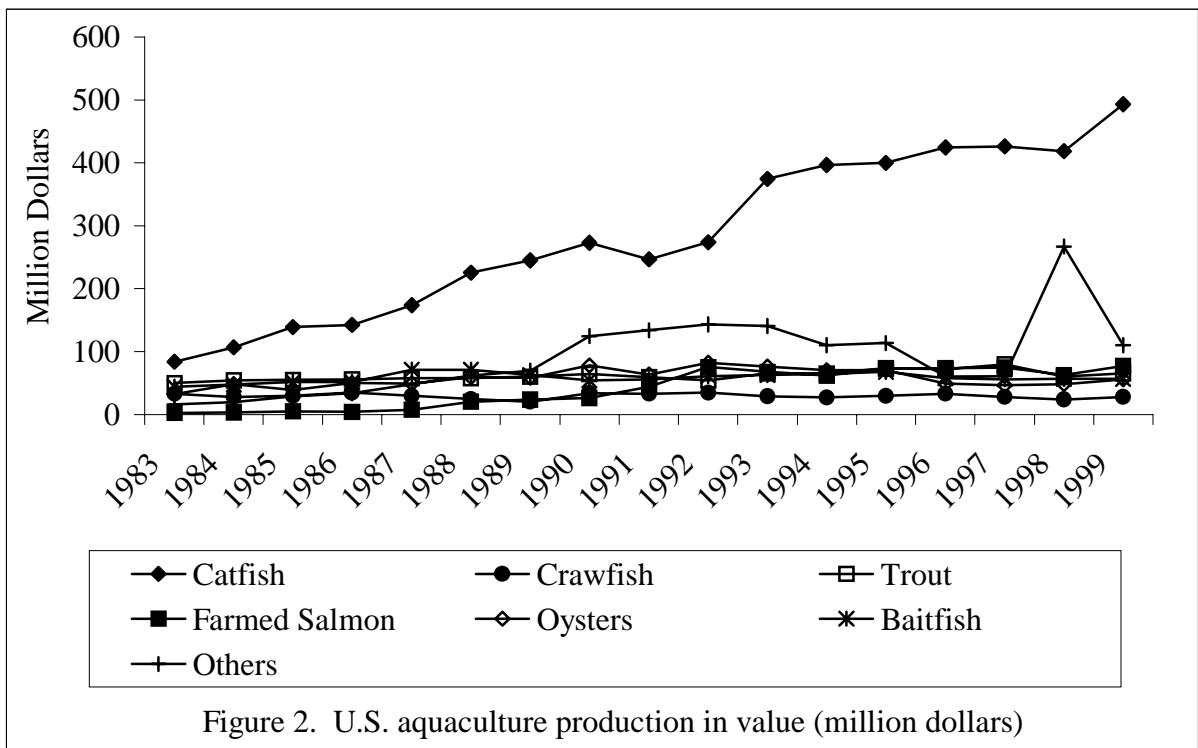
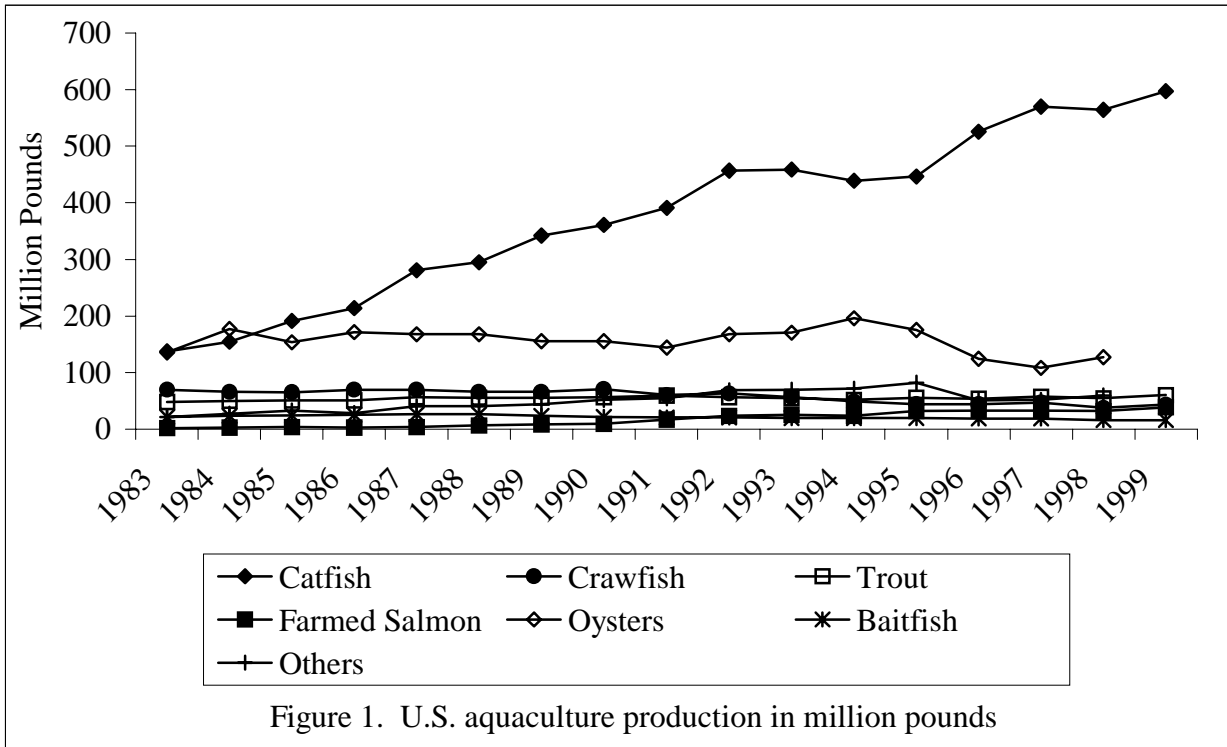
Many of the factors that have spurred the development and growth in the aquaculture industry during the last decade will remain potent forces behind its growth in the years to come. A number of these factors have been discussed before. Human population continues to expand, bringing with it increasing demands on worldwide food production and distribution. For example, the U.S. population increases at slightly over 2 million persons per year, at current consumption levels this means that suppliers must come up with over 30 million pounds of more seafood each year. Adding to this growing demand for seafood products are higher disposable incomes in many countries and gradually changing dietary patterns with increase the variety of food and the amount of food prepared outside the home. While numerous efforts are underway to preserve wild fisheries, there still appears to be strong pressures on a wide number of stocks. Therefore, most increases in seafood supply will have to come from higher aquacultural production.

