The Economics of Shrimp Production and Marketing

J. E. GREENFIELD
Chief, Economics Division
Southeast Region, National Marine Fisheries Service
St. Petersburg, Florida

My mission, as I understand it, is to describe the economic condition of the shrimp fishery today and to trace the causes of the most adverse situation ever to confront this heretofore healthy, growing industry. However unpleasant the autopsy, there is often wisdom for the future hidden in the trauma of the past.

Let me begin by examining developments in recent months on the demand or market side of the picture. We have witnessed a steady increase, over at least a decade, in the real demand for shrimp, an increase in the strictest economic sense of the term. Per capita consumption has increased markedly, despite a steady increase in real prices. Shrimp have become much more costly year by year to consumers, both institutionally, where two-thirds of the shrimp are consumed, and at the retail or home consumption level. The zenith of this trend was reached about a year ago during the time of the meat boycott and in the weeks that followed. As red meat prices increased sharply, demand was shifted to other options and shrimp prices increased even faster. The rapid increase in shrimp prices during the fall of 1973 represented the calm before the storm.

Midwinter 1973-74 saw the confluence of two major developments. The American consumer began to anticipate the possibility of a business recession with its threat of lower income and unemployment. Consumption of what consciously or subconsciously was considered to be gourmet or luxury items was curbed. Unfortunately, partially inadvertently, partially unavoidably, shrimp products were positioned in the consumer's mind as this kind of item, far beyond the reality of the situation. Breaded shrimp, in the context of a restaurant meal and on a per-serving basis, is price-competitive with a broad range of middle priced entrees. Consumers, however, began to eat in restaurants less often and began to avoid luxury purchases in retail food shopping.

At the same time, concurrent with recession psychology, a sharp increase in the cost of fuel developed. People traveled less for both business and leisure and the restaurant trade suffered a sudden recession of its own.

Concurrent with these domestic developments was a deepening world-wide expectation of recession, particularly in one of the major shrimp consuming nations, Japan. Japanese food distributors were already experiencing difficulty introducing frozen shrimp in the Japanese market when recession psychology contributed to further deterioration of the market for high-priced imported products. As Japan withdrew as a major competitor for the world supply of shrimp, breaders in the U.S. found imports relatively attractive. These events produced simultaneously a dramatic decline in demand and a moderate increase in supply.

