Economic Considerations and the Gulf of Mexico Menhaden Fishery

PAUL HOOKER
National Marine Fisheries Service
St. Petersburg, Florida 33702

Mr. Crance and I are preparing a profile on the menhaden fishery, from existing information, for use by the Menhaden Subcommittee. We are doing this as the input of the State-Federal Relationships Division to the Technical Coordinating Committee of the Gulf States Marine Fisheries Commission.

I would like to give you an idea of the approach that we are taking in describing the economics of the Gulf menhaden industry. In the Gulf in 1972 there were some 11 active plants and about 75 vessels valued at more than $60 million at 1972 prices. In that year, gross sales of meal, oil and solubles were a little over $30 million at the processed level.

To define an economic menhaden fishing season, I have used 9 years of data (1964-1972) on landings per vessel and landings per plant on a weekly basis. A plot of the data shows that landings per vessel per week start out relatively low, peak toward the center of the season and decrease toward the end of the season. The same holds true for landings per plant per week. A regression of landings on time (weeks of season) using a parabolic equation form yields a fairly good fit. From this curve, I predicted landings per vessel per week for each week throughout the season. Combining this with an estimate of the break-even landings (those landings per week per vessel that would be required for the boat just to break even, i.e. to cover its costs) enabled us to estimate seasonal parameters. The only estimate I was able to make for break-even landings was for 1968 when we estimated that it took landings of 216 tons per week per vessel to break even. When the present season opens in the spring, the estimated equation predicts that vessels land about 210 tons per week and, when it closes in the fall, vessels land about 237 tons per week, which just brackets this estimated break-even landings. Thus, based on the estimated seasonal landings equation and breakeven landings, the present menhaden season is opening about a week early and closing about a week early.

The next problem studied was that of effort and the resource. If you look at the economics of the whole industry it is fair to say that as long as industry's average cost is less than the average return, the industry will increase effort. If average cost is greater than average return the industry will decrease effort. What industry, taken as a whole, is trying to do is to equate average cost and average return, where average cost, of course, includes a respectable and reasonable profit.

In fisheries it is possible to over-fish certain stocks of fish so that increasing effort actually results in a decreased total catch. In the economist's terms, the marginal product of effort would be negative. Robert Chapoton has estimated a

maximum sustained yield (MSY) for the Gulf menhaden of around 470,000 metric tons per year. He estimated that it takes about 450,000 vessel ton-weeks of effort to capture this MSY on an average basis. Industry presently has the plant capacity to process more than twice this MSY figure. It has a plant capacity to process, on a yearly basis, something over a million metric tons.

For the current price structure, average costs are *less* than average return. What will tend to follow is that effort will *increase*. But, based on Chapoton's estimate, effort is about where it should be right now and increases in effort may actually decrease the total pounds of fish caught. As an example, if industry responded to highly inflated current prices by increasing effort by 50,000 vessel ton weeks for a year (that would be equivalent to about one plant and eight vessels fishing the way they do now), sustainable yield would be decreased by nearly 6,000 tons per year (which has a processed value of $345,000 at 1972 prices -- and more like a million dollars at 1973 prices). If this increased effort level continued into the future, then the present value of the expected loss (at 1972 prices) is over $2 million for the processed product. If this increased effort is the result of a new entrant into the fishery (50,000 vessel ton weeks would be about what an average new entrant would contribute). The investment cost to the new entrant at 1972 prices would be somewhere between $6 and $10 million. At 1973 prices it would probably be much more. You can see that if Chapoton's figures are right and my calculations are correct, a new entry into the fishery would result in the whole industry making less money. There are some companies who could make a $6-$10 million investment in a new industry. However, if you have a bumper crop of soybeans next year, the price of fishmeal is likely to go back down. Therefore, if someone were to invest in the industry just on the basis of returns this year, you could have a new entrant with everybody actually losing money instead of just dividing a full pie into smaller pieces. Perhaps with industry's help and through the Menhaden Subcommittee, we will be able to successfully address this problem and avert an undesirable level of capacity and effort in the industry.

In order to be of the most help to industry, we do need certain information. We know that the Gulf of Mexico menhaden industry is vertically integrated. We need estimates of the break-even costs per week for operating an average menhaden reduction plant in the Gulf and refined estimates of the break-even costs for operating an average Gulf menhaden vessel. By combining this new information (available only from industry) with the information that we have on seasonal productivity patterns, we can recommend economically rational season parameters.