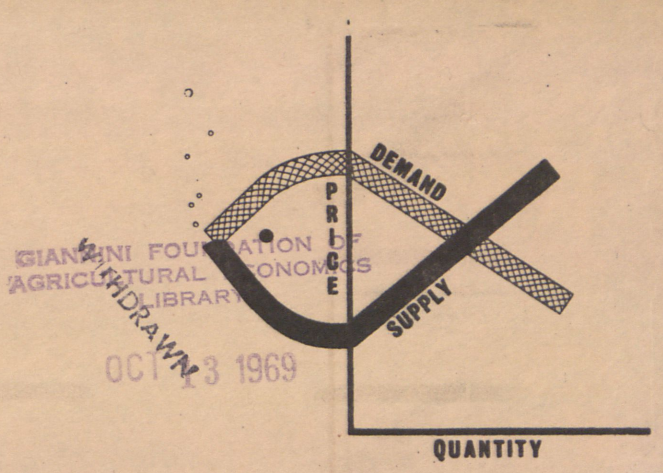

AN INVENTORY OF DEMAND EQUATIONS FOR FISHERY PRODUCTS

by

Darrel A. Nash and Frederick W. Bell
Division of Economic Research

Working Paper No. 10

July 1969

BUREAU OF COMMERCIAL FISHERIES
DIVISION OF ECONOMIC RESEARCH

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AN INVENTORY OF DEMAND EQUATIONS

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PREFACE

During FY 1969, the Division of Economic Research held a very important conference on the demand for fishery products. This conference was held in November of 1968 and attracted researchers in this field throughout the country. The purpose of the conference was to draw together on a species basis all the statistical demand relationships which had been computed by various researchers. These demand equations, in general, mathematically relate fish consumption by species to various demand determinants such as per capita income and prices. Notebooks containing these demand functions were then assembled and distributed to the conferees. After much discussion and debate, a demand function was chosen for each species as the best specimen so far in this area. The conference was an overwhelming success in that it greatly aided the Division of Economic Research in collecting and classifying demand functions for each U. S. fishery. The conference also served as a useful guide to further research in the demand and marketing areas. The equations presented in this Working Paper were selected as the most representative of all those submitted to the conference.

It is hoped that these equations will be useful as background information for those that are doing further work in fishery demand analysis.

Index of Researchers

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Index by Species

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
1	haddock	New England	landings	annual	least squares	log	Bell	unit reg. coeff. t-value
4a	haddock	Boston Fish Pier	landings	monthly	least squares	log	Waugh	unit reg. coeff. t-value
4a	scrod	Boston Fish Pier	landings	monthly	least squares	log	Waugh	unit reg. coeff. t-value
8	haddock	New England	wholesale	monthly	limited information max. liklihood	log	Lampe and Farrell	unit reg. coeff. t-value
9a	haddock	Holyoke-Springfield, Mass.	retail	weekly	least squares	linear	Storey and Lee	unit reg. coeff. t-value
11	cod	Boston New Bedford Gloucester	landings	monthly	least squares	log	Bell	unit reg. coeff. t-value
14	cod	New York	wholesale	monthly	least squares	log	Waugh	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable	X_1 Price	X_2 Quantity	X_3 Imports	X_4 Cold Storage Holdings	X_5 Personal Income	X_6 Quantity of Competing Fish
	unit	cents/lb.	thous. lbs.	thous. lbs.		.1 million	
1	reg. coeff. X_1		-3.833	0.0258		0.4355 1/	
	t-value		-1.103	0.105		2.296	
	unit	cents/lb.	million lbs.				million lbs.
4a	reg. coeff. X_1		-0.301				0.0 3/
	t-value		6.82				0.01
	unit	cents/lb.	million lbs.				million lbs.
4a	reg. coeff. X_1		-0.231				-0.052
	t-value		6.78				1.18 4/
	unit					-1.11151 40/	
8	reg. coeff. X_2	+1.40155 5/ 40/					
	t-value						
	unit						
9a	reg. coeff. X_2	-1.245					1.886 7/
	t-value	2.578					4.663
	unit	cents/lb.	thous. lbs.	thous. lbs.	thous. lbs.	.1 million	
11	reg. coeff. X_1		-0.303	0.051	0.162	-0.605 1/	
	t-value		0.844	1.364	5.605	3.025	
	unit	cents/lb.	million lbs.				
14	reg. coeff. X_1		-0.34459				
	t-value		2.43				

