

## SHRIMP MANAGEMENT SESSION

WEDNESDAY—PM—NOVEMBER 13, 1974

*Chairman—Clifford V. Varin, Fire Island  
Sea Clam Co., Inc., West Sayville, New York*

# Management or Bankruptcy in the Gulf Shrimp Industry

GEORGE A. ROUNSEFELL  
*Professor of Marine Science  
University of Alabama  
Tuscaloosa and Birmingham  
and  
Professor of Marine Biology  
Marine Environmental Sciences Consortium  
Dauphin Island, Alabama*

The shrimp producers have kept afloat for several years because of the steadily rising price for large and medium shrimp. The recent drop in price is disastrous because the numbers of shrimp available each year are limited, and the fleet has grown so large that no vessel can catch enough shrimp to make a profit at normal prices.

The proportion of baby shrimp in the catch has been steadily increasing, attesting to the failure of present state management programs. There are three commercial shrimp fleets—the boats and smallest vessels that fish in or near the nursery areas; the nearshore vessels; and the offshore vessels.

To avoid bankruptcy of the industry, the states need to give their commission authority to reduce the numbers of fishing craft in all three fleets through limited entry, accompanied by closure of nursery areas to all forms of shrimp gear while baby shrimp are present. If no action is taken, the federal government will eventually have to take over shrimp management.

Should we have management of the shrimp resource beyond the state level? We must answer several questions before deciding whether or not it is desirable. Then we must inquire as to its feasibility.

The only reason the shrimp fleet was not in serious trouble several years ago was a sharp rise in the price for large and medium shrimp (Fig. 1). The recent slump in shrimp prices has been disastrous. I cannot give you prices by sizes after 1970 since, unfortunately, the federal government is about 4 years behind in publishing this information. I even received my 1971 book too late to use. The chief reason this drop in price has had such a bad effect on the fishermen is the lowered catch for the same amount of fishing effort, which comes at a time when costs of operation are rising.

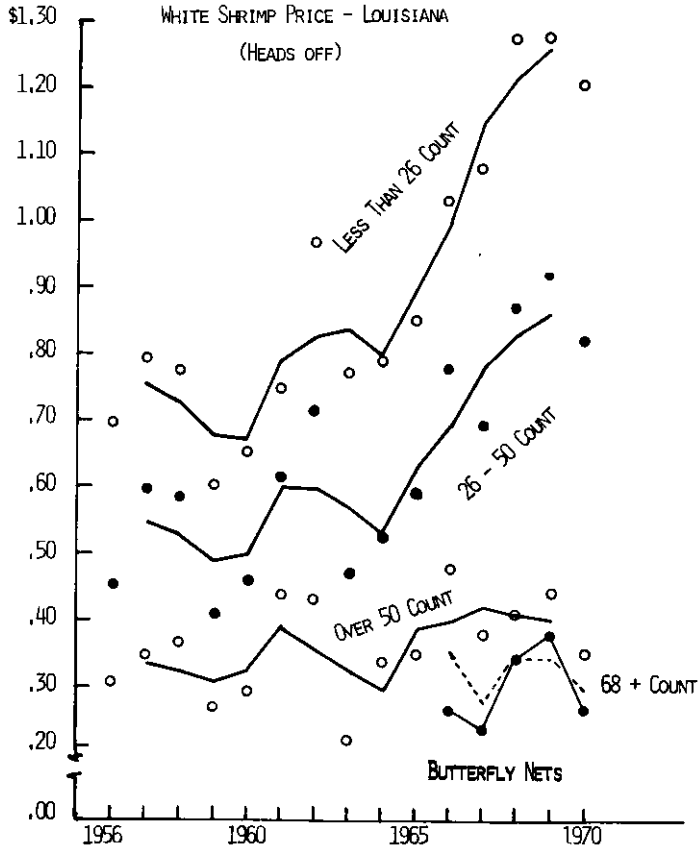


Fig. 1. Dockside price per pound of white shrimp in Louisiana (heads off) for large (less than 26 count), medium (26 to 50 count) and very small (over 50 count). In lower right is shown the price from 1966 to 1970 of baby shrimp (68 and over count) and the price paid for all shrimp sold by butterfly nets.

There is ample evidence that the lowered catch per boat is not caused by lowered abundance of each successive brood of shrimp but rather by a great increase in the amount of fishing effort. Figure 2 shows that the yield has reached a plateau around which it fluctuates from year to year. Greatly increased fishing effort has resulted in only a slight increase in yield so that the catch per yard of net has continued to fall.

Figure 3 shows the continuous increase in the average tonnage of shrimp vessels accompanied by an increase in their numbers. We know that the catch per yard of net is related to the speed of towing so that the change in efficiency is greater than can be shown merely by the yards of net used.