Over the last several years, higher consumption of catfish, tilapia, salmon and shrimp has boosted the percentage of U.S. seafood consumption coming from farm-raised products. However, much of the higher supply to meet this growing demand has come from imported products. While a rising demand for aquacultural products is will positively impact U.S. aquaculture, the U.S. industry is expected to be faced with strong competition from around the world. As with other agricultural sectors, the U.S. aquaculture industry must develop the knowledge and infrastructure that will allow it to compete economically with producers in other countries. This process will need to cover a variety of areas, from increasing production efficiencies at the production and processing levels, the development of new products, increasing economies of scale, and a host of other developments.

Over the last several years the markets for imported tilapia and Atlantic salmon have expanded very rapidly, and imports of shrimp have continued to grow, although at a slower pace. While not all the shrimp imported is farm-raised, almost 100 percent of the tilapia and Atlantic salmon are. If even only 50 percent of imported shrimp comes from farm-raised production, the total value of imported farm-raised shrimp, tilapia, and Atlantic salmon in 2000 was \$2.7 billion. To put that in perspective, the total estimated value of all U.S. poultry exports (broiler, turkeys, and eggs) in 2000 was \$2.1 billion, 22 percent lower.

Many of the major economic and supply trends that affected the U.S. aquaculture industry and seafood in general in 2001 are expected to continue. First, growth in the U.S. economy will be slow, but will continue. Second, demand strength is expected from continued, albeit slower, expansions of the U.S. and Asian economies and food safety scares in the European Union (EU). Third, aquaculture producers that can utilize feed rations with a large percent of plant products are expected to benefit from continued low grain prices. Fourth, the U.S. dollar is expected to remain strong against the most currencies encouraging imports of aquacultural and other seafood products. Fifth, lower beef production in the EU and consumer concerns over its safety are expected to boost demand for alternative protein products. While the U.S. aquaculture industry

has not traditionally exported a large amount of products to the EU, the current situation may provide an opportunity to gain an entry to those markets.



