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REGIONAL AND OTHER RELATED ASPECTS OF SHELLFISH CONSUMPTION

Some Preliminary Findings From the 1969 Consumer Panel Survey

Circular 361

UNITED STATES DEPARTMENT OF COMMERCE
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Regional and Other Related Aspects of Shellfish Consumption -- Some Preliminary Findings From the 1969 Consumer Panel Survey

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ABSTRACT

A consumer survey panel, consisting of representative households throughout the United States, recorded their fishery product purchases for a 12-month period, beginning in February 1969. They were participants in a study conducted under the aegis of the National Marine Fisheries Service, Division of Economic Research. This paper deals mainly with study findings respecting the consumption of major species of shellfish, at home and away from home.

Findings of the study indicate marked regional preferences for individual shellfish items. For example, oysters are consumed in South Atlantic States at nearly double the national per capita rate. Similarly, clams enjoy a high rate of consumption in Middle Atlantic and New England areas. All of which suggests an important correlation between consumption and tradition as well as a persistent tendency for seafood varieties, particularly those consumed in a "fresh" form, to be consumed in the area of catch.

The study also indicated an association between high income households and shellfish consumption, with oysters a single notable exception. Age of consumer, too, has an apparent bearing on shellfish consumption as it was found that older consumers are the more disposed toward consumption of these products.

With respect to consumption away from home, it appears that half or more of the crabs and lobsters are consumed in meals outside the home, but the majority consumed of other products was at home.

INTRODUCTION

This paper reviews several key areas of information yielded in an extensive survey of consumer purchases of fishery products during 1969. The survey was conducted under the auspices of the National Marine Fisheries Service and represents a major effort by Service economists to resolve, at least partially, previously unanswered questions regarding the consumption of fish and shellfish. The results of the survey can be developed into useful guidelines for industry decisions, especially in marketing. Also the results can greatly enhance the accuracy of forecasting future economic events in the fishing industry.

It is difficult to overstate the importance of building on our knowledge of consumer behavior. Consumers in a market economy are

the inevitable arbiters of what and how much will be produced. Meticulous production schedules and faultless distribution mechanics can become expensive exercises in the face of consumer aloofness. In Marshallian terms, the consumer is the regulator of all demands, his yeas and nays expressed convincingly in his mode of allocating limited funds.

Marketing problems represent, in large part, an encounter with "consumerism," i.e. the decision-making process undertaken by consumers in their acts of purchasing. Consumer actions (or reactions) characteristically defy prediction, however, and render the best of marketing strategies uncertain. New products introduced by food companies, for example, have less than a one in four chance of success. Nonetheless there are discernible patterns in consumer behavior. Studies have established reasonable inferences that prices, size of income, ethnic origin, age, and other demographic variables influence consumption of food products. The present survey was designed to test the applicability of these inferences to fish product consumption.

The survey's approach was direct. Members of a representative consumer panel, consisting of 1,500 households throughout the United States, logged the details of their fish product purchases for a 12-month period, February 1969 to January 1970. Essential characteristics of each household were known — income, ages, etc. — making it possible to arrange the data for intergroup comparisons and for examination for evidence of relationships between various demographic characteristics and fish consumption. The Service recognizes that knowledge of these relationships is a prerequisite to the formulation of successful marketing strategies and accurate forecasting.

SCOPE OF THE ANALYSIS

The focus of this paper is on certain characteristics of shellfish consumption. Major shellfish species are covered in the analysis as well as other seafood varieties where comparisons are relevant. Five aspects of consumption are examined: (1) geographic concentration and distribution patterns, (2) seasonality factors, (3) comparisons between volumes consumed at home and away from home, (4) relationships between size of income and volume consumed, and (5) effects of age on consumer preferences.

The analysis touches only highlights of the survey. Nonetheless, these reveal several important characteristics of fishery product consumption in the United States. These are discussed under the five above-noted topic headings.

GEOGRAPHIC CONCENTRATION AND DISTRIBUTION PATTERNS[1]

The survey revealed marked regional differences in apparent consumer preferences for fishery products. Shellfish varieties, for example, are highly popular in New England where per capita at-home consumption is more than double the U.S. average. The per capita rate of finfish consumption in New England, however, is not much above the national average (Appendix 2). In the West South Central States the reverse is true. While the area's per capita rate of finfish consumption tops the national average by 75%, the shellfish consumption rate is below average. The picture in the North Central States is again different. There, per capita consumption of both fish and shellfish are well below national averages.

The above examples are indicative of the regional contrasts in aggregate fish and shellfish consumption in the United States. These contrasts are illustrated in Figures 1, 2, and 3, which relate consumption to regional popula-

[1] See Appendix 1 for geographic divisions.

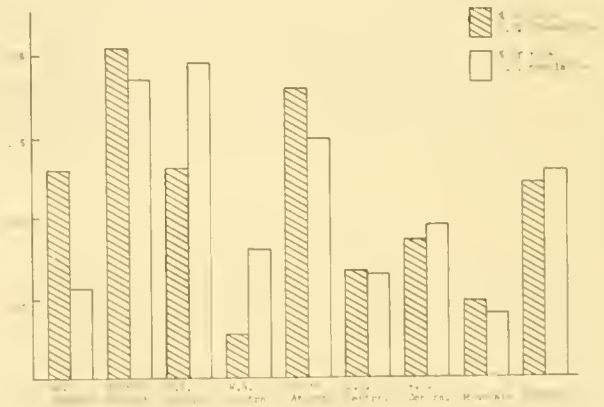


Figure 1.—Regional distribution of total shellfish consumption (at home) and population, 1969. Source: Appendix 2.

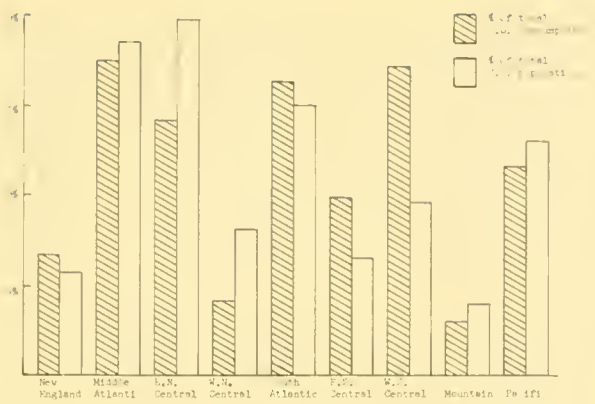


Figure 2.—Regional distribution of total finfish consumption (at home) and population, 1969. Source: Appendix 2.

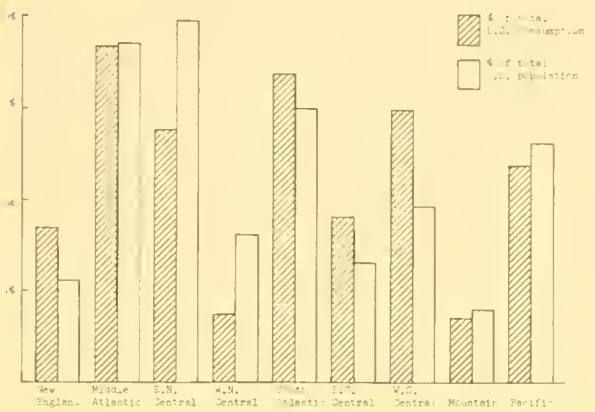


Figure 3.—Distribution of total shellfish and finfish consumption (at home) and population, 1969. Source: Appendix 2.

tion. (Where the bars indicate a higher percentage of consumption than of population, per capita consumption would be above the national average and vice versa.) A clearer picture of regional consumption patterns, however, is provided in similar examinations of individual species, which are discussed below.