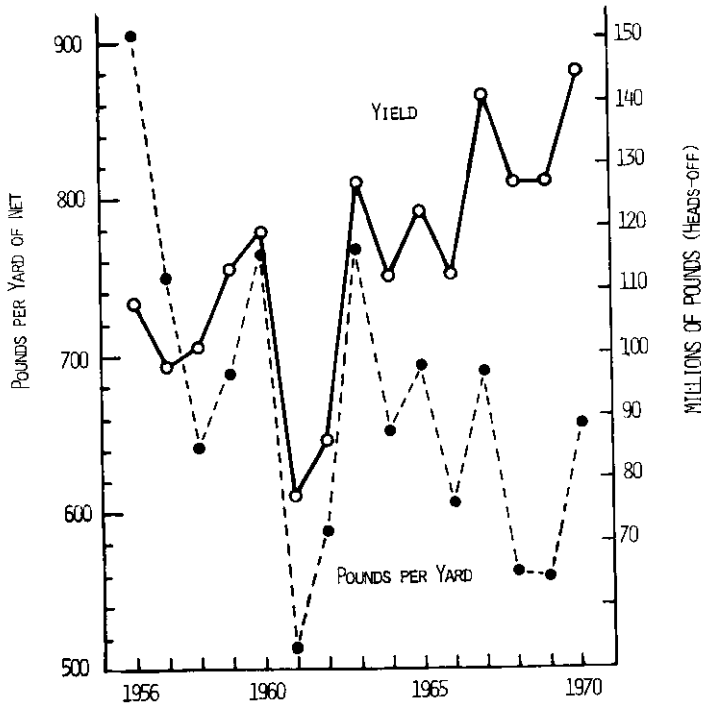


Fig. 2. The annual Gulf shrimp yield in millions of pounds, and the annual catch per yard of net opening by shrimp otter trawls (pounds, heads off).

You will note that the recorded number of undertonnage boats has also greatly increased. This increase in undertonnage trawlers has been accompanied by an increase in the amount of raw shrimp used for canning. The two appear to be related as shown by the fact that the catch of tiny shrimp (68 count and above) increased about three times in 15 years (Fig. 4). Taking more and more of each year's shrimp population at such an extremely small size appears to be counterproductive. The shrimp canners were putting up large packs before they commenced using such large quantities of baby shrimp.

Referring back to Figure 1 you will note at the bottom of the figure that the price for shrimp by the butterfly nets in Louisiana was lower than the average Louisiana price for 68 and over count shrimp in three out of five years. It is clear that the butterfly nets are taking baby shrimp. The statistics show no butterfly nets in Louisiana prior to 1966. From 1966 to 1970 they increased from 330 to 430.

Concerning management techniques in Louisiana White (1973) states:

The opening of the season is set in inside waters to harvest brown shrimp re-

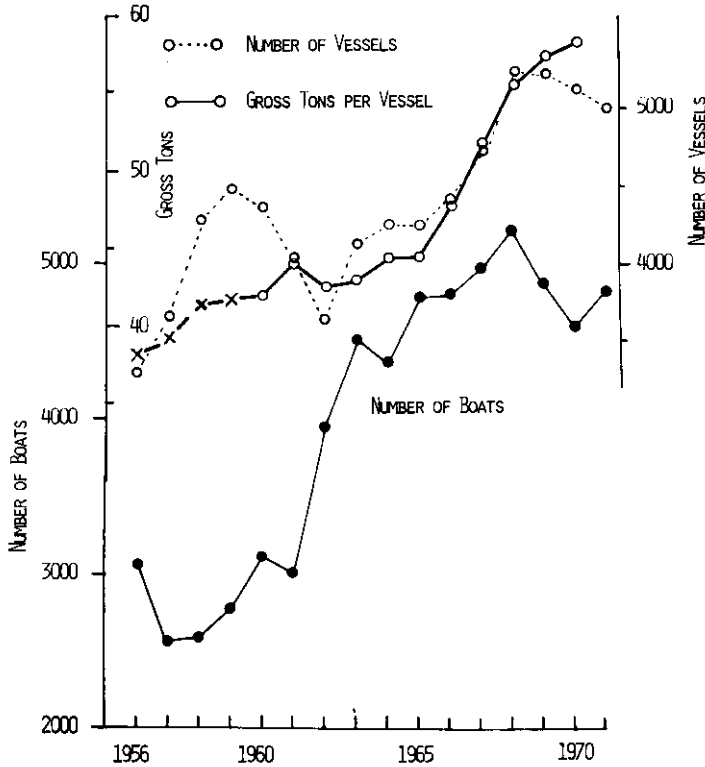


Fig. 3. The annual number and average tonnage of documented Gulf shrimp vessels, and the number of boats under 5 net tons.

cruited into Louisiana's coast when a majority of this population is of commercial size (*100 shrimp per pound count*). It is also necessary to harvest this population prior to their offshore emigration. (*italics mine*)

In harvesting this crop Gaidry (1973) states:

During the open season in Louisiana approximately 12,000 licensed trawl boats, using test trawls similar to that used in the biological samples, constantly search for the highest density areas of shrimp...

