


FLUCTUATIONS IN FISH PRODUCTION IN THE U.S. & ALASKA

By Walter H. Stolting *



On various occasions during the past several years, the Fish and Wildlife Service has been approached by governmental agencies and by private individuals with requests for information on seasonal variations in fish production. For example, the U. S. Employment Service was interested in finding ways and means of relieving temporary manpower surpluses in certain areas by transferring workers from these areas to manpower deficiency areas. It wanted especially to know whether fish-producing centers would be able to absorb unemployed persons from other areas and at what times during the year they could be employed. On the other hand, during the winter of 1945-46, due to releases from the armed forces, some fishing areas had a surplus of manpower, and in these cases the U.S. Employment Service was interested in knowing how long these surpluses would be available for other employment.

The U.S. Public Health Service was interested in forecasting future hospitalization needs. It wanted to know how employment varies in the different fishing areas in order to adjust adequately the services offered in marine hospitals located in or near the respective areas.

Veterans released from the armed forces and seeking information on possible future fishery activities also were interested in knowing of peaks and lows in fish production.

After having answered several specific requests of the nature outlined, it was felt that it would be preferable to have on hand comprehensive data on this subject rather than to resort to individual investigations for each specific case. Consequently, a detailed study was undertaken of the principal fisheries throughout the United States and Alaska. The following discussion is a result of this study.

The time of the year when fish are caught in abundance, or when fishery products are manufactured to the greatest extent, is determined for most areas by two factors:

- (a) biological habits of the respective fish; and
- (b) climatic conditions conducive to the operation of fishing vessels.

These two conditions are the principal causes of production peaks and lows that vary from one fishing area to another. Legal restrictions on fishing and economic factors should be mentioned as other causes. The study, which in most cases refers to average monthly production figures based on data for the years 1943, 1944, and 1945, reveals that there are three types of variations in yearly fish production cycles:

*Economist and Assistant Chief, Economics and Cooperative Marketing Section, Division of Commercial Fisheries, Washington, D. C.

NOTE: The author wishes to acknowledge the helpful counsel of Dr. R. A. Kahn, Chief of the Economics and Cooperative Marketing Section.

- (a) variations between different areas;
- (b) variations within one specific area between different species of fish and shellfish; and
- (c) accelerated variations for individual species, showing double peaks and double lows for a given period.

An example of the first type of variation (between different areas) may be found in the variations occurring in the South Atlantic as compared with the Middle Atlantic and North Atlantic areas. Table 1 (items 1, 2, 4, 5, and 8) (see p. 10) and Figure 1 show that fish in the Florida waters are abundant in the winter, while in the Middle Atlantic, fish are abundant in the early spring, and in the New England waters, in the latter part of spring and in early summer months.

