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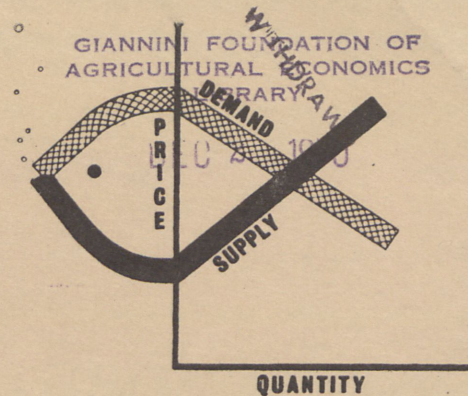
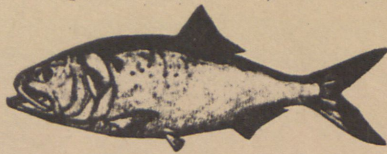
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## BASIC ECONOMIC INDICATORS

### MENHADEN

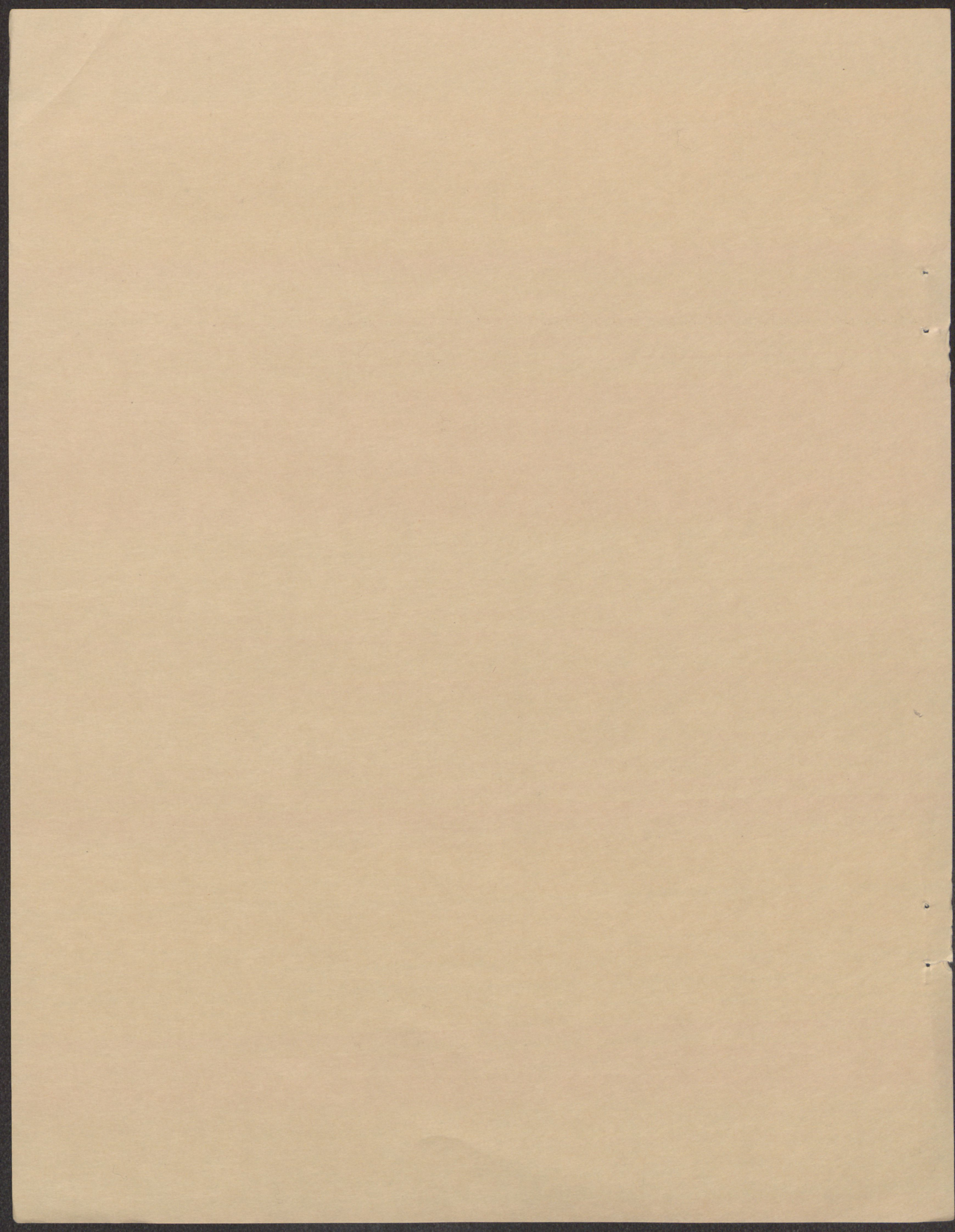
Master Plan Fishery 50 10 42

Working Paper No. 60

May 1970

105

BUREAU OF COMMERCIAL FISHERIES  
DIVISION OF ECONOMIC RESEARCH

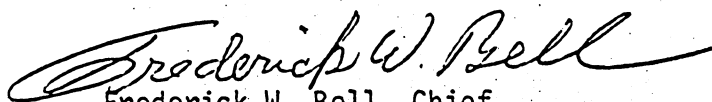


## Foreward

The purpose of "Basic Economic Indicators" is to bring together pertinent economic, technological and biological data for each Master Plan fishery. The Division of Economic Research of the Bureau of Commercial Fisheries has consolidated the basic variables which reflect the economic behavior of a fishery. Having this basic data set under one cover will materially aid research and development currently being conducted on each fishery and will serve as a helpful guide to policy decisions. In addition, Basic Economic Indicators reflect a major shift in thinking away from the separate discipline approach and to an interdisciplinary approach to solving many of the problems faced by the U.S. fishing industry. Hopefully, these data will be of great value in furthering quantitative analyses of the nation's fisheries.

It should be noted that data for 1967 and 1968 are preliminary. Some figures are approximations and are subject to revision. Comments and suggestions may be directed to the Division of Economic Research, 7338 Baltimore Avenue, College Park, Maryland 20740.

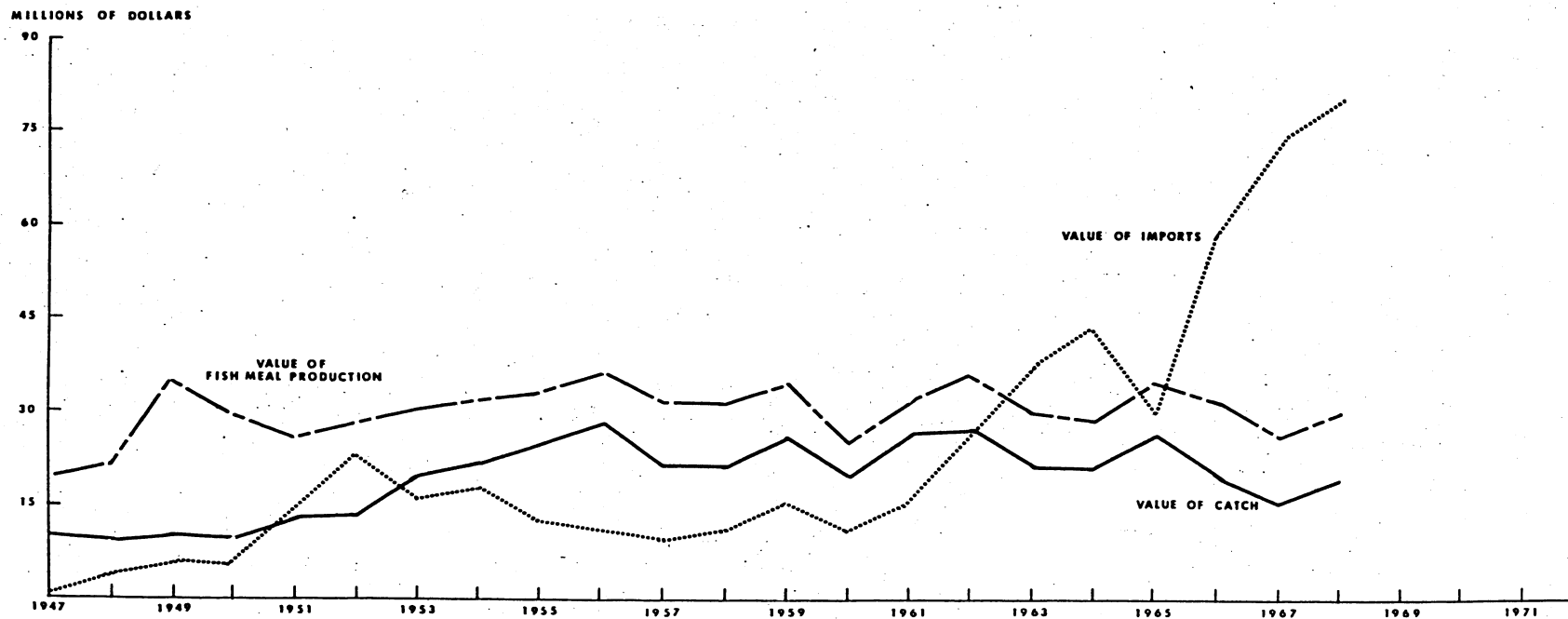
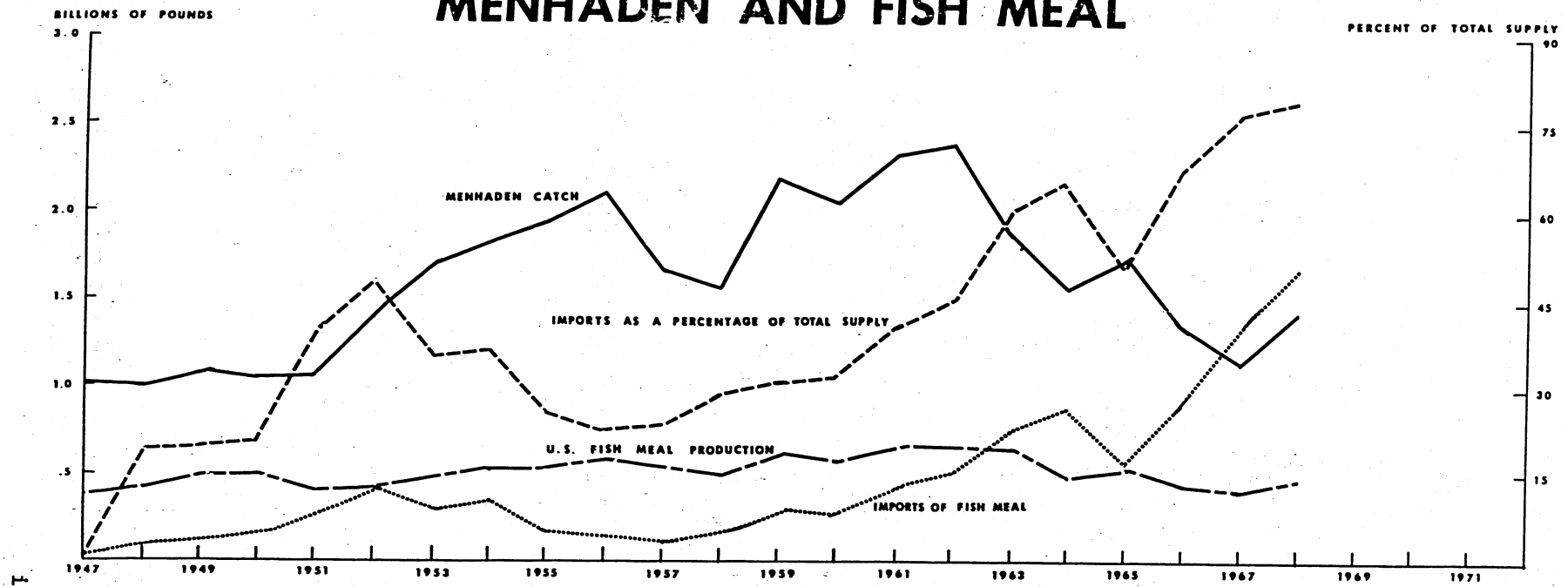
The "Basic Economic Indicators" were compiled and reviewed by the staff of the Division of Economic Research under the supervision of Richard K. Kinoshita with major contributions from Bruno G. Noetzel and Kenneth E. Koller.