Gaidry states that Louisiana had 12,595 shrimp trawl vessels in 1971 and 11,170 in 1970. The supposedly accurate figures of the National Marine Fisheries Service show only 1,693 shrimp trawl vessels in Louisiana in 1970. St. Amant (personal communication) told me that Louisiana presently has about 12,000 shrimp trawlers over the 40-foot length, about 8,000 less than 40-foot, plus about 4,000 boats over 15 feet in length with commercial licenses.

Gaidry (1973) in his report on Louisiana states:

The principal commercial gear used in fishing the passes is the wing net or

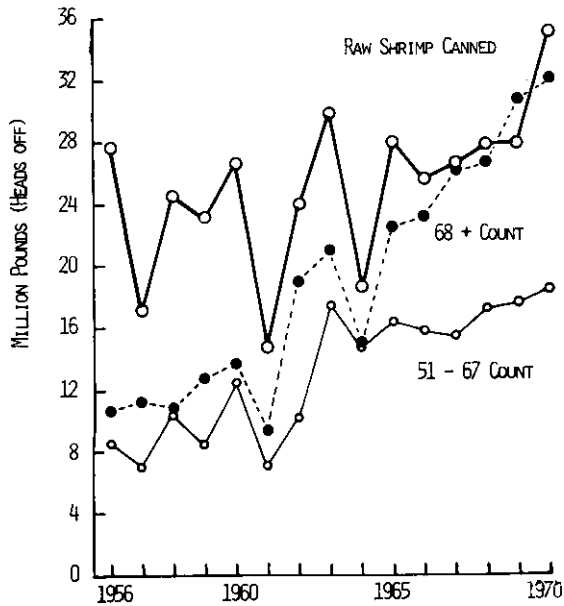


Fig. 4. The quantity of raw Gulf shrimp canned each year, and the quantities landed of baby shrimp (68 and over count) and of very small shrimp (51 to 67 count) in millions of pounds (heads off).

butterfly net . . . This net may be used either from a stationary platform or a commercial shrimp boat. The net is usually employed against the current of outgoing tides, thus capturing shrimp leaving the estuaries.

Concerning the capture of small shrimp Gaidry says:

The mesh size as now regulated ( $\frac{3}{4}$ -inch square,  $1\frac{1}{2}$ -inch stretched) is capable of harvesting a shrimp so small as to count 150 shrimp to the pound (a size that is of little value to either sports or commercial interests). Under the present legal framework fishermen can harvest shrimp in the nursery, discarding the small shrimp so that the overall catch will count under 68 per pound. Often, as the data verifies, over 80 percent of the nursery catch is discarded . . . The ultimate goal is to have a majority of the standing brown shrimp crop of commercial size (*100 whole shrimp to the pound*). (italics mine)

This is approximately 162 heads off shrimp per pound!

To understand more of the differing ideas as to what needs to be done about shrimp, I show in Figure 5 the gross tonnage of shrimp trawl vessels by gross tonnage categories for the 1970 state fleets from the federal statistics, which I have already noted, do not coincide with the numbers licensed by the states. The preponderance of the inshore fleet (boats and the smallest group of documented vessels) is in Louisiana with its vast marsh areas. Texas far outstrips the other states in tonnage of large and medium offshore vessels. Alabama has more tonnage in