Census of Aquaculture

The recently released 1998 Census of Aquaculture report provides a wealth of data about the U.S. aquaculture industry. The full text and a set of tables reported in the Census of Aquaculture can be found at the National Agricultural Statistics Service (NASS) web site – www.usda.gov/nas/.

The first aspect of the U.S. aquaculture to be reviewed is the number of farms in the industry and the value of their sales in 1998. The census showed slightly over 4,000 farms in the domestic aquaculture industry. These farms had total sales of \$978 million in 1998. Not expectedly, the majority of the farms and the bulk of the sales were located in the southern region. The farms responding to the census were divided into five regional groupings based on the States served by the five regional aquaculture research centers. The 13-State southern region had over two-thirds of the reporting farms and accounted for just about the same percentage of total sales. The western region had the second highest sales total, followed by the eastern region, the north-central region, and the tropical and subtropical region (Hawaii).

The census responses were also grouped according to the type of product produced. By far the largest sector of the industry was food fish producers. This group, with 54 percent of the farms, accounted for 71 percent of the total sales. To a large extent, the results of the census were influenced by the impact of the catfish industry, which dominated the U.S. Aquaculture industry. Mississippi is the center of the catfish industry and reported by far the largest sales, accounting for almost a third of the total. In all, the four major catfish producing States of Mississippi, Arkansas, Alabama, and Louisiana accounted for four of the top seven highest States in sales. While Mississippi was the top State in sales at \$290 million, Arkansas was second, at \$84 million, chiefly through its combination of catfish and baitfish sales. Sales of ornamental fish, mollusks (clams and oysters), and other products (alligators) placed Florida in third, at \$77 million. Maine was the fourth largest at \$67 million due to sales of Atlantic salmon. Alabama was the fifth highest at \$59 million, almost exclusively through catfish sales. The next five highest States in sales value were Washington, Louisiana, California, Idaho, and Virginia.

One of the observations that stand out from the Census of Aquaculture is the level of concentration in production. Slightly over 4,000 farms responded to the Census of Aquaculture. Of those 4,000 farms, 208 farms reported sales of \$1 million or more in 1998. This is only 5 percent of the farms, yet their combined sales were \$612 million, or over 60 percent of the total U.S. aquaculture sales. This type of concentration is repeated in many of the various segments of the industry. For example, catfish farms reporting sales over \$1 million represented less than 10 percent of total catfish farms, but they had 59 percent of the total sales. It is not much different in the trout industry where the largest 4 percent of farms accounted for 45 percent of total sales.

The impact of large operations can also be seen in the State-level data. In Maine, 65 farms responded to the Census of Aquaculture, however, 20 of these farms were food fish farms

reporting sales of \$64.6 million. These are assumed to be Atlantic salmon farms and their average sales were slightly over \$3 million. No other State can boast of aquaculture farms with this type of average sales. Even the largest catfish farms, those with sales of over \$1 million, only averaged \$2.6 million per farm.

While currently somewhat of an anomaly in the aquaculture industry, the census responses seem to suggest that the aquaculture industry is headed toward becoming a highly concentrated industry with the majority of the production coming from a small number of farms. If the aquaculture industry follows this path, it will be duplicating the type of production concentration that has occurred in the other livestock industries.

Catfish

Sales of catfish by growers to processors are expected to increase in 2001 and approach 605 million pounds, about 2 percent higher than in 2000. Sales in 2000 were relatively strong through the first half of the year and then slowed markedly in the second half. As this happened, processor inventories increased putting downward pressure on prices.

Based on grower inventories reported for the beginning of January, grower sales are expected to show modest increases during first-half 2001 compared with the previous year. However, the large inventory of foodsize fish held by growers is expected to place downward pressure on prices. Grower sales to processors in the second half of 2001 will be affected by both the general performance of the economy and what growth is realized in red meat and poultry supplies.

Over the last several years, low prices for corn and soybeans have benefited most catfish farmers by reducing average feed prices giving catfish producers an incentive to expand pond acreage. The latest forecasts indicate that average 2001 soybean meal and corn prices are expected to be slightly lower than in 2000.

Catfish Production Forecast Up in 2001

Catfish growers indicated that at the start of 2001 their stocks of broodfish and all classes of foodsize fish were higher than the previous year. This is the third year in a row that inventory levels of foodsize fish have increased, with the level of grower held inventories in 2001 up considerably from 2000.

