SELECTED ECONOMICS RESEARCH NEEDS OF THE GULF AND SOUTH ATLANTIC SHRIMP INDUSTRY--A WORKSHOP

by

Charles Adams

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GULF AND SOUTH ATLANTIC SHRIMP INDUSTRY--

A WORKSHOP

Summary of a workshop held
September 12-13, 1985
Madeira Beach, Florida

By

Charles Adams

Florida Sea Grant Extension Program
University of Florida
Gainesville, FL 32611

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INTRODUCTION

The domestic shrimp industry is the most important commercial fishery in the U.S. in terms of dockside value. The value of raw and processed shrimp product has recently reached record levels. In addition, the industry continues to grow in total volume and value of product moved through the overall market system. Domestic consumption of shrimp, coinciding with supplies, has reached unsurpassed volume during the 1980's. With production from domestic stocks having apparently reached a peak and the level of consumption increasing, supplies of imported product have become increasingly important in satisfying demand. However, the volume of imported product is also constrained by peaking worldwide production from wild stocks. Thus, cultured shrimp are becoming more important as an import source. The volume of imported shrimp moving into the U.S. market has reached record levels in the past two years, with cultured shrimp representing an increasing percentage of that import volume. As consumer demand for seafood products in general increases, which is indicated by a steadily increasing per capita consumption of seafood, the marketability of newly developed analog seafood products is likely to increase. These analog products may serve as substitutes to certain shellfish, such as shrimp.

These recent trends and changes in the domestic shrimp industry have not only enhanced on-going research efforts, but also have signaled new high priority areas of inquiry where regionally cooperative research efforts can be directed toward efficient management of the industry. Given that the majority of domestic shrimp production and processing occurs in the Southeast, research on the industry has historically

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centered at institutions located within that region. A recommendation which emerged from a January 1985 Sea Grant/National Marine Fisheries Service retreat was to conduct a workshop attended by Sea Grant, NMFS, State, and Industry economists from the Southeast region for the purpose of identifying the major research needs concerning several issues of growing importance to the domestic shrimp industry. This workshop would represent a continuing effort by Sea Grant to provide a forum for establishing regionally cooperative efforts in marine economics research. The retreat committee on Research Coordination and Data/Information Exchange identified three pertinent issues for the workshop. These were:

(1) The impact of the development of foreign shrimp mariculture on the various sectors (production, processing, wholesaling, etc.) of the domestic shrimp industry,

(2) The impact of future development of seafood-based analogs and Surimi on the domestic shrimp industry, and

(3) The status of and problems associated with the development and improvement of econometric and bio-economic modeling efforts concerning the domestic shrimp industry.

The workshop addressing the above issues was sponsored by Florida Sea Grant and the NMFS Southeast Regional Office during September 1985 at Madeira Beach, FL. The majority of institutions involved in shrimp industry economic research within the Southeastern region were represented. Brief statements of past, current, and anticipated involvement in research efforts concerning the three topics of interest were solicited from each institution in attendance. These were followed by discussion sessions concerning each of the major issues, with the

goal being to recognize areas of concern and establish priorities relative to on-going and potential research efforts. The workshop also represented an opportunity for marine economists from the Southeast region to discuss planned and on-going research efforts. It is the purpose of this paper to document the proceedings of that workshop and to prevent recommendations for future research.

SUMMARY STATEMENTS AND RESEARCH RECOMMENDATIONS

SESSION I: Economic Modeling of the Domestic Shrimp Industry

A statement of the issues and concerns regarding economic modeling of the domestic shrimp industry was presented by the group leader Wade Griffin, Texas A & M University and respondent remarks were given by Jim Easley, North Carolina State University. The presentations and the discussion that followed generated strong support for the continuation of research involving applied modeling of the shrimp industry.

Models are simply an abstract representation of a "real world" process. As such, models most often apply to a specific sector or component of the industry of interest, rather than the entire complex network of interrelated subsets which comprise the overall industry. In addition, these models may be oriented specifically toward economic (quantity demanded, prices at given market levels, import supply, firm entry/exit, etc.) or biological (stock size, recruitment, yield, etc.) aspects of the industry, or some combination thereof (i.e. bio-economic simulation models). Obviously the form and scope of an applied model is directly related to the problem being addressed.

Mathematical models are particularly useful in quantitatively describing how sensitive a given element of the industry is to change in related factors. This change can be due to "normal" fluctuation in the industry or due to a dramatic structural or policy shift. This information is in turn useful in assessing anticipated industry impacts in a "what if" fashion. Many models developed for the domestic shrimp industry have found application in this sense, such as in the assessment of alternative policy measures. However, such models must be timely. Models designed for recurring application must be updated as data become available. The cost of such maintenance should be realized.

The group was in general concensus on the importance of model development and refinement in providing an extremely useful *tool* for application in policy analysis and efficient management of the industry. The modeling discussion evolved such that specific modeling problems associated with a given topic area (SURIMI/analogs or imports) were (re)introduced during the respective topic discussion session. However, several generic guidelines, issues, and concerns regarding modeling of the shrimp industry were emphasized. These are given below.

(1) An inventory of existing models should be taken. This accounting should address what models have recently been developed for the various industry segments and how successful these efforts have been in answering management and development questions.

(2) Gaps in the explanatory power of existing models should be identified and assessed for relative importance to management decisions. When feasible, these gaps should be filled. As data become available, existing models should be refined to include more appropriate and timely parameter estimates, functional form, etc.

(3) The extent by which the development of needed models and the refinement of existing models are constrained by data needs should be assessed. These data requirements should be communicated to data managers.

(4) Models should be constructed to address long-run, in addition to short-run, phenomena inherent in the specific component of the industry being described.

(5) One option for economists to be able to answer a wide variety of management and development questions is to foster the development and maintenance of a large mathematical model, such as a simulation model, that would embody as many components of the domestic shrimp industry as is feasible. This model would be supported by a body of research designed to produce parameter estimates that the larger model requires to function. The supportive research would be conducted with the use of smaller individual econometric or linear programming (LP) models. Such a model could possibly be contained on the data processing facilities of NMFS for utilization by a regional Fisheries Center or laboratory. An alternative approach to the development of such a large single model would be to ensure, when possible, that individual research efforts produce models which can be linked (i.e. parameters or output from one model can be utilized by another model to address a problem within the corresponding industry sector).

SESSION II: Seafood Analogs/Surimi and the
Domestic Shrimp Industry

The workshop session on Surimi-based foods included a brief overview of recent trends in the U.S. and Japanese markets, an enumeration of possible research topics and methodological problems, and a discussion of research priorities for southeastern U.S. fisheries economists. Ken Roberts, Louisiana State University, served as group leader, while John Vondruska, National Maine Fisheries Service, served as respondent.

A number of guidelines, issues, and concerns related to research addressing Surimi products and their potential impact on the domestic shrimp industry were raised during the discussion session.   Some of these are listed below.

* The potential impact to the shrimp market from the introduction of Surimi based products may be overestimated.

* Major impacts may in fact be felt within the crab market, in particular the salad pack (king, tanner, and dungeness crab meats).   If the Surimi products serve as a close substitute to white flake meat, there could be considerable impact to the blue crab market.

* Research into the issue of substitutability in the shrimp market is currently data bound.   Research may need to be directed to the crab industry first.

* The use of "blended" product may serve to reduce the potential impact on the shrimp market (product may not be recognized by consumers as a substitute).