Frederick W. Bell, Chief

Division of Economic Research

# MENHADEN AND FISH MEAL

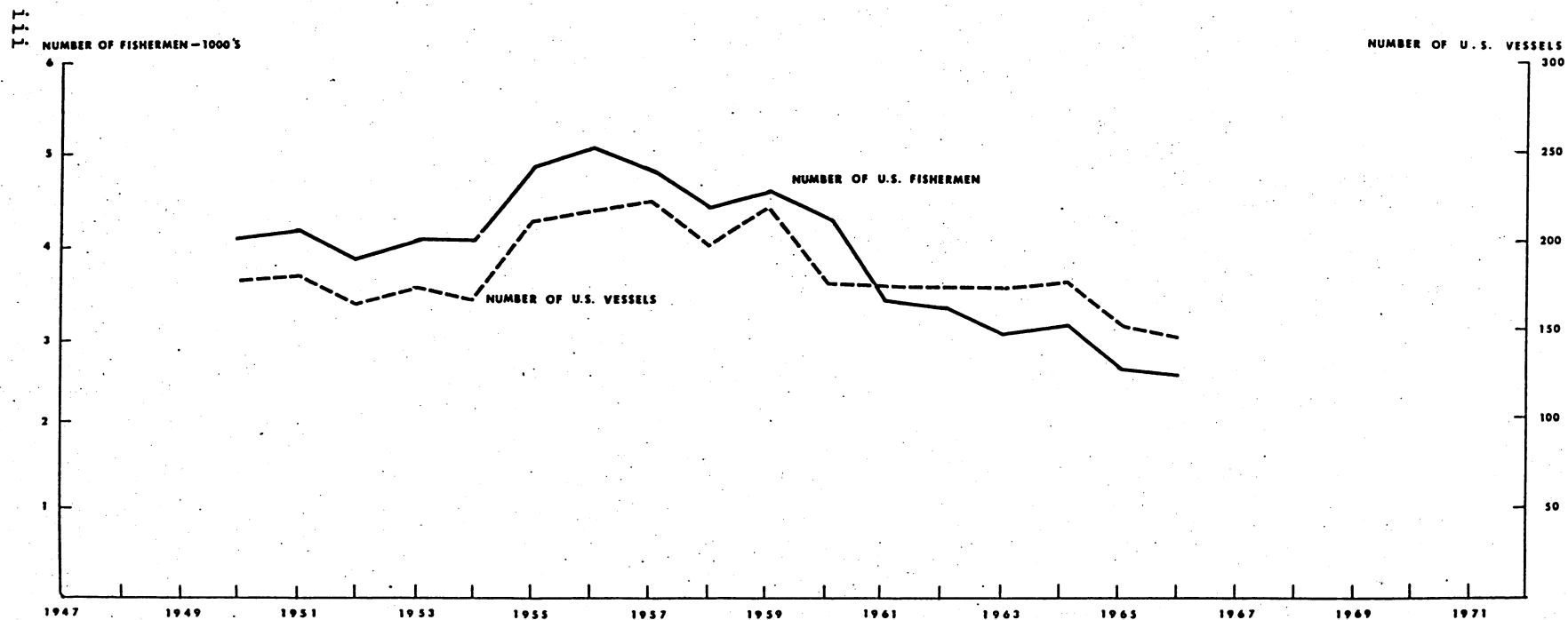
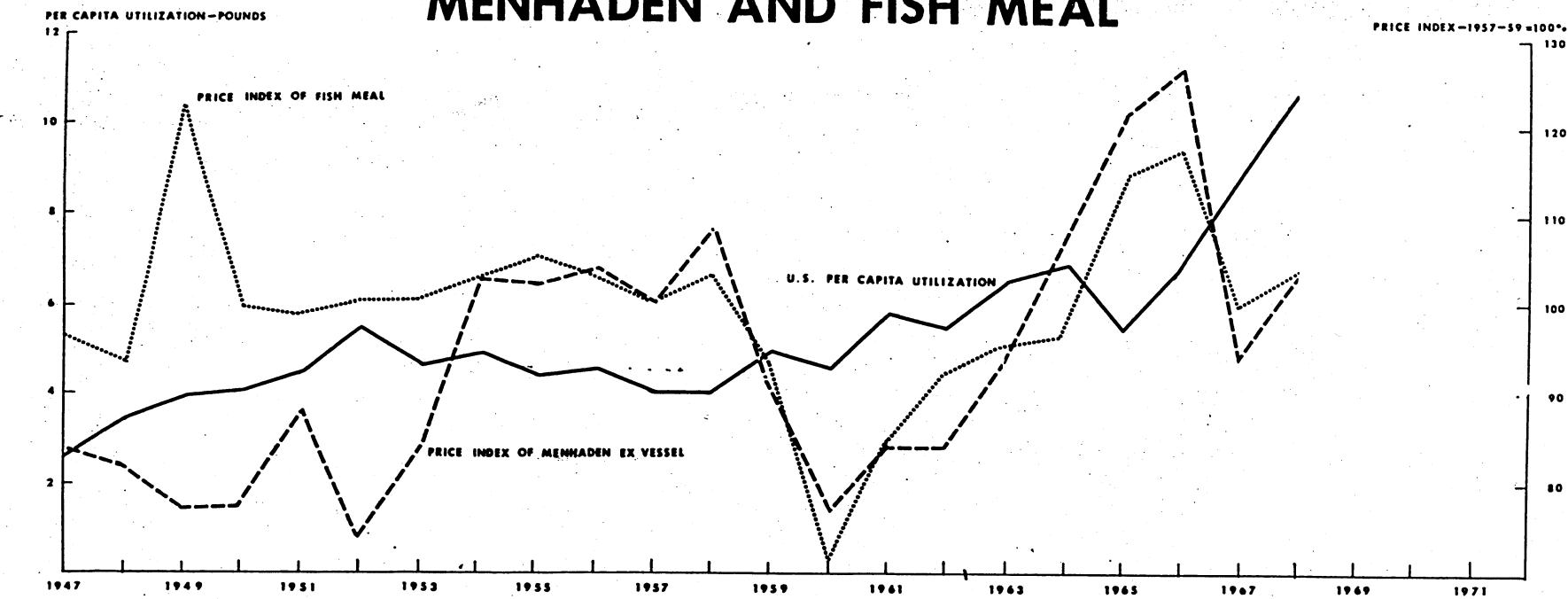