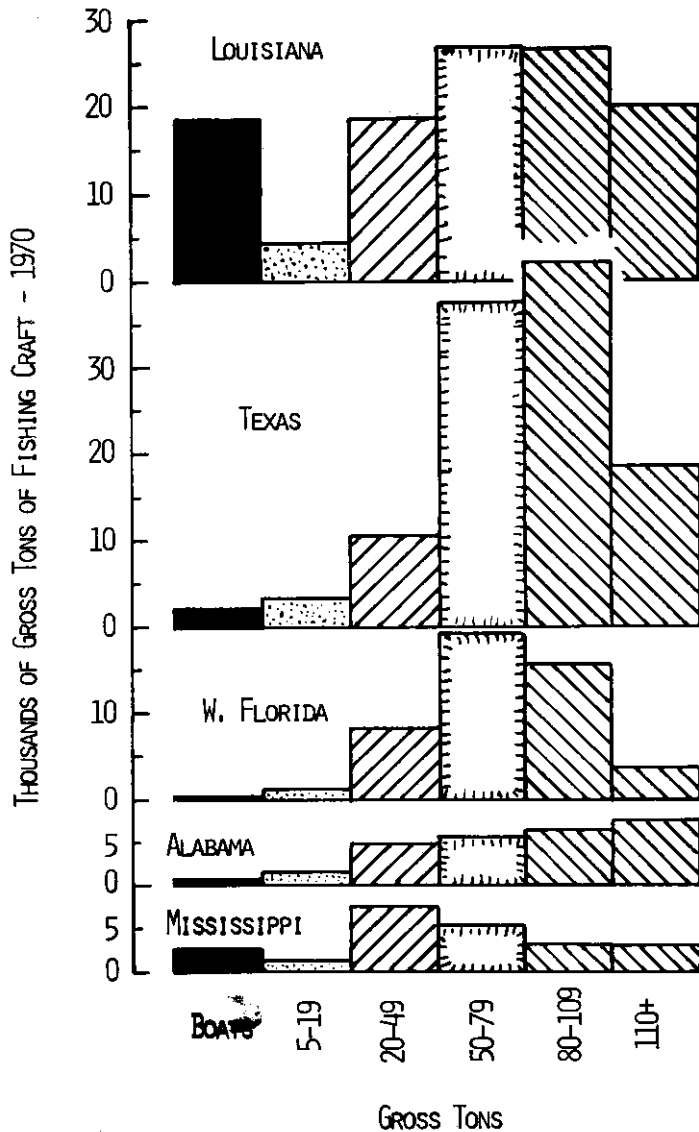


Fig. 5. Showing for the shrimp trawl fleet of each Gulf state the thousands of gross tons in each tonnage category. Undertonnage boats are estimated at 5 gross tons each.

the largest offshore category than in any other. Only Mississippi has more tonnage in nearshore vessels than in any other size; these are chiefly older Biloxi-type trawlers. In 1971 the median age of the Mississippi fleet was 17 years in contrast to 8 years in Alabama.

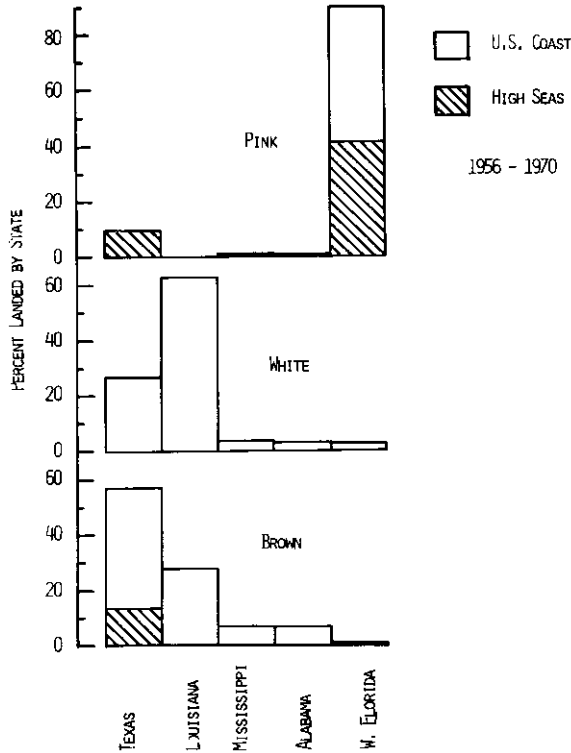


Fig. 6. Showing the percent of each of the three species of commercial shrimp landed in each Gulf state from along the U.S. coast and from off a foreign coast over a 15-year period.

The boats and the smallest documented vessels fish mainly in or near the nursery areas. The next size, the nearshore fleet, fish in the deeper inshore waters and a few miles offshore. The three largest groups seldom fish in inside waters, and some of them often fish off foreign coasts. Naturally, the two larger groups of vessels would like to have the smaller shrimp protected. The boats and inside vessels would like to catch the small shrimp before they leave the estuaries.

Another difference between states lies in the species of shrimp caught. Figure 6 shows that almost all the pink shrimp taken off U.S. shores are landed in Florida, although vessels from other states assist in taking them: the pinks landed in Texas and about half those in Florida are taken off the Yucatan and eastern Mexican coasts. The other states depend upon both white and brown shrimp but because they range farther offshore and in greater depths, the brown shrimp are the mainstay of the larger offshore vessels.