Oysters

The survey found oysters to be heavily favored in Southern States, particularly the South Atlantic area which stretches from Maryland south, along the Atlantic Coast (Figure 4). The South Atlantic region ranks fourth in population, but is the leader in at-home oyster consumption with 29% of the total. Per capita consumption of oysters in the South Atlantic

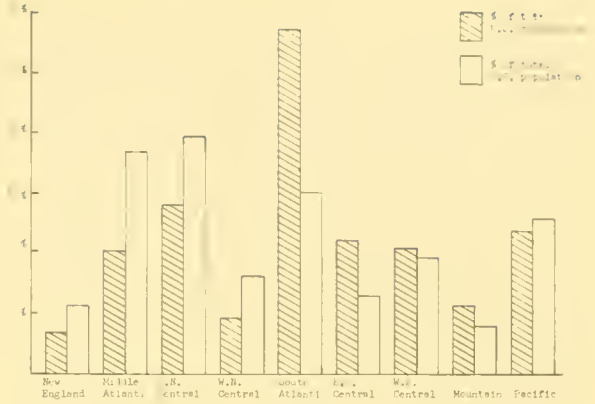


Figure 4.—Regional distribution of oyster consumption (at home) and population, 1969. Source: Appendix 2.

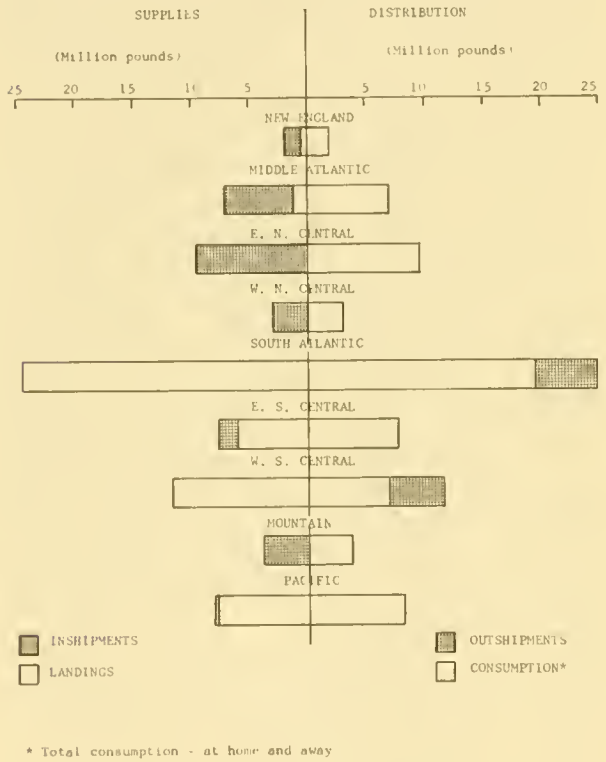
is nearly double the national average. The South Central and Mountain States comprise the only other regions that exceed national averages in per capita oyster consumption.

In total oyster consumption, the populous East North Central region ranked second in the survey. The area, which encompasses just under 20% of the U.S. population, consumed 14% of the oyster total during the survey period. Pacific States ranked third in total oyster consumption, just as they do in population. Results from the Middle Atlantic States were somewhat surprising. The area ranks a close second in population and accounts for 18.5% of the Nation's total. In oyster consumption, however, the area's rank appears to be fifth among the nine U.S. regions. Middle Atlantic residents consumed 10.2% of the total measured in the survey, which puts their per capita consumption of oysters only slightly above half the U.S. average.

The regional pattern of oyster consumption shows that, generally, areas with the highest rates of per capita consumption are also the major oyster producing areas. In aggregate, these areas account for over 60% of the total oysters consumed at home. Moreover, these areas consume about 84% of their total production. This pattern likely has evolved from a combination of cultural and technological influences. Tradition obviously is an important factor in the high localized rates of oyster consumption. Technological factors, however, may be even more important. Oysters are preferred in a "fresh" form, but their perishability re-

duces incentive to market output at distant points. Aside from the high risk of spoilage, producers and distributors in many instances face the obstacle of being inaccessible to dependable shipping channels.

Oysters, are, nonetheless, consumed in all regions in the United States. As noted in Figure 5, only two regions — the South Atlantic and West South Central — are completely self-sufficient in the product. The surplus from these regions thus moves in trade to the several other regions which rely on inshipments of oysters to satisfy demand. The shaded areas of the left scale of Figure 5 denote the quantity of inshipments, by region, including foreign imports, and the unshaded areas indicate the quantity produced within the region. On the right-hand scale of Figure 5, shaded areas in-



* Total consumption - at home and away

Figure 5.—Regional supplies and distribution of oysters. Source: Appendix 3.

dicate outshipments of the product within the region; the light areas show regional consumption.

There is, it appears, a national market for oysters. However, regions outside the producing areas consume less than their proportional share of output (based on population) and can be categorized as underdeveloped markets.

The existence of underdeveloped market areas for oysters implies fertile ground for future market expansion, assuming, of course, adequate resource availability. The fact that consumption rates are already high in the producing areas further implies that successful expansion of the industry will be linked closely with the development of the distant markets. The price effects of placing substantially increased supplies in local markets could be disastrously adverse.

It is not unlikely that aggressive marketing development in the underdeveloped market areas would produce advantages under the present scales of oyster production. These markets are in the high income, densely populated regions of the United States, which indicates a potential for marketing large quantities of oysters at prices more favorable than those received in local markets. There are, moreover, additional advantages to the regional economy that would come about through a shift in oyster marketing efforts toward more interregional trade. These include the value of such services as long-haul transportation performed by regional firms in the export activity for the local oyster industry.

Clams

It is apparent that clam markets are highly concentrated in three regions — New England, Middle Atlantic, and Pacific — where, in aggregate, 37% of the U.S. population consumes about 85% of the national total.

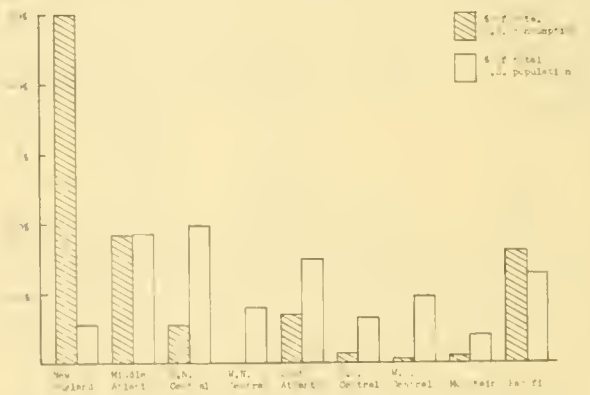


Figure 6.—Regional distribution of clam consumption (at home) and population, 1969. Source: Appendix 2.

Clams exemplify the influence of tradition in fishery product consumption. Per capita consumption of clams in New England, it appears, is close to nine times the national average, and the region accounts for over 50% of clam products (from all species) consumed at home (Figure 6). New England, however, no longer is a leading clam-producing area and must depend on other regions for over 80% of its supplies.

Outside of New England, clam products are consumed chiefly in the Middle Atlantic and Pacific regions. The two account, respectively, for 18% and 16% of U.S. clam consumption, and the per capita rate of consumption in both areas is close to the U.S. average. In all other regions, per capita consumption of clams is less than half the national average.

Unlike the situation for oysters, the major clam-producing areas are net exporters of the product (Figure 7). The Middle Atlantic region accounts for over 75% of the quantity of clams landed in the United States, but 3 out of every 4 lb. landed in the area are shipped to other regions, chiefly for consumption in New England and on the U.S. West Coast. The South Atlantic area ranks behind the Middle Atlantic in clam production and exports over half of what it produces. (Clam production in the South Atlantic is concentrated heavily in the Chesapeake area.)