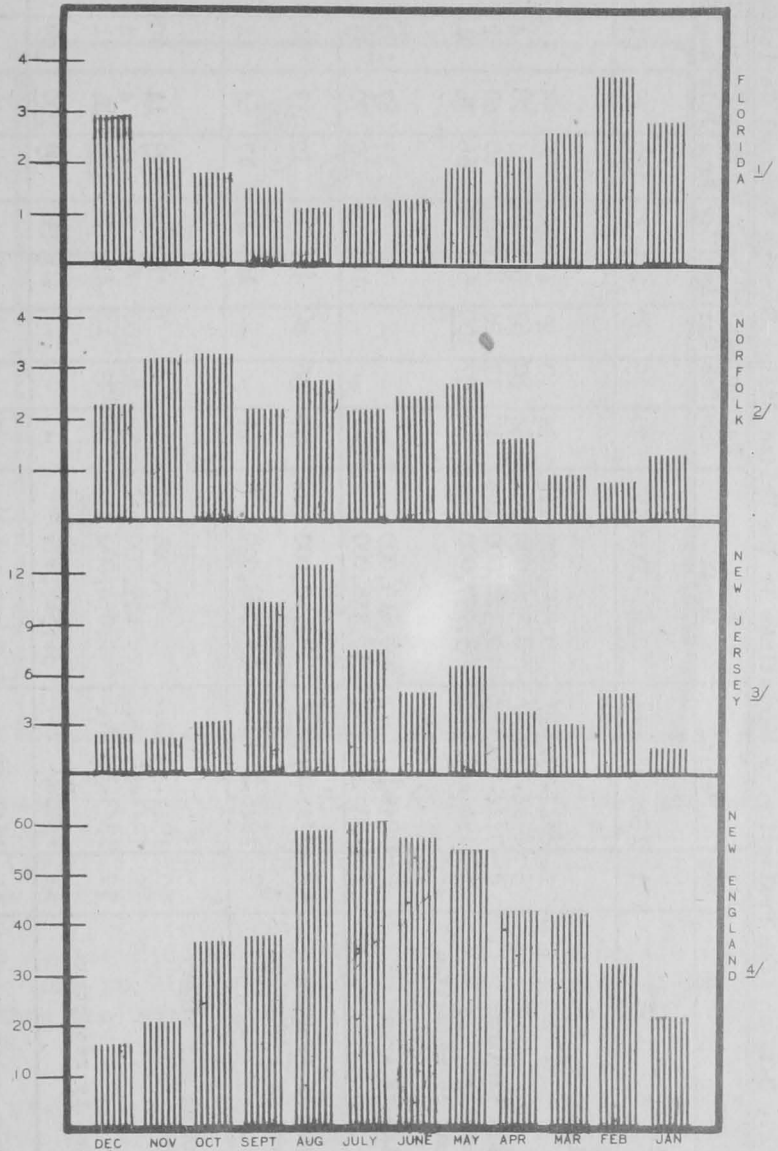
An example of the second type of variation (within a specific area) is given in Table 1 (items 2 and 3). Here records of production of finfish and shellfish in certain areas of Long Island, N.Y., are shown. The peak of finfish production occurs in the late spring; whereas, the heaviest shellfish production occurs in the late fall. This situation is shown graphically in Figure 2 (see p. 11).

Examples of accelerated variations are shown in Table 1 (items 9 and 10). Figure 3 (see p. 12), referring to the shrimp industry of the Gulf States,

graphically depicts this type of variation. This industry has what may be termed a "double" peak. It reaches a peak in May after a low in the preceding March and its high point in October. A similar double peak variation may be seen in the case of the menhaden fishery in the South Atlantic area.

Table 1 summarizes the production conditions prevalent in the fishing industry for the important areas of the United States.

FIGURE 1 - MONTHLY LANDINGS OF FISH IN SELECTED AREAS OF THE ATLANTIC SEABOARD FOR SPECIFIED PERIODS (IN MILLIONS OF POUNDS)



1/ PRODUCTION--CERTAIN AREAS OF FLORIDA - 7/41-6/42
 2/ NORFOLK, VA. AREA LANDINGS 1944-45 AV.
 3/ LANDINGS--CERTAIN AREAS OF N. J. - 7/44-6/45
 4/ BOSTON, GLOUCESTER, PORTLAND, NEW BEDFORD LANDINGS 1944-45 AV.

Table 1 - Monthly Data on Fish Production or Marketings in the United States Showing Seasonal Variations

