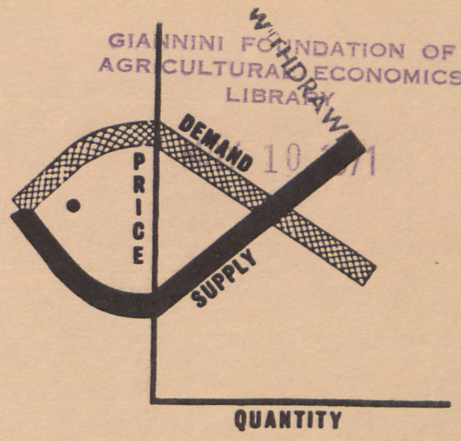

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PRELIMINARY ANALYSES OF A SURVEY OF BUYING PATTERNS FOR FRESH AND FROZEN FISH AND SHELLFISH BY HOUSEHOLD CHARACTERISTICS

BY

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Working Paper No. 46

August, 1970

BUREAU OF COMMERCIAL FISHERIES
DIVISION OF ECONOMIC RESEARCH

Tables

ABSTRACT

A consumer panel of 1,500 participants, theoretically representative of all U.S. households, were surveyed during one full year (February 1969 to January 1970) to obtain a complete record of fish purchases. This report summarizes the purchase patterns for fresh and frozen fish and shellfish. The more distinct differences in purchases among households are due to race, religion, region, and age of the head of the household. On a per capita basis, Negro households purchased well over twice the amount of fresh and frozen seafoods as white households, while Jewish households used about twice the amount as Catholic and Protestant households. Most of these products were found to be rather localized in usage, although a few--notably shrimp--retained a national market. In households where the age of the household head was over 45 years, purchases of fresh and frozen products were distinctly greater than in those with younger household heads. Purchases of fish meals in restaurants were definitely related to income level, in addition to the above factors.

Introduction

When the Bureau of Commercial Fisheries intensified its program of economic analysis about 5 years ago, the paucity of knowledge of the factors affecting fish consumption was recognized. While per capita consumption remained quite stable, it was apparent that significant changes were taking place within the composition of consumption.

Several market studies based on available information were completed. However, it was felt that in order to analyze the market for fishery products sufficiently, knowledge of consumer buying habits across a broad scale of social, economic, and regional characteristics was needed. To supply the required data, a survey of fish purchases on a household basis was made by Market Facts, Inc., under contract with BCF. The participants in the survey consisted of a panel of 1,500 households representing nine geographic regions and eight social, economic, and ethnic characteristics. The survey covered a 1-year span from February 1969 through January 1970. The participants kept a complete record of their fish and shellfish purchases over the year, identifying them as to species, amount, price, method of preservation, and processing. Reports were completed and returned twice monthly.

The survey was not primarily designed to extrapolate the data to total U.S. household consumption of fish. Our major

interest was in obtaining consumption patterns for many consumers in order to analyze differences in consumption across social and economic groups. In the months ahead we will make an intensive economic and statistical analysis of the survey results in an attempt to derive causal relationships between purchases and the various socio-economic factors for which data are available. For the moment, however, we will discuss only the tabulated survey results.

Two major categories of information are available. One is purchases of fishery products for home consumption and the other purchases of meals containing fish or shellfish by members of households away from home. There are significant differences between buying habits in the two types of purchases. Rather detailed quantitative figures are available for purchases for home consumption. The data for purchases away from home, however, are stated in terms of number of meals eaten. We felt that we could make more accurate estimates of actual quantities of fish products in the meals purchased away from home by using recommended standards of portion sizes per meal, than by asking the survey participants to estimate the amount of fish contained in a restaurant-purchased meal. We are now in the process of converting the number of meals to a weight basis. Away-from-home purchases, based strictly on the number of meals reported, show some interesting patterns. These same patterns should exist when the number of meals are converted to a weight basis.

This paper covers the purchase patterns for the major fresh and frozen fish and shellfish products for each of the variables. It will show which products exhibit extreme differences for each of the variables and, equally as important, which find general acceptance across all classes within each variable. Two items serve well to define these patterns: the price per pound and the amount purchased for households in the class.

Comparison to Official BCF Consumption Statistics

In spite of the fact that primarily we did not intend to extrapolate the raw results of the survey to the U.S. population, it is often desirable to do so. In order to do this, it is first necessary to change the weight basis of the survey figures. The respondents were asked to report the net contents weight for home purchases, which in many cases contains materials other than fish products. By applying the appropriate conversion factor to each item, the non-fish part of the retail purchase is eliminated, leaving the edible fish portion. This adjustment is shown in table 1. In total, the non-fish portion of home purchases comprised some 25 percent of the net contents.

Away-from-home purchases were then added to purchases for home use to obtain total per capita consumption. Two sources are presently available to estimate this figure. From the survey we

Table 1.--Conversion of retail weight to edible weight; all households, all quarters

Product	Retail weight	Edible weight
	Pounds per member	
Specialty items		
Tuna pie	.135	.068
Clam chowder	.236	.078
Oyster stew	.138	.040
TV dinners	.451	.150
Smoked fish	.110	.033
Other specialties	.344	.120
Total	1.414	.489
Shellfish, fresh & frozen		
Shrimp	.966	.752
Oysters	.204	.178
Crabs	.159	.127
Lobsters	.172	.038
Lobster tails	.135	.081
Clams	.076	.066
Scallops	.086	.086
Other shellfish	.008	.006
Total	1.806	1.334
Finfish, fresh & frozen		
Haddock	.596	.370
Flounder/sole	.549	.548
Halibut	.314	.184
Ocean perch	.627	.401
Cod	.564	.360
Salmon	.171	.103
Red snapper	.169	.108
Catfish	.255	.081
Whiting	.192	.088
Swordfish	.168	.097
Pollock	.015	.009
Other finfish	.676	.390
Total	4.296	2.539
Canned fish		
Salmon, pink	.886	.718
Salmon, red	.520	.421
Other salmon	.053	.042
Tuna, white	.916	.884
Tuna, light	1.756	1.696
Tuna, other	.226	.218
Sardines, domestic	.256	.228
Sardines, imported	.181	.172
Shrimp	.151	.151
Oysters	.183	.183
Other canned	.161	.146
Total	5.289	4.859
Grand Total	12.805	9.221