* Given the expected increase in shrimp supplies in the future, what will be the partial price effect of increased levels of Surimi products on the shrimp market? Will anticipated downward pressures on the shrimp prices have an effect on the rate and success of Surimi product introduction?

* What is the relationship between shrimp prices and availability of finfish supplies for Surimi use? Do dockside shrimp prices serve as a barrier to expanding finfish supply availability?

* Consumer survey analyses should be done (when data are available) to identify how Surimi fits into the total seafood market. What are the market weaknesses?

* What are the viable alternative product forms?

* What are the dynamics and trends of the Japanese market? How would that market compete with U.S. for available supplies?

* Data in general needs to be assessed , i.e., available finfish stocks, surimi supplies, prices at various market levels and product forms, acceptability, substitutability, market channels, etc. Research is presently constrained by overall lack of data.

SESSION III: Shrimp Mariculture/Imports and the
Domestic Shrimp Industry

This   session provided discussion on the potential impacts to the
domestic shrimp industry through imports of maricultured shrimp products.
Research needs   were   discussed.   Fred Prochaska, University of Florida,
served as group leader.   Schedule conflicts resulted in the lack of
planned   specific respondent participation.

The resulting discussion emphasized a number of research concerns.
Some of these research oriented topics have been expressed earlier
in the · context of modeling, but were reiterated here due to their
specific relevance to maricultured shrimp imports.   Two major areas
of concern were associated with domestic versus import quality and the
seasonal/size class imports on the domestic market.   A listing of some
major guidelines, issues, and concerns discussed in the the session
follow:

(1) Establish standard quality guidelines for domestic wild caught
and imported maricultured shrimp, particularly for maricultured shrimp
imported in boxed form.

(2) Examine the relative quality of domestic wild caught versus imported
maricultured shrimp and address the economic consequences of improving
domestic quality (i.e. access the price differential between domestic
shrimp and Ecuadorian whites).

(3) Would quality/image improvements have a positive impact on the
economic viability of domestic shrimp mariculture?

(4) What are the impacts on the domestic market due to the size
distribution of imported maricultured shrimp?

(5) How will existing or increased levels of maricultured shrimp imports
effect the seasonal nature of domestic prices on a size class basis?

(6) What impact will increased levels of imported maricultured shrimp
in specific size classes have on the effectiveness of domestic management
policies, such as seasonal closures, which target specific size classes?
What are the economic implications and how can these relationships be
built into existing and future models of the domestic shrimp industry?

(7) Communicate to data managers that timely and consistent data on a size class basis are vital to addressing the impacts to the domestic shrimp industry from increased levels of imported maricultured shrimp.

The participants also expressed an interest in discussing further the possibility of a regional project to address the questions raised regarding the potential impact to the domestic shrimp industry from changes in levels of maricultured shrimp imports. A regional approach seems to be justified given the commonality of the relative importance of shrimp harvesting and processing in Southeastern States and the similarity in potential impacts.

SESSION I: Economic Modeling of the Domestic Shrimp Industry

The following remarks are those given by the group leader and respondent. These remarks contain more detailed comments on issues and concerns regarding modeling efforts which concern the domestic shrimp industry.

Statement of Modeling

Wade L. Griffin
Texas A & M University

The Magnuson Fishery Conservation and Management Act provided for management of the shrimp resource in the Gulf of Mexico from the territorial sea to a point 200 miles from shore. Responsibility for developing a shrimp management plan for the Gulf of Mexico rests with the Gulf of Mexico Fishery Management Council.

The Council's primary challenge is to develop policies and regulations that attain the greatest overall benefit to the nation with particular reference to food production and recreational opportunities on the basis of the maximum sustainable yield as modified by relevant economic, social or ecological factors. In turn, economists are challenged to provide insights into cost and benefits of alternative policies and regulations for the shrimp fishery. The shrimp resource is utilized by several user groups. Responses to policies, and, therefore, the effects of policies, will most likely differ among the groups involved. Consequently, to be able to choose wisely among alternative policy options requires that economists anticipate how policies affect different groups involved in the fishery as well as to anticipate the potential aggregate effect of policies on the fishery as a whole. Evaluating policies also means that economists have to recognize and attempt to avoid unexpected effects and cost. Examples of unexpected results can be seen in agriculture as well as commercial fisheries. Most recently the Federal Government instituted a Payment In Kind (PIK) program to help reduce production of some agriculture commodities. Response by farmers was that production was cut by one-

third. Supporting dealers (chemical, equipment, etc.) sold one-third less product and as a result many supporting dealers went out of business.

In the Gulf of Mexico region, every state regulates the shrimp fishery within their territorial sea and the Gulf Council regulates the Fishery Conservation Zone (FCZ). States have a variety of gear restrictions, seasonal closures, and pound and size limitations. To date, the Gulf Council has instituted regulations for Florida and Texas in the FCZ waters. In Florida, they have a shrimp sanctuary where fishing is prohibited and in Texas they close the entire FCZ for 45 to 60 days.

All regulations have been based generally on biological reasonings, that is, increasing pounds necessarily implies increasing value. For example, the FCZ closures were instituted to protect the shrimp when they are small and growing rapidly. When the shrimp are harvested it is expected that total pounds will have increased. Value will have increased because more pounds are landed and shrimp are larger and command a higher price per pound.

In evaluating the Texas closure, the NMFS takes sample trawls in the shrimping grounds when the area is closed. They then simulate what catch would have been that year if there had been no closures. They subtract the simulated pounds from the actual pounds caught and if it is positive, they conclude that the closure achieved its purpose. Using a price predicting model, they calculate the value for the simulated pounds and subtract that from the actual value. In this way they predict if the value increased because of the closure. They have done this analysis each year of the closure.

The problem with this type of analysis is that it only looks to see if total pounds and value increased in the short run. It does not

consider how this added pounds and value are distributed nor what the long run consequence of this type of policy might be. In terms of distribution there has been unexpected influx of vessels from other states fishing in Texas waters when the season first opens up because the catch per unit effort is usually high. This has caused considerable congestion of vessels and pulse fishing in July and August off Texas. Also, for this short period of time demand for shore facilities often exceeds their availability. In terms of the long run, economist know that anytime rents are generated in an open-access common property resource through some sort of policy then it attracts more boats into an already over capitalized fishery.

It would appear then that there is significant reason for modeling the shrimp fishery by economist to evaluate policies and regulations proposed by the states and the Gulf Council. It would be nice if we could conduct experiments to find out the results of a given policy before it is implemented. However, in most cases that is impossible. We can, however, represent the system by a model that imitates the behavior of the system. Then, we merely reproduce or simulate under test situations the likely outcome for the actual system. The model then becomes a tool for addressing "what if" questions on systems we cannot control in a laboratory setting.

These types of simulation models can be solved deterministically or stochastically. Deterministic models ignore the risk and uncertainty inherent in the system being modeled. They provide a single answer to such "what if" questions. They provide a one-for-one mapping of input assumptions into the output vector for each output variable. Stochastic models account for at least one of the uncertain or risky

components in the system being modeled. The model does not provide a single answer to a question or set of initial conditions. Rather, the model provides a probability distribution of results for each set of initial conditions.

This type of modeling and policy analysis allows one to estimate the performance of a system without disrupting or destroying the system. It allows the evaluation of proposed changes in the system without disrupting the present system. When policies are instituted in fisheries it generally takes a long time span over which to fully determine their affect. This type of modeling allows the system to be evaluated over a long time span to account for the full affect of alternative policies. To develop a fully integrated simulation model requires an interdisciplinary effort on the part of biologists and economists.