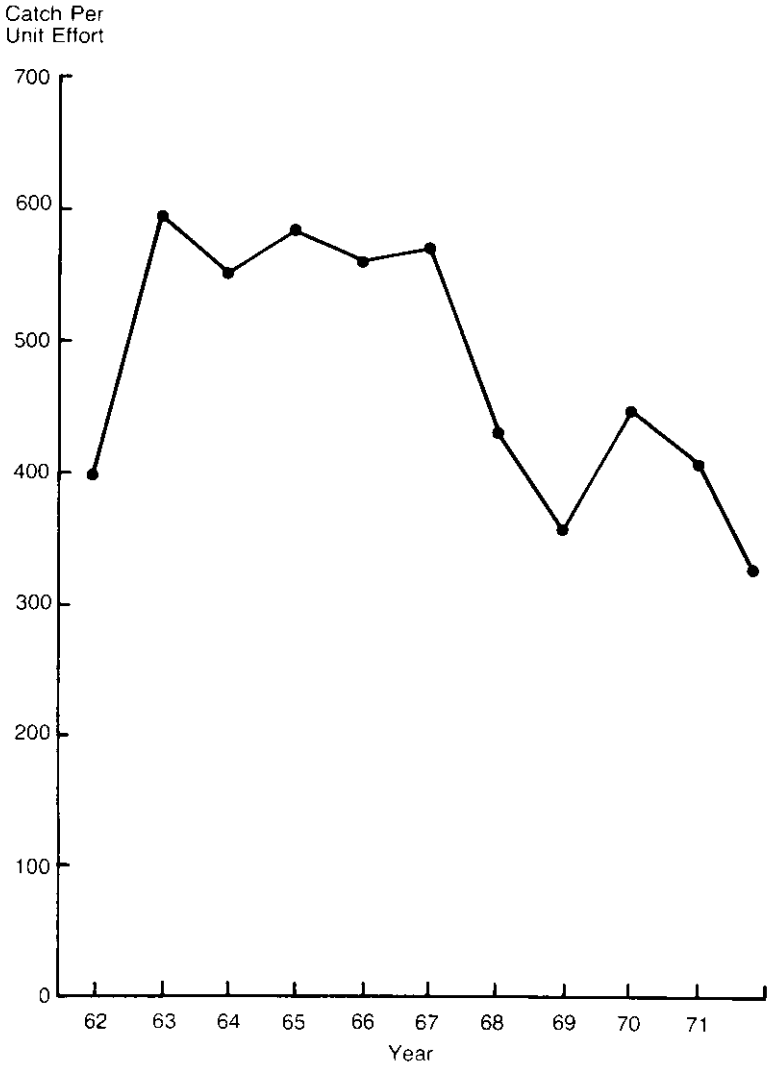

Fig. 1. Annual catch per unit of effort for years 1962-1971, Gulf of Mexico.

Specifically, imports had increased by October 1, 1974, by about 35 million pounds over the corresponding period a year earlier. Inventories had increased 20 million pounds or about 25% over the normal level for that same time of year. To characterize the impact of price on fishermen, the average price paid in September for all sizes of shrimp landed in 1973 was $1.97. The same figure for September 1974 was $1.17, a decrease of 41%. Shrimp producers supply a raw

material to a food processing-marketing industry and when the consumer reduces purchases even a little, middlemen begin immediately to reduce inventories and temporarily stop buying altogether. The price whiplash on the basic producer of the raw material in fishing is often violent. When there is confidence that the variation in consumer demand is temporary, middlemen usually cushion the shock by accumulating larger inventories for the future. There is a tendency to view the current situation as longer lasting, however.