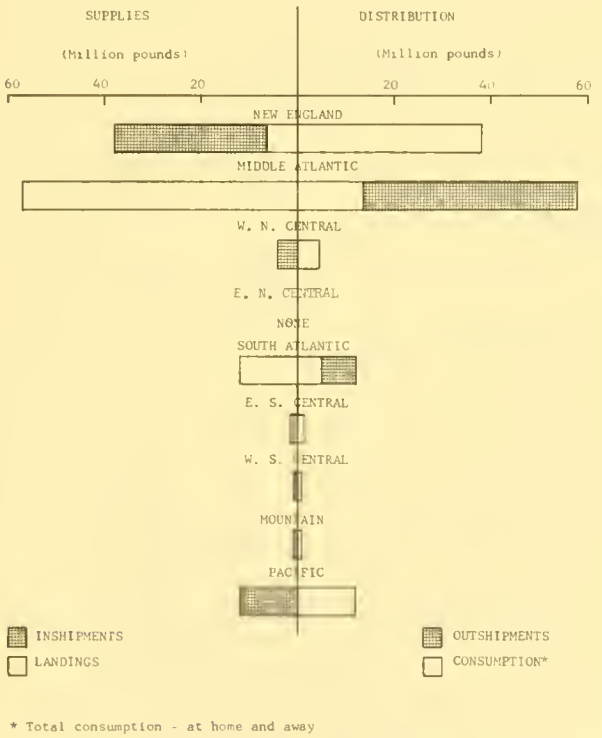


Figure 7.—Regional supplies and distribution of clams. Source: Appendix 4.

The reason why clam consumption is extremely low throughout the central regions of the United States cannot be found in the nature of the product. Over 60% of the clam harvest consists of surf clams that are further processed into frozen or canned products. Thus, there are few preservation or other technical problems that would tend to set geographic market limits. The relatively high rate of consumption on the West Coast bears this out. What is likely reflected here is the limitation with respect to the clam resource. Producers simply have not been confronted with a supply situation that required a broader market base. In any event, if discovery of new resource areas led to substantially heavier catches, there appears to be a high potential for marketing increases in supplies.

Crabs

There is a heavy concentration of crab consumption in the Pacific Coast States. The area accounts for over 40% of crabs consumed at home in the United States, and the per capita rate is better than three times the national average. Consumption in the Pacific States consists chiefly of king and dungeness crabs, which are products of the Northwest Pacific States and Alaska. The indications are that the region consumes over three-fourths of its output of king and dungeness crabs and the remainder goes into interregional trade.

Outside the Pacific region, the volume of crabs consumed is shared almost entirely by six regions, roughly in proportion to area populations; that is, per capita consumption in each approximates the national average. In the two remaining regions, which are the East and West North Central, crabs apparently are not consumed in significant quantity.

The regional distribution of crab consumption (at home) is illustrated in Figure 8, where it is shown that the one-two-three order of total consumption is Pacific, South Atlantic, and

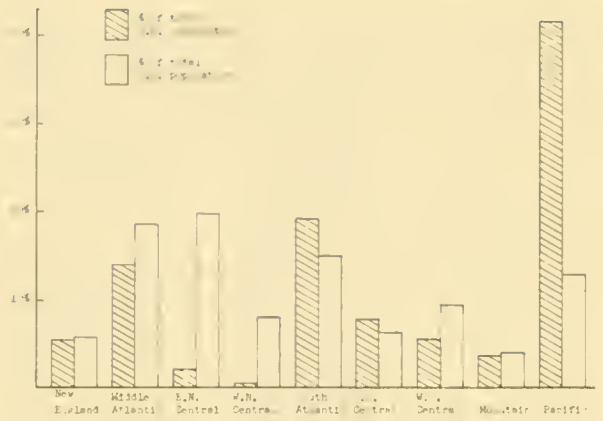


Figure 8.—Regional distribution of crab consumption (at home) and population, 1969. Source: Appendix 2.

Middle Atlantic. The South Atlantic and East South Central regions are the only regions other than the Pacific that account for something more than their proportional shares of crab consumption. The excess is moderate, but does indicate a localized consumption pattern inasmuch as the South Atlantic and East South Central States are major producers of blue crabs. The South Atlantic States apparently consume about 60% of their output, while the East and West South Central States utilize their entire output plus imports from other areas (Figure 9).

The catch of king crabs in 1969 was especially low, which probably accounts for the large proportion of total supplies apparently consumed in the Pacific area. In years of high output, it is not unlikely that larger quantities would be shipped out-of-region. The product is marketed in frozen form and presents few shipping and storage problems. Obviously the local market for the product is attractive to producers. This could mean that interregional trade in Pacific crabs would suffer nearly the full impact of further declines in king crab production.

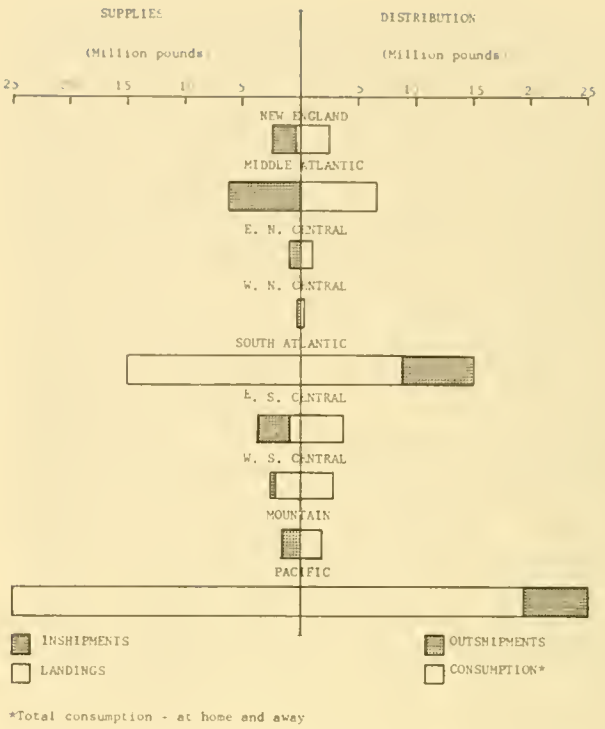


Figure 9.—Regional supplies and distribution of crabs. Source: Appendix 5.

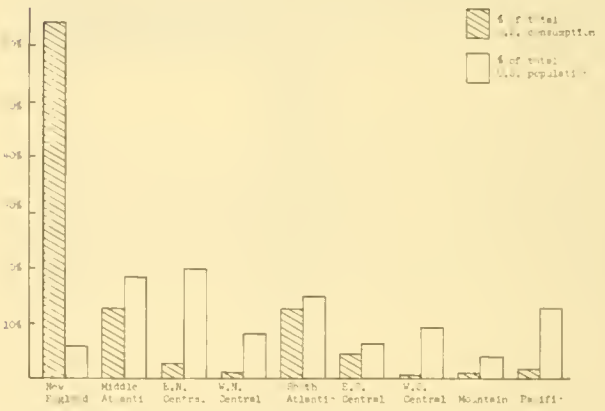


Figure 10.—Regional distribution of lobster consumption (at home) and population, 1969.

Lobsters

New England households, according to the survey, account for nearly two-thirds of lobsters purchased for consumption at home. Most of the remaining one-third of lobster purchases are made in the Middle Atlantic and South Atlantic regions (Figure 10). Consumption in all other regions is insignificant, with the exception of the East South Central area, which accounts for just under 5% of the total. The figures represent fresh lobster and consist chiefly of northern lobster. It is likely, however, that some of the quantity attributed to the southern area States represents local spiny lobster.

New England's predominance in at-home lobster consumption reflects the difficulties and high cost of shipping live lobster from the producing areas. Tradition, of course, insures a strong local market for limited supplies of northern lobster. It should be noted, however, that the survey also revealed that home consumption of lobsters represents only 40% of the total quantity consumed in the United States. Thus, with restaurant consumption taken into account, the regional distribution may not favor the New England area quite so heavily. Nonetheless, the important inference to be drawn from the at-home consumption distribution is that out-of-area retailers are reluctant to assume the risks of marketing live lobsters, which are highly perishable, outside their normal environment. Consequently, in the event that lobster production should be increased, and this is a possibility with deep-sea lobster fishing, improved ways of handling lobsters will be needed to enhance retailers' dispositions toward marketing the product.