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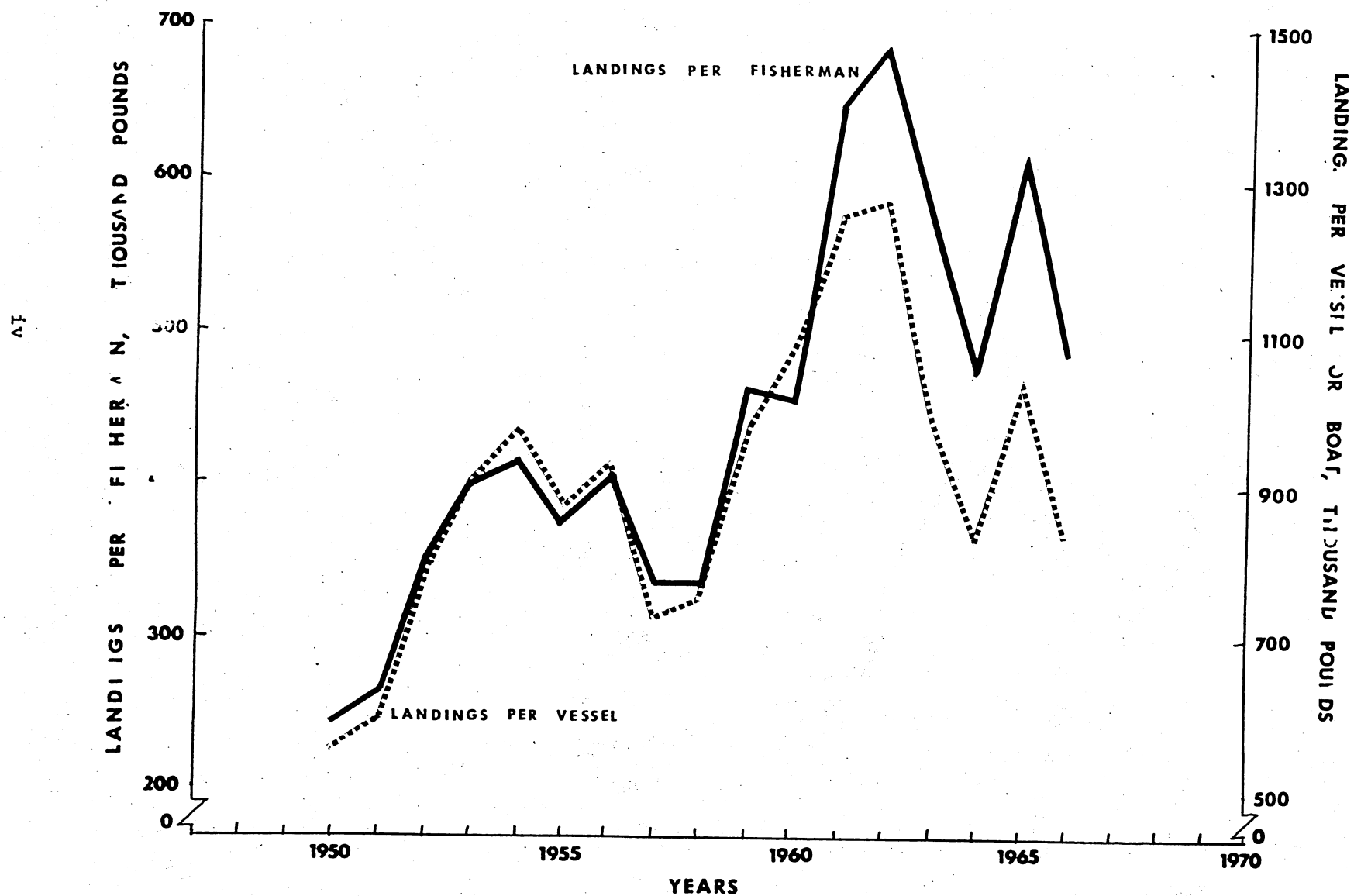
DIVISION OF ECONOMIC RESEARCH

BUREAU OF COMMERCIAL FISHERIES

# MENHADEN AND FISH MEAL



# PRODUCTIVITY OF WENHADEN FISHERMAN AND VESSELS, ATLANTIC AND GULF PURSE SEINE



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## I INDUSTRY PERFORMANCE INDICATORS

- Cost and earnings of vessels
- Earnings of fishermen
- Productivity
  - Vessels
  - Fishermen
  - Fishing effort
- Costs per pound of fish landed
- Historical growth rates
  - landings
  - fishermen
  - vessels

Table I-1.--Average cost and earnings of menhaden vessels, 1964-65

Item	1964 <sup>1/</sup>	1965 <sup>1/</sup>
No. of vessels	18	14
Av. length of vessels	133	132
No. of trips	n.a.	n.a.
Av. length of trip(days)	n.a.	n.a.
Crew size	17	17
Days at sea	130	145
Landings (pounds)	6,787,000	7,694,000
Av. price (\$/100 pounds)	1.41	1.57
Gross receipts (dollars)	95,700	120,801
Trip expenditures	-----Dollars per vessel-----	
Food	200	230
Fuel & lube	3,900	5,050
Other	882	1,088
Subtotal	4,982	6,368
Repair & maintenance		
Gear & supplies	9,789	11,015
Hull & engine	23,594	25,108
Subtotal	33,383	36,123
Fixed charges		
Interest	n.a.	n.a.
Insurance	10,755	11,180
Taxes & licenses	1,924	1,791
Administrative & lease	3,721	6,522
Subtotal	16,400	19,493
TOTAL CASH EXPENDITURES	54,765	61,984
TOTAL SHARE EXPENDITURES	40,935	58,817
Including:		
Wages	29,256	35,529
Captain's commission	n.a.	n.a.
Owner's share	11,679	23,288
Less depreciation	6,309	9,977
Net return before taxes	5,370	13,311

Source: Receipts and cost data from BCF, Division of Financial Assistance. Landings are estimations based on average prices for menhaden in 1964 and 1965 (Fishery Statistics of the U.S.). The samples include vessels operating in the South Atlantic and in the Gulf

<sup>1/</sup> Operations for fiscal year ending April 30, 1965 and 1966, respectively.

Table I-2.--Earnings of menhaden fishermen, 1964-65

Item	1964 <sup>1/</sup>	1965 <sup>1/</sup>
No. of vessels	18	14
Av. crew size	17	17
Gross receipts	\$ 95,700	\$ 120,801
Share to labor	29,256	35,529
Av. share per man <sup>2/</sup>	1,721	2,090
Food expenditures per man	12	13
Av. share per man including food <sup>2/</sup>	1,733	2,103
Real share <sup>3/</sup>	1,603	1,914
Wage in U.S. manufacturing	5,354	5,592
Real wage in U.S. manufacturing <sup>3/</sup>	4,953	5,088

Source: Based on data from Table I-1

<sup>1/</sup> Operations for fiscal year ending April 30, 1965 and 1966, respectively.

<sup>2/</sup> Share per fulltime fishermen or share per job site.

<sup>3/</sup> Deflated by CPI, 1957-1959=100

Table I-3.--Productivity of Atlantic and Gulf menhaden purse seine fishermen and vessels, 1950-66

	<u>Landings per fisherman</u>			<u>Landings per vessel</u>		
	Atlantic	Gulf	Combined 1/	Atlantic	Gulf	Combined 1/
	-----Thousand-----			-----pounds-----		
1950	239.2	258.1	245.4	5,640	5,260	5,502
1951	264.6	264.8	264.6	6,084	5,593	5,913
1952	303.2	299.3	349.8	7,082	6,479	7,955
1953	335.7	273.7	400.9	8,465	5,906	9,056
1954	384.7	286.8	415.2	9,243	6,368	9,743
1955	341.6	312.3	375.9	7,875	7,178	8,658
1956	347.6	317.9	403.9	7,990	7,464	9,343
1957	323.6	191.9	335.7	6,808	4,588	7,206
1958	313.5	232.8	333.8	6,280	5,534	7,545
1959	411.9	391.4	460.6	8,171	9,638	9,718
1960	459.7	446.1	453.8	8,594	11,604	10,794
1961	451.2	752.6	646.4	8,238	15,313	12,552
1962	539.2	689.2	685.6	9,115	13,439	12,718
1963	330.9	680.2	561.1	5,607	12,556	9,843
1964	186.0	738.4	477.2	3,136	13,426	8,335
1965	342.0	690.8	614.8	5,209	12,318	10,395
1966	267.1	509.7	487.4	4,040	9,001	8,346
1967						
1968						
1969						
1970						
1971						
1972						

Source: Data on landings, fishermen, and vessels from Fishery Statistics of the United States

1/ The Atlantic and Gulf combined may greatly differ from the components when duplicate fishermen and vessels are excluded.

Table I-4.--Costs per pound of menhaden landed, 1964-65

Item	1964 <sup>1/</sup>	1965 <sup>1/</sup>
Landings (pounds)	6,787,000	7,694,000
Gross receipts (dollars)	95,700	120,801
Average price (\$/100 pounds)	1.41	1.57
-----Dollars per 100 pounds-----		
Trip expenditures	0.07	0.08
Repair & maintenance	0.49	0.47
Fixed charges	0.24	0.25
Share to labor	0.43	0.46
Depreciation	0.09	0.13
Cost per unit of output	1.33	1.40

Source: Based on data from Table I-1

<sup>1/</sup> Operations for fiscal year ending April 30, 1965 and 1966, respectively.

Table I-5.--Financial structure of fishing firms: Atlantic and Gulf menhaden vessels

Item	All assets sizes		Under \$100,000		\$100,000-200,000		Over \$200,000	
	<u>thou.</u> <u>dol.</u>	<u>percent</u> <u>of total</u>	<u>thou.</u> <u>dol.</u>	<u>percent</u> <u>of total</u>	<u>thou.</u> <u>dol.</u>	<u>percent</u> <u>of total</u>	<u>thou.</u> <u>dol.</u>	<u>percent</u> <u>of total</u>
<u>Assets</u>								
Current assets	10.2	6.7	4.4	5.1	14.0	9.8	9.0	3.5
Net value of vessel	138.8	91.6	72.8	84.7	129.2	90.2	249.3	96.5
Other non-current assets	2.5	1.7	8.8	10.2	0	0	0	0
Total assets	151.5	100.0	86.0	100.0	143.2	100.0	258.3	100.0
<u>Liabilities</u>								
Total current liabilities	8.1	5.4	3.3	3.8	6.7	4.7	18.1	7.0
Total long-term liabilities	86.1	56.8	36.9	42.9	86.2	60.2	151.2	58.5
Capital stock earned surplus	57.3	37.8	45.8	53.3	50.3	35.1	89.0	34.5
Total liabilities and capital	151.5	100.0	86.0	100.0	143.2	100.0	258.3	100.0

Table I-6.--Estimated market value of a menhaden vessel,  
based on present value of future returns

Mean returns to vessel <sup>1/</sup>: \$17,483

Discount rate <sup>2/</sup> Percent:	Expected useful life - Years			
	5	10	15	20
	Market value in dollars:			
12	63,000	98,800	119,000	130,600
18	54,700	78,600	89,000	93,600
24	48,000	64,400	70,000	71,900

<sup>1/</sup> Based on data from Table I-1: Net return before taxes,  
plus depreciation, plus interest paid; average value  
for 1964-65.