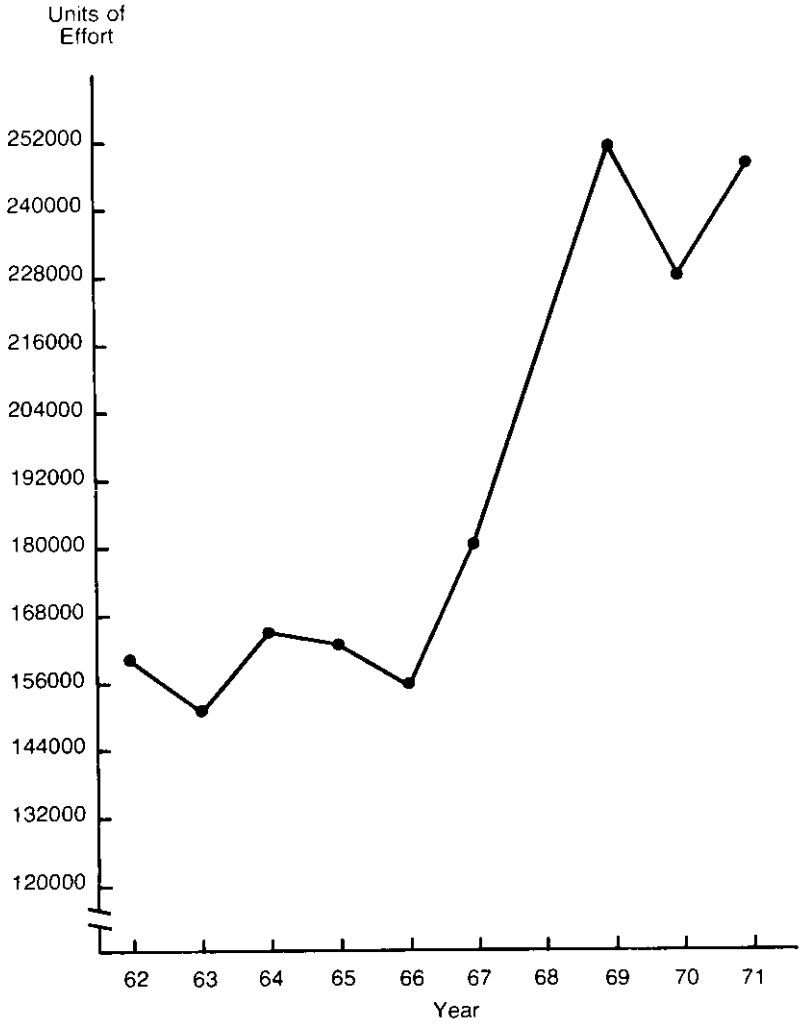

Fig. 2. Annual total effort by vessels for the years 1962-1971, Gulf of Mexico.

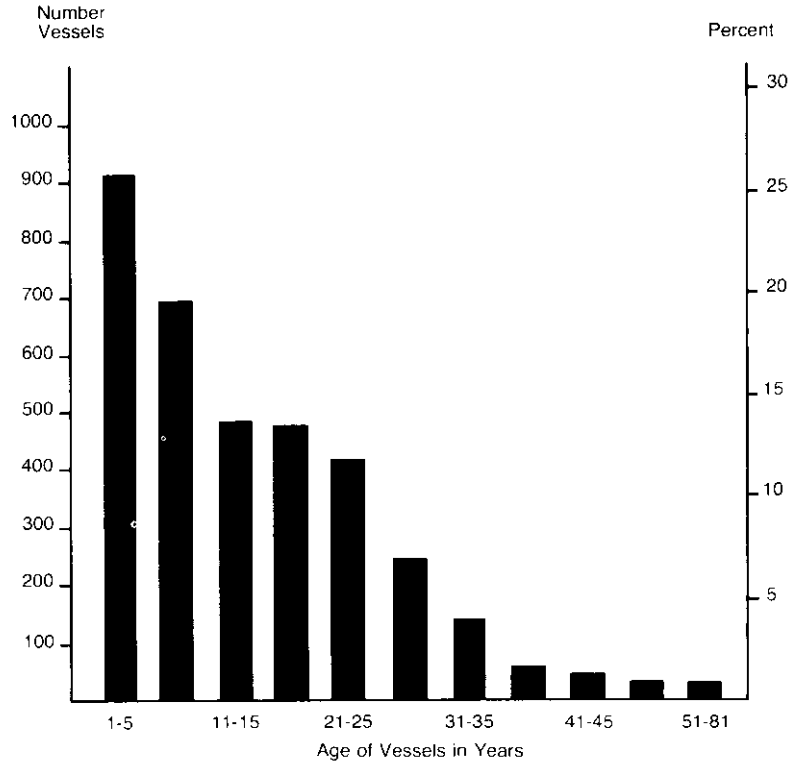

Fig. 3. Frequency distribution of number of vessels and percent of vessels by age in years, 1971.

Now let me shift to the supply side. We have witnessed in recent years a basic decline in catch per unit of effort for shrimp (Fig. 1). The National Marine Fisheries Service started two years ago, through the State-Federal Management program, to sponsor research in the economics and management of the Gulf of Mexico shrimp industry, through Texas A&M University. The National Marine Fisheries Service has been collecting catch, effort, and price statistics over the last 12 years. In 1971, through the cooperation of several owners, we began collecting cost information on a sample of about 50 shrimp trawlers. Texas A&M University is continuing this work now on a permanent basis. I want to acknowledge in particular Dr. Wade Griffin for his splendid effort in this regard.

Plotting effort on the vertical axis and time on the horizontal axis, it is clear that there has been a very dramatic increase in total effort in the Gulf of Mexico (Fig. 2). A unit of effort, in this case, is an index based on a combination of various vessel and crew characteristics that produced the highest multiple correlation with productivity or catch.