Area and Description of Data	Item No.	Period	Peak Month	Percentage of Peak Month's Production or Marketings													
				Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
NORTH ATLANTIC AREA																	
Boston, Gloucester, Portland, and New Bedford landings	1	1944-45 av ^{1/}	60,547,000 lbs.	27	35	62	62	97	100	95	91	70	69	53	35		
MIDDLE ATLANTIC AREA																	
Certain areas of Long Island, N. Y.:																	
Landings of finfish	2	8/44-7/45 ^{2/}	2,995,000 lbs.	24	10	21	45	100	65	55	49	37	55	37	14		
Landings of shellfish	3	8/44-7/45 ^{2/}	8,396,000 lbs.	54	80	67	50	29	34	28	4	30	65	100	75		
Certain areas of New Jersey landings	4	7/44-6/45 ^{2/}	12,328,000 lbs.	18	17	24	81	100	60	40	52	30	23	38	12		
Norfolk, Virginia area landings	5	1944-45 av ^{1/}	3,277,000 lbs.	68	97	100	65	85	66	76	81	48	26	21	38		
Number of menhaden utilized by reduction plants:																	
New York-New Jersey-Delaware area	6	1945 ^{3/}	298,619,000	-	-	-	2	2	37	67	100	47	9	-	-		
Chesapeake Bay area	7	1945 ^{3/}	58,346,000	-	-	-	10	19	100	70	95	51	25	6	-		
SOUTH ATLANTIC AREA																	
Production in certain areas of Florida	8	7/41-6/42 ^{2/}	3,720,000 lbs.	79	56	46	39	31	32	33	50	55	70	100	75		
Number of menhaden utilized by reduction plants	9	1945 ^{3/}	65,788,000	21	-	-	16	45	77	64	44	17	17	100	61		
GULF AREA																	
Shrimp production for canning and other purposes	10	1941-43 av.	77,000 bbl.	25	16	7	16	38	29	14	60	70	100	72	40		
Oyster receipts	11	1943-45 av.	149,000 bbl.	50	84	100	79	26	6	4	4	8	15	20	22		
Hard crab receipts	12	1943-45 av.	2,056,000 lbs.	6	11	18	44	71	100	81	71	43	45	38	8		
Number of menhaden utilized by reduction plants	13	1946 ^{3/}	31,519,000	-	-	-	-	31	89	100	59	33	8	-	-		
GREAT LAKES AREA																	
Chicago fresh, domestic fresh-water receipts	14	1943-45 av.	3,413,000 lbs.	43	44	56	78	100	90	67	75	63	69	77	52		
PACIFIC AREA: California																	
Sardine catch	15	1943-45 av.	130,000 tons	42	18	-	-	-	-	-	38	73	100	59	47		
Tuna catch	16	1943-45 av.	22,086,000 lbs.	11	22	23	39	68	66	84	100	64	59	44	47		
PACIFIC AREA: Oregon-Washington																	
Oregon landings	17	1943-45 av.	15,118,000 lbs.	6	7	15	28	40	49	57	100	76	39	21	8		
Seattle landings	18	1943-45 av.	8,079,000 lbs.	54	104	14	25	75	100	74	33	43	44	19	11		
Seattle shellfish receipts (excluding Gulf of Mexico shrimp)	19	1943-45 av.	563,000 lbs.	100	48	94	71	69	85	67	36	27	27	80	90		

^{1/}1944-45 data only. New Bedford not included in New England 4-port landings prior to 1944, and Norfolk, Virginia area landings not published prior to 1944.

^{2/}Complete monthly series of data for other 12-month periods not available.

^{3/}Data for prior years not available.

^{4/}1944-45 av. - January and February 1943 data not available.

In the North Atlantic area, the peak is reached in June while the low is reached in January. Production in the latter month is 27 percent of the peak month. Production during July and August remains on a fairly high and stable level, over 90 percent of the peak month, while September and October decrease to a production figure of about 70 percent of the peak month. November brings about a rapid decline to 53 percent. A sizable recovery does not occur before May.