know the panel participants purchased 23,784 fish meals away from home. On the assumption of a 4-ounce serving for all fish and shellfish, this comes to 1.22 pounds per capita for the year. Additional quantities of fish are consumed in school lunches and also by the small percent of the civilian population not living in households, such as hospitals, nursing homes, etc. As a second source, a U.S. Department of Agriculture publication[1/] indicates that 18 percent of total fish purchases are made away from home. If this is the case, given home purchases of 9.22 pounds per capita, an additional 2.02 pounds are purchased away from home. The purchases for home use and away-from-home purchases by the two methods give a total of between 10.44 and 11.24 pounds per capita. Official statistics[2/] for 1969 are 11.1 pounds per capita. Thus the survey results are well within an expected range of the official statistics.

Fish and Shellfsih Purchased for Home Use

Several household characteristics are found to result in significant differences in purchases for home use. These characteristics may be classed as ethnic, that is, race and religion; regional, consisting of the nine U.S. Bureau of the Census geographic groupings; seasons, here discussed on a monthly basis; economic

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1/ National Food Situation, Economic Research Service, United States Department of Agriculture, May 1970, p. 26.

2/ Fisheries of the United States - 1969, United States Department of the Interior, U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, CFS No. 5300, p. 64.

factors of income and occupation; and, finally, distinctive features of the household itself, that is, age of the household head and the number of persons composing the household. These purchase patterns can be seen in the tables which follow. In these tables the quantity figures shown are net retail weight and the price column is reported retail price per pound.

Ethnic Factors

Initially, in planning the survey, we had not intended to investigate ethnic differences, as these were thought to be rather unimportant. A study by Purcell and Raunikar[3/], however, found these differences to be important and our survey results confirmed this importance.

Race is singularly important in determining consumption habits, as shown in table 2. The quantity of shrimp, by far the most important fresh and frozen fishery product, consumed by Negro families is more than twice that consumed by white families. Other products which Negroes purchased much more of include oysters, crabs, ocean perch, red snapper, catfish, and whiting. On the other hand, white families purchased more lobsters and halibut than Negroes. White families did not compensate by higher prices, except in the case of salmon and red snapper, where expenditures were definitely higher. Negro households, however, reported higher expenditures for a number of products, such as lobsters.

3/ Purcell, J.C. and Robert Raunikar, Analysis of Demand for Fish and Shellfish, University of Georgia, College of Agriculture Experiment Stations, Research Bulletin 51, December 1968.

Table 2.--Purchase pattern by race

Product	Negro		White	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:				
Shrimp	1.13	1.988	1.35	.909
Oysters	1.28	.366	1.44	.194
Crabs	1.38	.291	1.24	.150
Lobsters	2.18	.065	.86	.175
Lobster tails	2.90	.210	1.50	.131
Clams	1.72	.015	.59	.078
Scallops	1.12	.062	1.35	.086
Other shellfish	1.13	.006	.84	.008
Haddock	.70	.641	.71	.593
Flounder-sole	.64	.700	.82	.540
Halibut	.76	.152	.82	.321
Ocean perch	.44	1.707	.58	.574
Cod	.51	.748	.64	.553
Salmon	.58	.192	1.03	.171
Red snapper	.48	.912	.97	.134
Catfish	.62	.937	.72	.223
Whiting	.29	1.381	.42	.135
All other finfish	.57	4.056	.71	.703

The three major religions provide a second measure of the ethnic variation in fish consumption. These are tabulated in table 3. Jewish households are the unquestioned leaders in consumption of fish products--flounder-sole, salmon, and the miscellaneous category are far higher than for households of other religions. They had measurably higher purchases of shrimp, crabs, scallops, halibut, and cod. Jewish households had higher expenditures for oysters, lobsters, clams, scallops, haddock, halibut, red snapper, catfish, and whiting.

Catholic households rank somewhat above Protestants in purchases of shrimp, lobsters, lobster tails, clams, scallops, haddock, flounder-sole, and cod. Oysters, red snapper, catfish, and whiting all exhibit somewhat higher consumption levels among Protestant families. It may be inferred from tables 2 and 3 that Negro Protestant families primarily account for the higher consumption of red snapper, catfish, and whiting by Protestants.

Regional Patterns

The regional purchase patterns show very graphically the fact that some fishery products have achieved the status of a "national" food while the consumption of others are strictly regional (table 4). Figure 1 shows the nine geographic regions designated by the U.S. Bureau of the Census which were used in the survey. Although shrimp consumption varied considerably by region, considerable quantities of this shellfish were purchased in each. It is interesting to note that two regions in which the respondents reported the lowest

Table 3.--Purchase pattern by religion

Product	Catholic		Jewish		Protestant	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.44	1.227	1.52	1.507	1.28	.859
Oysters	1.42	.115	1.76	.016	1.43	.234
Crabs	1.34	.148	1.14	.203	1.25	.157
Lobsters	1.09	.233	2.00	.051	.80	.161
Lobster tails	1.41	.229	1.67	.157	1.69	.108
Clams	.58	.109	1.08	.060	.59	.067
Scallops	1.33	.126	1.51	.236	1.34	.068
Other shellfish	.86	.006	0	0	.84	.008
Haddock	.74	.694	.88	.794	.69	.547
Flounder-sole	.84	.677	.79	2.733	.81	.429
Halibut	.80	.286	1.02	.900	.80	.298
Ocean perch	.61	.539	.57	.185	.55	.669
Cod	.61	.717	.68	.993	.63	.498
Salmon	1.16	.114	.97	1.321	.98	.146
Red snapper	1.03	.074	1.08	.065	.83	.202
Catfish	.77	.071	1.15	.046	.70	.316
Whiting	.39	.145	.72	.024	.37	.211
All other finfish	.75	.664	.80	3.026	.67	.826