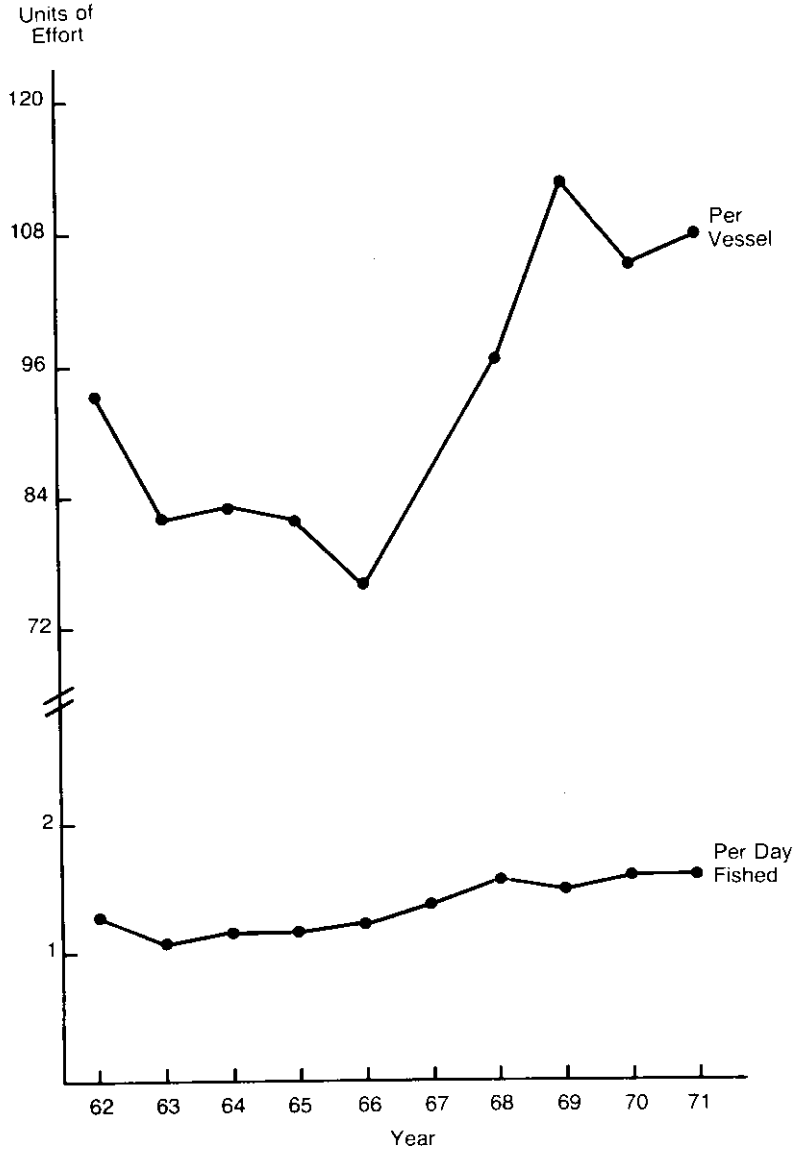

Fig. 4. Effort per day fished and annual effort per vessel for the years 1962-1971, Gulf of Mexico.

The most important source of increase in effort has been the increased fishing power of the newer trawlers (Fig. 3). This figure includes only vessels operating in the offshore fishery. It excludes the inshore, small boat fishery. The bayou fishery of Louisiana, for example, is not included. This is the offshore, high seas trawl fishery made up of vessels 50 feet and over in length. A large percentage of this fleet is less than 15 years old. This, more than anything else, explains the increase in horsepower, more efficient gear, and better vessel configuration generally. The result has been an increase in effort both per vessel and per day fished (Fig. 4).

The increase in effort has not resulted in higher aggregate landings in recent years, however (Fig. 5). For the period 1950 through 1972 the catch has remained essentially flat. Although this resource appears to be unaffected biologically from overfishing, we are experiencing higher cost per pound landed each year.