Shrimp

Shrimp products, which are marketed mostly in frozen form, have a fairly even distribution among the regions of the United States (Figure 11). With a single exception, no region's

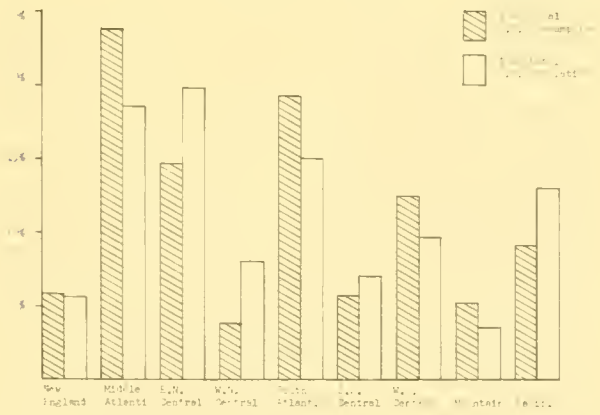


Figure 11.—Regional distribution of shrimp consumption (at home) and population, 1969.

per capita consumption of shrimp eaten at home varies more than 32% from the national average. Four regions are above average in per capita consumption; one is approximately average; and four are below average.

The Middle Atlantic States account for 24% of the total at-home consumption and rank first in this respect. Per capita consumption in the Middle Atlantic States is about 29% above the national average. The South Atlantic States follow in total consumption with 19% of the total, and the East North Central States are third with 15% of the total.

In the South Atlantic States the per capita consumption is about 28% above the U.S. average, whereas in the East North Central States the per capita consumption is 26% below the national average. Shrimp are also consumed in quantity in the West South Central States. In that area, per capita consumption tops the national average by 30%.

Heavy shrimp consumption in the South Atlantic and South Central States is indicative of the tendency for seafood products to be consumed largely in their area of catch. Shrimp, though, lend themselves to preservation and packaging techniques that assure quality maintenance in long-distance shipping. Thus, there is an effective nationwide marketing network for shrimp products. The Mountain area States, for example, have a high per capita rate of consumption, although they are located at relatively long distances from the producing areas.

The universality of shrimp consumption indicates little need for concentrated market development strategies. By the same token, the firmly entrenched competitive position of shrimp throughout the regions of the United States is a factor to be taken into account in the marketing of other seafoods. In any event, the geographic distribution pattern of shrimp consumption illustrates the favorable possibilities for seafoods that are suitably processed and packaged to undergo long-distance distribution.

Scallops

Scallops, like shrimp, adapt well to freezing techniques and can be marketed with consistent quality in distant markets. However, the geographic distribution of at-home consumption indicates a heavy preference for scallops in the New England and Middle Atlantic regions and a low rate of consumption in the Central and

Southern portions of the United States (Figure 12). The New England and Middle Atlantic

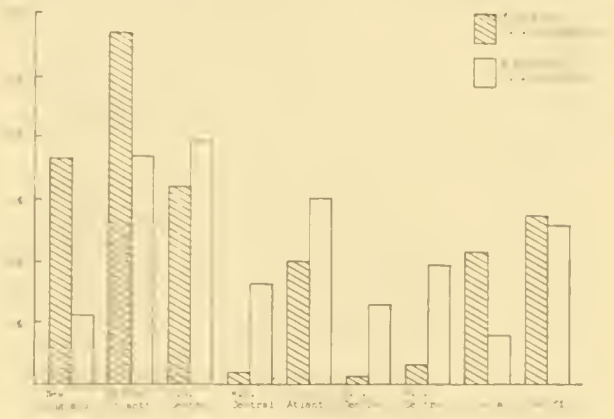


Figure 12.—Regional distribution of scallop consumption (at home) and population, 1969.

States account for nearly half of the scallops consumed at home, but include only about one-fourth of the U.S. population. Consumption in the South Atlantic States is less than proportional to the area's population, and the same is true for the North Central region, although in total quantity consumed, the North Central region ranks in third place behind the Middle Atlantic and New England. The South Central regions (East and West) along with the West North Central area consume less than 3% of total scallops purchased for use at home, although the areas have about one-fourth of the U.S. population.

Most of the U.S. catch of scallops is landed at New England ports, and there is an active local market for what is produced. Local marketings likely consist in large part of fresh (that is not frozen) scallops which have become a traditional favorite in New England. The proximity of the Middle Atlantic States to the major producing areas helps to explain the popularity of scallops in the area.

The easy adaptability of scallops to processing as a frozen product is born out especially by the high rate of consumption in the Mountain area States, where the per capita rate is over two and a half times the U.S. average. Significant quantities of scallops are also consumed in the Pacific area, which ranks fourth in total consumption.

Lobster Tails

Frozen lobster tails, which are mostly foreign imports, are consumed most heavily in the Middle Atlantic region. Per capita consumption of lobster tails in the Middle Atlantic is 1.6 times the U.S. average for at-home consumption, and the area accounts for 29% of the total consumed in the United States. The East North Central States consumed 27% of the U.S. total, and their per capita rate is about 1.4 times the national average. The East South Central region also is a major market for lobster tails and accounts for 16% of the total consumed at home (Figure 13).

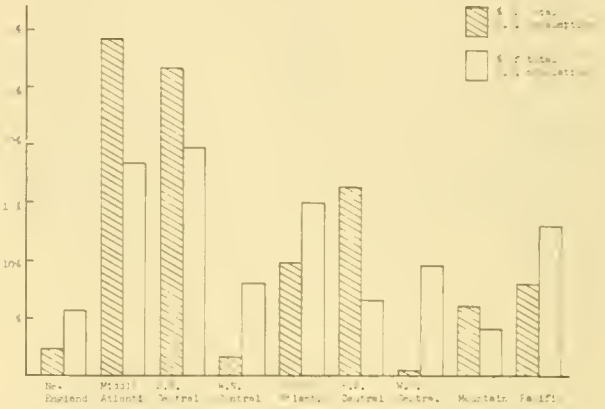


Figure 13.—Regional distribution of lobster tail consumption (at home) and population, 1969.

Not surprisingly, consumption of frozen lobster tails is low in New England, what with the availability of local supplies of northern lobsters. Consumption also is low (almost insignificant) in the West Central States, both North and South. Beyond this belt, however, lobster tail consumption picks up considerably, and in the Mountain areas the per capita rate is 1.5 times the national average. There are also significant quantities consumed in the Pacific States which account for 8% of the U.S. total although the per capita rate in that area is only 61% of the national average.

Recap

To recapitulate some of the findings regarding geographic distribution of fishery product consumption, it is useful to compare regional rankings. These comparisons are shown in

Table 1.—Regional ranking in at-home consumption of fishery products, and in population.

	New England	Middle Atlantic	E. North Central	W. North Central	South Atlantic	E. South Central	W. South Central	Mountain	Pacific
Population	8	2	1	6	3	7	5	9	4
Shrimp	6	1	3	9	2	7	4	8	5
Oysters	9	6	2	8	1	4	5	7	3
Crabs	6	3	8	9	2	4	5	7	1
Lobsters	1	3	5	9	2	4	8	7	6
Lobster tails	7	1	2	8	4	3	9	6	5
Clams	1	2	5	9	4	6	8	7	3
Scallops	2	1	3	8	6	9	7	5	4
Total shellfish[1]	3	1	4	9	2	7	6	8	5
Total finfish	7	1	4	8	3	6	2	9	5
Total finfish and shellfish	7	1	4	8	2	6	3	9	5

[1] Includes varieties not listed.

Table 1, where it can be seen that the Middle Atlantic area, which ranks second in population, is apparently the Nation's leading fish and shellfish market. The area achieved first or second ranking in consumption of four out of seven individual species examined in this analysis, which indicates diversity in tastes. The area's lowest rank — sixth — was in oyster consumption.

The South Atlantic region ranked just behind the Middle Atlantic in fish and shellfish consumption which was consistent with its population rank. Also, the area ranked first or second in four of the seven species examined. Consumption of oysters in the South Atlantic was especially high relative to other regions.

The West South Central region, which ranks fifth in population, ranked third in total fish and shellfish consumption. This ranking was influenced by heavy consumption of finfish, which were not specified in the analysis.

The East North Central region is the Nation's most populous, but ranked only fourth in both finfish and shellfish consumption. The area's rank is especially low in consumption of crabs, lobsters, and clams. However, the area constitutes one of the leading markets for oysters and lobster tails.