<sup>2/</sup> Arbitrarily chosen.

Table I-7(a).--Historical growth rate of menhaden landings,  
fishermen and vessels

---

Landings <u>1/</u> (1947-1968)	+ 1.90 percent per year
Fishermen <u>2/</u> (1950-1966)	- 2.60 percent per year
Vessels <u>3/</u> (1950-1966)	- 0.52 percent per year

---

1/ Log of landings (mil. lbs.) =  $3.1388 + 0.0086 \text{ time}$   
(1.79)\*

2/ Log of number of fishermen =  $3.6942 - 0.0117 \text{ time}$   
(3.54)\*

3/ Log of number of vessels =  $2.2960 - 0.0028 \text{ time}$   
(1.19)\*

\* T value

Table I-7(b).--Historical growth rate of Atlantic menhaden landings, fishermen, and vessels, 1950-66

---

Landings <u>1/</u>	- 2.00 percent per year
Fishermen <u>2/</u>	- 2.79 percent per year
Vessels <u>3/</u>	+ 0.30 percent per year

---

1/ Log of landings (thou. pounds) = 6.09132 - 0.00881 time  
(1.25)\*

2/ Log of number of fishermen = 3.57018 - 0.01191 time  
(2.75)\*

3/ Log of number of vessels = 2.15135 + 0.00149 time  
(0.43)\*

\* indicates T value

Table I-7(c).--Historical growth rate of Gulf menhaden landings, fishermen,  
and vessels, 1950-66

---

Landings <u>1</u> /	+ 8.05 percent per year
Fishermen <u>2</u> /	+ 0.08 percent per year
Vessels <u>3</u> /	+ 1.25 percent per year

---

<u>1</u> / Log of landings (thou. pounds)	= 5.48855 + 0.03361 time (6.16)*
<u>2</u> / Log of number of fishermen	= 3.19013 + 0.00035 time (0.12)*
<u>3</u> / Log of number of vessels	= 1.81760 + 0.00535 time (3.57)*

\* indicates T value

## II DEMAND INDICATORS

- Consumption

  - Aggregate
  - Per capita

- Prices

  - Exvessel
  - Wholesale

- Value

  - Landings
  - Wholesale

- Relative prices

- Seasonal demand

- Price and income elasticities

Table II-1.--Aggregate and per capita utilization of fish meal in the U.S.

	Aggregate	Per Capita
	<u>Million pounds</u>	<u>Pounds</u>
1947	390	2.71
1948	481	3.28
1949	578	3.87
1950	608	4.00
1951	677	4.40
1952	851	5.44
1953	742	4.67
1954	806	4.98
1955	725	4.39
1956	772	4.59
1957	690	4.03
1958	696	4.00
1959	879	4.96
1960	844	4.69
1961	1,059	5.79
1962	1,129	6.07
1963	1,264	6.70
1964	1,348	7.04
1965	1,050	5.42
1966	1,344	6.86
1967	1,724	8.71
1968	2,179	10.90
1969		
1970		
1971		
1972		

Source: Fishery Statistics of the U.S.

Table II-2.--Exvessel price of menhaden and the wholesale price of menhaden fish meal

	Exvessel Price	Wholesale Price
	-----Dollars per ton-----	
1947	25.20	110.20
1948	23.20	111.20
1949	21.40	157.60
1950	20.20	124.40
1951	23.00	120.20
1952	19.20	123.80
1953	22.00	124.40
1954	27.00	129.80
1955	26.80	133.40
1956	27.20	130.20
1957	26.20	126.00
1958	28.40	130.80
1959	23.80	117.80
1960	20.20	87.80
1961	22.20	104.40
1962	22.00	117.80
1963	24.60	120.80
1964	28.20	124.60
1965	31.40	147.00
1966	33.20	152.00
1967	24.60	128.00
1968	26.00	135.80
1969		
1970		
1971		
1972		

Source: Fishery Statistics of the U.S., BCF

Table II-3.--Value of menhaden landings at exvessel and value of fish meal at wholesale

	Exvessel	Wholesale <sup>1/</sup>
	<u>Thou. dollars</u>	<u>Thou. dollars</u>
1947	11,100	56,368
1948	10,600	60,142
1949	10,900	92,251
1950	10,402	70,996
1951	12,983	92,115
1952	13,221	109,950
1953	18,578	120,691
1954	23,491	130,865
1955	25,037	137,538
1956	28,425	148,046
1957	22,211	116,193
1958	21,933	112,646
1959	26,213	145,623
1960	20,301	99,671
1961	25,579	137,567
1962	25,866	162,589
1963	22,386	146,713
1964	22,190	141,992
1965	27,073	171,049
1966	21,767	158,685
1967	14,400	147,496
1968	18,700	176,270
1969		
1970		
1971		
1972		

Source: Fishery Statistics of the U.S., BCF

<sup>1/</sup> Includes value of imports

Table II-4.--Wholesale price of fishmeal relative to the Wholesale Price Index and the Wholesale Price Index of meat, poultry and fish, 1947-68

	Wholesale prices	Wholesale price/W.P.I. <sup>1/</sup>	Wholesale price/W.P.I.mfp <sup>2/</sup>
	-----Dollars per ton-----		
1947	110.20	135.60	n.a.
1948	111.20	126.40	n.a.
1949	157.60	188.80	n.a.
1950	124.40	143.20	121.20
1951	120.20	124.40	101.80
1952	123.80	131.60	113.20
1953	124.40	134.20	132.40
1954	129.80	139.80	139.80
1955	133.40	143.20	155.60
1956	130.20	135.60	157.80
1957	126.00	127.20	135.60
1958	130.80	130.20	121.20
1959	117.80	117.00	118.80
1960	87.80	87.20	89.80
1961	104.40	104.00	109.40
1962	117.80	117.00	118.80
1963	120.80	120.40	129.40
1964	124.60	124.00	137.20
1965	147.00	143.40	145.60
1966	152.00	143.60	138.00
1967	128.00	120.60	121.80
1968	135.80	125.00	n.a.
1969			
1970			
1971			
1972			

Source: Table II-2

Bureau of Labor Statistics

<sup>1/</sup> Deflated by wholesale price index, 1957-59=100

<sup>2/</sup> Deflated by wholesale price index for meat, poultry, and fish, 1957-59=100

Table II-5.--Price and income elasticities for fish meal

---

Price elasticity =  $-.452$   
Income elasticity     $N.a.$

Demand Equation for United States

$$C = -377 - 3.460P + 10.809P_s + .196F$$

C = utilization of fish meal in millions of pounds  
P = price of fish meal in dollars per ton  
P<sub>s</sub> = price of soybean meal in dollars per ton  
F = the consumption of chicken, million pounds, ready-to-cook weight.

---

Source: Division of Economic Research, Bureau of Commercial Fisheries

### III DEMAND PROJECTIONS

-U.S. Consumption  
Aggregate  
Per capita

Table III.1--Consumption projections for menhaden to the year 2000

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DEMAND PROJECTIONS WERE NOT COMPLETED AT THE TIME THAT THESE INDICATORS WERE COMPILED. THESE PROJECTIONS ARE EXPECTED TO BE COMPLETED IN THE NEAR FUTURE.

---

#### IV DOMESTIC PRODUCTION

—Landings

—Value

Table IV-1. --U.S. landings of menhaden

Year	Atlantic		Gulf		Total <sup>1/</sup>	
	Quantity	Value	Quantity	Value	Quantity	Value
	Thou. pounds	Thou. dollars	Thou. pounds	Thou. dollars	Thou. pounds	Thou. dollars
1947	n.a.	n.a.	n.a.	n.a.	1,007,981	11,123
1948	n.a.	n.a.	n.a.	n.a.	990,712	10,638
1949	n.a.	n.a.	276,506	3,248	1,075,573	10,905
1950	700,288	6,768	326,030	3,634	1,026,318	10,402
1951	769,100	8,111	357,965	4,872	1,127,065	12,983
1952	923,608	8,625	459,984	4,596	1,383,592	13,221
1953	1,259,031	13,389	437,045	5,189	1,696,076	18,578
1954	1,336,524	18,181	401,243	5,310	1,737,767	23,491
1955	1,386,791	17,748	480,992	7,289	1,867,783	25,037
1956	1,537,403	20,021	559,836	8,404	2,097,239	28,425
1957	1,327,595	16,771	362,533	5,440	1,690,128	22,211
1958	1,106,272	15,175	442,826	6,758	1,549,098	21,933
1959	1,450,896	16,312	751,836	9,901	2,202,732	26,213
1960	1,177,356	11,407	840,907	8,894	2,018,263	20,301
1961	1,294,244	13,987	1,020,433	11,592	2,314,677	25,579
1962	1,291,319	13,817	1,056,625	12,049	2,347,944	25,866
1963	848,105	10,212	967,693	12,174	1,815,798	22,386
1964	655,824	9,189	904,141	13,001	1,559,965	22,190
1965	703,252	10,171	1,022,837	16,902	1,726,089	27,073
1966	515,039	7,843	792,671	13,924	1,307,710	21,767
1967	463,620	5,846	700,088	8,545	1,163,708	14,391
1968	554,100	8,000	826,800	10,700	1,380,900	18,700
1969						
1970						
1971						
1972						

Source: Fishery Statistics of the United States.

<sup>1/</sup>From 1947-49, totals include actual figures and last available years data for the South Atlantic and Gulf. No survey was taken for the South Atlantic region from 1946-49 and from 1946-48 for complete Gulf.

