through the cooperative effort of the University of Miami Marine Laboratory, the Fish and Wildlife Service of the Department of the Interior, and the Florida State Board of Conservation. These data clearly have broad utility as basic information for analysis by the economist, the ecologist, the engineer, and others. For example, we have taken these data and analyzed the catch by month, by area, by species as a means of seeing how these elements may influence sales, employment, operating costs, and related factors in local areas. A review of these data quickly shows a number of things that are significant to an economic appraisal of some of the effects of the seasonal variation in catch. The removal of menhaden, the principal non-food variety, from the volume figures on total catch completely changes the dominant features of the seasonal catch variation. On the other hand, when volume figures are converted into dollar returns to fishermen the picture of variation is again modified. These conditions of variation have significance to an analysis of the local, the county, and the state-wide marketing of sea foods. As we examine the costs in local areas and by counties, we will uncover cost differences and similarities that may form the basis for either or both individual and group action.

We also plan to explore certain aspects of both the cost and the marketing feasibility of freezing and storing. It is appropriate to examine carefully any economic limitations to doing in Florida what is being done in other parts of the country. Such data as are available on sales patterns, marketing practices, consumer preference, per capita consumption of sea foods, and other relevant data will be utilized.

In the analysis of prices we will examine the relationships between the prices paid to the fisherman, the initial wholesaler, the city wholesaler, and the retailer. Our preliminary inquiries to obtain data have not been too fruitful, but we feel that enough is available to engage at least in a pilot study analysis. The types of questions that arise here are: What are the seasonal characteristics of prices? How do these compare with competitive sea-food and non-sea-food products? (The price relationships in certain markets of processed fish, frozen fish, and fresh fish are a part of this question.) How does geographical location and accessibility of sea foods from different geographical locations influence prices? A first step in the more effective marketing of Florida sea foods could possibly be taken within the state itself, and thus we will give some attention to marketing practices within Florida.

Survey of Household Consumer Preferences for Fish and Shellfish with Particular Emphasis on the Southern Region

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A year ago the Economics and Cooperative Marketing Section of the Branch of Commercial Fisheries began working on the form of a questionnaire to be used in a national survey of United States households for the purpose of determining their fish and shellfish preferences. We were joined in this work

by experts from the firm of Alfred Politz Research, Inc., marketing research specialists, with whom the Fish and Wildlife Service had contracted to do the field work on this survey. Upon completion of the questionnaire in late September 1951, blank copies were distributed to over one hundred interviewers on the field staff of the research firm. In October, 1951, persons in over two thousand households all over the United States, both in rural and urban areas, were asked to supply information in detail about their fish and shellfish preferences. Since the work was confined to households no consideration is given in this study to fish and shellfish consumption preferences of the relatively smaller consumption groups such as restaurants, institutions, etc.

This paper describes some of the results of the survey which are particularly applicable to the South. There are two principal aspects in which the detail can be presented. The first is concerned with how consumers in the South answered the questions which were asked in the survey. The second principal aspect has to do with providing information concerning the replies of consumers in all areas to southern fish producers to aid them in marketing their products throughout the United States.

Before presenting the results of the survey a short discussion is in order on the statistical methods used, in order that the results could be considered to reflect the thinking of *all* the nation's households. The persons questioned were mostly housewives who were selected on an area-sampling basis. A stratified random sample was used, with 2473 households out of the nation's forty odd millions constituting the sample. In the sample every household in the United States had an equal chance of being selected, after a few special control factors had been exercised. These control factors were fixed limits, based on census or other available data, on the number of households in each area, the number of persons engaged in agriculture, the percent of homes with mechanical refrigeration, and the percent of women in the labor force. The sample with respect to these criteria, is in exact proportion with census or other universal data for these items already available. As a result, the replies from the 2473 households which contributed interviews can be used as being representative of the whole United States allowing a narrow margin of error.

This technique of sampling on a probability basis proved to be remarkably accurate in this survey. Initially there was doubt whether taking only 24 to 26 hundred households out of the 40 odd million households in the United States would provide a basis for estimating the fish and shellfish preferences of all those households. Several means were employed of checking the data from the survey when it came in from the field, and some interesting results were found.

1. The percentage of farm households in the sample is about the same as in the census records.
2. The numbers of households with different religions are in the same proportions as in the World Almanac.
3. The percentages of households belonging to different races are in close proportion to census records.
4. The species which were indicated as being used by the respondents correspond to the proportions in the production records of the Fish and Wildlife Service.
5. The proportion of purchases in super markets is in agreement with distribution data available from marketing research sources.

These facts provide confidence in the statistical data obtained, in spite of the small number of households which was used as the sample.

Some of the more interesting results of the survey with respect to household consumers in the South (geographical boundaries of which are shown in Figure 1.), may now be presented. The great majority of such households do not have a special day of the week on which to serve fresh or frozen fish or shellfish. This was found to be true generally throughout the nation but particularly so in the South. Furthermore there is not a marked preference for seasons in which to serve these products.