The New England area is eighth in population among the nine U.S. regions. Its rank in finfish and shellfish consumption in the survey was seventh. The area consumed more lobsters than any other single region and was second in total scallop consumption, third in total shellfish consumption, but seventh in total consumption of finfish and ninth in oyster consumption.

Among the other four regions, the Pacific ranked highest in overall shellfish and finfish consumption. The area was especially strong in crabs, where it ranked first, and in oysters and clams, ranking third in these categories.

The South Atlantic States ranked fairly high in consumption of oysters and crabs, but were among the lowest in scallops. The West North Central region and the Mountain region ranked at, or near, the bottom in most categories. The Mountain States comprise the least populous region of the United States and actually consume more than their proportional share of seafood products. The West North Central States, however, rank sixth in population, but were ranked eighth or ninth in all categories of consumption covered in the analysis.

SEASONALITY FACTORS

Figures 14 and 15 indicate the seasonal changes in consumption for five leading shellfish species. Not surprisingly, the consumption of oysters closely follows the patterns of the

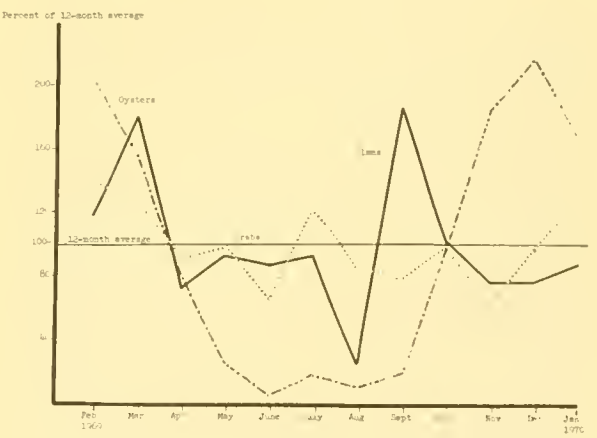


Figure 14.—Monthly index of survey panel consumption of oysters, crabs, and clams.

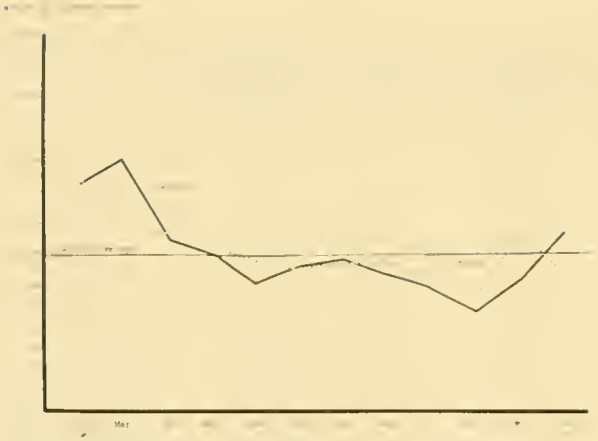


Figure 15.—Monthly index of survey panel consumption of shrimp and scallops.

"R" months, when most of the catch is landed. This reflects the fact that oysters are consumed chiefly in the "fresh" form. Consumption of clams also shows wide seasonal swings, which complement to a degree the changes in oyster consumption. This suggests the probability of substitution between products. For example, consumption of both oysters and clams drops sharply from March to April. At this point clam consumption rises while oyster consumption continues to fall. Clam consumption is steady through the early summer months (although below winter levels), but rises sharply during August. From September onward clam consumption drops as oyster consumption climbs sharply.

Crab consumption varies from month to month, but not to the degree exhibited by oysters and clams. Crab consumption apparently has a summer peak in July and a winter peak in January-February.

Month-to-month variations in both scallop and shrimp consumption appear slight in contrast to the wide seasonal swings in crabs, clams, and oysters. The picture here for scallops and shrimp is a winter peak with a steady tapering off beginning in March and lasting through November. The relatively smooth seasonality of consumption of scallops and shrimp reflects the availability of year-round supplies from both current catch and inventories.

CONSUMPTION AT HOME AND AWAY FROM HOME

The survey covered the question of the quantities of seafood consumed away from home. Although the answers were not as precise as would be desired, they did give some indication of the proportions of fishery products distributed through retail stores and through institutional outlets — restaurants, etc.[2] (Figures 16 and 17).

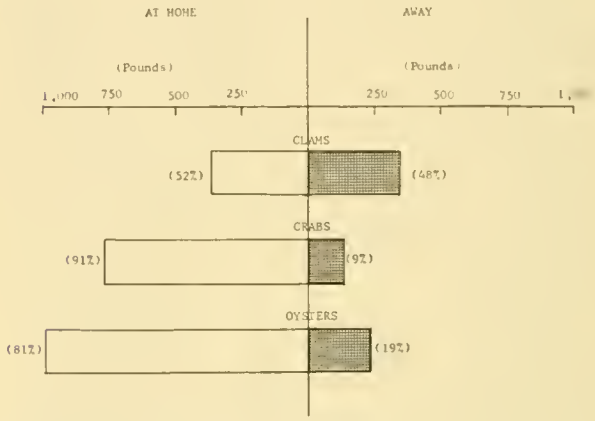


Figure 16.—Consumption at home and away, by survey panel: clams, crabs, and oysters.

Wide variations were found among the species examined in the breakdown between at-home and away-from-home consumption. It appeared, however, that proportionally more shellfish meals are consumed outside the home than finfish. Lobsters and clams, for example, appeared more likely to be consumed away from home than other varieties examined. The survey indicated that 59% of lobster consumption and 48% of clam consumption occur away from home. Consumption of shrimp and oysters outside the home accounts, respectively, for 21% and 19% of the total consumption of each. Fewer crabs proportionally — 9% — are eaten away from home than other species. Among

[2] The question regarding consumption away from home was cast in terms of number of meals. It was thus necessary to transform the number of meals eaten away from home into pounds, which was done by assuming average cooked portions in the neighborhood of 3 oz. This figure was obtained from the U.S. Department of Agriculture study of portion sizes served in institutional outlets (Peterkin and Evans, 1965).

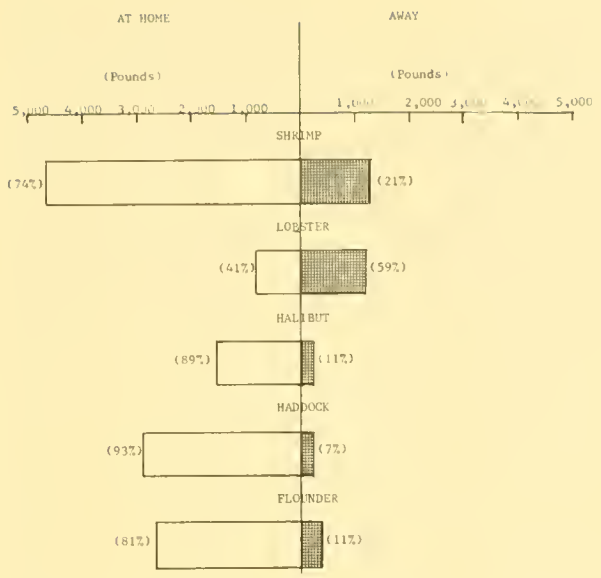


Figure 17.—Consumption at home and away, by survey panel: shrimp, lobster, halibut, haddock, and flounder.

the finfish examined, it was found that the proportion of halibut and flounder consumed away from home was 11% in each case, while 7% of haddock was consumed outside the home.

The above estimates are the result of preliminary considerations of the data in the survey. Further study in this direction is intended. It should be noted, however, that the findings are not inconsistent with the results of a 1965 survey of food consumption conducted by the U.S. Department of Agriculture (LeBovit, 1970). In that survey it was found that, overall, about 20% of fish product consumption occurred away from home. The average from the present survey appears to be slightly lower. Possibly these estimates will evoke surprise from domestic producers of certain seafood products who are accustomed to marketing 40% or more of their output to the institutional trade, which appears to be the case for shrimp and finfish portions. With this in mind, and assuming a fair degree of accuracy in the survey, it would appear that imports are predominant in retail sales. For example, if it is true that about 80% of shrimp are consumed at home and also that 40% of the domestic output of shrimp is distributed through institutions, then 3 out of every 5 lb. of shrimp purchased in retail stores are imports. In any event, the important point is that the larger volume of total distribution of seafood products flows through the retail markets and these outlets warrant attention in mass marketing strategies. Competition from imports in the retail markets is likely to be keener than experienced in the institutional trade.