At the beginning of 2001, the total number of foodsize fish held by growers was estimated at 334 million, up 18 percent from the previous year. The inventory of large foodsize fish was up 18 percent, while the number of medium foodsize fish held by growers rose 14 percent. Stocks of small foodsize fish were 20 percent higher than at the start of 2000.

Growers indicated a 1-percent increase from the previous year in the number of stockers held by growers. The number of fingerlings in inventory at the start of 2001 was 1.023 billion, a decrease of 3 percent from the previous year. Again, depending on the strength of the economy and supplies of meat and poultry, a smaller supply of catfish is expected to put some upward pressure on prices in the second half of 2001.

Farm Prices Expected To Be Lower in 2001

Farm prices during the first half of 2001 have averaged about 9 cents a pound lower than the previous year. In the second half of 2001, available supplies of catfish are expected to tighten and begin to place some upward pressure on both farm and wholesale prices. However, the increase volume of imports is expected to impact domestic prices.

Acreage up 2 Percent

The January growers survey reported pond acreage at 190,320 acres, up 2 percent. The breakout for production acreage in first-half 2001 is 156,855 acres for foodsize fish, 24,580 acres for fingerlings, and 5,615 for broodfish.

Processor Revenues Expected to be Flat

During 2000, catfish processors sold 297.2 million pounds of product, up 1.5 percent from a year earlier. With an increase in sales volume and a higher average price, gross processor revenues from catfish sales reached \$707 million in 2000, up 3 percent. With the expectation of slightly higher sales levels and relatively flat prices, processor revenues are forecast to reach between \$705 million and \$715 million in 2001.

Trout

The most recent survey of the domestic trout industry by the National Agricultural Statistics Service (NASS) showed total sales of trout at \$76 million, down slightly from 1999. The survey also included 271 operations that distributed trout in 2000. The trout are distributed for restoration or conservation purposes. Many of these operations are State or Federal hatcheries. The value of the fish distributed for these purposes was estimated at \$60.9 million in 2000 and is separate from the figure for the value of trout sold.

Most of the decrease in sales came from lower sales of foodsize fish. In terms of the trout report, foodsize fish are those 12 inches or more in length. Sale of foodsize fish was \$59.2 million, down 2 percent from the previous year. Most of this was due to lower sales in Idaho, the largest trout producer. Partially offsetting the decline in Idaho were higher foodsize fish sales in California, Pennsylvania, and Washington.

Sales of stockers (fish 6 to 12 inches) total 7.6 million pounds with a value of \$6.7 million, both figures are increases from the previous year. Stockers are either sold to trout farmers for further grow out or sold to private groups for stocking of specific lakes or rivers. In 2000, both the sales volume and the value of fingerling sales (fish under 6 inches) were about the same as the previous year. Trout eggs sales in 2000 were valued at \$4.0 million, down 19 percent from 1999.

Tilapia

Tilapia imports were not tracked individually until 1992, in 1993, the first full year of import data, only 18 million pounds of tilapia were imported. In 2000 imports of tilapia and tilapia

fillets reached 89.2 million pounds, 8 percent higher than the previous year. The value of tilapia imports increased even faster, growing 24 percent in 2000, to \$101.4 million. Imports of tilapia were higher in all the categories, with imports of whole fish up 2 percent, fresh fillets up 41 percent, and imports of frozen fillets up 44 percent. Frozen whole tilapia continues to dominate imports and accounted for 69 percent of imports on a quantity basis, but imports of filleted products have been growing at a rapid rate and on a value basis accounted for 67 percent of all tilapia imports.

China is now a major supplier of frozen whole tilapia. In 2000 its imports were 25.6 million pounds, 42 percent of the total. Shipments from China are expected to become even a larger percentage of total tilapia imports in 2001.

In 2000, imports of fresh fillets from Ecuador increased by 80 percent to 7.2 million pounds. Ecuador, which has had problems with its farmed shrimp industry, has started to diversify its aquacultural production.

In the frozen fillet segment of the tilapia import market, imports from China have been expanding the fastest. Shipments from China have gone from zero in 1997 to 4.0 million pounds in 2000. Imports from China are expected to continue to grow in 2001 as it vies for a larger proportion of this segment of U.S. fish imports.

