TRENDS AND DEVELOPMENTS

Additions to the U. S. Fleet of Fishing Vessels

A total of 52 vessels of 5 net tons and over received their first documents as fishing craft during November 1953--12 more than in November 1952. The west coast of Florida led with 10 vessels, followed by Texas and the east coast of Florida with 8 vessels each, according to the Bureau of the Customs.

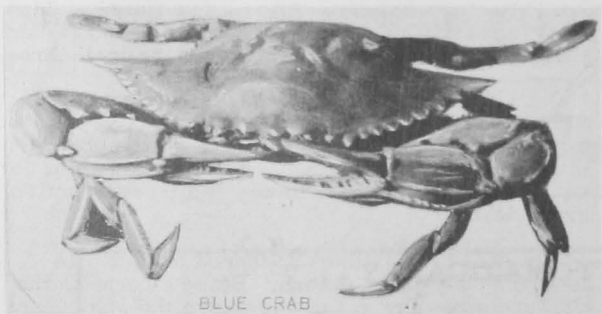
Vessels Obtaining Their First Documents as Fishing Craft, November 1953

Section	November		Eleven months ending with November		Total 1952
	1953	1952	1953	1952	
	Number	Number	Number	Number	Number
New England	1	4	19	30	30
Middle Atlantic	2	1	19	24	26
Chesapeake	3	4	76	63	65
South Atlantic	11	9	100	84	89
Gulf	24	14	236	144	161
Pacific	7	5	160	200	203
Great Lakes	1	1	7	13	13
Alaska	3	2	52	88	88
Hawaii	-	-	3	-	-
Total	52	40	672	646	675

NOTE: Vessels have been assigned to the various sections on the basis of their home port.

Atlantic Crab Meat Packers Plan Industry Sanitation Code

A voluntary industry sanitation code for blue-crab meat packers of the Atlantic Coast States was discussed at a meeting at National Fisheries Institute headquarters in Washington on January 13. A committee was formed which unanimously adopted a tentative code for National Fisheries Institute members, based on recommendations of the U. S. Fish and Wildlife Service following an intensive study of the problems. The rules and regulations of the State of Virginia, supplemented by those of other Atlantic States, served as a guide in formulating the code.

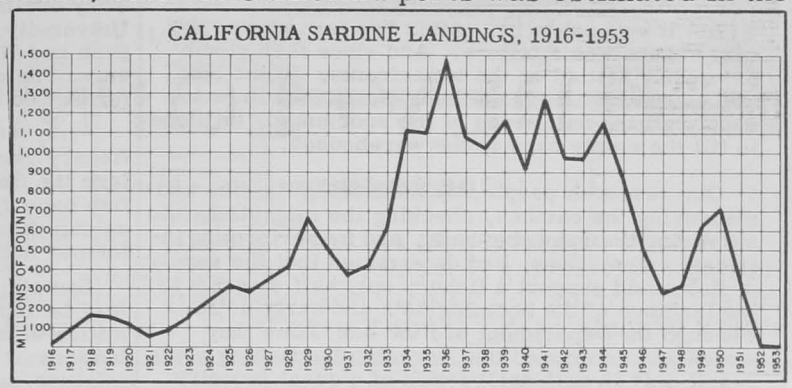


BLUE CRAB

This program is the outcome of an appeal made to the National Fisheries Institute by its New York City members and the Public Health Department of that City. Preliminary meetings were held in New York City; Jacksonville, Florida; and Hampton, Virginia. Other meetings were being scheduled covering the entire blue-crab production areas. Conferences have been held with the U. S. Fish and Wildlife Service, U. S. Food and Drug Administration, U. S. Public Health Service, and with the proper agencies of a number of states and cities. Plans involve a long-term program and offer hope for a branch of the industry that has unlimited potentialities.

California

LOSS OF SARDINE FISHERY MAY BECOME PERMANENT: Where a few short years ago the daily sardine (pilchard) catch at California ports was estimated in the thousands of tons, now days are counted between catches. Thousands have lost their livelihood with the vanishing California sardine which is now even too scarce to provide bait for anglers, claims the Chief of the Marine Fisheries Branch of the California Department of Fish and Game in an article published in the January 1954 Outdoor California. The major part of the article follows:



What has caused this catastrophe? Could it have been prevented? Will the sardines return, and can we help them? The answers to these questions are complex but we have them. The causes of scarcity can be summarized as too much fishing and not enough reproduction.

The sardine industry sprang up during World War I and reached a level during the succeeding decade or so which produced reasonable quantities of food and provided a reasonable living for fishermen and plant operators. Then with the development of reduction plants for meal and oil, catches skyrocketed. New and bigger plants were built, many new large boats joined the fleet. Everyone made money hand over fist as the ever-growing harvest of silver sardines flowed into the plants to be transformed into dollars.