Table 4.--Purchase pattern by region

Product	New England		Middle Atlantic		E. North Central	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.16	.998	1.41	1.257	1.58	.726
Oysters	1.49	.125	1.52	.116	1.38	.149
Crabs	1.37	.161	1.68	.126	2.14	.018
Lobsters	.70	1.895	1.11	.114	2.66	.021
Lobster tails	1.07	.052	1.40	.211	1.56	.181
Clams	.40	.649	.84	.073	1.14	.021
Scallops	1.40	.275	1.35	.131	1.47	.069
Other shellfish	1.52	.009	1.23	.003	.50	.008
Haddock	.67	1.911	.72	.994	.71	.501
Flounder-sole	.87	.618	.88	1.213	.83	.191
Halibut	.70	.300	.74	.246	.85	.194
Ocean perch	.66	.114	.57	.324	.57	.823
Cod	.57	.792	.64	.753	.64	.519
Salmon	1.17	.125	1.02	.082	1.41	.078
Red snapper	1.43	.018	.93	.124	1.23	.052
Catfish	0	0	0	0	.72	.132
Whiting	.36	.144	.38	.171	.48	.074
All other finfish	.717	1.780	.723	.741	.74	.474

Table 4.--Purchase pattern by region (continued)

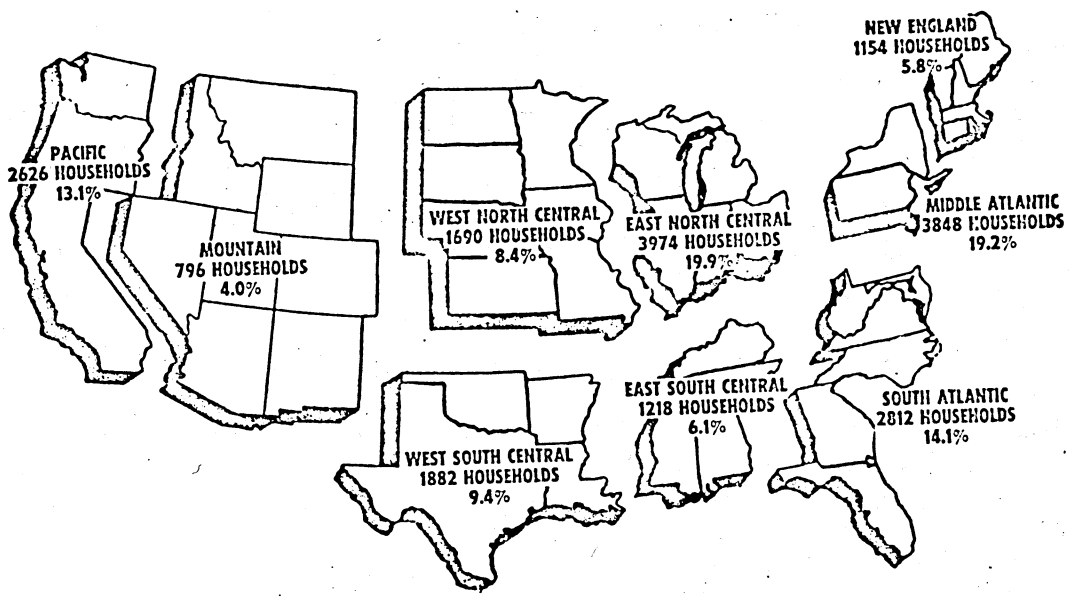
Product	W. North Central		South Atlantic		E. South Central	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.48	.466	1.31	1.253	1.10	.863
Oysters	1.61	.121	1.76	.403	1.34	.360
Crabs	1.06	.006	1.49	.213	1.59	.203
Lobsters	3.50	.004	.70	.141	2.01	.122
Lobster tails	2.39	.025	1.67	.087	1.65	.336
Clams	0	0	1.10	.035	1.44	.016
Scallops	1.11	.009	1.62	.056	1.49	.007
Other shellfish	0	0	.51	.009	.61	.004
Haddock	.71	.500	.73	.569	.63	.335
Flounder-sole	.91	.046	.70	.804	.94	.436
Halibut	1.00	.219	.83	.055	.79	.037
Ocean perch	.55	.557	.54	.991	.59	1.569
Cod	.63	.263	.62	.615	.56	.575
Salmon	.94	.055	.58	.071	1.04	.262
Red snapper	.99	.002	.83	.104	1.12	.763
Catfish	.78	.205	.32	.153	.73	1.858
Whiting	.44	.147	.39	.324	.29	.754
All other finfish	.99	.460	.58	1.689	.38	.904

Table 4.--Purchase pattern by region (continued)

Product	W. South Central		Mountain		Pacific	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.07	1.265	1.29	1.287	1.29	.686
Oysters	1.18	.227	.95	.296	1.09	.193
Crabs	.80	.097	1.15	.151	.94	.536
Lobsters	2.89	.005	1/	1/	2.35	.021
Lobster tails	3.98	.004	1.51	.201	2.32	.082
Clams	.99	.003	1.06	.017	.48	.092
Scallops	1.17	.014	.77	.227	1.46	.090
Other shellfish	.56	.019	0	0	1.55	.012
Haddock	.66	.041	.91	.126	.78	.305
Flounder-sole	.57	.305	.73	.321	.77	.535
Halibut	.88	.039	.77	1.537	.86	.954
Ocean perch	.52	.696	.56	.369	.61	.192
Cod	.64	.437	.65	.379	.67	.543
Salmon	1.08	.019	1.01	.228	.95	.741
Red snapper	.43	.270	.78	.086	.65	.356
Catfish	.72	.718	1.10	.016	0	.030
Whiting	.20	.253	1.06	.174	.81	.017
All other finfish	.43	.852	.72	.476	.66	.760

1/ Incomplete data

Figure 1.--Geographic Regions Used in the Survey of Household Purchases



consumption, that is, the East North Central and the West North Central regions, the expenditures were the highest. High shrimp consumers were in the Middle Atlantic, South Atlantic, West South Central, and surprisingly, the Mountain regions. Apparently, shrimp are exported from the East South Central region rather than consumed there.