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_7 Price of Competing Fish	X_8 Price of Competing Fish	X_{11} Price Index	X_{12} Sin 30^o t	X_{13} Cos 30^o t	X_{14} Lent Demand	X_{15} Bishops' Decree
	unit			1957-59 = 100				
1	reg. coeff.			1.884 2/				
	t-value			2.804				
	unit							
4a	reg. coeff.				-0.001	0.060		
	t-value				0.16	5.62		
	unit							
4a	reg. coeff.				-0.002	0.055		
	t-value				0.23	5.21		
	unit							
8	reg. coeff.			-1.49905 6/ 40/				
	t-value							
	unit	cents/lb.	cents/lb.					
9a	reg. coeff.	2.243 8/	2.510 9/					
	t-value	2.816	2.620					
	unit	cents/lb.		1957-59 = 100			1 non-Lent mos.	1 before mos.
11	reg. coeff.	0.313 10/		1.732 2/			10 Lent	10 after
	t-value	6.904		7.270			0.034	-0.019
							2.370	-0.871
	unit							
14	reg. coeff.				0.00004	0.00007		
	t-value				3.51	4.08		

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_{16} Time	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
1	unit			0.767	1.1	-2.609	1.136
	reg. coeff.						
	t-value						
4a	unit			0.86		-3.22	
	reg. coeff.	0.001					
	t-value	2.95					
4a	unit			0.82		-4.33	
	reg. coeff.	0.001					
	t-value	2.95					
8	unit						
	reg. coeff.		14.5166 40/		1.4		
	t-value						
9a	unit			0.82	1.668		
	reg. coeff.			adj. for			
	t-value			D.F.			
11	unit			0.815	1.015	-3.300	-1.997
	reg. coeff.		-1.142				
	t-value						
14	unit			0.79		-2.9	
	reg. coeff.	0.0041					
	t-value	11.40					

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
16	yellowtail flounder	New Bedford	landings	monthly	least squares	log	Bell	unit reg. coeff. t-value
19	flounder	Fulton Fish Market	wholesale	monthly	least squares	log	Waugh	unit reg. coeff. t-value
20	whiting	Gloucester Portland Rockland	landings	monthly	least squares	log	Bell	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable		X_1 Price	X_2 Quantity	X_3 Imports	X_4 Cold Storage Holdings	X_5 Personal Income	X_7 Price of Competing Fish
16	unit		cents/lb.	thous. lbs.	thous. lbs.	thous. lbs.	.1 million	cents/lb.
	reg. coeff.	X_1		-0.438	-0.059	0.184	0.771 1/	0.252 11/
	t-value			13.818	1.194	5.276	3.238	4.367
19	unit		cents/lb.	million lbs.				
	reg. coeff.	X_1		-0.09728				
	t-value			1.10				
20	unit		cents/lb.	thous. lbs.	thous. lbs.	thous. lbs.	.1 million	cents/lb.
	reg. coeff.	X_1		-0.044	-0.152	-0.057	1.223 1/	0.561
	t-value			4.866	2.350	2.130	3.176	3.373

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_{11} Price Index	X_{12} Sin 30^{o} t	X_{13} Cos 30^{o} t	X_{14} Lent Demand	X_{15} Bishops' Decree
	unit	1957-59 = 100			1 non-Lent mos.	
16	reg. coeff.	1.710 2/			10 Lent	
	t-value	5.296			0.088	
					4.758	
	unit		0.00007	0.00003		
19	reg. coeff.		7.76	3.34		
	t-value					
					1 non-Lent mos.	1 before mos.
	unit	1957-59 = 100			10 Lent	10 after
20	reg. coeff.	2.024 2/			0.101	-0.100
	t-value	4.062			3.593	2.123

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_{16} Time	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
16	unit reg. coeff. t-value			0.806	1.169	-2.283	1.760
19	unit reg. coeff. t-value	0.00049 14.75		0.82			
20	unit reg. coeff. t-value		-6.484	0.706	1.341	-22.727	27.795

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
27	fish meal	United States	wholesale	quarter	least squares	linear	Wheeland	unit reg. coeff. t-value
28	fish meal	United States	wholesale	quarter	least squares	linear	Wheeland	unit reg. coeff. t-value
29	fish meal	United States	wholesale	quarter	least squares	linear	Wheeland	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		Dependent Variable	X_1	X_2 Broiler Placements in 4th Qtr.	X_3 Price of Peruvian Fish Meal in 4th Qtr.	X_4 Time	X_5 Price of Peruvian Soybean Fish Meal	X_6 3rd Qtr. Broiler Placements	R^2	Constant
27	unit reg. coeff.	X_1	Fish Meal Use in 4th Qtr.	0.435	-2.175				0.87	199.60
	t-value			2.20	-3.78					
28	unit reg. coeff.	X_1	Fish Meal Imports to U. S.			4.00	-110.86		0.77	208.86
	t-value					9.44	-5.53			
29	unit reg. coeff.	X_1	4th Qtr. Fish Meal Use				-142.47	0.44	0.85	110.477
	t-value						-3.56	4.38		