As fishery economists, we would think that we can effectively relate to complex policy issues. Yet, even in commercial agriculture where there has been extensive research, model building and policy analysis, agricultural economists are left with substantial uncertainties about the likely effect of many government policies and regulations. Fishery economists have a ways to go to catch up with them and we need to start catching up. We need models that can address "what if" questions about a resource and we need to work with other disciplines in developing these models.

Shrimp Industry Modeling: Response

J. E. Easley, Jr.
North Carolina State University

I reinforce Wade's comments regarding modeling. It is useful work, and as models and data improve, will likely become even more useful. Asking "what if" questions of management and policy alternatives is probably much less costly than trial-and-error methods in a fishery. Given that these latter methods do tend to be costly and disruptive (especially if they turn out to be the wrong move), there is usually strong opposition to testing new strategies. Modeling offers a productive alternative.

I would like to suggest some points for us to consider during this meeting. Some may be helpful in future modeling efforts; some may not be. These points are:

1. What are the effects of the size distribution of imports on domestic prices? Are these effects seasonal, i.e., do they differ through the course of the domestic harvesting season?

2. If there are relative size price effects, is there potential for "fine tuning" management to minimize these effects on the domestic fishery? To answer this question, a dynamic model with size classes incorporated (both for catch and prices) would likely be necessary.

3. Would better estimates of substitution in consumption of different size classes improve our models? If we attempt to manage for changing the size composition of the catch, what is the effect on relative prices (by sizes)?

4. Data suggests that imports have had significant effects on relative prices (by size class). If growth in future imports come increasingly from cultured shrimp, one might expect the size distribution of cultured shrimp to change as producers look at prices by size class. Surely there is substitution in production, and growers--perhaps after some initial "shaking out"--will look at prices as well as costs to determine optimal harvest size. We might want, at some point in the future, to include in our models a feedback mechanism to shrimp growers, and their expected response.

SESSION II: Seafood Analogs/Surimi and the Domestic
Shrimp Industry

Additional points of consideration regarding the impact of surimi-based foods on the domestic shrimp industry are contained in the group leader and respondent remarks. These more detailed research oriented comments follow a market overview of Surimi-based foods.

Economics of Surimi Foods

John Vondruska
National Marine Fisheries Service

Market Overview*

The U.S. market for surimi-based seafoods rose to 70 million pounds
in 1984, with imitation crab accounting for most of that total. This
contrasts with a smaller, relatively stable market of 5-6 million pounds
of mostly ethnic surimi-based foods in 1975-80. While imitation crab
was apparently intended to emulate king or snow crab, supplies exceeded
the total U.S. supply for all natural crab in 1985 on a tonnage basis.
Smaller amounts of shrimp, scallop, lobster and other seafood analogs
are sold, and the functional properties of surimi suggest to food
scientists much wider use by the food processing industry in stand-alone
(non-analog) products and as an ingredient. Actual use will depend
on several factors, and the future size, growth and impact of U.S.
supplies of surimi-based foods are a matter of much speculation.

Large growth in U.S. markets for surimi-based foods implies a
significant amount of fisheries development, if growth is to be
accomodated at current real prices. One optimistic estimate suggests
a U.S. market of 1.0 billion pounds of surimi-based foods in 1990 (or
roughly 0.5 billion pounds of surimi from 2.5 billion pounds of landed
fish, assuming a 20 percent yield). Supply constraints, rising costs
and prices of fish, competition from other products, and other factors
may mean a much smaller market in 1990.

Depending on future changes in Japanese supply and demand, Japan
could play a major role in the expansion of U.S. supplies of surimi-based

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foods. Japan is the major producer, consumer and exporter of surimi-based foods. While imitation shellfish and other products are likely to be important in the expansion of U.S. and other markets, total Japanese exports of all surimi-based foods accounted for only 3.6 percent of output in 1984, and exports of surimi accounted for a lesser fraction of surimi. On the other hand, a U.S. market of 1.0 billion pounds would represent roughly half of today's Japanese output. After declining, Japanese domestic consumption appears to be recovering, even growing, suggesting that Japanese processors may perceive export markets more as a vehicle for increasing output rather than as a vehicle for offsetting declining domestic demand. Since stocks of Alaskan pollock within U.S. waters are being harvested at essentially the maximum rate, Americanization of harvesting and processing is not likely to increase world supplies of surimi, and Americanization could even decrease world supplies of surimi if the output mix contains, for example more fillets and less surimi.

Alaskan pollock is the dominant fish used to make surimi, but some 150 other species worldwide may have the necessary functional protein properties, and the southeastern United States has some large resources of finfish that may prove to be economical sources of surimi. Yields and costs are critical. Large scale evaluation of producing menhaden surimi is planned to begin in 1986. The southeast also has important, established fisheries for shrimp and crabs, and markets whose markets and prices could be affected by competition from surimi-based foods. Yet, new viable commercial fisheries could provide employment opportunities for human and capital resources now facing financial and economic difficulties in other southeast fisheries.

Research Considerations and Methodological Problems

Ken Roberts
Louisiana State University

The rising consumption of seafood over the past two years marked a reversal of a static market situation during the previous seven years. During this period shrimp consumption increased five consecutive years. Thus, within an expanding seafood market the subject of our interest at this meeting is performing well. Performances of shrimp products in the market cannot be attributed only to recent declining wholesale prices as the period includes high prices also.

The massive increase in shrimp supply forecast by numerous non-business based individuals, if fulfilled, will keep pressure on prices. Given an annual one percent increase in U.S. population through 1990, the prospective supply increase will face a market requiring rising per capita consumption to maintain prices. This is the antithesis of the recent well-known west coast crab situation. Over the most recent three years king crab landings have declined yet prices fell. This once premium imaged seafood demonstrated rising ex-vessel and wholesale prices under falling production in the preceding three year period. The concern has been expressed that analog crab products substituted for king and snow crab in wholesale markets sufficiently well to permanently affect price-volume relationships. Is this actually the case or have analogs created a new slot in the seafood product array with attributes only peripherally to existing product offerings? Research on the interaction of crab analogs with existing markets offers the only prospect for empirical work at this time. Before journeying into the analog - shrimp field, the fundamentals of what has occurred is the necessary first step.

There are numerous matters which require insight from experienced seafood trade people and researchers in order to improve the prospect of better identifying the role and impact of analogs from the consumer through to fisheries management. A few thoughts are presented in outline form below as a means fostering discussion.

1. With U.S. seafood consumption at 3 billion pounds, how can analogs increase to .5 - 1 billion pounds in the next four years? How are such figures derived? Do the procedures and forecasters merit all the attention?

2. Identifying substitute relationships in demand equations for various species has yielded few instances of success on a statistical basis. With data of relatively recent vintage on analogs limited to crab, can this procedure yield much insight? Have our previous approaches been insufficient?

3. How should researchers proceed to determine whether analogs are simply moving into an expanded market for seafood, actually substituting for the mimicked species, or as likely some of both?

4. Will cross elasticities emerge? That is, will crab analog success lessen interest in certain species or preparations of shrimp?

5. Analogs were originally viewed as being blended in some proportion with natural supplies, i.e. an extender of some nature. While this is evident from the various surimi/crab content products, blending can also occur at the point of sale. For example, analogs are frequently included with other seafoods in salads, sandwiches, au gratins, etc. This avoids the "imitation" image when the product stands alone.