Table IV-2.--U.S. landings of menhaden by major states

Year	New Jersey	Delaware	Virginia	North Carolina	Mississippi	Louisiana
-----million pounds-----						
1947	178	248	178	n.a.	n.a.	n.a.
1948	164	148	151	n.a.	69	88
1949	143	160	136	n.a.	46	166
1950	139	152	170	125	70	208
1951	190	166	127	104	115	210
1952	179	208	91	191	123	283
1953	396	361	160	132	59	307
1954	377	306	285	160	79	270
1955	367	307	313	185	128	298
1956	486	353	189	247	173	321
1957	419	286	265	173	142	163
1958	201	270	321	235	123	242
1959	296	281	412	280	174	443
1960	306	281	246	190	219	470
1961	328	303	295	222	301	582
1962	376	269	324	123	264	689
1963	178	103	256	190	250	633
1964	64	33	331	173	238	600
1965	74	46	352	161	278	682
1966	13	4	273	182	191	556
1967	46	0	220	150	167	510
1968						
1969						
1970						
1971						
1972						

Source: Fishery Statistics of the United States

Table IV-3.--Supply and disposition of fish meal in the U.S.

	U.S. Production			Imports	Total
	Menhaden	Other	Total		
	-----Million pounds-----				
1947	197	176	373	17	390
1948	208	191	399	82	481
1949	227	247	474	104	578
1950	207	273	480	128	608
1951	231	189	420	257	677
1952	288	155	443	408	851
1953	350	128	478	264	742
1954	366	148	514	292	806
1955	381	148	529	196	725
1956	421	171	592	180	772
1957	345	183	528	162	690
1958	316	180	496	200	696
1959	448	165	613	266	879
1960	437	143	580	264	844
1961	495	128	623	436	1,059
1962	479	146	625	504	1,129
1963	368	144	512	752	1,264
1964	321	149	470	878	1,348
1965	352	156	508	542	1,050
1966	270	178	448	896	1,344
1967	238	184	422	1,302	1,724
1968	286	183	469	1,710	2,179
1969					
1970					
1971					
1972					

Source: Division of Economic Research, BCF

## V DOMESTIC EMPLOYMENT, VESSELS AND EFFORT

- Fishermen
- Vessels
- Trips
- Days at sea
- Days fishing

Table V-1.--Number of fishermen and vessels in the menhaden fishery

	Fishermen	Vessels and boats
	<u>Number</u>	<u>Number</u>
1950	4,080	728
1951	4,111	729
1952	3,908	674
1953	4,089	717
1954	4,083	691
1955	4,883	832
1956	5,065	849
1957	4,873	882
1958	4,544	788
1959	4,684	867
1960	4,353	759
1961	3,495	689
1962	3,337	602
1963	3,140	603
1964	3,196	588
1965	2,722	495
1966	2,620	470
1967		
1968		
1969		
1970		
1971		
1972		

Source: Fishery Statistics of the United States, BCF

Table V-2.--Number of menhaden vessels and boats

Year	Vessels			
	North Atlantic	South Atlantic	Gulf	Total <sup>1/</sup>
	<u>Number</u>			
1947	63	n.a.	n.a.	n.a.
1948	72	n.a.	34	n.a.
1949	67	n.a.	53	n.a.
1950	68	48	66	182
1951	68	51	64	183
1952	71	55	71	170
1953	85	57	74	181
1954	85	55	63	174
1955	100	72	67	212
1956	113	73	75	219
1957	106	81	79	227
1958	94	77	80	201
1959	106	71	78	222
1960	87	45	76	183
1961	91	55	69	180
1962	93	52	72	180
1963	96	57	72	179
1964	98	63	76	183
1965	70	55	83	161
1966	65	55	88	153

Table V-2.--Number of menhaden vessels and boats (continued)

Year	Boats, Motor and Other			Total Boats <u>1/</u>	Total Vessels and Boats <u>1/</u>
	North Atlantic	South Atlantic	Gulf		
	-----Number-----				
1947	189	n.a.	n.a.	n.a.	n.a.
1948	216	n.a.	102	n.a.	n.a.
1949	201	n.a.	159	n.a.	n.a.
1950	204	144	198	546	728
1951	201	153	192	546	729
1952	206	165	213	504	674
1953	247	171	222	536	717
1954	249	165	189	517	691
1955	282	216	201	620	832
1956	307	219	225	630	849
1957	294	241	237	655	882
1958	266	231	240	587	788
1959	297	213	234	645	867
1960	249	135	267	576	759
1961	263	165	167	509	689
1962	181	156	159	422	602
1963	196	168	152	424	603
1964	199	183	160	405	588
1965	139	110	180	334	495
1966	131	110	177	317	470

Source: Fishery Statistics of the U.S., BCF

1/ Exclusive of duplication

Table V-3.--Number of fishermen in menhaden purse seine fishery

	On Vessels				On boats and shore	
	N. Atlantic	S. Atlantic	Gulf	Total	Total	
	Number					
1947	1,478	n.a.	n.a.	n.a.	n.a.	
1948	1,807	n.a.	676	n.a.	n.a.	
1949	1,635	n.a.	1,057	n.a.	n.a.	
1950	1,750	985	1,345	4,080	n.a.	
1951	1,750	987	1,352	4,089	22	
1952	1,835	1,108	1,537	3,866	42	
1953	2,121	1,162	1,597	4,089	n.a.	
1954	2,205	1,159	1,399	4,083	n.a.	
1955	2,410	1,555	1,540	4,883	n.a.	
1956	2,652	1,624	1,761	5,065	n.a.	
1957	1,924	2,010	1,889	4,873	n.a.	
1958	1,651	1,774	1,902	4,514	n.a.	
1959	1,836	1,576	1,921	4,684	n.a.	
1960	1,468	1,000	1,885	4,353	n.a.	
1961	1,440	1,226	1,404	3,495	n.a.	
1962	1,442	1,009	1,480	3,339	n.a.	
1963	1,600	993	1,329	3,140	n.a.	
1964	1,637	1,077	1,382	3,196	n.a.	
1965	975	929	1,480	2,722	n.a.	
1966	886	929	1,554	2,620	n.a.	
1967						
1968						
1969						
1970						
1971						
1972						

Source: Fishery Statistics of the U.S., BCF

Table V-4.--Fishing effort in the Gulf of Mexico,  
menhaden purse-seine fishery, 1946-68

Year	Effort <sup>1/</sup>	Catch per unit of effort <sup>2/</sup>
	<u>Vessel ton-weeks</u>	<u>tons</u>
1946	2,355	.2
1947	21,891	1.7
1948	40,710	.9
1949	66,150	2.7
1950	84,117	2.1
1951	93,722	1.9
1952	113,289	1.8
1953	104,665	2.2
1954	88,817	2.1
1955	122,970	1.9
1956	155,074	1.7
1957	155,166	1.1
1958	202,766	1.1
1959	205,716	1.8
1960	209,477	2.0
1961	241,622	2.1
1962	288,976	.8
1963	277,329	1.7
1964	274,110	1.6
1965	335,627	2.2
1966	379,475	1.4
1967	402,337	.9
1968	380,439	1.1

<sup>1/</sup> Preliminary.

<sup>2/</sup> Short tons per vessel ton week

Source: B. J. Rothschild, The Dynamics of the  
Menhaden in the Atlantic Ocean and the  
Gulf of Mexico, January 1970.

## VI BIOLOGICAL STOCK ASSESSMENT

Table VI-1.--Estimate of maximum sustainable yield from world  
stocks of menhaden 1/

		MSY
		<u>Thou. metric tons</u>
I. West Central Atlantic <u>2/</u>		750
II. South East Atlantic <u>3/</u>		<u>1,000</u>
	Total	1,750

Source: Bureau of Commercial Fisheries, Division of Economic Research.

1/ Only preliminary data available for West Central and South  
East Atlantic areas.

2/ Includes Gulf of Mexico and U.S. Atlantic Coast.

3/ Includes coasts of South and West Africa.

## VII INTERNATIONAL TRADE

— Imports  
Quantity  
Value  
Price

Table VII-1.--Fish meal imports into the U.S.

	Quantity	Value	Price <sup>1/</sup>
	Thou. pounds	Thou. dollars	¢ per pound
1947	17,116	827	4.83
1948	82,248	5,042	6.13
1949	104,366	7,462	7.15
1950	127,710	7,160	5.61
1951	256,956	14,376	5.59
1952	408,078	24,305	5.97
1953	263,946	15,200	5.75
1954	292,000	18,082	6.19
1955	196,000	12,956	6.61
1956	180,000	11,518	6.40
1957	162,000	9,717	6.00
1958	200,000	11,335	5.67
1959	266,000	15,884	5.97
1960	264,000	11,068	4.19
1961	436,000	16,740	3.84
1962	504,000	24,298	4.82
1963	752,000	37,039	4.93
1964	878,000	44,181	5.04
1965	542,000	30,720	5.03
1966	896,000	59,300	6.61
1967	1,302,000	73,000	5.60
1968	1,710,000	82,500	4.82
1969			
1970			
1971			
1972			

Source: Fishery Statistics of the U.S., BCF

<sup>1/</sup> Average price of all imports of fish meal.