Crab consumption is highly regional and declines rapidly in importance as distance from regions of landing increases. The Pacific Coast States inhabitants lead the list in crab consumption, due no doubt to the availability of dungeness and king crabs at comparatively low prices. Consumers in the Atlantic and Gulf States are largely supplied by the blue crab. Crabs are virtually unknown in the interior regions. Lobsters, clams, and scallop consumption are even more regionalized. Price seems to be extremely effective in rationing consumption.

Lobster tails have apparently penetrated a few markets in various regions. Because they are an import item, they have not been identified with a specific fishery region in the U.S. Except for New England, it is interesting to note that price per pound is a very strong conditioner of purchases of lobster tails; for example, at the price of $4.00 per pound in the West South Central region purchases of this item were practically nil.

Among finfish, groundfish and ocean perch are rather well-known nationwide, no doubt because of their use in fish sticks, portions, and dinners. Cod seems to be the most evenly dispersed, followed by ocean perch. Haddock is comparatively unavailable in the West South Central region, while flounder-sole is not marketed heavily in the West North Central. New Englanders retain a large portion of the haddock for themselves, while marketing ocean perch in other regions.

Halibut consumption is rather widely diffused. Respondents in the Mountain States expressed a relatively high preference for this fish, followed by those in the region of production, that is, the Pacific States. The survey participants in the South Atlantic and East South Central States did not use much halibut. Salmon consumption is quite localized, the important users residing in the Pacific and Mountain States. Red snapper is most important in the East and West South Central and in the Pacific States. Consumption of catfish is quite specific to the East South Central region where most of it is caught. There is some dispersion to the Central region but no consumption was reported in the States along the North Atlantic and Pacific Oceans. Whiting is rather widely dispersed. The high consumption rates of red snapper, catfish, and whiting in the East South Central region are apparently a function of race, as well as regional availability. Respondents in the New England and the South Atlantic regions are important users

of numerous other species of finfish--at least a half pound per person in each of these two regions.

Seasonal Shifts in Purchases

Strong seasonal shifts are not in evidence among shellfish beyond those which would commonly be expected (table 5). This may result partially from the mixing of species and thus evening out seasonality within each product category. The seasonality of oyster consumption is confirmed by the survey. Lobster consumption has a strong seasonal shift, the average for July being about 15 times that for January and February. Shrimp consumption seems to decline from a high in the winter months to a low in fall. The evenness of crab purchases strongly suggests the mixing of several crab species.

No seasonal trends in purchases of groundfish are in evidence from the survey. Movements in purchases of groundfish and halibut from the February high may reflect some bias in the study and may result from unusually high purchases by participants at the beginning of the survey, as the trend appears downward throughout the survey year. Salmon, catfish, whiting, and red snapper are notable for a lack of a seasonal pattern.

Economic Characteristics

Income does not appear to be as strong a factor in explaining purchases as is sometimes ascribed to it (table 6). There was a general increase in purchases as income rises, but not

Table 5.--Purchase patterns by month, February 1969 to January 1970

Product	February 1969		March 1969		April 1969	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.25	.108	1.21	.087	1.21	.090
Oysters	1.13	.034	1.34	.026	1.31	.014
Crabs	.99	.018	1.15	.016	1.55	.012
Lobsters	1.67	.002	1.42	.006	.81	.010
Lobster tails	.74	.027	1.31	.015	2.41	.007
Clams	.74	.007	.62	.011	1.16	.004
Scallops	1.27	.010	1.22	.011	1.14	.008
Other shellfish	1.01	.002	.82	.001	.90	.002
Haddock	.63	.081	.71	.058	.65	.056
Flounder-sole	.73	.061	.75	.064	.84	.042
Halibut	.71	.044	.72	.039	.76	.035
Ocean perch	.45	.093	.50	.068	.55	.061
Cod	.66	.058	.59	.058	.63	.056
Salmon	.81	.019	.92	.018	1.02	.014
Red snapper	.63	.023	.88	.013	.68	.026
Catfish	.73	.019	.59	.026	.78	.017
Whiting	.39	.019	.35	.021	.23	.037
All other finfish	.75	.097	.63	.099	.63	.098

Table 5.--Purchase patterns by month, February 1969 to January 1970 (continued)

Product	May 1969		June 1969		July 1969	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.22	.084	1.30	.078	1.38	.072
Oysters	1.23	.004	1.67	.001	1.05	.003
Crabs	1.36	.013	1.65	.009	.75	.016
Lobsters	.83	.025	.82	.023	.59	.032
Lobster tails	1.64	.006	1.76	.008	1.96	.007
Clams	.73	.006	.51	.006	.37	.006
Scallops	1.48	.007	1.60	.006	1.24	.007
Other shellfish	.50	.001	1.15	0	0	0
Haddock	.77	.057	.55	.071	.68	.037
Flounder-sole	.75	.050	.85	.040	.79	.046
Halibut	.83	.025	.94	.027	.90	.018
Ocean perch	.61	.043	.63	.038	.58	.036
Cod	.65	.043	.64	.033	.58	.043
Salmon	.99	.015	1.06	.013	.90	.020
Red snapper	.82	.010	.99	.010	.57	.017
Catfish	.67	.014	.83	.022	.59	.026
Whiting	.42	.016	.38	.014	.42	.008
All other finfish	.62	.078	.71	.053	.65	.063

Table 5.--Purchase patterns by month, February 1969 to January 1970 (continued)