RELATIONSHIP BETWEEN INCOME AND CONSUMPTION

The survey indicated a clear tendency for households with higher incomes to consume greater quantities of most shellfish products. Consumer panel households in the $10,000 plus income bracket, for example, consumed 38% of the shrimp tallied in the survey although the group comprised only 31% of the total number of households. Similarly, the upper income group consumed well above their proportional share of other shellfish with the exception of oysters (Table 2). Apparently the income-consumption relationship for oysters is the reverse of what was observed for other shellfish. About 48% of oysters were consumed in survey households with incomes under $7,000; this group made up 44% of the total number of households. The deviation exhibited by oysters is likely influenced by the geographic distribution of oyster consumption. As noted previously, oysters are heavily consumed in areas where they are produced. Family incomes in these areas generally are below national averages.

Table 2.—Percent of total U.S. seafood consumption by household income, 1969.

	Household income			
	Under $5,000	$5,000-$6,999	$7,000-$9,999	$10,000 and over
Percent of total survey households	29	15	25	31
Percent of total consumption:				
Shrimp	17	14	31	38
Oysters	32	16	25	27
Crabs	18	14	24	44
Clams	14	4	40	42
Scallops	19	12	32	37
Ocean perch	29	16	30	25
Light tuna	20	15	28	37

Two varieties of finfish were examined — ocean perch (frozen) and tuna (canned). It was found that consumption of ocean perch tapered off in the top income groups whereas

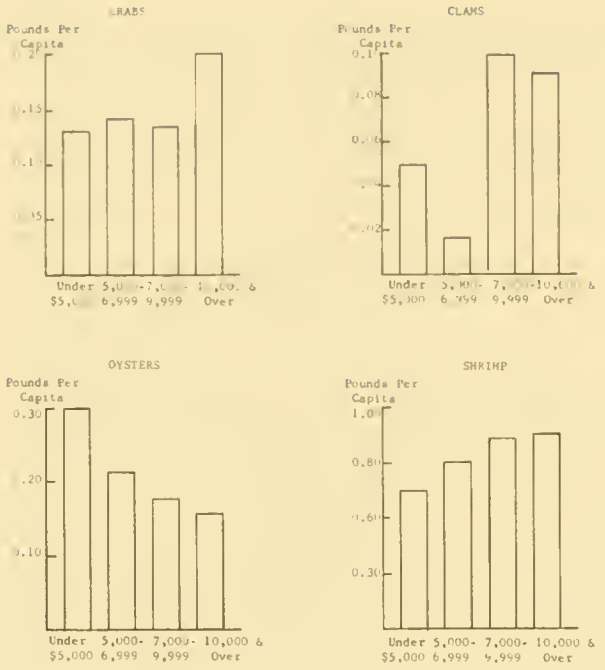


Figure 18.—Per capita consumption by household income group: crabs, clams, oysters, and shrimp. Source: Appendix 9.

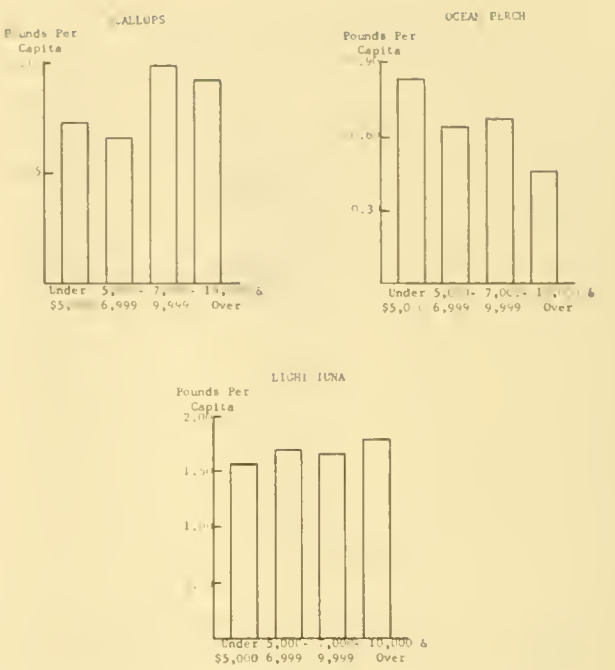


Figure 20.—Per capita consumption by household income group: scallops, ocean perch, and light tuna. Source: Appendix 9.

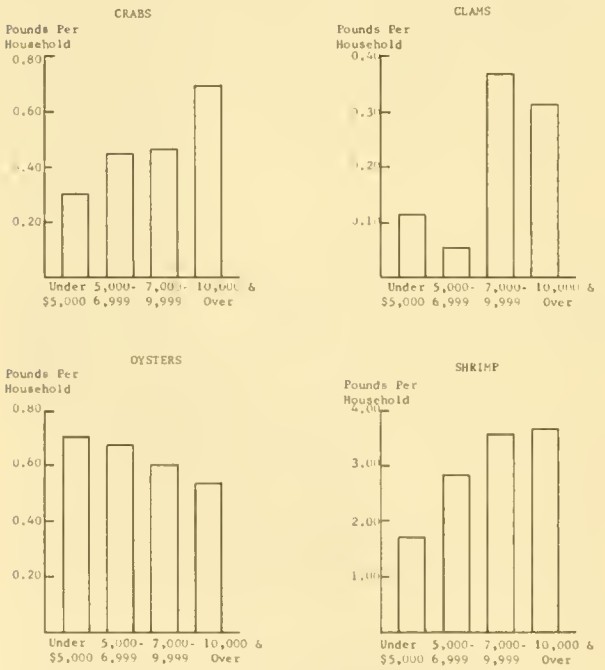


Figure 19.—Consumption per household by household income group: crabs, clams, oysters, and shrimp. Source: Appendix 10.

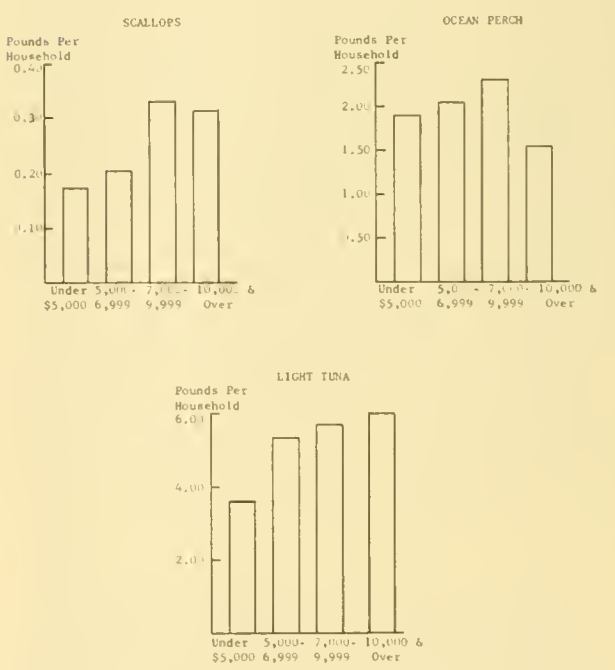


Figure 21.—Consumption per household by household income group: scallops, ocean perch, and light tuna. Source: Appendix 10.

canned tuna consumption showed a tendency to increase with income.

In evaluating the association between income group and consumption, it is necessary to view consumption on a per capita basis as well as per household. Families in the survey tended to be larger in the upper income brackets, and this fact would account, at least in part, for greater consumption. As may be seen in Figures 18 through 21, however, the income-consumption relationships for shellfish products are similar on both household and per capita bases, which supports the contention that higher incomes influence greater consumption of shellfish products. It should be pointed out that the reverse indication for oysters does not necessarily brand this species as a unique exception. Supplies of oysters, it appears, are more available to lower income areas, and technological barriers sustain this situation. Given the experience of other shellfish, there appears little reason to disbelieve that per capita consumption of oysters among higher income groups in urban areas could be increased considerably provided consistent supplies are made available.