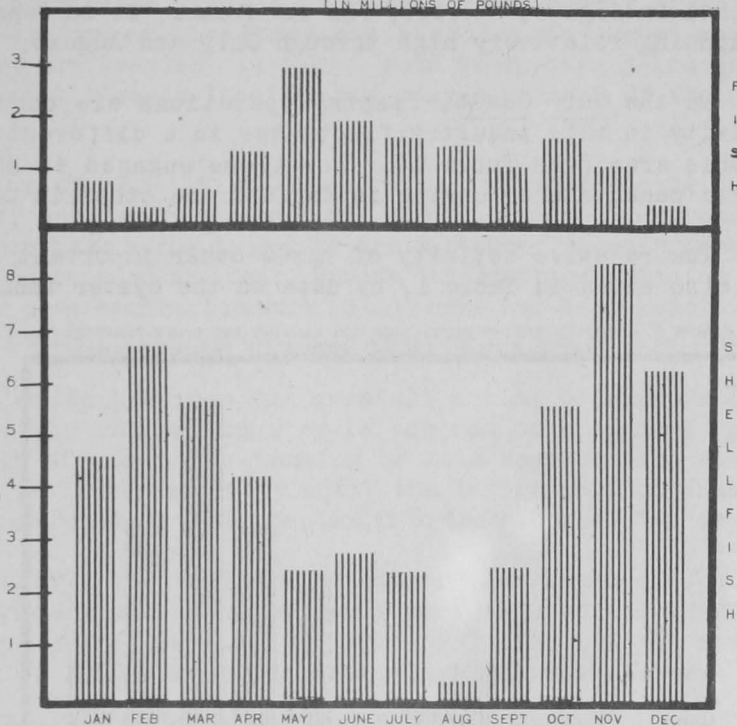
The South Atlantic area shows nearly the reverse situation, starting with a peak production in Florida in November, and reaching a low in May equivalent to 31 percent of peak production. The two months following the peak have an approximately even production of 77 percent of the peak month, while the two months following the low remain on an approximately even basis at 32 percent of the peak production.

Data on menhaden production are also given for this area. They show a double peak, one occurring in June and the other in November. Production commences in April after two months of inactivity and rises to a peak in June. Then there is a gradual decline through the summer months until another low is reached in September and October. Both of these months are 17 percent of the peak month of November. Production continues fairly high through December, with an abrupt decline commencing in January.

For the fishery industries of the Middle Atlantic area, comprising the Atlantic seaboard States from New York to Virginia, five different series of data are included in Table 1. They show the relative activity of finfish and shellfish production in this area.

The peak month of finfish production in the Long Island, New York, area is May, and the low production, which is 10 percent of the peak, occurs three months earlier, in February. In the Norfolk, Virginia, area, the peak of finfish production is reached in March, when pound net fisheries are commencing operations and boats engaged in the trawl fishery are operating. The low occurs in November, when production is 21 percent of the peak. Another high occurs in May, due almost entirely to the catch of pound net operators. The months of June, July, and August follow on relatively high levels. The data on shellfish are for the Long Island, New York, area, and show production to be highest in November and lowest in August, when it amounts to only 4 percent of the peak. The two industries, based on shellfish and finfish, have peaks and lows directly opposite to one another.

FIGURE 2 - MONTHLY LANDINGS OF FISH AND SHELLFISH--CERTAIN AREAS OF LONG ISLAND, NEW YORK. AUGUST 1944 THROUGH JULY 1945 (IN MILLIONS OF POUNDS)

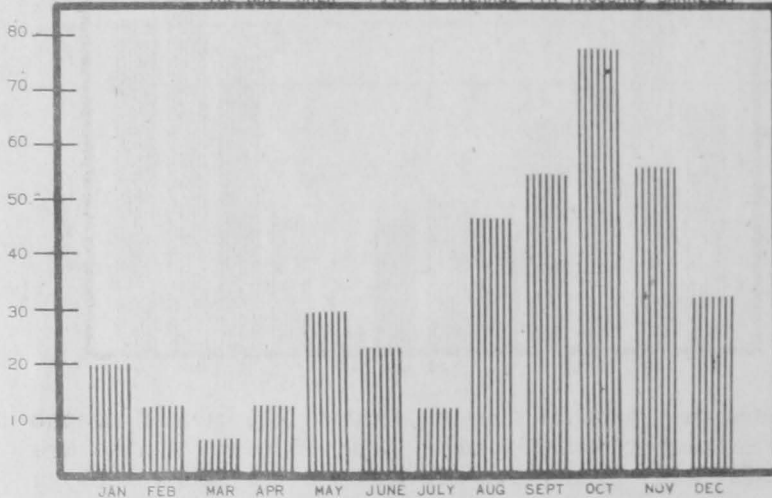


Activity of the Middle Atlantic menhaden industry is given by two series of menhaden production figures, one for the New York-New Jersey-Delaware area and the other for the Chesapeake Bay area. Significant operations do not start in these areas until June. In that month, the legal season for purse seining of menhaden begins in Virginia. Prior to that month, menhaden are caught in pound nets in both areas, but this type of gear provides only an insignificant portion of the catch. At the close of the season, the Chesapeake Bay area operates one month longer than the New York-New Jersey-Delaware area. The peak for the latter is reached in August; whereas, for the former, it is reached in June, with production continuing relatively high through July and August.