Table VII-2.--U.S. imports of fish meal by country of origin

	Canada	Chile	Norway	Peru	So. W. Africa	Other	Total
-----Million pounds-----							
1947	7.4	n.a.	n.a.	n.a.	n.a.	9.9	17.1
1948	58.4	n.a.	n.a.	n.a.	n.a.	23.8	82.2
1949	67.8	n.a.	n.a.	n.a.	n.a.	36.6	104.4
1950	84.4	n.a.	n.a.	n.a.	n.a.	43.3	127.7
1951	102.6	n.a.	n.a.	n.a.	n.a.	154.4	257.0
1952	79.7	8.0	81.0	15.4	61.5	163.2	408.1
1953	57.1	3.6	41.9	19.6	26.4	115.3	263.9
1954	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	292.0
1955	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	196.0
1956	93.8	2.2	17.6	12.8	6.8	46.0	180.0
1957	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	162.0
1958	29.0	-	.4	55.6	13.8	101.2	200.0
1959	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	266.0
1960	55.2	24.4	n.a.	102.0	11.6	70.8	264.0
1961	62.2	20.0	n.a.	210.0	21.0	122.8	436.0
1962	67.8	16.6	n.a.	312.0	19.2	88.4	504.0
1963	79.2	45.2	n.a.	450.4	14.4	162.0	752.0
1964	85.8	22.6	n.a.	571.6	26.2	174.0	878.0
1965	65.2	10.2	n.a.	408.6	5.8	52.0	542.0
1966	87.2	178.8	42.0	553.2	13.2	21.4	896.0
1967	93.2	81.8	226.4	885.0	-	15.2	1,302.0
1968	60.0	83.2	47.2	796.6	-	723.0	1,710.0
1969							
1970							
1971							
1972							

Source: Bureau of the Census, U. S. Imports annuals

Table VII-3.--U.S. exports of fish oils by country of destination

	Canada	Sweden	Norway	U.K.	Netherlands	W. Germany	Other	Total
	-----Million pounds-----							
1947	2.9	n.a.	n.a.	n.a.	6.8	-	1.2	10.9
1948	10.9	n.a.	n.a.	n.a.	-	-	.9	11.8
1949	8.3	n.a.	n.a.	n.a.	10.7	11.3	8.3	38.6
1950	3.4	n.a.	n.a.	n.a.	41.4	11.3	19.9	76.0
1951	3.5	n.a.	n.a.	n.a.	12.1	12.1	22.1	49.8
1952	.8	n.a.	n.a.	n.a.	23.9	10.3	7.9	42.9
1953	4.1	n.a.	n.a.	n.a.	17.8	72.3	12.7	106.9
1954	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1955	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1956 <sup>1/</sup>	3.3	-	12.6	1.8	49.6	63.5	10.5	141.3
1957	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1958 <sup>1/</sup>	13.2	-	11.5	-	21.8	34.2	14.5	95.2
1959	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960	2.2	27.2	15.9	n.a.	41.6	20.4	1.5	108.8
1961	16.8	11.4	31.3	n.a.	17.0	6.7	12.2	95.4
1962	7.4	13.4	10.0	15.1	29.0	16.9	4.8	96.6
1963	7.1	44.8	19.4	70.4	19.3	21.4	4.6	187.0
1964	.3	44.7	11.5	2.2	31.5	21.3	8.9	120.4
1965	1.0	37.9	4.5	5.5	13.0	11.0	8.1	81.0
1966	1.4	6.6	11.4	14.3	24.5	9.4	9.7	77.3
1967	.1	10.5	-	6.6	9.7	1.5	-	28.5
1968	1.5	14.9	-	-	3.4	-	.1	19.8
1969								
1970								
1971								
1972								

Source: Bureau of the Census, U. S. export annuals.

<sup>1/</sup> Includes all aquatic animal oils and fats, crude or refined.

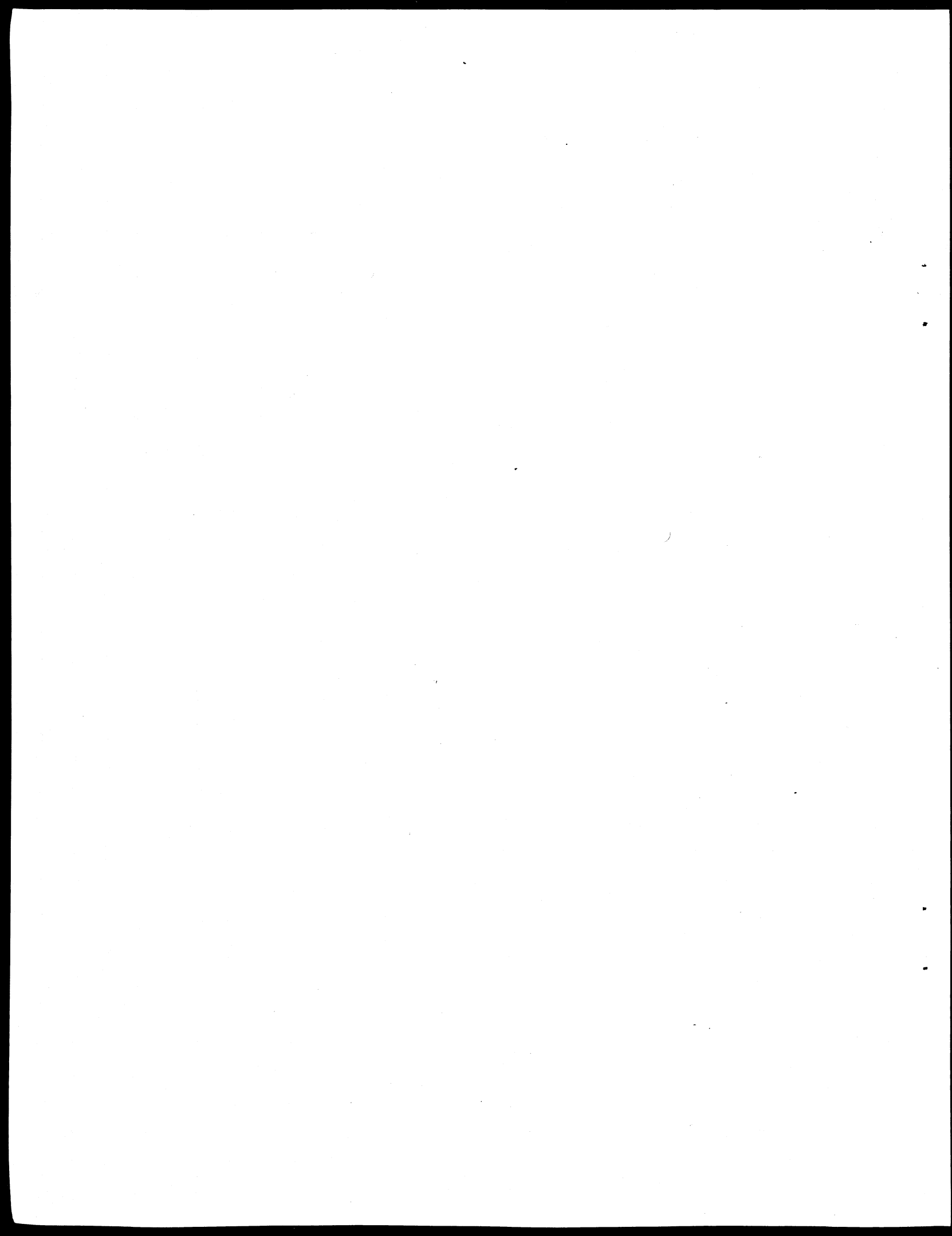
Table VII-4.--Extent of U.S. involvement in imports of fishmeal to the United States, 1968

U.S. investment abroad by country	Amount of Investment	Quantity of total U.S. imports	Quantity of imports based on U.S. involvement	Percentage of quantity
	<u>Mil. dol.</u>	<u>Thousand metric tons</u>		<u>Percent</u>
		591.0 <sup>1/</sup>		
Peru	51.0		336.0	57
Chile	5.0		33.0	6

U.S. investment abroad by country	Value of total U.S. imports	Value of imports based on U.S. involvement	Percentage of Value
	<u>Million dollars</u>		<u>Percent</u>
	71.6 <sup>1/</sup>		
Peru and Chile		57.0	80

Source: Division of Current Economic Analysis, BCF

<sup>1/</sup> Import figures are 1966-68 annual averages



## VIII FOREIGN PRODUCTION

### —Landings

Table VIII-1.--World production of fish meals by selected countries

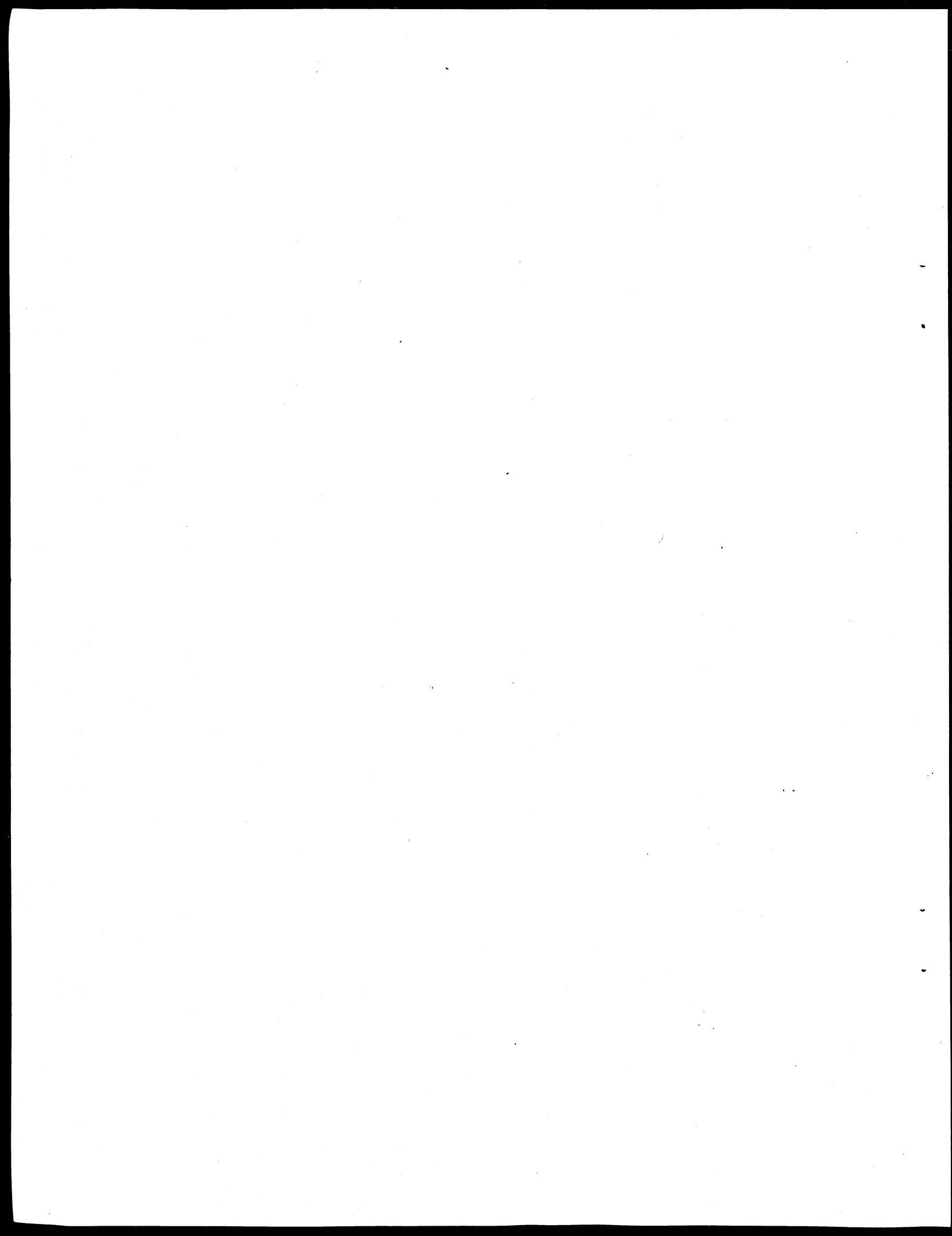
	S. Africa	Canada	U.S.	Chile	Peru	W. Germany	Netherlands
	-----Million pounds-----						
1947	11	50	390	1	-	2	6
1948	24	86	431	2	-	37	11
1949	42	82	578	6	1	80	13
1950	68	91	584	9	2	113	20
1951	130	102	520	13	16	150	13
1952	174	80	584	19	2	150	-
1953	256	80	641	17	-	173	21
1954	84	130	744	15	36	154	24
1955	96	127	750	31	44	185	21
1956	73	168	848	23	68	168	17
1957	101	113	770	28	142	174	20
1958	123	145	752	25	280	169	21
1959	161	155	940	64	733	202	35
1960	215	104	777	93	1,231	183	17
1961	257	152	844	128	1,852	151	18
1962	272	100	845	202	2,451	180	13
1963 <sup>1/</sup>	239	183	703	237	2,495	180	17
1964 <sup>1/</sup>	236	172	634	384	3,425	180	18
1965	263	198	672	205	2,827	177	18
1966	240	199	590	480	3,243	181	21
1967	402	200	539	359	4,004	194	19
1968							
1969							
1970							
1971							
1972							