The effect of this decline in economic efficiency has not had the effect of discouraging additional investment in more trawlers.The return per unit of investment, although declining, has remained sufficiently high to compare favorably with other competing investment alternatives. Rising shrimp prices have helped retard the decline in earnings as demand increased rapidly with growing prosperity. As long as the return for the next dollar invested in a shrimp trawler exceeds the return from the investor's next best opportunity, it is rational to build more trawlers.

In late fall 1973 fuel prices suddenly began to soar. By spring 1974, the average diesel fuel price had doubled from the previous spring from 16¢ to 32¢ per gallon.

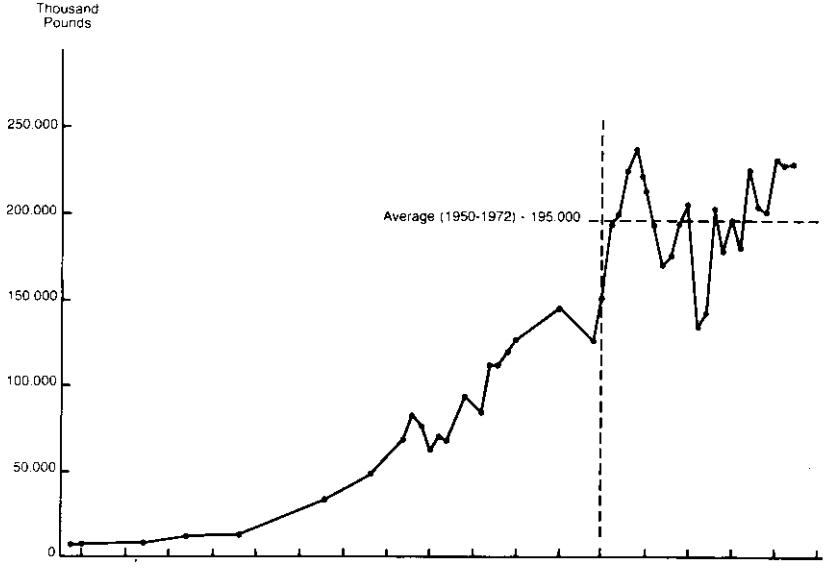

Fig. 5. Shrimp landings in five Gulf states from the Gulf of Mexico, heads-on, 1889-1972.

Table I. Net Return 1973 and 1974 by Vessel Class

Class	Construction and size	Net Return 1973	Net Return 1974
I	70-78′ Steel	$ −15,401	$ −32,580
II	63-69′ Steel	560	−13,222
III	63-69′ Wood	14,180	−17,413
IV	45-68′ Wood	− 8,313	
V	45-62′ Wood	− 3,033	− 9,909

Of almost equal significance, the cost of other supplies and services also rose over this same period by 20%, repairs, maintenance, nets, and the cost of new construction. Due to both fuel and other costs, the shrimp trawling industry experienced a rate of cost inflation far in excess of the general economy. Net return to the average shrimp trawler turned negative for the larger steel hulls and the smaller wooden hulls (Table I). This figure indicates the economic performance of five different classes of boats, the first two classes being steel and the latter three classes wood. These data are based on a sample of about 60 trawlers that provide detailed cost records to Texas A&M University on a confidential basis. There are no really large steel trawlers over 78 feet in the sample. Nor does the sample include smaller wooden hulls under 45 feet. These data classes illustrate with considerable clarity what is happening to the shrimp fishing firm today and explain why so many of the larger steel trawlers are idle. Although many trawlers were unprofitable in 1973, the larger wooden trawlers continued to show high net returns. The majority of these vessels were purchased at a time when initial construction costs were much less and interest on debt was at a lower rate. Although there were some 20 trawlers in the sample averaging a return of about $14 thousand in 1973, there will be no class of trawler in our sample averaging profitable operations in 1974. Projecting inflation to continue at a rate of about 12% annually in the last quarter of 1974 and no increase in fuel costs, the average trawler regardless of size class, will show a loss for 1974. It does not follow, however, that all vessels will find it rational to stop fishing. Class III trawlers, for example, showing a loss of $17 thousand in 1974 will still be earning $6 thousand above operating costs. Under these conditions, it is perfectly rational to continue operations and fish at a short term loss. As long as earnings exceed variable costs by any amount there is labor income for the captain and crew with something left over to apply to fixed costs. By their very nature, fixed costs such as debt amortization or major overhaul can be postponed. The owner of a vessel in Class III losing $17 thousand a year has $6 thousand above variable costs to apply to interest payments, repair or other fixed cost. There are questions with regard to how long one can operate under this kind of climate and how long this climate will continue, however.