Product	August 1969		September 1969		October 1969	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.32	.076	1.38	.078	1.35	.068
Oysters	1.38	.002	1.50	.003	2.47	.017
Crabs	1.67	.012	1.52	.010	1.55	.013
Lobsters	1.89	.007	.64	.020	.84	.011
Lobster tails	1.77	.011	1.79	.009	1.50	.011
Clams	.71	.002	.28	.012	.50	.007
Scallops	1.40	.007	1.38	.006	1.39	.006
Other shellfish	.39	.002	0	0	1.96	0
Haddock	.75	.035	.76	.046	.82	.045
Flounder-sole	.84	.035	.78	.048	.85	.042
Halibut	.88	.020	.87	.021	.86	.023
Ocean perch	.56	.050	.66	.038	.55	.058
Cod	.67	.038	.61	.053	.63	.049
Salmon	.97	.014	1.37	.011	.94	.010
Red snapper	1.09	.013	.95	.011	1.17	.011
Catfish	.68	.029	.83	.021	.69	.018
Whiting	.27	.018	.44	.013	.40	.009
All other finfish	.78	.074	.72	.074	.75	.059

Table 5.--Purchase patterns by month, February 1969 to January 1970 (continued)

Product	November 1969		December 1969		January 1970	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.51	.060	1.44	.091	1.50	.071
Oysters	1.34	.032	1.49	.039	1.35	.028
Crabs	1.86	.008	1.21	.013	.69	.018
Lobsters	1.06	.012	1.07	.018	2.55	.002
Lobster tails	2.04	.010	2.22	.012	1.84	.012
Clams	.62	.005	.73	.005	.77	.005
Scallops	1.55	.004	1.55	.006	1.28	.008
Other shellfish	1.89	.001	1.24	0	0	0
Haddock	.82	.032	.74	.039	.86	.037
Flounder-sole	.78	.040	.95	.038	.95	.041
Halibut	.97	.020	.79	.019	.87	.024
Ocean perch	.61	.048	.64	.034	.58	.058
Cod	.61	.041	.65	.038	.66	.051
Salmon	.93	.010	1.07	.012	1.27	.014
Red snapper	.99	.011	.86	.013	1.08	.010
Catfish	.74	.019	.68	.021	.71	.022
Whiting	.74	.012	.34	.009	.44	.016
All other finfish	.75	.056	.75	.049	.67	.058

Table 6.--Purchase patterns by per capita income

Product	Under $1,000		$1,000-$1,999		$2,000-$2,499	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.07	.550	1.19	.853	1.47	.520
Oysters	1.36	.185	1.23	.231	1.35	.140
Crabs	2.01	.026	1.34	.144	.78	.095
Lobsters	1.93	.003	.59	.233	1.82	.035
Lobster tails	1.75	.016	1.70	.161	1.98	.067
Clams	.43	.002	.44	.069	.55	.045
Scallops	.94	.031	.99	.086	1.57	.062
Other shellfish	1.31	.007	.92	.007	.57	.011
Haddock	.74	.626	.68	.548	.67	.552
Flounder-sole	.69	.311	.78	.484	.88	.311
Halibut	.84	.109	.80	.282	.76	.211
Ocean perch	.57	.602	.54	.653	.49	.618
Cod	.58	.370	.60	.597	.67	.478
Salmon	.98	.026	1.01	.216	1.16	.047
Red snapper	.40	.346	1.02	.229	.79	.034
Catfish	.68	.455	.70	.393	.87	.126
Whiting	.26	.731	.53	.121	.48	.037
All other finfish	.55	1.029	.65	.852	.78	.409

Table 6.--Purchase patterns by per capita income (continued)

Product	$2,500-$2,999		$3,000-$3,499		Over $3,500	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.18	1.469	1.42	1.226	1.52	1.052
Oysters	2.49	.171	1.60	.151	1.36	.209
Crabs	1.00	.228	1.21	.112	1.33	.217
Lobsters	1.80	.113	.95	.215	1.01	.208
Lobster tails	.74	.256	2.22	.091	1.82	.133
Clams	.57	.138	.59	.064	.75	.095
Scallops	1.46	.075	1.36	.086	1.62	.108
Other shellfish	1.40	.005	.90	.004	.67	.008
Haddock	.73	.480	.72	.705	.73	.593
Flounder-sole	.77	.690	.84	.762	.85	.624
Halibut	.79	.323	.75	.469	.89	.378
Ocean perch	.67	.789	.50	.733	.60	.455
Cod	.66	.549	.62	.721	.66	.529
Salmon	.93	.116	.95	.188	1.01	.218
Red snapper	.84	.091	.86	.066	.98	.132
Catfish	.71	.291	.56	.104	.73	.089
Whiting	.36	.315	.40	.245	.54	.052
All other finfish	.74	1.079	.68	.798	.82	.822

without encountering decreases in some income classes. Flounder, halibut, ocean perch, cod, and salmon seem to be positively related to income; haddock apparently is neutral; and red snapper, catfish, and whiting are purchased mostly by lower income households. Red snapper, and to a degree whiting, show that the higher income households purchase a higher-price product. Some of the shellfish, in particular shrimp, clams, and scallops, show definite trends to the purchase of higher priced items by higher income classes.

While there were no significant differences in consumption across occupational classes by individual products, there were some interesting patterns (table 7). For shellfish, "clerical and sales" 4/

Table 7.--Fresh and frozen fish and shellfish purchases by occupational class

Occupational class	Shellfish	Finfish
	Pounds per person	
Professional and semi-professional	1.31	3.42
Proprietors and managerial	1.61	3.52
Clerical and sales	2.27	4.43
Craftsmen and foremen	1.97	3.76
Operative (brakemen, drivers, assemblers, etc.)	1.34	3.95
All others	2.16	6.54

4/ Bookkeepers, mail carriers, sales agents, brokers, etc.

occupations purchase the greatest quantities, while "all other" 5/ follows closely. Finfish purchases by the "all other" occupation category are 50 percent more than the second highest category, that is, "clerical and sales." Those in "professional and semi-professional" occupations purchase less finfish and shellfish per person than those in any other occupation.