On the Gulf Coast, fishing operations are conducted primarily for shrimp. Activity in this industry fluctuates in a different manner from other fisheries in this area (see Table 1). For those engaged in shrimp operations, there is a double peak, one occurring in May and the other in October.

The relative activity of three other important segments of the Gulf fishery are also shown in Table 1, by data on the oyster industry, the crab industry, and

FIGURE 3 - MONTHLY SHRIMP PRODUCTION FOR CANNING AND OTHER PURPOSES IN THE GULF AREA - 1943-45 AVERAGE (IN THOUSAND BARRELS)



the menhaden industry. Production of oysters is heaviest during the first four months of the year. A peak is reached during March. Activity continues fairly high during April and from May on an abrupt decline occurs. A low is recorded during July, when production is only 4 percent of the peak. Heaviest production of hard crabs occurs during June. A gradual decline begins in July, until a low is reached in January, when production is only 6 percent of the peak month. Menhaden production is highest in July and no activity is recorded from November through April.

duction is highest in July and no activity is recorded from November through April.

For the Great Lakes area, figures on Chicago receipts are given. They are not to be construed as having a bearing on labor requirements for the Chicago market. They represent only fresh, domestic fresh-water shipments, and the Chicago market handles many other varieties, such as salt-water species and shellfish. The figures in Table 1 for Chicago are an indication of the fishing activities on the Great Lakes. Activity there reaches a peak in late spring, the heaviest month being May. The low point is reached in January when arrivals amounting to but 43 percent of those for the peak month of May are recorded. The variations in this area are not subject to the extreme degrees of fluctuation which occur in other areas. The months of July through November remain on an approximate 70 percent level as compared to the peak, and the months of December through March, on an approximate 50 percent level.

Fishing on the Pacific Coast in the California area is conducted mostly for sardines, tuna, and mackerel. The landings of the respective catches are concentrated in certain areas of that State. In California, sardines are produced almost entirely

for reduction and canning. There is a closed season on the production of sardines for reduction and for canning in can sizes larger than 10 ounces from March through July. The season opens in August, ends on March 1st, and the peak is reached in October. In the tuna industry, the peak is reached in August, with relatively high activity during May, June, and July, when the sardine season is closed. The lowest month of tuna production is January, representing 11 percent of the peak month.

For the Pacific Coast in the Oregon and Washington area, monthly records of Oregon landings and Seattle receipts are given in Table 1. These consist mostly of salmon, halibut, and groundfish. For Oregon, landings are heaviest in August and for Seattle, Washington, landings are heaviest in June. Both areas have a low in the month of January. In that month, Oregon landings are only 6 percent of the peak, and Seattle, only 5 percent.

The peak of activity for the shellfish industry on the West Coast, as indicated by Seattle receipts, occurs in the winter, during January, and gradually decreases during the summer months to a low in August and September, when production is still fairly active at 27 percent of the peak. Recent information indicates that the important oyster and razor clam canning industry in this area has been reactivated after a wartime lapse. The peak of this industry is reached in the spring months.

For Alaska, the salmon catch provides the greatest amount of employment in the fisheries of this area. The salmon industry is subject to a limited season because of the short duration of the runs. Canning of this species does not get under way until May. There is little activity until the latter part of June and only relatively small amounts are packed after September to the close of the season.