Table VIII-1.--World production of fish meals by selected countries  
(Continued)

	Norway	Sweden	U.K.	Other	Total
	-----Million pounds-----				
1947	162	9	112	135	877
1948	277	9	133	167	1,175
1949	189	9	127	118	1,243
1950	322	13	132	191	1,544
1951	433	12	159	228	1,776
1952	438	13	175	278	1,912
1953	356	11	187	291	2,032
1954	550	14	184	762	2,697
1955	438	13	199	881	2,787
1956	583	12	190	939	3,087
1957	422	14	180	1,042	3,005
1958	260	14	172	1,153	3,114
1959	295	-	177	1,386	4,148
1960	312	12	168	1,476	4,586
1961	334	12	161	1,753	5,660
1962	269	12	160	2,137	6,639
1963 <sup>1/</sup>	294	14	166	1,851	6,379
1964 <sup>1/</sup>	415	17	175	2,403	8,057
1965 <sup>1/</sup>	705	14	190	2,672	7,940
1966 <sup>1/</sup>	930	15	193	2,656	8,747
1967 <sup>1/</sup>	1,084	15	179	3,137	10,134
1968					
1969					
1970					
1971					
1972					

Source: FAO Yearbook of Fishery Statistics

<sup>1/</sup> Does not include meals solubles and similar products of aquatic animal origin.



## IX FOREIGN CONSUMPTION

—Consumption  
Aggregate  
Per capita

—Prices

Table IX-1.--World consumption of fish meals by selected countries

Year	Canada	U.S.	West Germany	Netherlands	Norway
	----- <u>Million pounds</u> -----				
1948	131	481	44	25	245
1949	160	578	110	24	394
1950	189	608	148	86	169
1951	210	677	221	76	142
1952	167	851	251	n.a.	155
1953	135	742	283	70	113
1954	205	806	330	114	137
1955	216	725	373	141	107
1956	284	772	381	183	156
1957	217	690	449	179	100
1958	208	696	452	192	7
1959	202	879	517	237	88
1960	380	844	596	321	80
1961	222	1,059	745	366	34
1962	198	1,129	940	377	126
1963	296	1,264	860	395	60
1964	291	1,348	1,082	401	2
1965	319	1,050	1,133	371	128
1966	308	1,344	1,089	318	359
1967	305	1,724	1,253	339	1/
1968					
1969					
1970					
1971					
1972					

Table IX-1.--World consumption of fish meals by selected countries (continued)

Year	Sweden	United Kingdom	Other	Total
----- Million pounds -----				
1948	15	181	623	1,175
1949	9	178	1/	1,243
1950	22	226	56	1,544
1951	24	575	51	1,776
1952	21	248	219	1,912
1953	32	379	278	2,032
1954	34	n.a.	1,071	2,697
1955	35	n.a.	1,208	2,787
1956	34	n.a.	1,277	3,087
1957	43	489	838	3,005
1958	37	457	1,065	3,114
1959	53	537	1,671	4,184
1960	51	544	1,770	4,586
1961	60	693	2,381	5,660
1962	64	778	3,027	6,639
1963	79	787	2,638	6,379
1964	104	990	3,839	8,057
1965	113	981	3,845	7,940
1966	125	785	4,419	8,747
1967	137	990	5,386	10,134
1968				
1969				
1970				
1971				
1972				

Source: FAO yearbook of fishery statistics and Bureau of Commercial Fisheries (See table II-1)

1/ Values are negative due to incomplete data.

Table IX-2.--World per capita fish meal consumption by selected countries.<sup>1/</sup>

Year	Canada	United States	West Germany	Netherlands	Sweden	United Kingdom
-----Pounds-----						
1947	n.a.	2.71	n.a.	n.a.	n.a.	n.a.
1948	10.39	3.28	0.89	2.53	2.17	3.62
1949	11.98	3.87	2.22	2.40	1.29	3.54
1950	13.76	4.00	2.96	8.50	3.14	4.49
1951	14.84	4.40	4.40	7.41	3.39	7.42
1952	14.53	5.44	4.96	n.a.	2.95	4.89
1953	9.07	4.67	5.53	6.67	4.46	7.45
1954	13.37	4.98	6.45	10.74	4.71	n.a.
1955	13.73	4.39	7.12	13.12	4.82	n.a.
1956	17.61	4.59	7.19	16.80	4.65	n.a.
1957	13.01	4.03	8.37	16.23	5.84	9.47
1958	12.15	4.00	8.33	17.16	4.99	8.81
1959	11.53	4.96	9.47	20.88	7.11	10.29
1960	21.22	4.69	10.75	27.95	6.82	10.35
1961	12.15	5.79	13.26	31.45	7.98	13.09
1962	10.65	6.07	16.51	31.93	8.46	14.55
1963	16.09	6.70	14.94	33.01	10.39	14.63
1964	15.50	7.04	18.57	33.07	13.57	18.26
1965	16.70	5.42	19.20	30.17	14.61	17.97
1966	15.36	6.86	18.26	24.89	16.01	14.30
1967	14.95	8.71	20.74	26.90	17.41	17.89
1968		10.90				
1969						
1970						
1971						
1972						

Source: FAO Yearbook of Fishery Statistics and Bureau of Commercial Fisheries. (See Table II-1).

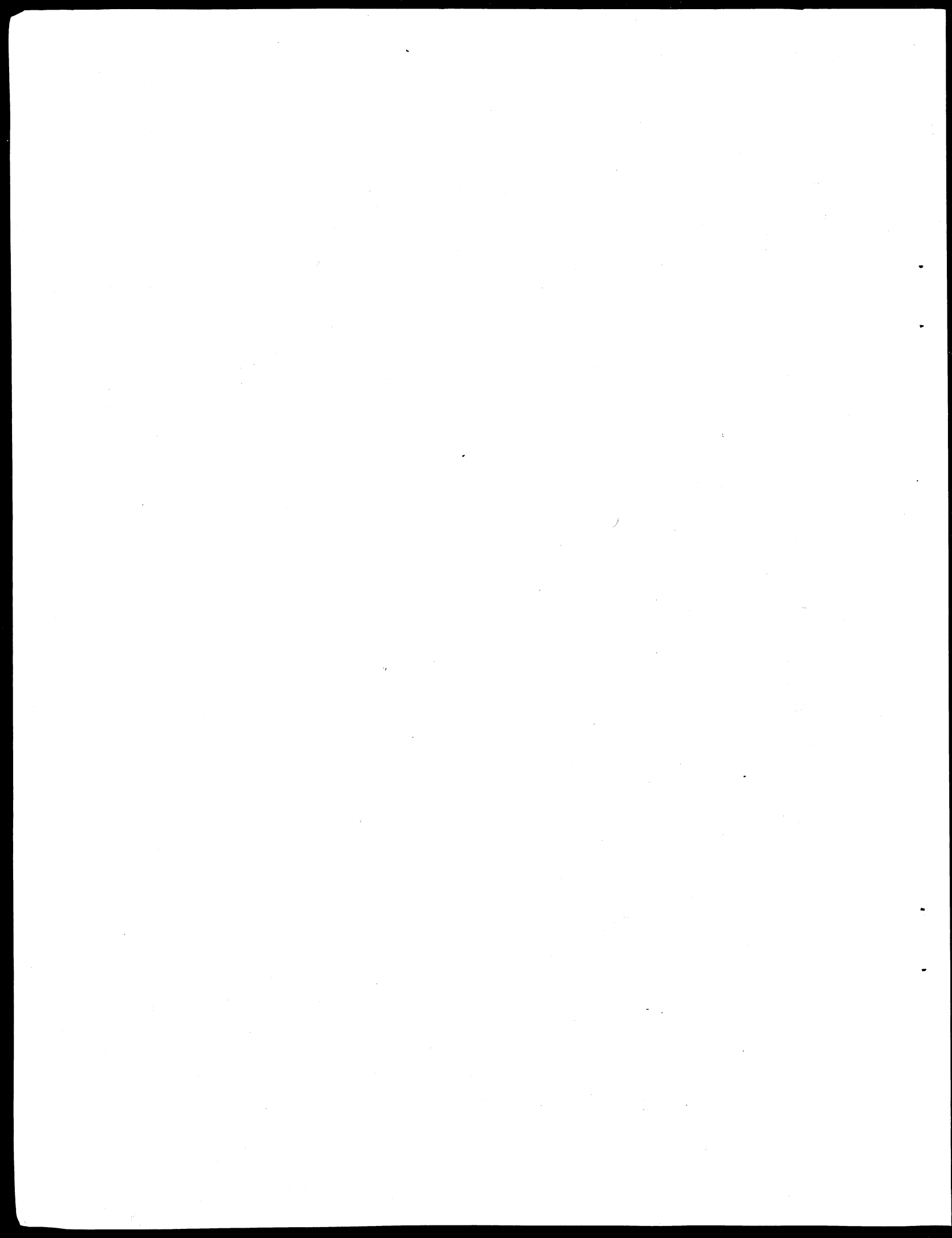
<sup>1/</sup> Per capita utilization, as fish meal used primarily as animal feed.