Characteristics of the Household

Table 8 shows an unmistakable pattern of higher consumption levels associated with higher age classes of household head. The products that do not follow this trend are red snapper, catfish, and whiting. Age may be a very important factor in fish consumption as the age structure of the nation changes through time.

Size of household can be seen as a very important factor in fish purchases (table 9); the smaller households have the highest per capita users. In nearly every case there is an uninterrupted decline as household size increases. Red snapper and whiting show an exception for households with more than five persons. These two are purchased at extremely low prices, indicating a substitution of a lower-priced product. In many cases there are lower-priced purchases as family size increases.

Summary of Purchases for Home Use

In many respects purchases of fresh and frozen fish and shellfish are strongly tied to dietary traditions. Thus we find that, by race, Negroes are the highest users and, by religion, households with Jewish

5/ Service workers, laborers, etc.

Table 8.--Purchase patterns by age of household head

Product	Under 25 years		25-34 years		35-44 years	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:						
Shrimp	1.36	.746	1.22	.927	1.40	.644
Oysters	1.39	.077	1.12	.123	1.30	.087
Crabs	.48	.218	1.26	.086	1.43	.113
Lobsters	0	0	.77	.108	.88	.130
Lobster tails	0	0	1.73	.059	2.67	.074
Clams	1.35	.044	.85	.029	.83	.045
Scallops	1.69	.030	1.43	.032	1.59	.048
Other shellfish	0	0	1.03	.006	.91	.005
Haddock	.75	.270	.70	.243	.70	.457
Flounder-sole	.72	.070	.76	.389	.83	.460
Halibut	1.01	.116	.79	.170	.76	.127
Ocean perch	.55	.313	.51	.477	.50	.449
Cod	.74	.395	.62	.623	.62	.468
Salmon	1.40	.006	.93	.037	.89	.064
Red snapper	0	0	.57	.209	.52	.086
Catfish	.75	.187	.61	.137	.75	.031
Whiting	.21	.266	.24	.143	.36	.066
All other finfish	.63	.156	.68	.566	.60	.614

Table 8.--Purchase patterns by age of household head (continued)

Product	45-54 years		Over 55 years	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:				
Shrimp	1.44	1.210	1.26	1.052
Oysters	1.42	.219	1.53	.343
Crabs	1.21	.245	1.25	.169
Lobsters	1.39	.216	.55	.218
Lobster tails	1.42	.254	1.37	.144
Clams	.65	.101	.43	.111
Scallops	1.54	.114	1.13	.131
Other shellfish	.55	.014	1.22	.006
Haddock	.72	.704	.71	.866
Flounder-sole	.80	.620	.83	.688
Halibut	.95	.345	.78	.542
Ocean perch	.60	.7622	.58	.769
Cod	.64	.491	.63	.662
Salmon	1.09	.266	.97	.278
Red snapper	1.23	.237	.77	.163
Catfish	.79	.519	.60	.301
Whiting	.31	.252	.48	.270
All other finfish	.56	1.141	.61	1.051

Table 9.--Purchase pattern by household size

Product	1 person		2-3 persons	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:				
Shrimp	1.41	1.698	1.36	1.234
Oysters	1.48	.422	1.52	.311
Crabs	1.16	.438	1.27	.204
Lobsters	2.02	.181	.98	.229
Lobster tails	1.96	.378	1.35	.215
Clams	.51	.263	.72	.082
Scallops	1.53	.244	1.36	.107
Other shellfish	1.48	.003	.96	.010
Haddock	.75	.901	.69	.830
Flounder-sole	.84	1.023	.85	.712
Halibut	.83	.542	.80	.395
Ocean perch	.64	.890	.61	.775
Cod	.68	1.364	.64	.599
Salmon	1.18	.488	1.04	.214
Red snapper	.92	.151	1.09	.210
Catfish	.71	1.321	.71	.324
Whiting	.43	.413	.44	.181
All other finfish	.64	2.341	.81	.932

Table 9.--Purchase pattern by household size (continued)

Product	4-5 persons		Over 5 persons	
	Retail price per pound	Per capita purchases	Retail price per pound	Per capita purchases
	Dollars	Pounds	Dollars	Pounds
Fresh and frozen:				
Shrimp	1.31	.840	1.18	.422
Oysters	1.22	.131	1.24	.059
Crabs	1.22	.124	1.43	.063
Lobsters	.64	.168	1.51	.028
Lobster tails	2.03	.073	2.43	.026
Clams	.51	.067	.50	.037
Scallops	1.19	.068	1.77	.040
Other shellfish	.87	.005	.42	.009
Haddock	.76	.338	.70	.605
Flounder-sole	.78	.433	.70	.316
Halibut	.86	.293	.78	.102
Ocean perch	.51	.571	.48	.324
Cod	.63	.475	.58	.522
Salmon	.90	.156	1.07	.020
Red snapper	.74	.109	.38	.234
Catfish	.71	.141	.62	.107
Whiting	.37	.154	.24	.270
All other finfish	.67	.657	.60	.852

background purchase the greatest quantities. Both groups are consumers of those products which are growing steadily in consumption, that is, shrimp and "other shellfish" and groundfish species. Apparently, those who are consumers of fish by tradition are inclined to purchase greater quantities of new products as they are available.

A few fishery products are marketed nationwide, however, the majority are consumed more heavily in the regions where they are landed. Several analysts expected stronger seasonal shifts in fish purchases than were detected by the survey. Those seasonal shifts which did occur are probably conditioned more by availability than by seasonal preferences of consumers.

Income and occupation are rather mixed in terms of explaining fish purchases. The purchase of most species tends to be greater for higher income groups. By occupation, clerical and sales workers are the most important purchasers. By type of household, occupants in older households and single-person households are the most frequent users.