Tilapia imports for 2001 are expected to reach 93 million to 95 million pounds on a product-weight basis. The value of imports is expected to reach between \$106 and \$108 million in 2001. Average import values are expected to increase slightly as imports of fillets continue to grow, but prices in the different categories are not expected to show much increase, and they should be pressured by rising imports from China.

Farmed Salmon

U.S. imports of Atlantic salmon in 2000 totaled 289 million pounds and \$741 million. These are increases of 19 percent in quantity and 18 percent in value. All three Atlantic salmon import categories (fresh whole fish, frozen whole fish, and fresh and frozen fillets) showed increased quantities, but the average unit values for both fresh and filleted products fell in 2000 after rising in 1999. In 2000, imports of filleted products grew 35 percent to 159 million pounds. Imports of Atlantic salmon fillets are now the largest product categories, surpassing imports of fresh products. The value of filleted products reached \$443 million in 2001, accounting for 60 percent of all Atlantic salmon imports.

While U.S. economic growth is not forecast to be as strong as for the previous year, imports of Atlantic salmon are expected to continue to expand in 2001. Shipments are expected to approach 300 million pounds and \$770 million in value. Demand is expected to remain relatively strong, especially from the restaurant industry, where Atlantic salmon has become a featured product for many businesses. Also a strong dollar versus the currencies of major suppliers like Canada and Chile is expected to encourage imports.

Shrimp

U.S. shrimp imports rose 4 percent to 761 million pounds in 2000 and the value was up 20 percent to \$3.8 billion. The average import value of a pound of shrimp rose 15 percent to \$4.94.

Growth in imports of prepared shrimp mirrors changes that have been occurring in the salmon and tilapia markets. Producers in other countries are trying to increase revenues by moving away from producing a generic commodity to more specialized value-added products. In 2000, the quantity of prepared shrimp imports increased by 23 percent and the value rose by 35 percent. Between 1998 and 2000 the shrimp imports have expanded by 65.3 million pounds, higher imports of prepared shrimp products have accounted for 72 percent of the increase.

The source of shrimp imports has also changed. In 1998, imports from Ecuador accounted for 20 percent of all shrimp imports on a quantity basis, by 2000 imports this had fallen to only 6 percent. The decreases in imports from Ecuador are the combined result of disease problems, the weather effects of El Nino, and diversification into other products like tilapia.

Over the last 2 years, while imports from Ecuador and Mexico have declined, imports from Thailand, China, and a number of Central American countries such as Panama, Costa Rica, and Honduras have taken their place. Imports from Thailand dominate the prepared shrimp market and accounted for 80 percent of the value of imports in that category. Rebounding from disease problems in the early 1990's, China's shrimp industry seems to be strongly expanding. Shipments in 2000 reached 40 million pounds, up over 100 percent from the previous year and around the same quantity level as Ecuador and Indonesia, although the value is not as high. Imports from China are expected to be a major factor in coming years.

Imports of shrimp in 2001 are expected to increase only modestly on a quantity basis and on a value basis are expected to be flat or decline somewhat as unit values decline. Slower expected growth in the United States economy is expected to lower the demand for shrimp, especially at the higher priced end of the market. However, the shrimp market is also impacted by changes in market demand in Japan and Europe.

Mollusks

Exports Down in 2000

In 2000, the value of oyster exports was up 10 percent from the previous year and the volume rose by 18 percent. After rising in 1999, both mussel and clam exports fell in 2000. It had been expected that economic growth in Asian countries would result in a stronger export market for U.S. mussels and clams, as the majority go to either Japan, Korea, or Hong Kong/China. Part of the reason that the value of clam exports has fallen in each of the last 4 years is that shipments to Canada have fallen. Shipments to Canada are down due to the strength of the U.S. dollar relative to the Canadian dollar, which has increased the price of U.S. products. Mussel exports declined in 2000, but the export levels (quantity and value) were still higher than in either 1997 or 1998. Domestic mussel producers have been facing a growing domestic demand for their products as witnessed by the continued growth in mussel imports.

Imports Rise for All Mollusks

2000 was the second year in a row that the value and quantity of imports rose for each of the three types of mollusks. If the domestic economy remains relatively strong in 2001 and foodservice expenditures remain healthy, then mollusk imports are expected to again increase.