Interestingly, the income distribution of canned tuna consumption flattened out when per capita rates were considered. This indicates that income level per se has little influence on demand for tuna.

EFFECTS OF AGE ON CONSUMER PREFERENCE

There were positive indications in the survey that older consumers are the more disposed toward consumption of fishery products. About 50% of households in the United States are headed by persons 45 years and older, yet this group, according to the survey, accounts for 72% of the oyster consumption, 68% of the clam consumption, and 70% of the scallop consumption, to cite several examples. On the other hand, the 28% of U.S. households headed by persons under 35 appear to consume only 20% of the oysters, 14% of the clams, and 13% of the scallops. Shrimp alone, among seven categories of seafood examined, exhibited an even distribution with respect to age of household head (Table 3).

Table 3.—Percentage distribution of seafood consumption at home by age of household head.[1]

	Age of household head		
	Under 35	35-44	45 and over
U.S. population ...	28%	22%	50%
Percent of total consumption:			
Shrimp	31	18	51
Oysters	20	8	72
Crabs	22	19	59
Lobsters	20	21	59
Clams	14	18	68
Scallops	13	17	70
Finfish	23	18	59
Canned fish ..	22	20	58

[1] Projected U.S. distribution based on per household consumption revealed in survey sample.

Income may be a factor in the tendency for "older" households to consume more fishery products, assuming that higher incomes are associated with older household heads. Nonetheless, the apparent even distribution of shrimp would seem to discount this contention. The simple conclusion thus is that young households are not consuming their proportional share of seafood products. Consequently, there is a generation of consumers growing up who are not developing the preferences for seafood products exhibited by persons in the older age brackets. In brief, the lines of tradition in seafood consumption are being broken. Producers would do well, therefore, to pay heed to this apparent trend and direct their marketing efforts accordingly.

ACKNOWLEDGMENT

The authors wish to express their appreciation to Francis M. Schuler, research assistant, for his valuable contribution to the statistical and graphic presentations in this report.

TECHNICAL NOTE

Characteristics of the Sample of Survey Households

The participating households in the survey are members of Market Facts, Inc., Consumer Mail Panel which consists of 25,000 households across the United States. The Panel is constituted on the basis of a "balanced sample" and

is designed to parallel census data for the United States with respect to geographic divisions, household income, population density and degree of urbanization, and age of Panel members.

A sample of 1,500 households was selected from the full Panel by stratified random sampling. The smaller sample maintains correspondence with the above mentioned census data and provides a reasonable cross section of other demographic characteristics, e.g. education, occupation, race, religion, family size, and age and sex composition of the children.

The survey Panel may be considered closely representative of the population of U.S. households with respect to the significant demographic variables. Household surveys, however, are particularly vulnerable to nonsampling errors arising from unavoidable biases in the questionnaire and in the memories of the respondents. To minimize the nonsampling errors, completed questionnaires were monitored for obvious reporting errors.

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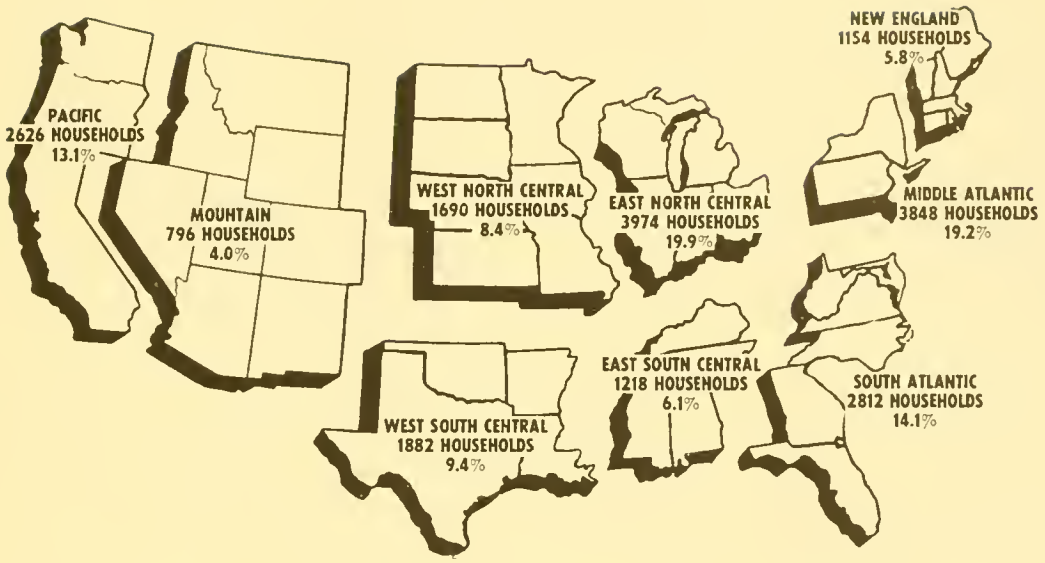
APPENDICES



Appendix 1.—Geographic divisions of the United States and distribution of survey sample.

Appendix 2.—Estimated at-home consumption of shellfish, finfish, and canned fish by region. Population data from Bureau of the Census.

	New England	Middle Atlantic	E. North Central	W. North Central	South Atlantic	E. South Central	W. South Central	Mountain	Pacific	Total
POPULATION:										
(Thousands) .	11,466	37,242	39,759	16,206	30,145	13,054	19,337	8,102	26,095	201,406
%	5.67	18.49	19.74	8.04	14.96	6.48	9.60	4.02	12.95	100.0
CONSUMPTION[1]:										
Shrimp:										
Per capita ...	0.998	1.257	.726	.466	1.253	.863	1.265	1.287	0.686	0.976
Total	11,443	46,813	28,865	7,552	37,772	11,266	24,461	10,427	17,901	196,500
%	5.82	23.82	14.68	3.84	19.22	5.73	12.44	5.30	9.10	100.0
Oysters:										
Per capita ...	0.125	0.116	0.149	0.121	0.403	0.360	0.227	0.296	0.193	0.210
Total	1,433	4,320	5,924	1,961	12,148	4,699	4,389	2,398	5,036	42,308
%	3.38	10.21	14.00	4.63	28.71	11.10	10.37	5.66	11.90	100.0
Crabs:										
Per capita ...	0.161	0.126	0.018	0.006	0.213	0.203	0.097	0.151	0.536	0.166
Total	1,846	4,692	716	97	6,421	2,650	1,876	1,223	13,987	33,508
%	5.50	14.00	2.13	0.28	19.16	7.90	5.59	3.64	41.74	100.0
Lobster:										
Per capita ...	1,895	0.114	0.021	0.004	0.141	0.122	0.005	0.022	0.021	0.167
Total	21,728	4,246	835	65	4,250	1,593	97	178	548	33,540
%	64 78	12.65	2.48	0.19	12.67	4.74	0.28	0.53	1.63	100.0
Lobster tails:										
Per capita ...	0.052	0.211	0.181	0.025	0.087	0.336	0.004	0.201	0.082	0.134
Total	596	7,858	7,196	405	2,623	4,386	77	1,629	2,140	26,910
%	2.21	29.20	26.74	1.50	9.74	16.29	0.28	6.05	7.95	100.0
Clams:										
Per capita ...	0.649	0.073	0.021	0	0.035	0.016	0.003	0.017	0.092	0.074
Total	7,441	2,719	835	0	1,055	209	58	138	2,401	14,856
%	50.08	18.30	5.62	0	7.10	1.40	0.39	0.92	16.16	100.0
Scallops:										
Per capita ...	0.275	0.131	0.069	0.009	0.056	0.007	0.014	0.227	0.090	0.085
Total	3,153	4,879	2,743	146	1,688	91	271	1,839	2,349	17,159
%	18.37	28.43	15.98	0.85	9.83	0.53	1.57	10.71	13.68	100.0
Other shellfish:										
Per capita ...	0.009	0.003	0.008	0	0.009	0.004	0.019	0	0.012	0.008
Total	103	112	318	0	271	52	367	0	313	1,536
%	6.70	7.29	20.70	0	17.64	3.38	23.89	0	20.37	100.0
Total shellfish:										
Per capita ...	4,164	2.031	1.193	0.631	2.197	1.911	1.634	2.201	1.712	1.819
Total	47,744	75,639	47,432	10,226	66,229	24,946	31,597	17,833	44,675	366,321
%	13.03	20.64	12.94	2.79	18.07	6.80	8.62	4.86	12.19	100.0
Total finfish:										
Per capita ...	5.802	4.648	3.506	2.454	5.375	7.491	8.630	3.712	4.433	4.922
Total	66,526	173,101	139,395	39,770	162,029	97,788	166,878	30,075	115,679	991,240
%	6.71	17.46	14.06	4.01	16.35	9.87	16.84	3.03	11.67	100.0
Total shellfish and finfish:										
Per capita ...	9.966	6.679	4.699	3.085	7.572	9.402	10.264	5.913	6.145	6.740
Total	114,270	248,739	186,828	49,996	228,258	122,734	198,475	47,907	160,354	1,357,560
%	8.41	18.32	13.76	3.68	16.81	9.04	14.61	3.52	11.81	100.0
Total canned fish:										
Per ctpita ...	5.677	5.657	4.168	4.159	5.293	6.778	5.513	6.545	5.926	5.318
Total	65,092	210,678	165,716	67,401	159,557	88,480	106,605	53,028	154,639	1,071,196
%	6.07	19.66	15.47	6.29	14.89	8.25	9.95	4.95	14.43	100.0
Total shellfish, finfish and canned fish (Includes specialty items not shown):										
Per capita ...	17.609	14.294	10.044	7.882	14.220	17.237	16.555	14.239	13.958	13.479
Total	201,905	532,337	399,229	127,736	428,662	225,012	320,124	115,364	364,234	2,714,713
%	7.43	19.60	14.71	4.70	15.79	8.28	11.79	4.24	13.41	100.0