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
30a	canned tuna	U.S.	landings	annual	least squares	linear	Suttor	unit reg. coeff. t-value
31a	canned salmon	U.S.	landings	annual	least squares	log	Suttor	unit reg. coeff. t-value
32	bluefish	Fulton Fish Market	wholesale	monthly	least squares	log	Waugh	unit reg. coeff. t-value
32a	mackerel	Fulton Fish Market	wholesale	monthly	least squares	log	Waugh	unit reg. coeff. t-value
34	nothern lobster	U.S.	landings	annual	least squares	log	Waugh	unit reg. coeff. t-value
35	scallops	New England	landings	annual	least squares	log	Bell	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable	X_1 Price	X_2 Quantity	X_3 Imports	X_4 Cold Storage Holdings	X_5 U.S. Personal Income	X_6 Quantity of Competing Fish
30a unit	X_2						
reg. coeff.		-5.446				0.823	
t-value		6.440				3.578	
31a unit							
reg. coeff.	X_2	-0.006					
t-value		0.030				-1.628	
						3.818	
32 unit	X_1	cents/lb.	million lbs.				
reg. coeff.			-0.23889				-0.01783 14/
t-value			3.28				0.70
32a unit	X_1	cents/lb.	million lbs.				
reg. coeff.			-0.06258				-0.00399 15/
t-value			1.96				0.04
34 unit	X_1	cents/lb.	lbs/100 per.			per cap. dol.	
reg. coeff.			-1.20008			1.11746	
t-value			4.75			14.99	
35 unit	X_1	cents/lb.	thous. lbs.	thous. lbs.		.1 million	
reg. coeff.			-0.624	-0.654		1.291 1/	
t-value			2.526	9.857		0.890	

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	X_7 Price of Competing Fish	X_8 Price of Competing Fish	X_{11} Price Index	X_{12} Sin 30° t	X_{13} Cos 30° t	X_{14} Lent Demand	X_{15} Bishops' Decree
30a unit							
reg. coeff.	6.869 12/						
t-value	4.223						
31a unit							
reg. coeff.	0.308 13/						
t-value	2.351						
32 unit							
reg. coeff,				0.00004	0.00002		
t-value				2.0	0		
32a unit							
reg. coeff.				0.00009	0.00003		
t-value				3.0	1.5		
34 unit							
reg. coeff,							
t-value							
35 unit			1957-59 = 100				
reg. coeff.			0.4166 2/				
t-value			0.441				

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	X_{16} Time	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
30a unit			0.959		-0.572	0.993
reg. coeff.						
t-value						
31a unit			0.889		-0.006	-1.628
reg. coeff.						
t-value						
32 unit						
reg. coeff.	0.00056		0.68		-4.19	
t-value	8.0					
32a unit						
reg. coeff.	0.00042		0.55		-16.0	
t-value	4.7					
34 unit			0.95		-0.83	0.93
reg. coeff						
t-value						
35 unit						
reg. coeff.		-7.795	0.583	2.408	-1.602	2.069
t-value						

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
36	scallops	New Bedford	landings	monthly	least squares	log	Bell	unit reg. coeff. t-value
39	clams	Fulton Fish Market	wholesale	monthly	least squares	log	Waugh	unit reg. coeff. t-value
40a	fresh and frozen oysters	U.S.	landings	annual	least squares	log	Suttor	unit reg. coeff. t-value
40	oysters	U.S.	wholesale	annual	least squares	linear	Nash	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable	X_1 Price	X_2 Quantity	X_3 Imports	X_4 Cold Storage Holdings	X_5 U.S. Personal Income	X_6 Quantity of Competing Fish
36 unit	X_1	cents/lb.	thous. lbs.	thous. lbs.	thous. lbs.	.1 million	
reg. coeff.			-0.654	0.015	-0.154	0.321 1/	
t-value			9.857	0.818	6.043	1.763	
39 unit	X_1	cents/lb.	million lbs.				
reg. coeff.			-0.19853				
t-value			2.23				
40a unit	X_2						
reg. coeff.		-0.103					
t-value		0.463					
40 unit	X_2		lbs./cap.				
reg. coeff.							
t-value							