REGIONAL BOUNDARIES FOR REGIONS COVERED IN SURVEY

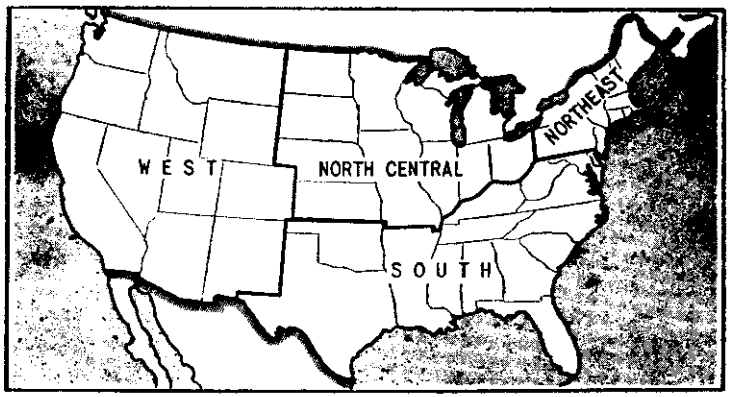

Fig. 1

Canned salmon and mackerel are two of the canned fish items which are used in relatively large volume in the South. Canned tuna is not used as much as in other areas of the country. Ocean perch is the main item of frozen fish consumption, fresh-water species are the main items of fresh fish consumption. For fresh, frozen, and canned shellfish, shrimp is the leading species.

The reader interested in more detail about preferences of southern consumers or in particulars about other sections of the country, should obtain Fishery Leaflets 407 & 408 which are Parts 1 & 2 of "Fish and Shellfish Preferences of Household Consumers."

Information from this study can be of benefit to Southern fish producers, by aiding them in marketing their products throughout all regions of the United States. An inspection of Table 1 will give the pattern of use for various types of fishery products found regionally and nationally in the study. Fish products of all types were used much more than shellfish products. The relatively smaller production of the latter is one reason for this. Of course it should be noted that a potential market for more shellfish exists if increased

TABLE 1

HOUSEHOLDS CONSUMING FISHERY PRODUCTS OCT. 1950-SEPT. 1951: BY REGIONS AND TYPE OF PRODUCT

ITEM	NORTH-EAST	NORTH CENTRAL	SOUTH	WEST	U.S.
			Percent		
FISH:					
Fresh	76.4	62.7	71.0	71.1	70.0
Frozen	51.8	62.2	42.9	51.9	52.2
Canned	79.4	79.9	71.5	83.2	77.7
Cured	29.1	21.0	9.9	23.3	20.3
SHELLFISH:					
Fresh	35.5	18.4	24.7	27.6	26.2
Frozen	19.4	22.7	14.3	23.6	19.4
Canned	29.8	17.2	10.8	29.8	20.4

SOURCE: *Fish and Shellfish Prefereences of Household Consumers—1951, Part II—Regional Summary*, Fishery Leaflet 408, Fish and Wildlife Service.

production can be obtained. Many households are not consumers of any type of shellfish products.

Other information to be drawn from Table 1 includes the fact that all types of fish and shellfish products, excepting fresh fish, are consumed in less-than-average quantities in the South. Fresh fish is desired by more households in this area than the national average. It is interesting to note that if the cost of serving fresh fish was the same as the cost of frozen fish, most households in this area (as in the entire nation) would prefer to serve fresh fish. The compartively low consumption of canned fish in the South poses some interesting questions and warrants scrutiny by the fishing industry to determine if price, type of product, type of pack or other factors are involved in this situation.

Shrimp, the fishery product of greatest value produced in the South, was the item used most by those households using fresh, frozen, and canned shellfish. This species is consumed in all regions of the country. (Table 2). However, in the Northeast region it will be observed that the use of fresh and frozen shrimp is lower than the average for the nation as a whole. In this area shrimp competes with scallops and lobsters, which are locally produced, for its share of consumer expenditures for shellfish. Any proposed market expansion on the part of the shrimp industry should note this situation.

With respect to fish, it should be noted from Table 2 that southern varieties do not sell well outside southern regions to any great exent. Mullet is consumed predominantly in the South. This also holds true for sea trout, red snappers and croakers, as well as for frozen fish.

Consumers had definite opinions as to why they preferred certain seafoods. For fresh seafoods taste was the dominant factor, while for frozen products ease of preparation was the principal reason cited, for preference.

The survey showed that most people can get the kind of fresh and frozen fish and shellfish they want. The super market is the principal source of fishery products. The distribution system for these fishery products as presently constituted seems to operate effectively, although it may be that inertia and close familiarity with the present distribution system are the reasons for this.