In 2000, mussel imports continued to be the largest segment of mollusk imports on a quantity basis. In addition, with its continued growth in import value, mussels passed oysters and became the most valuable of mollusk imports. Mussel imports were 43.1 million pounds in 2000, up 23 percent from the previous year, after increasing only slightly in 1999. The value of mussel imports rose 41 percent to \$47.4 million, almost doubled that of 1997. The majority of mussel imports are farm-raised, in either Canada or New Zealand. With the U.S. dollar remaining strong against the Canadian dollar mussel imports are expected to expand again in 2001.

After increasing 15 percent in 1999, clam imports rose by 7 percent to 20.8 million pounds in 2000. The quantity of clam imports has risen in each of the last 4 years. Canada is also the largest supplier of clams to the U.S. market, and like mussels, imports of clams are expected to increase in 2001.

U.S. Aquaculture Production 1/ 2/

Quantities in 1,000 pounds							Estimates For 1999 4/	Estimates For 2000 6/
Species	1993	1994	1995	1996	1997	1998		
Finfish:								
Baitfish	20,574	21,709	21,759	20,849	19,929	16,389	16,169	NA
Catfish	459,013	439,269	446,886	472,123	524,949	564,355	596,629	633,787
Salmon	25,279	24,714	31,315	30,657	39,745	32,017	39,114	NA
Striped Bass	5,950	7,625	8,315	7,850	8,400	9,385	9,733	NA
Tilapia	12,500	12,980	15,075	15,965	16,860	18,191	17,749	NA
Trout	54,642	52,075	55,934	53,620	56,710	55,103	60,261	59,164
Shellfish:								
Clams	6,125	4,872	4,325	3,834	9,243	9,735	5/	NA
Crawfish	56,784	49,080	58,146	46,584	49,232	37,945	42,890	NA
Mussels	308	424	410	986	597	527	5/	NA
Oysters	24,399	28,016	23,221	18,546	15,737	18,157	5/	NA
Shrimp (SW)	6,614	4,409	2,205	2,866	2,646	4,409	4,625	NA
Miscellaneous 3/	6,613	20,462	23,359	19,813	22,625	23,495	5/	NA
Total	678,801	665,635	690,950	693,693	766,673	789,708	5/	NA

Value in 1,000 dollars							Estimates For 1999 4/	Estimates For 1999 4/
Species	1993	1994	1995	1996	1997	1998		
Finfish:								
Baitfish	63,033	68,714	72,522	70,254	73,580	57,392	56,618	NA
Catfish	325,432	344,475	351,222	364,951	372,497	419,094	492,545	501,400
Salmon	68,358	61,915	75,991	60,995	65,053	62,694	76,823	NA
Striped Bass	14,270	18,835	21,156	20,308	21,783	24,128	21,943	NA
Tilapia	15,625	16,225	22,613	23,948	29,505	27,287	26,649	NA
Trout	54,309	52,569	61,447	56,958	60,212	59,710	65,055	75,791
Shellfish:								
Clams	12,096	14,023	19,709	20,315	26,753	29,612	41,804	NA
Crawfish	28,518	26,994	34,714	34,820	49,232	23,649	28,210	NA
Mussels	927	1,249	1,221	5,085	3,365	2,801	796	NA
Oysters	76,139	69,928	70,628	64,368	39,031	47,951	55,956	NA
Shrimp (SW)	26,455	17,637	8,818	11,464	10,582	17,637	13,700	NA
Miscellaneous 3/	97,232	58,545	75,243	152,169	177,994	166,688	6,638	NA
Total	782,394	751,109	815,284	885,635	929,587	938,643	886,737	NA

1/ Source for 1993 through 1998 data is 1999 Fisheries of the United States, National Marine Fisheries Service, U.S. Department of Commerce.

2/ Clams, oysters, and mussels are reported as meat weights (excludes shell) while other identified species such as shrimp and finfishes are reported as whole (live) weights. Weights and values represent the final sales of products to processors and dealers.

3/ Miscellaneous includes ornamental/tropical fish, alligators, algae, aquatic plants, eels, scallops, crabs, and others. The high value and low production of miscellaneous occurs because production value, but not weight, are reported for many species such as ornamental fish.

4/ See Sheet 2 for details.

5/ Estimates of mollusk quantities are not comparable, as data for FAO is reported including shell weight.

6/ Estimates are from annual survey of producers, compiled by NASS, USDA. Data reflects the quantity of sales of foodsize fish and the value of sales at all levels.