Consumption Away from Home

Away-from-home purchases show distinct characteristics in the type of products and type of purchasers. Comparisons indicate that lobsters and clams are more frequently purchased away from home, and perch and flounder are more popular for home consumption. While income seemed to have mixed effects on home consumption, it is a definite determining factor in consumption away from home, as shown

in table 10. This fact is brought out most explicitly for household incomes of over $15,000 per year. Gradual increases in fish meals away from home are seen beginning at about the $6,000 to $8,000 income range, but are much more important as the $15,000 classification is approached.

Comparing meals eaten away from home across household income classes from $6,000 to $8,000 to over $15,000, we find that shrimp, clams, crabs, tuna, seafood platters, and flounder-sole show the strongest increases. Those which generally are affected less by income are oysters, perch, haddock, and fish sandwiches.

The age of household head accounts for a great difference in the number of fish meals purchased away from home, both totally and by individual product (table 11). The older the household head the more frequent the purchase of such meals. This probably is part of a general pattern for older households to eat out more often. Some of the more frequently purchased products fail to show increases for the over 55 group. These are shrimp, lobster, crabs, tuna, seafood platters, and fish sandwiches. These products are apparently better known by the lower age groups and result in an equalizing effect across age groups. Even for these products, however, the under 35 age group is definitely the low volume purchaser.

Meals purchased away from home by race and religion (tables 12 and 13, respectively) follow the overall pattern of the home purchasers, that is, Negro families purchased more meals per person

Table 10.--Meals purchased away from home per person by income per household

Product	Under $4,000	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$7,999	$8,000-$8,999	$9,000-$9,999	$10,000-$14,999	Over $15,000
	Number								
Shrimp	.452	.416	.446	.572	.619	.909	.918	1.092	1.906
Lobster	.120	.117	.088	.386	.088	.236	.114	.283	.676
Clams	.082	.060	.189	.128	.036	.180	.150	.251	.382
Crabs	.138	.117	.148	.092	.075	.126	.075	.134	.400
Oysters	.085	.026	.060	.128	.066	.118	.068	.098	.222
Perch	.153	.151	.097	.221	.047	.252	.193	.169	.120
Halibut	.149	.077	.063	.088	.054	.112	.154	.138	.140
Haddock	.242	.154	.094	.126	.124	.122	.143	.121	.129
Tuna	.173	.107	.152	.113	.047	.188	.198	.184	.616
Seafood platter	.317	.232	.218	.216	.372	.279	.222	.368	.590
Fish sandwich	.312	.346	.212	.291	.329	.310	.216	.352	.410
Flounder-sole	.193	.110	.209	.133	.163	.145	.154	.235	.500
Other	1.918	1.400	1.246	1.570	1.729	1.454	1.611	1.936	2.672

Table 11.--Meals purchases away from home by age of head of household

Product	Under 35 yrs.	35-44 yrs.	45-54 yrs.	Over 55 yrs.
	Number			
Shrimp	.618	.675	1.165	1.003
Lobster	.149	.232	.359	.252
Clams	.144	.146	.199	.210
Crabs	.079	.184	.160	.171
Oysters	.042	.050	.106	.186
Perch	.073	.101	.100	.307
Halibut	.046	.031	.102	.251
Haddock	.061	.058	.170	.250
Tuna	.095	.156	.360	.214
Seafood platter	.202	.224	.475	.401
Fish sandwich	.249	.319	.416	.289
Flounder-sole	.089	.184	.231	.333
Other	1.028	1.379	2.032	2.534

Table 12.--Meals purchased away from home by race (per person)

Product	Negro	White
	----Number-----	
Shrimp	1.40	.90
Lobster	.32	.26
Clams	.16	.18
Crabs	.20	.15
Oysters	.04	.11
Perch	--	.16
Halibut	--	.12
Haddock	--	.15
Tuna	--	.22
Seafood platter	1.24	.33
Fish sandwich	.52	.32
Flounder-sole	.04	.23
Other	3.16	1.81

Table 13.--Meals purchased away from home by religion (per person)

Product	Catholic	Jewish	Protestant
	----------	Number	----------
Shrimp	.831	1.978	.850
Lobster	.290	1.390	.200
Clams	.172	.382	.173
Crabs	.158	.147	.147
Oysters	.084	.029	.110
Perch	.254	.022	.136
Halibut	.096	.147	.124
Haddock	.127	.264	.144
Tuna	.282	1.169	.154
Seafood platter	.256	.522	.352
Fish sandwich	.320	.294	.318
Flounder-sole	.220	.346	.216
Other	1.802	2.338	1.800

than white families, and Jewish families purchased more than families of other religions. Negro families again purchased greater amounts of shrimp, lobster, and crabs, than did white households and we can add seafood platters and fish sandwiches to the list. In the case of religion, Jewish households purchase proportionately less flounder-sole and halibut, and more lobster, shrimp, and clams in away-from-home purchases. Catholic and Protestant households show proportionately higher consumption of "other" fishery products away from home compared to the home consumption.

Regional patterns in away-from-home purchases are quite closely aligned with the home purchases, as shown in table 14.

Occupational classes show some changes in away-from-home purchases, as shown in table 15. Those in clerical and sales occupations, in most instances, continue to be the most important users. Noticeable decreases in away-from-home purchases of "all other" (labor and services) occupations are found. Consumption by professional and semi-professional people is an important segment of the away-from-home purchases, probably more properly an income-related effect than occupation per se.

Seasonal shifts in away-from home consumption are not strong for any product (table 16). These may be summarized as follows: shrimp, tuna, flounder-sole, and other meals are purchased more frequently in spring and summer; while lobster, haddock, and seafood platters exhibit a slight increase in summer or late summer.