To obtain an indication of activity in this industry, as shown in Table 2, data on production of canned salmon for three years were secured and averaged. They are weekly figures. Greatest activity on the average for the 1943-45 seasons occurred in the second week of July, while the following four weeks show a high

Table 2 - Weekly Data on Production of Canned Salmon in Alaska

Description of Data	Period	Peak Week	Earliest Opening Date To Last June Week	Percentage of Peak Week's Production							
				JULY				AUGUST			
				Week				Week			
Production of canned salmon	1943-45 average	607,366 cases	-*	1st	2nd	3rd	4th	1st	2nd	3rd	4th
				87	100	90	93	95	85	76	54
				SEPTEMBER							
				Week				4th wk - Sept to latest closing date			
				1st	2nd	3rd					
				41	7	2					-*

*These periods cover more than one week, therefore, no percentage computation was made. Production in both periods was less than the peak week.

average of 91 percent of the peak week. The week of lowest activity, except for some scattered production at the very beginning and the very end of the season, was the third week in September, which the table shows to be only 2 percent of the peak.

These data are an average for all of Alaska. Because of the wide expanse of coast line of that territory and the specific nature of the salmon run, the season in some local areas of the Western District is over before it has gotten well under way in the Southeastern District. Consequently, if local areas of Alaska are considered, variation in the production peaks of these local areas will be noted.

The following observations maybe made with respect to the Pacific and Atlantic Coasts on the basis of the foregoing discussion. While on the Atlantic Coast, production peaks progress very definitely in accordance with climatic conditions in the various latitudes, on the Pacific Coast, peaks occur at about the same time in Alaska and in California.

The apparent possibilities which are created by the moving peak on the Atlantic Coast do not mean much in the solution of problems resulting from surpluses or deficiencies in manpower. In the first place, absolute quantities of fish caught in the North Atlantic area are much heavier than the absolute quantities caught in the Middle Atlantic or South Atlantic areas. In addition, types of fishing gear vary so greatly in the different areas that men skilled in the application of one gear cannot easily be transferred to another gear. Furthermore, distances are still so great that the cost of transferring great numbers of fishermen or of fishermen and their families would prohibit seasonal exchanges of labor.

For the fishery industries as a whole, and especially for those sections of the fishery industries in which peaks and troughs cannot be alleviated within the industry itself, the data presented herein should form the basis of better planning for the effective adjustment of the total available labor supply. They also serve to direct our thinking toward ways and means of moderating the repercussions of peaks and troughs by specific remedial measures. To be more precise, the following are given as examples of ways and means of alleviating these repercussions:

- (a) In some areas, especially on the Pacific Coast of the United States, boat owners and boat operators have striven to develop boats and gear for year-round fishing. Notable examples of this are the boats on the Pacific Coast which have provisions for operating several of the following types of gear: purse seines, otter trawls, line trawls, shark gear, troll lines, and hand lines. These attempts have been successful to a certain extent. They should be supported by governmental agencies as well as private institutions which have an interest in stabilizing and equalizing fishermen's income on a year-round basis.
- (b) The industry itself has made successful attempts to freeze large quantities of fish during the peak period for the purpose of extending canning operations into periods of the year when raw fish might otherwise not be available. This ambition of the industry itself; namely, to give its employees full employment during the whole year, or at least during the major part of the year, deserves the high praise and support of all who are interested in improving the social conditions of those employed in the fishing and fishery industries.
- (c) In some areas, fishermen as well as processors have attempted to diversify their activities. In Florida, a large number of fishermen are trained carpenters and painters who offer their services during the summer months in the fast-growing cities of this southern State. In other areas, canneries which can shad and whiting for certain periods of the year, employ the same canning laborers throughout other periods in order to can fruits and vegetables.
- (d) One means which may be used in all areas, affected by seasonal variations mentioned above, is the following. Fishermen as well as fishery labor might establish cooperative associations or credit unions for the purpose of keeping reserves accumulated in good months available for use in lean months and also for the purpose of making loans available to those who due to accident, illness, or other reasons, were unable to accumulate proper reserves during the last peak period.

Any successful action which is taken along the lines referred to in (a) to (d) certainly will result in some benefits for fishery industries operating under the disadvantages of extreme variations in employment. This study should assist the fishery industries by providing information concerning the basic seasonal production factors which are to be considered in order to make any of these plans mentioned above, and any others, successful and operative.