Table IX-3.--World fish meal prices by selected countries.

Year	United States	Peru <sup>1/</sup>
	<u>Dollars per short ton-----</u>	
1947	110.20	n.a.
1948	111.20	n.a.
1949	157.60	n.a.
1950	124.40	n.a.
1951	120.20	n.a.
1952	123.80	n.a.
1953	124.40	n.a.
1954	129.80	n.a.
1955	133.40	n.a.
1956	130.20	n.a.
1957	126.00	n.a.
1958	130.80	141.28
1959	117.80	145.37
1960	87.80	94.90
1961	104.40	110.30
1962	117.80	122.60
1963	120.80	120.85
1964	124.60	131.95
1965	147.00	154.65
1966	152.00	156.40
1967	128.00	130.15
1968	135.80	130.95
1969		
1970		
1971		
1972		

Source: Fishery Statistics of the United States.

<sup>1/</sup>Peruvian fish meal at U.S. East Coast ports.



X U.S. TRADE BARRIERS

Table X-1(a).--Present U. S. tariff structure for menhaden

: Stat. :		:	Rates of Duty			U.S. Imports-1968	
: suf- :		:					
Item	: fix :	Product Description	: June 30, 1967 :	: Jan. 1, 1969 :	: K-R Concession :	Quantity	: Value
Marine-animal oils:							
Fish oils other than liver oils:							
177.24	00	Menhaden	3 1/3¢ per lb.	2.65¢ per lb.	1.7¢ per lb.	--	--

Source: Division of Economic Research, Bureau of Commercial Fisheries

Table X-1(b).--Present U. S. tariff structure for the industrial trawl fishery

: Stat. :		:	Rates of Duty			:	U.S. Imports - 1968	
: suf- :		:				:		
Item	: fix :	Product Description	: June 30, 1967 :	Jan. 1, 1970 :	Jan. 1, 1972:	Quantity	: Value	
								Dollars
Subpart O. - Animal Feeds								
Tankage; dead fish and whales; fish and whale scrap, meal and solubles; homogenized condensed fish and whales; all the foregoing not fit for human consumption:								
184.54	00	Cod-liver solubles.... Lbs.	10% ad val.	7% ad val.	5% ad val.	648,000	31,320	
184.55		Other...						
	10	Fish or whale meat in air-tight containers....Lbs.	Free	Free	Free	23,726,878	4,396,500	
	30	Scrap and meal.... Tons	"	"	"	855,285	82,516,686	
	40	Solubles.... Tons	"	"	"	1,773	144,419	

Source: Division of Economic Research, BCF

Table X-2.--Historical synopsis of investigations<sup>1/</sup>

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1. Section 9(b) of the Fish and Wildlife Act of 1956

None

2. Escape Clause under Executive Orders and the T.E.A. of 1951,  
as amended (T.C.)

None

3. Section 301 of the T.E.A. of 1962. (T.C.)

None

4. Section 332 of the T.E.A. of 1930 (Investigations by the Tariff  
Commission)

None

5. Antidumping under Antidumping Act of 1921 (Customs Bureau)

None

6. Countervailing (Section 303 of T.E.A. of 1930 Customs Bureau)

None

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Source: Division of Economic Research, Bureau of Commercial Fisheries.

<sup>1/</sup> Antidumping information checked since 1954; for Section 332 and countervailing no summary lists available and an inquiry into a number of cases has not been completed.

## XI GOVERNMENT PROGRAMS

- Subsidies
- Mortgage insurance
- Loans
- EDA projects
- BCF expenditures
- Federal aid to states

Table XI-1.---Bureau of Commercial Fisheries programs and expenditures  
on menhaden, fiscal years 1965-69

Bureau of Commercial Fisheries Programs	1965	1966	1967	1968	1969
<u>1960 and 1964 Fishing Fleet Improvement Act</u>	-				
a) Number of Vessels Constructed	-	-	1	-	-
b) Total Government Subsidies to Vessels Constructed (dollars)	-	-	343,911	-	-
<u>Mortgage Insurance Program</u>					
a) Number of Vessels	-	-	-	-	-
b) Value of Mortgages (dollars)	-	-	-	-	-
<u>Fisheries Loan Fund</u>					
a) Number of Vessels Receiving Loans	-	-	-	-	-
b) Total Value of Loans (dollars)	-	-	-	-	-
Other BCF Programs (dollars) <sup>1/</sup>	n.a.	n.a.	700,000	1,000,000	1,000,000

Source: Division of Financial Assistance, Bureau of Commercial Fisheries.

<sup>1/</sup> 1971 Program Memorandum, Department of the Interior, Living Aquatic  
Resources.

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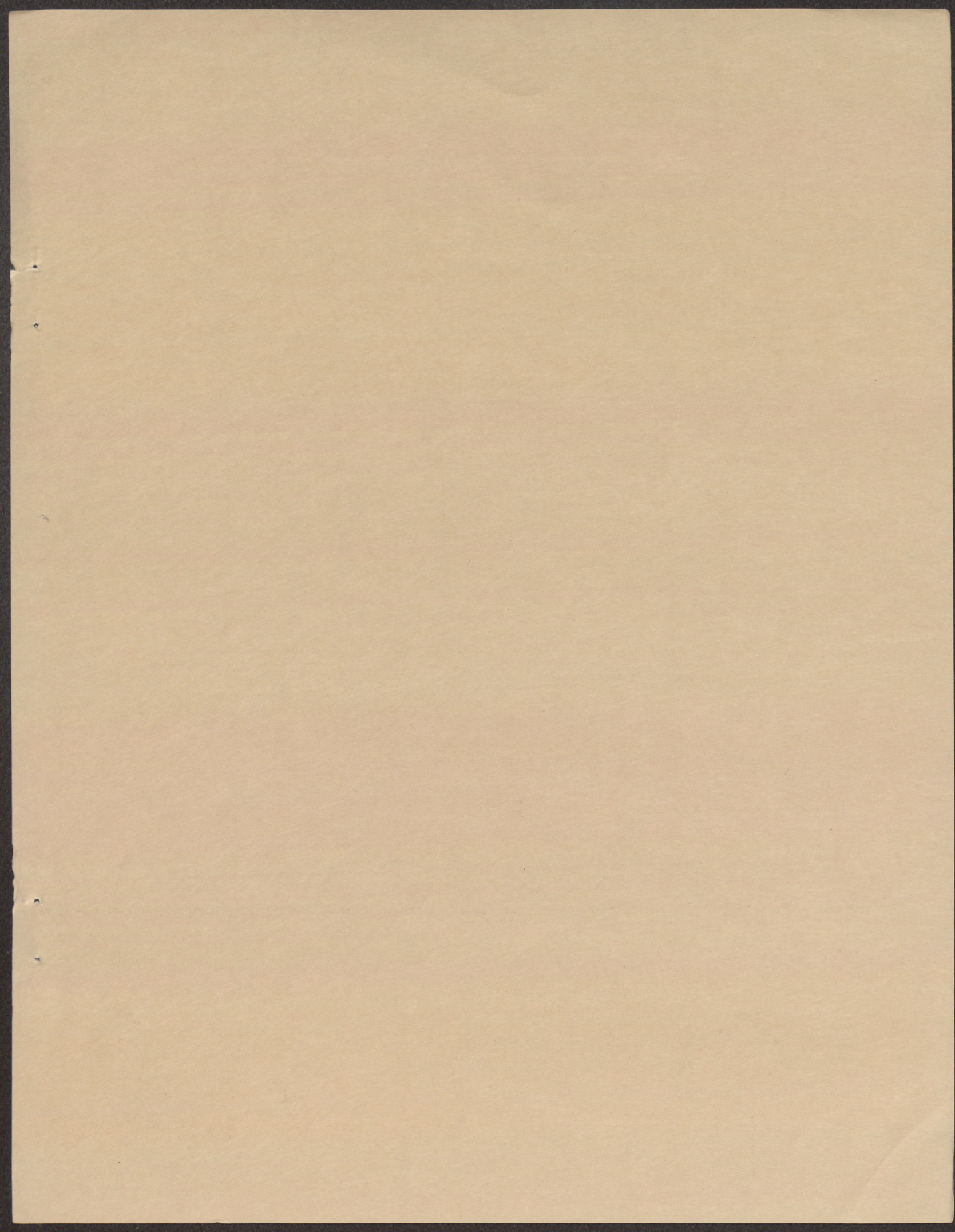
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55. Basic Economic Indicators-Clams.
56. Basic Economic Indicators-Oysters.
57. Basic Economic Indicators-Shrimp.
58. Basic Economic Indicators-Blue Crabs.
59. Basic Economic Indicators-King and Dungeness Crabs.
60. Basic Economic Indicators-Menhaden.
61. Basic Economic Indicators-Tuna.
62. Basic Economic Indicators-Salmon.



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.