Table 14.--Meals purchased away from home by region (per person)

	New Eng.	Mid Atlan.	E.North Central	W.North Central	South Atlan.	E.South Central	W.South Central	Mtn.	Pac.
	Number								
Shrimp	1.003	.893	.611	.822	1.038	.384	.896	1.438	1.240
Lobster	.929	.386	.140	.113	.163	.060	.052	.216	.360
Clams	1.158	.188	.086	.124	.088	.013	.032	.118	.257
Crabs	.222	.240	.034	.026	.261	.046	.082	.032	.312
Oysters	.050	.072	.046	.038	.136	.298	.165	.097	.139
Perch	0	.028	.534	.065	.117	.076	.030	.070	.026
Halibut	.104	.054	.090	.140	.026	.010	.066	.718	.260
Haddock	.394	.236	.138	.140	.088	.119	.075	.064	.036
Tuna	.532	.144	.134	.253	.342	.060	.072	.156	.318
Seafood platter	.259	.413	.260	.186	.468	.338	.388	.297	.310
Fish sandwich	.124	.350	.444	.407	.492	.172	.096	.184	.186
Flounder-sole	.208	.318	.124	.072	.354	.496	.088	.162	.188
Other	2.098	1.608	1.715	1.180	2.020	1.976	1.478	1.789	2.563

Table 15.--Meals purchased away from home by occupation of household head (per person)

	A	B	C	D	E	F
	Number					
Shrimp	.996	1.068	1.298	.808	.386	.633
Lobster	.262	.320	.451	.190	.060	.197
Clams	.204	.229	.219	.124	.059	.203
Crabs	.192	.161	.219	.114	.056	.158
Oysters	.131	.169	.082	.107	.036	.055
Perch	.152	.152	.210	.150	.124	.148
Halibut	.108	.134	.144	.128	.041	.125
Haddock	.122	.182	.144	.120	.112	.160
Tuna	.301	.206	.344	.130	.080	.203
Seafood platter	.416	.390	.340	.272	.147	.387
Fish sandwich	.397	.306	.210	.318	.370	.296
Flounder-sole	.344	.198	.410	.135	.079	.173
Other	2.066	1.636	1.946	1.774	1.326	2.016

A = Professional and semi-professional workers

B = Proprietors, managers, and officials

C = Clerical and kindred workers, and sales workers

D = Craftsmen, foremen and kindred workers

E = Operative and kindred workers

F = All others

Summary

In summary, the away-from-home purchases show similarities as well as some important differences from home purchases. Region, season, and age of household head, show the same general relationships in each type of purchase. Income has a more definite influence for away-from-home purchases, no doubt reflecting a general tendency for higher income groups to eat out more frequently. Those in professional occupations also definitely are more important as away-from-home purchasers than as home purchasers.

There are innumerable untapped markets for fish and shellfish over a large cross-section of the population. Habit and tradition seem to be quite strong in fish buying patterns. Race, religion, age of household head, and regional location are the most important determinants of per capita fish consumption.

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44. Methods for Calculating Civilian Per Capita Consumption of Fresh and Frozen Shellfish by S. Erickson. February 1970

45. The Organization of the California Tuna Industry: An Economic Analysis of the Relations Between Performance and Conservation in the Fisheries by R. Marasco. March 1970

46. Preliminary Analyses of a Survey of Buying Patterns for Fresh and Frozen Fish and Shellfish by Household Characteristics by D. Nash. August 1970

47. Projections of Certain Fishery Products of Commercial Importance in Louisiana by D. Nash. April 1970

48. The Productivity of the Sea and Malthusian Scarcity by F. Bell and E. Carlson. April 1970

49. A Survey of Fish Purchases by Socio-Economic Characteristics - Fourth Quarterly Report - November, December 1969, and January 1970 by D. Nash. April 1970

50. A Survey of Fish Purchases by Socio-Economic Characteristics- Annual Report by D. Nash. April 1970

51. Basic Economic Indicators - Atlantic Groundfish. April 1970

52. Basic Economic Indicators - Halibut. April 1970

53. Basic Economic Indicators - Northern Lobsters. April 1970

54. Basic Economic Indicators - Sea Scallops. April 1970

55. Basic Economic Indicators - Clams. April 1970

56. Basic Economic Indicators - Oysters. May 1970

57. Basic Economic Indicators - Shrimp. May 1970

58. Basic Economic Indicators - Blue Crabs. May 1970

59. Basic Economic Indicators - King and Dungeness Crabs. May 1970

60. Basic Economic Indicators - Menhaden. May 1970

61. Basic Economic Indicators - Tuna. May 1970

* 62. Basic Economic Indicators - Salmon. May 1970

71. Economic Projections of the U.S. and World Demand for Major Fishery Products by F. Bell, D. Nash and F. Waugh. June 1970

72. The Fundamental Theory of the Economics of Commercial Fishing by E. Carlson. June 1970

73. The Determinants of Actual and Subsidized Competitive Strengths and Weaknesses of U.S. and Canadian Groundfish Fisheries by D. Cleary. August 1970

74. Regional and other Related Aspects of Shellfish Consumption-- Some Preliminary Findings from the 1969 Consumer Panel Survey by D. Nash and M. Miller. September 1970

75 Cross Section Production Functions for North Atlantic Groundfish and Tropical Tuna Seine Fisheries -- Measures of Fishing Power and Their Use in the Measurement of Fishing Effort by E. Carlson September 1970

* 63 through 70 are presently in process and cover basic economic indicators for 16 other master plan fisheries.

The goal of the Division of Economic Research is to engage in economic studies which will provide industry and government with costs, production and earnings analyses; furnish projections and forecasts of food fish and industrial fish needs for the U.S.; develop an overall plan to develop each U.S. fishery to its maximum economic potential and serve as an advisory service in evaluating alternative programs within the Bureau of Commercial Fisheries.

In the process of working towards these goals an array of written materials has been generated representing items ranging from interim discussion papers to contract reports. These items are available to interested professionals in limited quantities of offset reproduction. These "Working Papers" are not to be construed as official BCF publications and the analytical techniques used and conclusions reached in no way represent a final policy determination endorsed by the U.S. Bureau of Commercial Fisheries.