6. Will labeling as imitation affect retail sales? How will blending affect markets?

7. Is the raw material available for a .5 - 1 billion increase? If yes, then will such a near term demand allow raw material costs to remain low? Are the available species capable of yielding analogs of similar quality to the initial offerings.

8. There are as many as four grades of surimi with which to make the over 600 analogs available in Japan. What quantities are likely to be available in various grades? What are the yields and prices associated with each?

9. What are the basic forces in the shrimp market nationally and internationally which will impact the rate of analog introduction and success?

10. Can growth of shrimp analogs change fisheries policy in regard to shrimp in the U.S.?

Research Priorities for Southeast Fisheries Economists

John Vondruska
National Marine Fisheries Service

In the view of economists attending the workshop, there are several possible areas of economics and marketing research that could be pursued within the framework of southeastern regional interests, but other work, such as in relation to shrimp imports and the management of several southeastern fisheries should receive more emphasis. Three areas of work were suggested: market and consumer survey analysis, cooperative work with food scientists, and supply-demand analysis.

Survey analysis: Data on surimi-based seafoods will be obtained in a planned national food consumption survey, but the 1977-78 Nationwide Food Consumption Survey (USDA) and the 1981 National Seafood Consumption Survey (NMFS) provide much data that has not been analyzed. Hu provided a comparative analysis of these and two other surveys, along with a set of cleaned data tapes.* Several southeast economists have also analyzed consumer survey data.

Cooperative work with food scientists: Three major technological breakthroughs in seafood processing have taken place in the past two decades: mechanical meat-bone separation, stabilization of processed minced fish for good frozen storage shelflife, and fabrication processes taking advantage of the gelforming ability of fish flesh. Because of these breakthroughs, a multi-discipline "International Symposium on Engineered Seafoods, Including Surimi" is being held in Seattle, November 19-25, 1985, and the results should provide a guide to further work by southeast economists in cooperation with food scientists. Possible

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*Teh-wei Hu. Analysis of seafood consumption in the U.S.: 1970, 1974, 1978, and 1981. Unpublished report for S-K cooperative agreement (no. NA82AA-H-0053), September 30, 1985. Dr. Hu is Professor of Economics, Institute for Policy Research and Evaluation, The Pennsylvania State University, University Park, PA. 16802 (phone: 814-865-4451).

cooperative work include production economics, feasibility analysis, consumer panel evaluations, market testing, and least-cost ingredient selection for formulated products.

Supply-demand analysis: Available data may limit what can be done in this area. Most analyses so far have been based largely on Japanese data to represent both the Japanese and U.S. markets, and those analyses have been descriptive, but it is possible that further effort to assemble available data could provide the basis for some reasonably rigorous econometric modeling. One suggested area of work is to model the effects of crab analogs on natural crab markets and then see if any lessons can be used in a hypothetical situation involving shrimp analogs and natural shrimp. It was agreed during the workshop that the appropriate shrimp product to be concerned about is a frozen, breaded analog for the fast-food market. Concern was also expressed about potential effects of imitation products on the market for blue crab, which is processed largely into crab meat.

SESSION III: Shrimp Mariculture/Imports and the Domestic
Shrimp Industry

The following remarks by the group for this session discusses some
of the points listed previously regarding this topic but in more detailed
fashion.   There are no respondent remarks for this session.

Shrimp Mariculture and Imports:
Effects on U.S. Markets and Research Needs

Fred J. Prochaska
University of Florida

Situation and Trends

A record 610 million pounds (heads off) of shrimp were available
for U.S. consumption in 1984. Between 1965 and 1978 imports and
U.S. domestic landings both increased with imports generally accounting
for a little over 50 percent of the total supply. Since that period
U.S. production declined from a peak in 1977 to levels produced during
the mid 1960's (primarily due to a decline in Pacific landings) while
imports increased from a little over 250 million pounds (heads off)
to 422 million pounds in 1984. During the 1983-84 period imports
averaged 71 percent of total U.S. shrimp supplies.

Continuous and standarized statistics are not available to
segregate total shrimp imports into those produced by mariculture
and those from worldwide wild harvest. One estimate is that 15 percent
of U.S. 1983 imports (63 million pounds heads off) were farm raised.
However, other estimates put world mariculture output at only 74
million pounds in 1983. Realistic long term projections place 1990
shrimp mariculture at between 400 and 525 million pounds (heads off).
One certainty is that we are not certain as to the current and future
volume of farm or mariculture raised shrimp nor are we certain about
the share that will be imported into the U.S. With respect to total
world shrimp production, research results and general opinion is
that most or all future increases in world shrimp supplies will come
from mariculture.

Effects of Shrimp Mariculture and Imports

Analyses of the effects of shrimp mariculture imports have been indirect at best. Furthermore, analytical models of total shrimp imports have been incomplete in several dimensions. Principal inadequacies are (1) until recently most estimates were based on single equation demand models which cannot separate supply and demand changes, and (2) limited recent simultaneous supply and demand models have been restricted to aggregate shrimp imports or to one narrowly defined size class due to data limitations.

One simultaneous import supply and demand model developed at the University of Florida was used to analyze effects of imports in general and mariculture imports indirectly. Price elasticity of demand was found to be negative and highly inelastic while real income had a positive and highly elastic effect on imports. Substitutes for imports (domestic landings and inventories) have negative impacts on U.S. import demand. On the supply side, an increase in price, exchange rate (foreign currency per U.S. dollar) and world production all increase foreign shrimp offered to U.S. buyers while increased shrimp demand from foreign buyers decreases supply offered U.S. importers. A combination of these factors will ultimately determine the effects of shrimp mariculture on U.S. markets and the domestic shrimp industry.

U.S. shrimp prices should continue to increase due to increased incomes, higher domestic costs of production and no significant growth in U.S. production. All of these factors will continue to increase import demand. Higher prices resulting from increased U.S. demand

will cause the quantity supplied to increase, ceteris paribus. Given these expectations, the exact price and quantity imported will then depend largely on world production, exchange rates and demand by foreign buyers in final equilibrium. Increased world production is estimated to increase import supply to the U.S. in final equilibrium by 3.5 percent for each 10 percent increase in world production. It is difficult to predict demand by foreign buyers. Japan is the main competition for U.S. shrimp buyers. Recent trends in the Japanese economy suggest growth in Japan's shrimp imports. A decline in the exchange rate is expected for the next few years. These latter factors will tend to offset some of the potential increase in imports from increased world production which is expected to come from expanded shrimp mariculture.

NMFS preliminary estimates suggest that if world mariculture production increases 450 million pounds by 1990, U.S. real shrimp prices would increase from $2.10 per pound in 1983 to $2.36 in 1990 (assuming one-third of the increased production is imported). Without the increase in imports, real prices were projected to be $2.83. This represents a decrease in real prices of $0.47 due to the increased imports over current levels. Predictions made with the import supply and demand models discussed above are that nominal import prices would be approximately $5.75 in 1990 without increased world production and approximately $4.75 with an extreme increase in world production equal to 750 million pounds. With both sets of predictions, 1990 prices will exceed prices of the 1980's due to the projected large increase in demand compared to projected supply increases. Without the increase in world production prices would be higher in both cases.

These aggregate predictions, however, may be quite different for given size classes of shrimp. It appears the most popular size shrimp targeted in South American mariculture is in the 31-40 count range. This should result in greater downward price pressures for these size classes. There will also be some impact on smaller shrimp prices since total control over production and a lack of sizing in the current mariculture production practices result in some production of small shrimp. Prices of U.S. shrimp larger than 30 count, however, should increase, assuming the current composition of aggregate demand doesn't change. Recent price trends for given sizes of shrimp are starting to bear out these expectations. Also, recent research has shown prices for smaller shrimp (31-40) are more sensitive to imports than are larger shrimp (21-25) prices.