The forces causing consumers to avoid the purchase of shrimp may be moderating already. Shrimp prices have firmed and apparently are bouncing back from their industry lows. Restaurants, where most shrimp are eaten, seem to be following a strategy of holding shrimp meal prices constant against rising prices for other meals. Although shrimp meals are not becoming less expensive in the absolute sense, they are already less expensive compared to other entrees. While gasoline prices have stabilized at much higher prices, vacation and business travel too have rebounded.

Barring a major deepening of the recession, there is hope for recovery in ex-vessel shrimp prices within the next year. Full recovery in real terms to 1972 levels may require another year or two.

On the supply side however, I am much more pessimistic. I would anticipate no future decline in fuel costs. I think that would be a dangerous planning assumption. On the other hand I do not expect significantly increased fuel costs. It appears that we will be facing, in the next year or two, the reality of many business failures in the trawling industry. One would expect these failures to be concentrated among the larger steel and smaller wood vessels, the least efficient ends of the spectrum. The majority, however, will be able to operate at a level that generates enough revenue to cover their variable costs and earn something to apply to debt servicing and other fixed costs. By putting off overhaul, some repairs, and with a moratorium on their mortgage, most will weather the economic storm and return to normal levels of return by the end of the 1977 season. The new fuel cost-shrimp price relationship will force the surviving trawler operations into a more fuel-efficient fishing strategy and to adopt fuel-saving technology such as twin, double-net trawls.

There will be some opportunity for those who cannot survive to sell their vessels, perhaps out of the U.S. fleet, perhaps to some other fishery, or to retire the vessel permanently. When the process is complete we may have witnessed a major reduction in the size of the fleet, by as much as 40%.

There is really little that can be done about the current situation beyond (1) implementing available cost reduction technology or strategy and (2) stimulating demand where it has been irrationally depressed. Most input costs are determined by policies of the Federal Energy Administration, the Arab states, and forces far beyond our control as an industry. There are some changes that can be made in fishing strategy that could improve fuel economy. More group or fleet fishing has always held potential cost savings. More likely, perhaps, is the adoption of double net, twin otter trawls already demonstrated to be much more power-efficient. The recent escalation in diesel fuel prices should markedly accelerate the rate of adoption of new techonology in the shrimp industry.

On the demand side, there is probably less opportunity for short term improvement. Normal industry promotion and federal-state government consumer education efforts may be successful in correcting misconceptions about the comparative cost of shrimp-based meals within a few months. Two to 3 years might be required however, for a full recovery of the shrimp price cycle to its 1972 level. Just recently some impounded S-K funds in the amount of $1 million, to be used over a 2-year period, have been released for consumer education regarding

shrimp and other fishery products. These funds will be used to develop materials and programs to encourage commercial firms to advertise and to generate cost free public relations-based promotion. These funds will be multiplied by creating a proliferation of unpaid media space as public relations activity through food editors. NMFS will work with states, industry groups, trade associations, restaurant chains, and food retailing chains, trying to use our limited funds to create a more favorable climate for shrimp and other seafoods. We are also devoting a larger portion of our own normal consumer education budget toward this objective. I think we must be realistic however, and recognize that this is not a really large promotional budget, on a multi-product, national scale. Our expectations in this regard should be modest. I do not know if you can agree with all of my analysis of causes, but I am confident that we agree on the serious state of the industry and the reality of a major adjustment through attrition. I am equally confident that efficient operators will weather the storm and a stronger, more efficient industry is already in the making.