TABLE 2

HOUSEHOLDS CONSUMING SOUTH ATLANTIC AND GULF FISHERY PRODUCTS, OCT. 1950-SEPT. 1951: BY REGIONS AND PRODUCTS

ITEM	UNIT	NORTH-EAST	NORTH CENTRAL	SOUTH	WEST	U.S.
Households using:						
Fresh fish	No.	523	459	521	229	1732
Mullet	%	. . .	.7	13.8	. . .	4.3
Sea trout	%	2.5	.4	4.6	1.3	2.4
Red snapper	%	.2	.7	6.0	2.2	2.3
Croaker	%	.4	. . .	4.0	. . .	1.4
Frozen fish*	No.	355	855	315	167	1292
Mullet	%	. . .	.2	1.3	. . .	.4
Red snapper	%	.3	. . .	1.3	. . .	.4
Fresh shellfish*	No.	243	135	181	89	648
Shrimp	%	43.6	60.0	60.8	44.9	52.0
Oysters	%	12.3	31.1	21.5	10.1	18.5
Crabmeat	%	13.6	3.7	23.2	31.5	16.6
Frozen shellfish*	No.	133	166	105	76	480
Shrimp	%	54.1	83.1	77.1	76.3	72.0
Crabmeat	%	12.8	4.2	16.2	10.5	10.2
Oysters	%	2.3	10.8	2.9	3.9	5.6
Canned Shellfish*	No.	204	126	79	96	505
Shrimp	%	47.5	54.0	38.0	56.3	49.3
Crabmeat	%	40.7	17.5	34.2	40.6	33.8
Oysters	%	2.0	8.7	20.3	12.5	8.5

*Includes varieties from all regions.

SOURCE: *Fish and Shellfish Prefereences of Household Consumers—1951, Part II—Regional Summary,* Fishery Leaflet 408, Fish and Wildlife Service.

Regardless of this, the present distribution system should constantly be subjected to improvement.

The major concern of this survey was to study the marketing of fresh and frozen fish, particularly groundfish fillets. As a result, in some parts of the study information was obtained only with respect to fresh fish, frozen fish, or both together. However, the information is of such a nature that it may be applied to the marketing of shellfish as well. This is particularly true for the questions on packaging.

Most people prefer a one-pound package and desire a long and flat shape. Apparently packages contain sufficient information on their wrappers to satisfy consumers. This includes the weight of the contents, whether it is raw or cooked, and the kind and cut of the product enclosed. Householders were not as definite in their opinions with respect to information on packages about recipes and the nutritive value of the contents but there is an indication that more information might be shown. It is worthy of note that in the South and North Central regions, where the relative use of all fish and shellfish is lower, most families fry fish or shellfish. In the other two areas where consumption is relatively greater, more baking, broiling, and boiling are done.

Efforts to introduce more diverse cooking methods, through recipes or other means, might aid in raising the level of fish and shellfish consumption in the South and North Central areas.

In indicating their preference for wrapping materials, more householders liked cellophane because they can see the product. For many people of course, a cello wrapped product is the only type available.

Information was also obtained with respect to the purchase of frozen fish or shellfish by mail order. There is a relatively small business of this type, conducted predominantly in the North Central Region of the United States. From the replies to the questionnaire, it is evident that this type of business operates satisfactorily in that area. However, there was no evidence of any great desire for the extension of it to other areas of the country.

These results are the major ones of interest to Southern producers and distributors which have been obtained in analysis to date. The returns will be subjected to further analysis, particularly with respect to differences in preferences between the rural and urban households and households with different levels of income. Additional detailed information is also expected to be obtained with respect to packaging.

What Determines Fish Prices ?: An Approach to the Problem

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There are many factors which influence the prices of foods. While numerous studies of such factors as they relate to prices of agricultural commodities have been made, scientific approach to these economic phenomena as they pertain to fishery products is largely a virgin field[1]. This paper presents the results of preliminary studies of the effects of certain economic factors on prices of certain fishery products.

In considering this subject investigation was made of the inter-relationship of the volume of landings of ocean perch (rosefish) at Gloucester, Massachusetts, and the prices received by the fishermen at that port. A tabulation was made of the landings and corresponding prices received by fishermen at the ex-vessel level for each day during the 1948 calendar year (Table 1). An examination of these figures indicates that there is no significant correlation between the daily landings and the prices received by fishermen. It might be expected that changes in the volume of daily landings would be reflected in some lead or lag in price changes, but no evidence of such a pattern is discernible. There is similarly a lack of evidence of any correlation between the total landings and prices of ocean perch in 1948 during one week of each month (Table 2).

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1 Of previous studies in this field may be mentioned Eunice M. Werner, "A Comparison of Controlled and Uncontrolled Fish Prices in New York City", Fisheries Market News, Vol. 6 No. 10; William C. Herrington, "Imported Fish: A Major New England Problem", Commercial Fisheries Review, Vol. 8, No. 2; and Harden F. Taylor, "Survey of Marine Fisheries of North Carolina", The University of North Carolina Press, 1951.