Market, Industry and Research Implications

Imports will increase with increased production through shrimp mariculture. Import and domestic prices will continue to increase although at lower levels than without increased world supply. Those directly affected logically will request solutions to problems encountered. Many of the consequences of import related problems can be lessened through research. However, before listing these it should be noted that the increased supply is beneficial to the consumer in that prices will be lower than without the increase. Overall shrimp quality will also increase due to production controls, rapid movement of shrimp from ponds to processing facilities, and increased competition.

Tariffs and quotas have repeatedly been requested as a means to curb imports. More than sufficient research has been conducted on the topic. The inelastic import demand would cause considerable price increases with little reduction in import quantity as a result of tariffs. Quotas are necessary if significant reductions in imports are to be achieved. Further research shows that short run price increases are likely to encourage further entry into the already over capitalized U.S. shrimping industry. The problem of low economic returns to shrimping operations would likely worsen in the long run.

Considerable attention will have to be devoted to quality control in handling domestic production in order to remain competitive with imported high quality mariculture products. A further source of competition to the domestic marketing and processing sector will occur through vertical integration on the part of foreign mariculture firms. Sufficient volumes of high quality shrimp produced on a continuous basis will give these newly developed firms an entry into the market. Seasonability of imports will become less noticeable.

U.S. shrimp mariculture is generally not competitive with shrimp from the wild harvest or from foreign mariculture production. Downward pressure on domestic shrimp prices will further discourage development of domestic mariculture. To succeed, attention will have to be given to cost reductions in U.S. operations and/or a special product image will have to be developed to command higher prices.

The anticipated increase in imported shrimp in the middle size categories offers some interesting implications for management. First, season and/or area closures, such as the Texas closure, may be necessary to take full advantage of expected price increases for

large shrimp relative to price changes for smaller shrimp. The harvest of small shrimp by inshore bay boats would be impacted less than harvest in the middle size classes. The profitability of such operations may, however, be in serious jeopardy with even nominal downward pressures on prices. A consideration related to size of shrimp imported that may qualify these conclusions is availability of P.L.'s for stocking ponds. Shortages will result in less densely stocked ponds which may encourage production of larger shrimp.

A further concern to the inshore fishery by 1990 will likely be competition from the recreational sector for shrimping rights. If considerable allocations are given to the recreational sector, expanded imports may only replace the loss in commercial landings.

It is safe to conclude that extensive economic research has been conducted on the shrimp industry. Principal research needs remaining are analyses of individual shrimp product markets (by form and size), economics related to improved quality, restrictions on size of shrimp harvested and limited entry. Improvements in quality and timeliness of data are necessary to accomplish these research efforts. All or most research on the shrimp industry should be done on a regional basis with formal coordination among researchers.

PARTICIPANT REMARKS

Each institution represented at the workshop was asked to deliver a brief presentation outlining past, current, and anticipated interest or activity in the three major topics of discussion. These statements were solicited to provide an overview of research efforts which exist in the Southeast region with respect to the shrimp industry.

In addition to remarks specifically concerning shrimp industry oriented research efforts, additional comments were presented concerning two topics of discussion. These were:

(1) Dr. Lee Anderson's (IPA -NMFS) suggestions for strengthening the economic component at the Washington Office, Centers and Regional Offices of the National Marine Fisheries Service. Dr. Anderson paraphrased his working paper entitled "A Review of Economics and Economists in the NMFS". In response to these comments, the current level of Sea Grant/NMFS economic coordination and cooperation was supported by the workshop participants. There was general support for Dr. Anderson's notion of a core group of economists at the Washington NMFS Office and the Centers/Regional Offices, but the Regional Directors should have some influence on work conducted by those core groups of economists. It was suggested that NMFS should have an economist who possesses a direct link with the highest level possible in the Washington office - possibly the AA. Also, a "critical mass" of economists is likely needed in each Center and Region, but the group should be tailored to the specific needs of the area. The group also agreed in principle to the need to reduce the current amount of "brush fire" work done by economists and become involved in more long-term studies. Finally, the group agreed that the interaction between economists and statisticians/data management group be enhanced such that each may better serve the needs of the other.*

(2) Update on Sea Grant access to NMFS data. The NMFS has recently initiated efforts to increase the availability of certain raw data to Regional Councils and other research clientele (i.e. Sea Grant economists). Currently, the Florida Sea Grant Program is being utilized on a test basis to establish the feasibility of accessing NMFS data on a more timely basis via direct access of the Burroughs 6800 data files in Miami. These efforts were supported by the group. In addition, much interest was expressed regarding the accessability status of the DB-Fish data file.

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*These remarks paraphrase a NMFS Southeast Regional Office internal memo on the subject of the workshop response to Dr. Lee Anderson's comments.

SHRIMP MODELING WORK

J. E. EASLEY, JR.
NORTH CAROLINA STATE UNIVERSITY

Recent work in the Department of Economics and Business at North Carolina State University has emphasized the development of a dynamic model to assist with management decisions. The model has been applied to bay scallops, the New River shrimp fishery, and the Pamlico Sound shrimp fishery.

The management decision of perhaps most importance is when to open a season. Hence, the control model has been developed to generate the optimal season. Components of the general model are:

1) Objective function specified as present value of net income
2) Demand function
3) Production function
4) Cost function
5) Discounting function
6) Control vector specified with an on-off switch
7) Equation of motion (incorporate biological function)

Shrimp Industry Workshop

Southeast Fisheries Center, Miami, Florida

Dr. James Waters, Industry Economist, Beaufort, N.C.

John Poffenberger, Industry Economist, Miami, FL

Recent research includes; (1) an analyses of the impacts of the Texas Closure regulation, which was prepared for the Gulf of Mexico Fishery Management Council and (2) a report on cost and revenue data collected from (offshore) shrimp fishermen in the Gulf of Mexico and South Atlantic areas. Forthcoming research is a descriptive report on the shrimp processing industry.

During the next fiscal year, the Southeast Fisheries Center has two projects planned that relate directly to the topics for this workshop. At the request of the Gulf Council, the Center will conduct a survey of "inshore" shrimp fishermen at one location in Louisiana and one location in Texas. The objectives of this survey are to collect data on (1) the relative importance of (inshore) shrimp fishing as the primary versus a secondary source of income and (2) the cost, and thus net revenue (income) of inshore shrimp fishing. The other research project will be an effort to improve the data currently being collected on shrimp imports. The Bureau of Census provides data on monthly imports of shrimp to the National Marine Fisheries Service. These data are aggregates and do not provide any detail on the quantity of imports by size category. Detailed data (by size) is provided to Customs, by the importing companies, however, these data are not recorded nor automated by Customs personnel. Our efforts, therefore will be to record and automate shrimp imports by size categories.

SUMMARY OF CURRENT ECONOMIC RESEARCH RELATED TO MARINE SHRIMP

Ray Rhodes
Division of Marine Resources
South Carolina Wildlife & Marine Resources Department
Charleston, South Carolina

Title/Topic: Estimation of Recreational Shrimping in South Carolina

Principal Investigator: David Liao

Completion Date: Summer, 1987

Summary: Using a mail survey and in-person interviews, the economic impacts of recreational shrimpers' expenditures on the S.C. economy and the total recreational shrimp harvest will be estimated.