The difference between the sizes of shrimp landed from the inside and outside waters along the U.S. coast and those taken off the Mexican coast is very great (Fig. 7). Thus during three 3-year periods a great many under-sized shrimp

## PINK SHRIMP

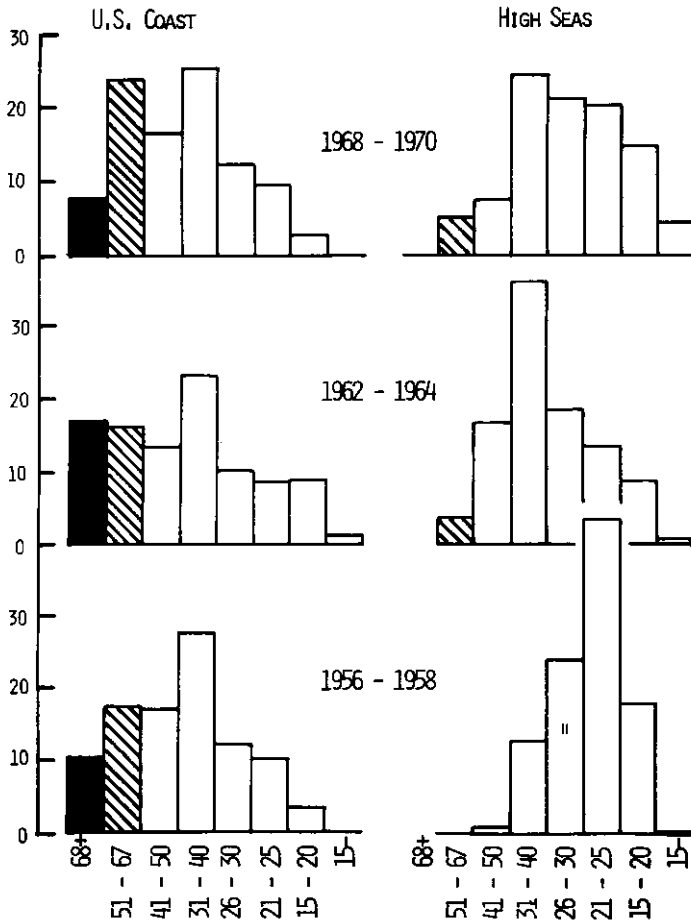


Fig. 7. Showing for pink shrimp the percent of the catch landed in each size category by three 3-year periods for shrimp caught along the U.S. coast and for shrimp taken off a foreign coast.

were landed from the waters off Florida, but very few were brought home from Campeche. This illustrates a principle. You cannot afford to travel a long distance in a large expensive trawler to bring home a low-priced product. Of course these small shrimp would not keep long without heading and this also could not be accomplished by a small crew. These small and low-priced shrimp can be taken profitably only when they can be taken either in great abundance, or by cheap gear and landed without heading for the peeling machines. Thus even on the closer grounds along the northeast Mexican coast very few small brown shrimp were landed (Fig. 8).



## BROWN SHRIMP

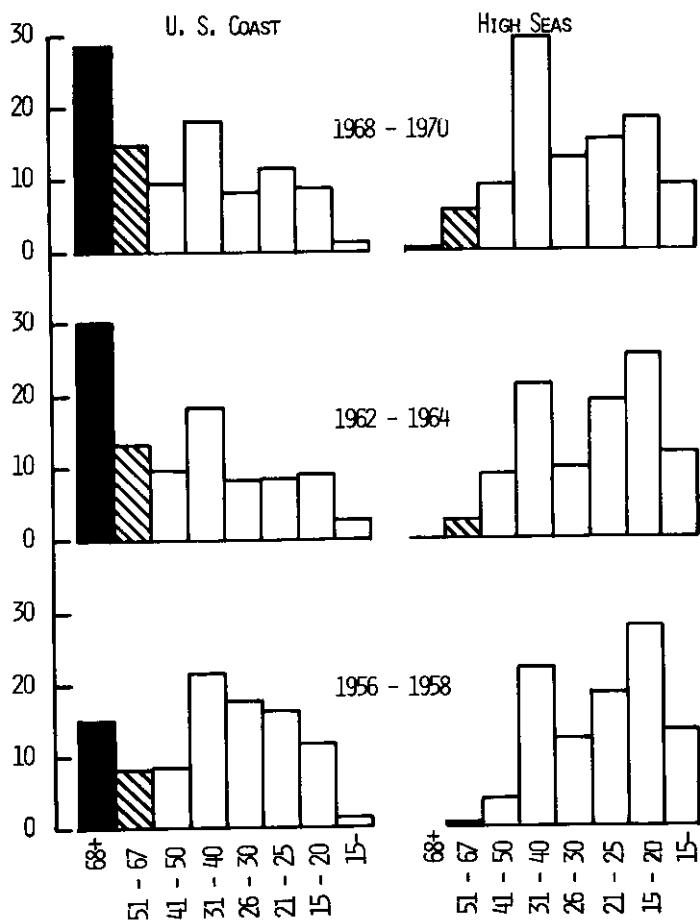


Fig. 8. Showing for brown shrimp the percent of the catch landed in each size category by three 3-year periods for shrimp caught along the U.S. coast and for shrimp taken off a foreign coast.