As the industry expanded into the Northwest, annual landings reached 750,000 tons, or 1½ billion pounds. To the industry, the fish seemed inexhaustible, and new plants and boats were built despite the solemn warnings of scientists that the house of cards would soon come tumbling down.

No fish could withstand this sort of exploitation for long. A fleet of 300 vessels, each able to take from 100 to 200 tons a day, was capable of decimating any kind of fish.

Gradually the signs of depletion were evident. The older and larger fish were caught off and the fishermen had to take the younger ones. Each boat caught less fish for its night of fishing, but greater numbers of boats sustained the total catch for awhile. And rising prices maintained fishermen's incomes. Scarcity was masked.

At the same time that the nets were taking their toll, nature conspired to hasten the end by failing to provide good oceanic conditions for spawning and the survival of young fish. Sardine spawning success has always fluctuated widely and in some years few young fish were produced. However, there were always enough older fish to fill the boats, and occasional poor spawnings went unnoticed by the industry. Then in the last several seasons came a series of years when few baby sardines survived. The nonproduction of young fish, coupled with the killing off of the oldest fish, resulted in a severe curtailment of abundance.

Now scarcity has proceeded so far that even if oceanic conditions should become favorable, we fear that insufficient spawning sardines remain to take advantage of them to produce a good hatch.

The disappearance of the sardine was not a sudden thing--it has been progressive. The danger signs were there years ago but all warnings went unheeded. It is no pleasure to say, "We told you so." The sad part of this story of a failing industry is that it could have been prevented.

When the first signs of failure appeared, over 15 years ago, we warned the industry. Total catches were still rising and fortunes were still being made. So, who cared that the average size of the fish was diminishing, that each fisherman's catch per night's fishing was declining? The scoffers had their day and built new reduction plants and canneries.

The fishery off Canada failed first. Only the largest sized fish migrate north and when the big fish were caught, they couldn't migrate. Then Oregon and Washington lost their industry. But the fishermen thought it was a temporary shortage due to a change in the currents.

Next came the collapse of the fabulously rich San Francisco fishery. After a few flurries, Monterey faded into history. Fair spawnings in 1947 and 1948 postponed the end and prolonged the death throes.

By 1950 the Central California fishermen and plant operators in their desperation called for help. At last they realized that this was no temporary shortage. The department's recommendations for a management program finally fell on ears not entirely deaf.

But still the sardines appeared to thrive in Southern California waters. Being closest to the offshore spawning areas and where the adolescent fish have always occurred, the southern grounds continued to produce. When the 1947 and 1948 fish reached catchable size--or somewhat less--they were pounced upon by the entire West Coast fleet which had concentrated in southern waters. Few fish survived to migrate north. Few fish survived to spawn. Few fish survived.

The optimistic fishermen heralded the upsurge as the start of a returning abundance. Now, they

thought, the fish have come back like we always said. This has been just the low point on a natural cycle and here we go again on that silver rocket to the moon.

But it was not to be. After two fair years, the next season was a failure. And since then gloom has really settled on the waterfronts. In the last two years there have not been enough sardines to supply all the bait needs of the sportsmen, let alone to fill the empty cans in the warehouses.

Our research people, by measuring the fish and measuring the catches, checking the migrations and surveying the spawning beds, and by performing intricate calculations, had determined that the supply of fish could support a fishery only half as great as the landings of the booming 30's and early 40's. Through the Department of Fish and Game they stated and reiterated that unrestricted fishing would result only in self-destruction of a great industry. They pointed out that restrictions on nets, closed areas, processing limitations and closed seasons, even had they been more severe, would still be nothing but panaceas giving lip service to conservation.

Nothing short of a direct curtailment of fishing--which would result in less production--could preserve the fishery. The calculations indicated that although the supply could not withstand a 700,000-ton catch indefinitely, it could maintain half that amount year after year. The recommendations aroused laughter but no interest.

As catches plummeted, the researcher calculated that the reduced sardine population could no longer maintain a 300,000-ton production. They recommended a seasonal bag limit of what then sounded like a ridiculously low figure. Who could guess that a year's total catch would soon be a mere 5,000 tons, including bait?

While fishing continued recklessly, each successive calculation showed a lower safe annual limit that should be set.

It can be stated without fear of contradiction that had landings been limited to 300,000 tons a year in the early 1940's, there would be no sardine crisis now. Had a limit of 200,000 tons a year been established as late as 1947, there would not be 75 idle processing plants rusting away nor over 100 purse seine boats for sale at any price. But no one could believe that the ugly word "overfishing" was the cause and no one wanted any regulation or restriction of their "right" to fish.

Committees were appointed and deliberated. Some saw merit in our proposals for a managed fishery. Some didn't. All quarreled over details while agreeing that conservation was a good idea.