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Title/Topic: Economic Analysis of Shrimp Farming Development Models for South Carolina Coastal Impoundments.

Principal Investigators: David Liao and Paul Sandifer

Completion Date: Winter, 1985

Summary: Development of enterprise budgets and economic indicators for large and small shrimp aquaculture in coastal impoundments.

- -

Title/Topic: Financial Feasibility Analysis of Highland Shrimp Farming

Principal Investigators: Raymond J. Rhodes, Jack Whetstone and Paul Sandifer

Completion Date: August, 1986

Summary: Development of a deterministic microcomputer financial model using production strategies predicated on the monoculture of Penaeus setiferus and P. vannamei in earthen leeves.

- -

Title/Topic: Economic Performance of South Carolina Shrimp Trawlers in 1982.

Principal Investigator: David Liao

Completion Date: Winter, 1986

Summary: An analysis of South Carolina shrimp trawler costs and return data collected in a National Marine Fisheries Services survey.

Status of Economic Research
at the Center for Wetland Resources, Sea Grant Development
Louisiana State University

Ken Roberts
Louisiana State University

At Louisiana State University, the Department of Sea Grant Development at The Center for Wetland Resources has recently completed an investigation entitled "Econometric Analysis of the Markets for Shrimp in the United States." A monthly three-stage least squares model was constructed of the U.S. Shrimp Market. This model included the following equations: exvessel and wholesale prices, imports, landings, cold storage holdings, and apparent consumption of shrimp, and Gulf shrimping trips. The project was centered on the structural aspects of the industry through analysis of elasticities and multipliers. Three recent changes in the market were of special interest: the volatile nature of short-term interest rates; the strength of the dollar against other currencies; and the impact of aquacultured shrimp. The lack of specific data on aquacultured shrimp was a problem in the analysis of the changes caused by this source of production and of imports in general.

At the conclusion of this project, some preliminary short-term forecasts of prices were made using both the econometric model and an ARIMA time series model. A continuation of this forecasting work has been planned. This will involve further work on the econometric model. As such, future impacts of imports in general and of aquacultured imports will play an important role. Data on the production of pond raised shrimp would be of great use in this type of modeling. The relationship between exchange rates and the imports of shrimp will also be investigated further. One problem with using a monthly model to forecast prices is the timely availability of data.

The other shrimp project which is about to be completed is "Market Structure of the Louisiana Shrimp Processing Industry, Emphasizing Small Shrimp", which centered on the structure - conduct - performance linkages in the shrimp market. Marketing channels for Louisiana shrimp were investigated along with employment, labeling, product forms, sources of supply, and concentration ratios. Special attention was paid to small (greater than 50 count to the pound, headless basis) shrimp since a trend to smaller shrimp in the Gulf has been documented and since the large amount of landings of small shrimp differenciates Louisiana from other Gulf States. Results were compared to Florida's industry (Alvarez, et. al, 1976) and the raw data was provided to the National Marine Fisheries Service for use in their Gulf-wide shrimp marketing study.

FRED LYDA
GEORGIA SEA GRANT PROGRAM

The Georgia Sea Grant Program does not currently have anyone working in the three previously defined primary topic areas.* We have one Master's candidate (Agricultural Economics) who is initiating a research project to look at the effects, if any, that the creation of a shrimping co-operative has had on ex-vessel prices. It is doubtful that this effort will more than touch on the import problem.

Most Georgia shrimp producers and packers feel that domestic shrimp prices have been dramatically affected by pond raised imports. At least one Georgia processor feels that the imported pond raised shrimp have had a leveling effect on domestic prices and that the eventual solution to low domestic prices is to limit the number of vessels thereby increasing volume. Fishermen and packers are anxious. They have worked with average to well below average quantities for the past six years and have seen prices decline steadily for the past three years.

The Georgia Program would participate in any meaningful way to help provide factual information (with respect to the future) to all domestic shrimp fishermen. We currently are advising all our constituents in the harvesting and packing sectors to improve and maintain quality to the end users. In addition, we are encouraging packers who do not have freezers to look at the feasibility of installing or utilizing, on a rental basis, existing freezers to maximize price.

*Shrimp Industry Modeling; Shrimp Mariculture/Imports; and Seafood Analogs and Surimi

Past, Current and Anticipated Activities

Douglas Lipton
Special Assistant for Bioeconomics, Office of
Data and Information Management, F/S2, National Marine
Fisheries Service, Washington, D.C.

The NMFS Washington Office has no current or planned research directly related to shrimp. However, we will be conducting a national economics workshop on October 16-17 in Rockport, Massachusetts. The two workshop topics are: 1) analyzing fisheries trade issues and 2) alternative management strategies. Both topics are relevant to the shrimp industry, and we encourage your attendance both for the input you can provide and guidance you may receive.

Approximately one year ago the NMFS Washington Office of Policy and Planning did conduct a study to estimate the impact of shrimp mariculture on U.S. markets. The study employed an econometric model which forecasted shrimp prices under various scenarios of import levels. The study also discusses the impact of surimi production.

STATEMENT OF INTEREST

for

Selected Research Needs of the Gulf and South
Atlantic Shrimp Fishery - A Workshop

September 12-13, 1985
Holiday Inn
Madeira Beach, Florida

by

Paul J. Hooker, Ph.D.
Economist
Gulf of Mexico Fishery Management Council
Lincoln Center Suite 881
5410 West Kennedy Boulevard
Tampa, Florida 33609

My general interests in this workshop are two-fold. I am interested

in the economic research results that are or will be available for use

in evaluating the economic impacts of management measures on the shrimp

fishery. I am also interested in the use of modeling - simulation

modeling in particular - as a tool for accomplishing those evaluations.

The Gulf Council identified a number of "shrimp research needs" to its

Scientific and Statistical Committee during a recent meeting. An edited

version of the economic research needs is:

1. Determine the impacts of setting seasons/sanctuaries for fishing
    and the consequent dislocation of portions of the commercial
    fleet; e.g., the "Texas closure" and the Tortugas sanctuary.
    This should address the economic impact of "in-shore/off-shore"
    closures not only in terms of value of shrimp but also in terms
    of employment and returns to labor and capital by demographic
    classes.

2. Determine the economic impact of imports on U.S. industry.

3. Determine costs and earnings for vessels and boats, including
    opportunity costs, tax shelter benefits and imputed nonpecuniary
    income.

4. Estimate maximum economic yield.

5. Estimate employment levels and returns to labor.

6. Estimate the economic effects of discarding undersized shrimp.

7. Determine the effects of unrestricted entry.

8. Increase understanding of industrial organization, market structure and behavioral relationships among economic units.

Some of these items have been addressed rather well, such as the recent International Trade Commission study on imports. Some are so broad as to be difficult to address in their present form, such as items 7. and 8. Some are "sleepers", such as item 4. Once you start defining "economic yield." Information certainly exists on all the items. One of my tasks with the Gulf Council is to help refine the economic research needs to reflect the information that exists and to state the needs as tasks that are neither Gargantuan nor trivial.

My second interest is in simulation modeling as a tool for synthesizing available information on a fishery system and providing a framework for tracking the many dynamic behavioral relationships involved something that most of us can do in our heads (or with non-computer extensions) only for simple if not trivial systems.