There is little doubt that were fewer shrimp taken at a very small size more would survive to a larger size. Would this be of any benefit except to the consumer? I have already shown that the catch per unit of fishing effort has been falling. If anything occurs to raise the numbers of larger shrimp produced by each brood the result will be a higher yield, but the catch per unit of fishing effort will rise only temporarily until more new vessels enter the fleet. Under such circumstances one can scarcely blame a small boat fisherman for wanting to capture the shrimp before they leave the estuary. Although to the consumer the protection of small shrimp

may be of some value, for the large number of small boat fishermen it merely looks as if they are being asked to suffer for those with larger vessels.

We all know that a fishery cannot continue without a profit. This profit depends partly on the quantity caught, partly on the price paid for the shrimp, and partly on the cost of operation. In a recent analysis by Lacewell, Griffin, Smith, and Hayenga (1974) it was found that in 1971 the average 53- to 65-foot shrimp vessel in the Gulf made slightly more profit than the average 66- to 72-foot vessel. The larger vessels caught more shrimp and because they can fish deeper, they caught larger shrimp and got a better price, but the operation of the larger vessels was so expensive that the smaller vessels made a little more net profit. With the rising costs of all supplies, especially fuel, the larger vessel will be even more handicapped. Thus Terrance Leary recently stated that it now costs the Texas vessels 64 cents for fuel for every pound of shrimp landed.

The chief obstacle to the making of a fair profit has been over-investment in shrimp vessels. Every time a profitable year occurs more new vessels enter the fishery further dividing up the available shrimp. The federal loan program to prevent inefficient operators from being forced out of the fishery has only intensified this problem.

To help the situation we must first choose from several goals such as: (1) Attainment of the largest poundage of shrimp from each annual brood. (2) Attainment of the largest amount of money from each annual brood. (3) Employment of the largest number of fishermen and shore workers to catch and process each annual brood. (4) Attainment of the largest profit from each brood.

The first-named objective, the largest poundage, means a waste of capital and labor. It is just about what is actually occurring as competition between an excessive number of vessels lowers the catch of each boat.

The second goal, attainment of the largest amount of money, would mean obtaining a much lower total poundage of larger and higher priced shrimp. This higher total value would not only produce less shrimp but it would cost more to harvest since it would be taken chiefly by the larger offshore vessels. Therefore, the profit margin might be reduced.

The third possible goal, employment of the largest number of fishermen and shore workers would mean less concentration on raw fresh or frozen headless shrimp, and more effort to enhance the value of the catch by further processing. This is exemplified by the shrimp canners. In 1970 they used about 35 million pounds of baby shrimp costing them less than 30 cents a pound and converted them into 2½ million cases of canned shrimp worth 26.7 million dollars in the warehouse, or about 76.5 cents per pound of raw headless shrimp. However, in 1970 the catch of baby shrimp (above 67 count) was 22.1% of the entire Gulf catch while 15 years earlier in 1956 the canners used 27.7 million pounds of raw shrimp; the baby shrimp were only 10% of the Gulf catch.

This proves three things. First, that it is possible to can shrimp without using baby shrimp. Second, that through the use of peeling machines the number of employees in the shrimp canning industry has been reduced. And third, that despite the much-touted management programs in the various Gulf states, the slaughter of baby shrimp has been steadily increasing. Apparently the present management

programs are a failure.

The fourth possible goal of management is to obtain the highest net profit from each annual brood of shrimp. In reality this is the only goal that can insure a viable industry. This goal of maximum net profit cannot be attained while we are trying to harvest the population prior to their offshore migration. Nor can it be attained while baby shrimp are slaughtered in the narrow exits to their nursery areas. It reminds me of Franklin Roosevelt helping the food shortage by paying the farmers to slaughter their baby pigs.

A lot revolves around the proper size to harvest shrimp. The Galveston laboratory of the National Marine Fisheries Service conducted marking experiments on pink shrimp on the Tortugas fishing grounds in 1961. From this single experiment Kutkuhn (1966) concluded that for these pink shrimp the mortality rate was sufficiently high so that the maximum value of a brood was highest when you commenced harvesting at about 70 heads off count. However, he was using a spread of only 45 cents between the price of the 70 count and the 26 and over count. In 1970 as I have shown, the spread had increased from 45 cents to 85 cents with no increase in the price of baby shrimp. In the meantime the fishing intensity has probably doubled so that the harvest is taken in a much shorter time. Both of these facts indicate the need for a larger size shrimp.

Based largely on Kutkuhn's experiment, Lindner (1966) concluded about 9 years ago that it was safest not to start taking shrimp until they reached a headless count of 60 per pound. This was with a weekly fishing mortality of only 7%.