[1] Per capita consumption in pounds, total in thousands of pounds.

Appendix 3.—Regional supplies and distribution of oysters.

	Supplies		Distribution	
	In-shipment[1]	Landings	Consumption	Out-shipment
	Thousand pounds		*Thousand pounds*	
New England	2,024	300	2,324	--
Middle Atlantic	6,004	1,000	7,004	--
East North Central	9,605	--	9,605	--
West North Central	3,180	--	3,180	--
South Atlantic	--	24,912	19,697	5,215
East South Central	1,605	6,014	7,619	--
West South Central	--	11,674	7,116	4,558
Mountain	3,889	--	3,889	--
Pacific	166	8,000	8,166	--
Total	26,473	51,900	68,600	9,773

[1] Includes 16,700 thousand pounds in foreign imports.

Appendix 4.—Regional supplies and distribution of clams.

	Supplies		Distribution	
	In-shipment	Landings	Consumption	Out-shipment
	Thousand pounds		*Thousand pounds*	
New England	31,423	6,392	37,815	--
Middle Atlantic	--	57,248	13,817	43,431
East North Central	4,242	--	4,242	--
West North Central	--	--	--	--
South Atlantic	--	11,860	5,362	6,498
East South Central	1,061	--	1,061	--
West South Central	298	--	298	--
Mountain	703	--	703	--
Pacific	12,202	--	12,202	--
Total	49,929	75,000	75,500	49,929

Appendix 5.—Regional supplies and distribution of crabs.

	Supplies		Distribution	
	In-shipment[1]	Landings	Consumption	Out-shipment
	Thousand pounds		*Thausand pounds*	
New England	2,456	100	2,556	--
Middle Atlantic	6,414	83	6,497	--
East North Central	992	--	992	--
West North Central	135	--	135	--
South Atlantic	--	14,941	8,891	6,050
East South Central	2,903	766	3,669	--
West South Central	302	2,296	2,598	--
Mountain	1,694	--	1,694	--
Pacific	--	25,176	19,367	5,809
Total	14,896	43,362	46,399	11,859

[1] Includes 3,035 thousand pounds in foreign imports.

Appendix 6.—Survey panel consumption and monthly index of consumption of shrimp, oysters, crabs, clams, and scallops.

Species	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Avg.
Shrimp:													
Consumption (pounds)	520.1	418.5	431.1	416.5	386.3	356.2	363.5	371.6	325.2	299.5	455.7	354.5	391.6
Index	133	107	110	106	99	91	93	95	83	76	116	91	100
Oysters:													
Consumption (pounds)	162.3	124.5	65.2	20.6	5.0	14.9	8.1	16.2	81.0	158.2	193.6	141.0	82.5
Index	197	151	79	25	6	18	10	20	98	192	235	171	100
Crabs:													
Consumption (pounds)	86.6	76.9	59.2	62.6	43.5	81.3	55.6	50.1	62.6	42.3	62.5	88.6	64.3
Index	135	120	92	97	68	126	86	78	97	66	97	138	100
Clams:													
Consumption (pounds)	35.5	53.6	21.2	28.7	28.0	29.5	7.9	56.2	32.3	23.9	24.1	26.8	30.6
Index	116	175	69	94	92	96	26	184	106	78	79	88	100
Scallops:													
Consumption (pounds)	45.9	53.6	37.2	36.2	29.3	32.3	33.7	30.4	27.5	21.9	29.5	40.3	34.8
Index	132	154	107	104	84	93	97	87	79	63	85	116	100

[1] The base for each index is the 12-month average consumption for each species.

Appendix 7.—Consumer panel consumption of fresh and frozen clams, crabs, and oysters at home and away from home.

Item	At home	Away from home
	Pounds	
Clams	368 (52%)	339 (48%)
Crabs	772 (91%)	139 (9%)
Oysters	991 (81%)	235 (19%)

Appendix 8.—Consumption at home and away from home, by survey panel: shrimp, lobster, halibut, haddock, and flounder.

Item	At home	Away from home
	Pounds	
Shrimp	4,699 (74%)	1,263 (21%)
Lobster	835 (41%)	1,224 (59%)
Halibut	1,528 (89%)	187 (11%)
Haddock	2,901 (93%)	206 (7%)
Flounder	2,670 (81%)	315 (11%)

Appendix 9.—Consumption per household by household income group for selected species.

	Shrimp	Oysters	Crabs	Clams	Scallops	Ocean perch	Light tuna
				Pounds			
Under $5,000	1.73	0.709	0.302	0.115	0.170	1.914	3.60
$5,000-$6,999	2.86	.675	.451	.055	.206	2.037	5.33
$7,000-$9,999	3.56	.607	.461	.370	.335	2.31	5.69
$10,000 and over	3.65	.536	.692	.312	.315	1.55	6.09
Total	2.96	.625	.487	.232	.263	1.92	5.16

Appendix 10.—Per capita consumption by household income group for selected species.

	Shrimp	Oysters	Crabs	Clams	Scallops	Ocean perch	Light tuna
				Pounds			
Under $5,000	0.749	0.307	0.131	0.050	0.073	0.829	1.56
$5,000-$6,999	0.909	.214	.143	.017	.066	.647	1.69
$7,000-$9,999	1.04	.178	.135	.107	.099	.674	1.66
$10,000 and over	1.06	.156	.202	.091	.092	.453	1.78
Total	0.966	.204	.159	.076	.086	.626	1.68

GPO 998-672

Regional and Other Related Aspects of Shellfish Consumption; Some Preliminary Findings from the 1969 Consumer Panel Survey, by Morton M. Miller and Darrel A. Nash, Circular 361

ERRATA

Page 13, right column. In the Technical Note, the reference to the consumer mail panel should read "consists of 20,000 households," rather than "consists of 25,000 households."

Page 15. The Appendix title should read "Geographic divisions of the United States and distribution of full consumer panel."

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