I hear rumors about economists who have become disenchanted with "modeling" and read comments that "[l]arge scale, long term modeling of fisheries has, unfortunately, not yet proven to be very useful for making management decisions." I am curious as to why, and suspect that the usual communications gremlins are at work. I find it hard to accept that there are economists so ingenuous as to be unable to get results, given a sufficiently long time to work on a thing. If a scientist - an economist in particular - becomes disenchanted because his results are not accepted by fishery managers or industry, then he is not made

of very stern stuff. I am not personally aware of any large-scale,
long-term simulation modeling of fishery economic systems for the purpose
of assisting managers to make decisions. I am willing to learn and
look forward to this workshop to provide an opportunity.

NMFS Southeast Region
Fishery Development Analysis Branch Economics Program .

Richard Raulerson
National Marine Fisheries Service

The goal of the program is to provide timely economics information to the fishing industry and to government agencies to help guide investment or program decisions. The result will be better industry investment decisions leading to a more profitable industry and better government program decisions leading to better use of taxpayer dollars. Most of the economics effort will be directed to the fisheries development area, but some resources will be available for selected fishery management and habitat concerns.

The economics program has set several objectives to reach the goal of timely economics information:

1. To assemble and organize all available commercial fisheries data so that the data can be easily used by the industry, the economics program, Sea Grant, academic institutions, NMFS, and others.

2. To provide industry and government with situation and outlook information which describes the current state of the fishing industry and provides useful forecasts of industry trends and economic health.

3. To provide industry studies for the fishing industry which describe the economic feasibility of new fisheries, new developments or potentials in fisheries from harvesting to marketing.

4. To provide information to government program managers which will be used in development, management or habitat decisions.

5. To coordinate economics program activities with Sea Grant economists and NMFS economists to make use of knowledge gained by others while avoiding duplication of effort.

Each objective has associated projects, methodologies and outputs. As a general rule, projects will result in written outputs, usually reports, in less than a year from the start date and will use methods which do not require large efforts to develop or use. Some projects, e.g., situation and outlook reports, will be continued from year to year, but will always have several associated outputs during a given year. No project will be terminated due to lack of data, i.e., some output will always be obtained based on available data.

Summary of Southeast Region Economics Program Outputs

Data Objective

Most of the data assembled for situation and outlook reports and for industry studies will be displayed in those reports. Historical data may occasionally be reproduced and published in special data reports.

Situation and Outlook Objective

Publication dates for quarterly situation and outlook reports:

Report	Annual	1st Qtr	2nd Qtr	3rd Qtr
Finfish	2/1	5/1	8/1	11/1
Shellfish	2/10	5/10	8/10	11/10
Shrimp	2/20	5/20	8/20	11/20

All quarterly reports will be published in the New Orleans Market News Report.

Other situation and outlook reports will be longer and will be published as needed. These reports will include longer supporting tables and graphics. Brief summaries may be published in the NMFS Fishery Market News Report, New Orleans, as appropriate. Some may be more widely reviewed and submitted for publication, e.g. in Marine Fisheries Review, others may support oral presentations to industry meetings and be available for SERO distribution to selected individuals and in response to specific requests..

Industry Studies Objective

Report Title	Publication Date
Economics of Yellowfin Tuna Fishery	October 1985
Potential of Southeast Butterfish Fishery	September 1985
Economics of Gulf Menhaden Surimi	FY 1986
Evaluation of Potential Candidate Species for Surimi Production	FY 1986
Potential of Gulf Squid Fishery	FY 1986

Government Program Objective

Fisheries management documents will be reviewed by the economics staff on request. Other government program analyses will be conducted on a time-permitting basis as the occasion warrants.

Economics Coordination Objective

A meeting with Sea Grant economists in the southeast will be conducted during FY 85. Sea Grant manuscripts and economics proposals for national Sea Grant funding will be reviewed on a demand basis. The office will serve as a major reviewer for manuscripts submitted for the Marine Fisheries Review. Time will be made available to review all manuscripts and proposals submitted for review.

Staff Responsibility for Program Objectives (lead person listed first)

o Program Leader - Richard Raulerson
o Data - John Vondruska, Jeffrey Cunningham and Richard Raulerson
o Situation and Outlook - John Vondruska and Richard Raulerson
o Industry Studies - Jeffrey Cunningham and Richard Raulerson
o Government Programs - Richard Raulerson
o Economics Coordination - Richard Raulerson, John Vondruska and Jeffrey Cunningham

SHRIMP MODELING WORK

Wade L. Griffin
Texas A & M University

Significant modeling work has been carried on in the Department of Agricultural Economics at Texas A & M University. A firm level simulation model (FLEETSIM) was developed to analyze growth and survival of a typical fishing fleet on the Texas Gulf Coast. The model simulates the annual activities of an individual's fleet: harvesting, financial, cash receipts, vessel replacement and depreciation, cash flow, income taxes, balance sheet and growth. A typical fleet is replicated 50 times over a ten year planning horizon. Random values for each vessel's landings and prices in each of the 10 years are generated from empirical probability density functions for these variables. In trying to use the model for policy analysis, it was discovered that we needed some mechanism to change landings of the individual vessel based on changes in the over all fishery. We are now beginning to develop a macro model to link to the micro model that causes this change in landings over time.

The General Bioeconomic Fisheries Simulation Model (GBFSM) will be used to analyze the impact of the Texas closure on the Gulf shrimp industry. The GBFSM is currently being modified to allow days fished and vessel numbers to be determined within the model based on economic conditions imposed by any policy. Stochastic values for critical biological variables may be drawn from pre-specified distributions which conform to existing information by the use of random generators available in GBFSM. By repeating the process of drawing values from the distribution for each critical variable and calculating landings, the

closure can be accessed under all possible future environmental conditions. Probability distributions before and after the closure can be compared for significant differences.

An optimization model for decision makers in the shrimp industry is being constructed. The model includes an objective function and equations of motions which consist of biological and economic parts. The biological part is a system of stochastic difference equations which describe the shrimp dynamics patterns in the Gulf of Mexico.

Particular attention is given to updating the shrimp biomass estimate in any point of time. The economic variables' values will be provided by vector autoregression (VAR). The final part includes an economic analysis of the models' results for suggested policy.

An import model was developed to estimate the impact of shrimp imports on the U.S. shrimp industry. Regression analysis was used to estimate supply and demand equations. These equations were then formulated into a simulation model that could address such questions as import restrictions and tariffs.

STATEMENT OF INTEREST AND INVOLVEMENT

Charles M. Adams and Fred J. Prochaska

Assistant Professor/Extension Marine Economist,
Florida Sea Grant, Cooperative Extension Service
and Professor, respectively, Food and Resource
Economics Dept., Institute of Food and Agricultural
Sciences, Univ. of Florida, Gainesville, Florida

The Food and Resource Economics Department and the Florida Sea Grant Program at the University of Florida have been and are currently involved in several individual research efforts oriented toward addressing economic problems which exist in the domestic shrimp industry. These efforts are likely to continue with additional funding of the current Sea Grant economics project at the University of Florida.

A number of reports and publications concerning the domestic shrimp industry have emerged from this on-going research effort. The most recent pertinent research includes...

(1) An M.S. thesis entitled "World Shrimp Production and Implications for the United States Import Market" was completed which provided an economic overview of world shrimp production and the implications for the U.S. shrimp market. Trends in world shrimp production from wild stocks by country were documented. In addition, current and anticipated development in shrimp mariculture production was assessed. The domestic impact of implementing restrictive trade policies by the U.S. was modeled and analyzed in terms of exvessel prices, fleet size, scale of processing operations, and consumer demand.