In the Tortugas marking experiments of Kutkuhn, only 21% were recovered of which only 75% were recovered at sea. Profiting by this first large scale marking experiment, Costello and Allen (1968) performed a more sophisticated experiment on the Tortugas pink shrimp in which the recovery rate increased from the earlier 21% to 33.3% with 93% recovered aboard the fishing craft. Furthermore while Kutkuhn obtained only a 7% per week fishing mortality they discovered that it had risen to 13.1% per week.

From the available data, I would say that one could obtain both a larger poundage, and a much increased value, by not harvesting shrimp below a 50 count heads off.

It behooves us to thoroughly reexamine the question of the best size to commence harvesting shrimp. Obviously, the present tendency to take more and more baby shrimp is poor management.

The marking experiments by the Galveston laboratory to obtain growth and mortality rates were not pressed after I left the laboratory in 1962; consequently 13 years later we still lack adequate mortality rates for white and brown shrimp. Are we now going to start all over again on more research while the shrimp fishery suffers, or shall we try to manage with available information while the states attempt to fill in the gaps in our knowledge which the federal government left because of vacillating research programs?

I note that the federal government complains about the high cost of collecting the statistics so sorely needed for proper management and neglects to keep them up-to-date while they squander your Sea Grant funds on such inhouse projects as RUFAS II, and on the analysis of their own statistics.

History repeats itself. Only a few years back the Saltonstall-Kennedy Act provided adequate funding for contract research and the Secretary of the Interior appointed the American Fishery Advisory Committee to aid in selecting worthwhile projects. Within a very few years, this Committee complained that there were no funds left to allocate. The federal government was utilizing almost all the S-K funds itself, even for such non-research items as running Market News offices. The Bureau of the Budget then stepped in and reduced their original appropriation by the amount of these S-K funds.

It appears to me that a large share of the Sea Grant funds and some of your 88-309 funds are commencing to follow the path of the former S-K funds.

In the 18 years since I first came to the Gulf, the five Gulf states have all developed competent biological staffs, but the federal government is determined to circumscribe both their funds and their authority, and to blame the states for depletion of even the offshore fisheries. Let me quote from their recent handout entitled, "A Draft Outline for the National Fisheries Plan" (1974):

This multiplying fishing pressure and the lack of effective management has resulted in overfishing of several important species. Present management lies mainly with states whose policies, interests and authorities often differ, resulting at times in conflicting and inefficient regulations. Moreover, the roles of state and federal governments in management beyond the territorial seas has not been clearly defined leading in some cases to a management vacuum. Largely as a result of these forces, there has been a serious depletion of some major fisheries stocks off the U.S. coasts and a major deterioration of some important segments of the fishing industry.

We hear a great deal nowadays about man's destruction of the estuaries, and while there is some truth in it, it is nevertheless being used as the whipping boy for our failure in resource management. It would appear that in many cases state politics are too potent to permit adequate management by state officials. Meanwhile, Uncle Sam is watching your performance awaiting the approaching opportunity to take over. I submit that unless the Gulf states can forget politics long enough to breathe life and authority into their own commission, the industry faces a continuing disaster, in which case Uncle Sam will eventually step in. Perhaps most of you remember the international shrimp treaty with Cuba that was ratified and would have taken over your authority but for the advent of Fidel Castro. If you want adequate management, and want to do it yourselves, the time to act is rapidly growing shorter.

Your problem has three facets—biological, economic, and social. All three must be solved in one package. Millions upon millions of dollars have been spent upon shrimp research since Weymouth and Lindner started investigations in 1930. That was 45 years ago and we now know a great deal about shrimp biology, despite federal failure to follow through. It is time to stop twiddling our thumbs and start using this accumulated knowledge.

The federal government, forgetting the need for mortality rates, is presently turning its attention toward shrimp mariculture. You have one prime example of mariculture in Florida which lost millions of dollars for the stockholders and destroyed many hundreds of acres of supposedly public marsh. It is time the shrimp

industry inquire as to the legality of turning large portions of productive marsh into private ponds. At the same time you might inquire as to why fixed, anchored, and moving nets are all permitted to fish for shrimp in narrow passes.

I assume that we all want to strive toward the highest net profit from each annual brood of shrimp. Both this highest net profit and the highest yield cannot be attained simultaneously. The quantity of shrimp available each year is limited so that there can be no profit when there are too many boats competing for the same shrimp. The old hackneyed method of decreasing fishing pressure by cutting down the efficiency of each unit of gear will not work; it will only make bankruptcy a little closer. The only real solution is to reduce the number of fishing units. This poses a problem since there are in reality at least three rather distinct commercial fisheries—the boats and very small vessels that fish entirely in or close to the sheltered nursery areas, the nearshore vessels of more draft that fish in the larger primary bays and venture a few miles offshore in good weather, and the offshore vessels that fish anywhere in the Gulf. Clearly then there needs to be a reduction in all three fleets.