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_7 Price of Competing Fish	X_8 Price of Competing Fish	X_9 Price of Competing Fish	X_{11} Price Index	X_{12} Sin 30° t	X_{13} Cos 30° t	X_{14} Lent Demand
36	unit	cents/lb.			1957-59 = 100			1 non-Lent mos. 10 Lent
	reg. coeff.	-0.260			0.436 2/			0.004
	t-value	3.571			1.592			0.257
39	unit							
	reg. coeff.					-0.00002	-0.00001	
	t-value					1.40	0.43	
40a	unit							
	reg. coeff.	0.711 16/	0.212 17/	0.016 18/				
	t-value	3.977	2.244	0.217				
40	unit	cents/lb.						
	reg. coeff.	0.0056 16/						
	t-value	2.85						

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	X_{16} Time	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
36 unit						
reg. coeff.			0.717	0.711	-1.529	0.491
t-value						
39 unit						
reg. coeff.	0.00058		0.86		-5.10	
t-value	18.34					
40a unit						
reg. coeff.			0.976		-0.103	-1.208
t-value						
40 unit						
reg. coeff.	-0.0192	0.352	0.83		0.505 19/	
t-value	12.010					

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
42	shrimp	S. Atlantic and Gulf	landings	monthly	least squares	linear	Waugh	unit reg. coeff. t-value
42a	shrimp	U.S.	landings	annual	least squares	linear	Suttor	unit reg. coeff. t-value
44	shrimp	Chicago 26-30 count	wholesale	quater	least squares	linear	Elkin	unit reg. coeff. t-value
47	shrimp	U.S.	wholesale	quarter	least squares	linear	Doll	unit reg. coeff. t-value
48	shrimp	U.S.	wholesale	annual	least squares	linear	Elkin	unit reg. coeff. t-value
50	shrimp	U.S.	retail	annual	least squares	linear	Cleary	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Confernece Problem No.	Dependent Variable	X_1 Price	X_2 Quantity	X_3 Imports	X_4 Cold Storage Holdings	X_5 Personal Income	X_7 Price of Competing Fish
	unit	cents/lb.	million lbs.				
42	reg. coeff. X_1		-0.796				
	t-value		1.60				
	unit						
42a	reg. coeff. X_2	-0.290				1.329	0.082 16/
	t-value	2.167				2.513	0.293
	unit						
44	reg. coeff. X_2	-1.34836					
	t-value	6.08488					
	unit						
47	reg. coeff. X_2	-0.144				0.168	
	t-value	4.63				11.89	
	unit	lbs. per capita				lbs. per cap	
48	reg. coeff. X_2	-0.00654				0.73452	
	t-value	4.15009				10.86097	
	unit	lbs. per capita		lbs. per cap	lbs. per cap		
50	reg. coeff. X_2	0.375		0.150	0.247		
	t-value	1.596		3.000	3.742		

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_8 Price of Competing Fish	X_9 Price of Competing Fish	X_{12} Sin 30^o t	X_{13} Cos 30^o t	X_{16} Time	X_{17} Other Variables	X_{18} Other Variables
	unit							
42	reg. coeff.			29.526	-27.517	0.483	-1.979 20/	-1.767 21/
	t-value			5.91	5.63	6.56	2.72	2.36
	unit							
42a	reg. coeff.	0.150 24/	0.073 17/					
	t-value	0.379	0.388					
	unit							
44	reg. coeff.					4.00795	-0.4337 25/	0.36193 26/
	t-value					14.047	0.57158	0.07622
	unit							
47	reg. coeff.						0.002 25/	0.038 26/
	t-value						0.24	3.88
	unit							
48	reg. coeff.							
	t-value							
	unit							per cap
50	reg. coeff.							0.371 28/
	t-value							4.638

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_{19} Other Variables	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
42	unit reg. coeff. t-value	-2.408 22/ 3.51		0.61		-0.78 23/	
42a	unit reg. coeff. t-value			0.934		-0.290	1.329
44	unit reg. coeff. t-value	0.40268 27/ 0.07641		0.897	2.168	-0.38	
47	unit reg. coeff. t-value	0.039 27/ 3.95	0.060	0.828		-0.41	1.14
48	unit reg. coeff. t-value		0.30912	0.931	0.984	-0.46	1.24
50	unit reg. coeff. t-value		0.004	0.918		+0.375	