(2) A Ph.D. dissertation is in progress which will describe the structure, conduct, and performance of the shrimp processing industry in the Southeast region. This study will utilize data collected by

the National Marine Fisheries Service Southeast Center in Miami. The research will focus on the movement of processing firms in and out of the industry. In addition, the movement of individual firms in and out of the market for specific product forms of shrimp is to be addressed. Market channels for shrimp products in the Southeast region will also be examined.

(3) An econometric model was developed which further described the impact on the domestic shrimp market of implementing restrictive trade policies such as tariffs and quotas by the U.S. A simultaneous model was estimated which consisted of expressions representing import demand, import supply, exchange rates, and a market clearing equilibrium. In addition, an exvessel price model and a fleet entry-exit model were estimated to further complete the analysis. The models were flexible enough to be used to address the issue of increased levels of imported mariculture product. The models in general were used to address the incidence of implementing tariffs and quotas as a means of controlling future imports of shrimp products, a large portion of which is expected to be composed of mariculture product. A major finding was that although tariffs would reduce imports, the increase in exvessel prices received by domestic producers would be nominal while price increases faced by U.S. importers would be substantial. Quotas would be necessary for sizeable reductions in imports.

(4) A Ph.D. dissertation was recently completed which was entitled "The Price Dynamics of the U.S. Shrimp Market". This study examined the causal direction of price movement between market levels in the domestic market on a monthly and quarterly basis. The major determinants of exvessel, wholesale, and retail price for two distinct size classes

of raw-headless shrimp were identified. Expressions for margins between market levels were developed. Price movements between market levels appear to be recursive on a monthly basis but simultaneous on a quarterly basis. Changes in factors which determine market prices have a larger impact on smaller rather than larger size classes of shrimp. The model developed can be used to assess the price impacts of expanded trade or the implementation of restrictive trade or domestic closure policies on market level and size class bases.

Research concerning the domestic shrimp industry is complemented by additional research regarding the Florida oyster industry, aquacultural development, small-scale commercial fishing industries, development of the raw tuna industry in Florida, and others.

CONCLUSIONS AND IMMEDIATE RESEARCH RECOMMENDATIONS

The workshop succeeded in providing a listing of research needs for each of the major discussion topics. To this end, the workshop generated an assessment of the views and concerns of the participating marine economists regarding issues recognized to be of regional importance in the Gulf and South Atlantic shrimp industry.

The participants recommended the continued support of the development and refinement of empirical mathematical models which describe economic relationships existing in the domestic shrimp industry on a local and regional basis. An issue expressed to be of immediate concern was to take an inventory of existing models that have been recently developed for the various segments of the domestic shrimp industry and identify how successfully these models have addressed management and development questions. The participants also supported the need for initiating research regarding the potential impact that seafood-based analog products may have on the domestic shrimp industry. The majority of the impact which may arise from substitution was suggested to be presently associated with the crabmeat market. However, the lack of current data by which to address many basic research questions was stressed as an overriding concern. The workshop participants expressed the immediate need to begin developing the data base necessary to address future research questions that may develop. Problematic issues suggested to be less constrained by data and to be of more basic and immediate concern were (1) to examine the impact that surimi products have already had on the crabmeat market and (2) identify the domestic and international market forces that may have an effect on the availability and acceptance of seafood-based analogs in general. Finally, participants provided

guidelines regarding research on the impact which arise from current and increased levels of imported maricultured shrimp products. Any future increases in the level of shrimp imports will most likely come from increased supplies of maricultured shrimp products. A major area of inquiry concerns the potential impacts on a size class basis. However, the current lack of data which delineates imported maricultured product in general and on a size class basis places severe restrictions on the number and scope of research questions which can be addressed. Emphasis was placed on the immediate need to correct these data restrictions.

The shrimp industry is the most valuable component at dockside of the commercial fishing industry in the nation and, more specifically, the Gulf and South Atlantic region. Therefore, the potential for developing regionally cooperative research efforts regarding the workshop topics was discussed. Such an approach may be particularly timely given recent National Sea Grant Office support toward the notion of establishing the framework for a regional multi-institutional Sea Grant research program, which could be coordinated with NMFS and the industry. The development of a regional research proposal with participants each taking responsibility for certain objectives was found to be a viable option. The possibility of having a follow-up meeting to discuss a regional approach and establish firm research priorities was suggested.

PARTICIPANTS

NAME	AFFILIATION AND ADDRESS
WADE L. GRIFFIN	Dept. of Agricultural Economics Texas A & M University College Station, Texas 77843 (409) 845-4291
KEN ROBERTS	Knapp Hall Center for Wetland Resources Louisiana State University Baton Rouge, Louisiana 70803 (504) 388-2145
PERRY PAWLYK	Knapp Hall Center for Wetland Resources Louisiana State University Baton Rouge, Louisiana 70803 (504) 388-2145
WALTER R. KEITHLY	Center for Wetland Resources Louisiana State University Baton Rouge, Louisiana 70803 (504) 388-2439
FRED PROCHASKA	Food and Resource Economics Dept. 1170 McCarty Hall University of Florida Gainesville, Florida 32611 (904) 392-5054
CHUCK ADAMS	Food and Resource Economics Dept. 1170 McCarty Hall University of Florida Gainesville, Florida 32611 (904) 392-5054
ROBERT POMEROY	209 Barre Hall Dept. of Agri. Econ. & Rural Sociology Clemson University Clemson, S.C. 29631 (803) 656-3374

FRED LYDA

Room 34, Ecology Bldg.
University of Georgia
Athens, Georgia 30602
(404) 542-7671

J.E. EASLEY, JR.

Dept. of Economics and Business
North Carolina State University
Raleigh, North Carolina 27695-8110
(919) 737-2885

JEFF CUNNINGHAM

National Marine Fisheries Service
9450 Koger Blvd.
St. Petersburg, Florida
(813) 893-3830

JON VONDRUSKA

National Marine Fisheries Service
9450 Koger Blvd.
St. Petersburg, Florida 33702
(813) 893-3830

RICHARD RAULERSON

National Marine Fisheries Service
Fisheries Development + Analysis Branch
9450 Koger Blvd.
St. Petersburg, Florida 33702
(813) 893-3830

DOUG LIPTON

National Marine Fisheries Service
NOAA U.S. Dept. of Commerce
Washington, D.C. 20235
(202) 624-7261

LEE ANDERSON

College of Marine Sciences
University of Delaware
Newark, Delaware 19711
(302) 645-4252

JOHN POFFENBERGER

National Marine Fisheries Service
Southeast Fisheries Center
75 Virginia Beach Drive
Miami, Florida   33149
(405) 361-4261

RAY RHODES

South Carolina Marine Resource Center
P.O. Box 12559
Charleston, South Carolina   29412
(803) 795-6350

P.J. HOOKER

Gulf of Mexico Fishery Management Council
The Lincoln Center, Suite 881
5401 West Kennedy Blvd.
Tampa, Florida   33069
(813) 228-2815

JIM WATERS

NMFS, Beaufort Lab
Pivers Island
P.O. Box 570
Beaufort, North Carolina   28516
(919) 728-4595

JACK GREENFIELD

Assistant Regional Director
Fisheries Development Division, NMFS
Duval Bldg.
9450 Koger Blvd.
St. Petersburg, Florida   33702
(813) 893-3271

DON SWEAT

Marine Extension Agent
12175 125th Street, North
Largo, Florida   33544
(813) 586-5477