Another factor to consider is the seasonal nature of the fishery. Many of the inshore vessels are tied up for long periods and trawl only when shrimp are abundant locally.

A third factor that cannot be ignored is the great number of 16-foot trawls used by non-commercial fishermen, usually with outboard motors. At the October meeting in Biloxi of the Gulf States Marine Fisheries Commission, St. Amant said there are about 45,000 of these 16-foot trawls in Louisiana, and Swingle estimated 4,300 in Alabama. Thus in Louisiana alone these so-called sport trawls can cover a sweep of nearly 14 miles. At a towing speed of only 3 miles an hour they can fish 40 square miles or about 25,600 acres per hour. The impact of these thousands of nets dragging over the shoal nursery areas on the vegetation and on the bottom fauna can only be destructive. How many baby shrimp do they take or destroy? Many of these shrimp are sold without appearing in the statistics.

In addition to limitations of the various classes of shrimp fleets, there must be an end to the senseless slaughter of baby shrimp. This can only be accomplished by closure of the shallower nursery areas to all forms of shrimp fishing during periods when they are occupied by undersized shrimp. When a state publication says that their data verify that 80% of the shrimp caught in these shallow areas are discarded you wonder why they allow such shameful waste. Knowing the ability and integrity of the state administrators, I surmise that perhaps politics plays some role in this inability to practice sound conservation.

Whenever limited entry into a fishery is discussed, there are invariably hysterical outcries about depriving anyone of the right to fish since fish are considered to be a public resource. These people should take a look at what happened to our open range when everyone turned their livestock loose without any consideration of the devastating effect of overgrazing. Finally, the number of cattle in each area was officially limited to what the range could support.

Failure to act will mean the loss of an enormous investment. It is not in the public interest to jeopardize an investment of upwards of 250 million dollars in fishing craft and gear. The goal of limited entry is to return the fishery to a profitable

basis so that several thousand fishermen can make a decent living. For the 16,000 shrimp fishermen in 1970 the average investment was about \$15,000 per fisherman. This often represents a life savings and years of arduous toil. For many Gulf coast communities the shrimp fishery is the major industry and when there is no profit to pay for nets, ice, fuel, groceries, and vessel repairs the entire community suffers. Furthermore, the life of a shrimp vessel is limited. Without sufficient profit to amortize his investment, the fisherman is really living off his capital and will inevitably be forced out of the fishery.

Let me give you an example of how limited entry works. In British Columbia the salmon gillnetters faced a situation analagous to what we are facing. The salmon stocks were being overfished, but there were so many gillnet boats that the fishermen could not make a living. The government offered the fishermen two types of license which they called A and B. The B license was a cheap license that could be renewed for 10 years. A B boat could not be replaced by another. Many older fishermen or part-time fishermen took out a B license. The A license cost more, but the boat could be replaced by another of equal tonnage, and it could be renewed indefinitely. The money from the A licenses was put into a special fund which the government used to purchase A boats. The government then auctioned off the purchased A boats but they were not given a salmon license.

In a few years this system has already reduced the fleet to where they are able to take off some of the fishing restrictions.

Are the states willing to admit that only the federal government has the all-seeing wisdom to manage their resources, or do they wish to retain control where it belongs? The choice is yours for the time being.

#### REFERENCES CITED

- Costello, T.J., and Donald M. Allen. 1968. Mortality rates in populations of pink shrimp, *Penaeus duorarum*, on the Sanibel and Tortugas grounds, Florida. U.S. Fish Wildl. Serv., Fish. Bull. 66(3):491-502.
- Gaidry, Wilson J., III. 1973. White shrimp investigations. In Investigations of commercially important penaeid shrimp in Louisiana estuaries. La. Wildlife and Fish. Comm., Tech. Bull. 8:153 p.
- Kutkuhn, Joseph H. 1966. Dynamics of a penaeid shrimp population and management implications. U.S. Fish Wildl. Serv., Fish. Bull. 65(2):313-338.
- Lacewell, Ronald D., Wade L. Griffin, James E. Smith and Wayne A. Hayenga. 1974. Estimated costs and returns for Gulf of Mexico shrimp vessels: 1971. Texas Agri. Exp. Sta., Tech. Rept. 74-1:26 p.
- Lindner, Milton J. 1966. What we know about shrimp size and the Tortugas fishery. Proc. 18th Ann. Sess., Gulf and Carib. Fish. Inst., p. 18-26.
- National Marine Fisheries Service. 1956-1971. Fishery statistics of the United States.
- \_\_\_\_\_ . 1974. A draft outline for the national fisheries plan.
- White, Charles J. 1973. Brown shrimp investigations. In Investigations of commercially important penaeid shrimp in Louisiana estuaries. La. Wildlife and Fish. Comm., Tech. Bull. 8:153 p.