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
51	shrimp	U.S.	retail	annual	least squares	linear	Cleary	unit reg. coeff. t-value
54	crabs	Fulton Fish Market	wholesale	monthly	least squares	linear	Waugh	unit reg. coeff. t-value
57	yellow perch	Lake states	wholesale	annual	least squares	linear	Nash	unit reg. coeff. t-value
58	lake whitefish	Lake states	wholesale	annual	least squares	linear	Nash	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable		X_1 Price	X_2 Quantity	X_5 U. S. Personal Income	X_7 Price of Competing Fish	X_8 Price of Competing Fish
51	unit						
	reg. coeff.	X_2	-0.280		1.037	0.624 29/	0.349 30/
	t-value		0.989		5.010	2.943	1.646
54	unit		cents/lb.	million lbs.			
	reg. coeff.	X_1		-0.27793			
	t-value			3.76			
57	unit		cents/lb.	per cap lbs.	per cap dol.	cents/lb.	cents/lb.
	reg. coeff.	X_2	-0.00699		-0.00032	0.00332 35/	-0.0122 36/
	t-value		2.085		2.712	2.065	2.127
58	unit		cents/lb.	per cap lbs.		cents/lb.	
	reg. coeff.	X_2	-0.00817			0.00148 38/	
	t-value		2.499			0.328	

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_9 Price of Competing Fish	X_{10} Price of Competing Fish	X_{11} Price Index	X_{12} Sin 30^o t	X_{13} Cos 30^o t	X_{16} Time
51	unit reg. coeff.	-0.557 31/	0.538 32/	-0.863 33/			
	t-value	3.011	2.161	1.647			
54	unit reg. coeff.				-0.00006	-0.00003	0.00053
	t-value				2.52	2.29	11.03
57	unit reg. coeff.			0.00264 37/			
	t-value			2.465			
58	unit reg. coeff.			0.00687 37/			
	t-value			1.859			

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.		X_{18} Other Variables	Constant	R^2	D. W. Statistic	Price Elasticity	Income Elasticity
51	unit reg. coeff.	0.412 34/	-0.811	0.886		-0.28	
	t-value	0.572					
54	unit reg. coeff.			0.66		-3.60	
	t-value						
57	unit reg. coeff.		0.4055	0.78		-0.560	
	t-value						
58	unit reg. coeff.		0.895	R = 0.816		-1.09	-1.55
	t-value						

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Product	Geographic Area	Market Level	Observational Interval	Econometric Approach	Form of Equation	Researcher	Statistical Measure
59	lake trout	Lake States	wholesale	annual	least squares	linear	Nash	unit reg. coeff. t-value
60	yellow pike	Chicago	wholesale	monthly	least squares	linear	Waugh	unit reg. coeff. t-value

Equations Selected by Conference on Fishery Demand Analysis

Demand Conference Problem No.	Dependent Variable	X_1 Price	X_2 Quantity	X_{11} Price Index	X_{16} Time	X_{17} Other Variables	X_{18} Other Variables	Constant	R^2	Price Elasticity
	unit	cents/lb.	per cap lb.	cents/lb.				0.0527	0.913	-4.292
59	reg. coeff. X_2	-0.00079		0.00012 39/						
	t-value	9.249		1.226						
	unit	cents/lb.	thous. lbs.		10 months	thous. lbs.	thous. lbs.		0.60	
60	reg. coeff. X_1		-0.02848		0.0429	-0.02167 20/	-0.01383 21/			
	t-value		2.06		4.29	1.35	1.00			

Footnotes

1. Aggregate
2. CPI for meat and poultry
3. Scrod
4. Haddock
5. Frozen fillets
6. CPI
7. Swordfish
8. Cod
9. Halibut
10. No species given in formula
11. No species given in formula
12. Canned salmon
13. Canned tuna
14. Mackerel
15. Bluefish
16. Clams
17. Scallops
18. Shrimp
19. Cross
20. Quantity t-1
21. Quantity t-2
22. Quantity t-3
23. All time periods
24. Oysters
25. Second quarter
26. Third quarter
27. Fourth quarter
28. Per capita landings
29. Soft clam price index
30. Blue crab price index
31. Scallop price index
32. N. Lobster price index
33. Meat
34. Fresh and frozen finfish price index
35. Yellow pike
36. Average of haddock, flounder, ocean perch
37. Wholesale, fish
38. Lake trout
39. Beef (not index)
40. Significant at 5 percent confidence level

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14. A Price Incentive Plan for Distressed Fisheries by A. A. Sokoloski and E. W. Carlson.

15. Demand and Prices for Shrimp by D. Cleary.

16. Industry Analysis of Gulf Area Frozen Processed Shrimp and an Estimation of Its Economic Adaptability to Radiation Processing by D. Nash and M. Miller.

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In the process of working towards these goals an array of written materials have been generated representing items ranging from iterim 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.