Realizing that something was causing the sardines to make themselves unavailable, even if it wasn't fishing, level-headed leaders in the industry asked for additional research which they hoped would throw light on the disappearance. They asked the Legislature for special added taxes on themselves to finance research, and as a result the Marine Research Committee was formed. They requested larger appropriations for the University of California for research. Seagoing surveys are expensive. The agencies, financed in part by this new tax, and using also their own funds, have banded together under the Marine Research Committee. They are the Department of Fish and Game, the University of California, Stanford University, U. S. Fish and Wildlife Service, and the California Academy of Sciences. Their program is called the California Cooperative Oceanic Fisheries Investigation.

Important results have been produced by this fishery research program, but it will be years before the final story is told. In the meantime, the fish have gone from all our coast and only in Mexico can they be found in anything approaching their former numbers.

Something drastic must be done, and soon. It may be too late but we must try. An advisory committee established late in 1951 and composed of the leaders of the industry, sportsmen's groups, Legislature, and the Department labored long and earnestly to develop a conservation plan. In spite of everything, a workable program was laid before the Legislature in 1953. Bickering and disagreement over details caused its defeat. Fishing continues unrestricted and every sardine that shows a fin is captured forthwith.

Now, only complete cessation of fishing for a few years, followed by rigid control of fishing intensity for many years can hope to revive the sardine fishery. The few remaining fish must be given a chance to reproduce.

In recognition of the plight of the fishery, the Fish and Game Commission adopted a resolution last November that sums the situation accurately. It reads:

> "WHEREAS, It appears to the Fish and Game Commission that the sardine industry of California is in a state of collapse because of a continuing scarcity of fish to the point where there is insufficient supply for either processing or bait; and
>
> "WHEREAS, There are no indications of a return to abundance in the foreseeable future; and
>
> "WHEREAS, Present statutory controls are inadequate to insure a recovery of the fishery, and only strict regulation of catches adjusted to meet changes in the amount of the supply offers any hope for the future of this important industry; now, therefore, be it
>
> RESOLVED, That the Fish and Game Commission respectfully requests the Governor of the State of California to call an extraordinary session of the Legislature to be concurrent with the 1954 Regular Budget Session to consider enactment of a statute conferring upon the Fish and Game Commission the authority to regulate the taking of sardines for all purposes, consistent with the principle of maximum sustained yield."

So, once again we shall try to save an industry with the support of those in the industry who wish to remain in business and the sport fishermen who see the sardine as a feed fish for the game species and as bait.

* * * * *

SARDINE STUDY PROGRESS REPORT: A progress report on the studies of the California sardine (pilchard), anchovy, Pacific mackerel, and jack mackerel, has been issued by the research agencies participating in the California Cooperative Oceanic Fisheries Investigations. The report covers the fiscal year July 1, 1952, to June 30, 1953. The work by the agencies during the period has been supported by a special tax on anchovy, jack mackerel, and Pacific mackerel landings, as well as the special tax on sardines and appropriations from the California State Legislature. This apparent broadening of the scope of the sardine program (symbolized by the change in name from the California Cooperative Sardine Research Program) formalizes what has been recognized by scientists and industry from the beginning of the program, that despite the critical state of the sardine fishery there is no specific "sardine problem;" the sardine problem is an integral part of the broader question of California's marine resources.

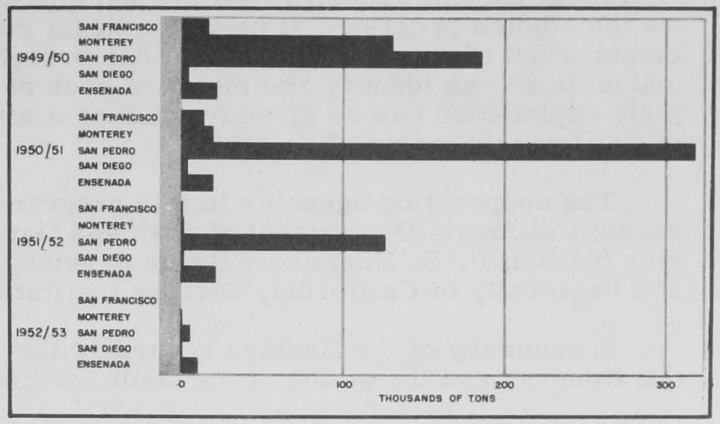


Fig. 1 - The total California sardine catch for the 1952/53 season was 5,420 tons. Only 70 tons of the total came from ports north of Point Conception. The Baja California port of Ensenada accounted for more tonnage than all California ports even though the catch there (9,630 tons) amounted to less than half that for the previous year. The Ensenada totals are for the calendar year in which the California season starts (1949/50 = 1949, etc.). The tonnage for Ensenada were obtained through the courtesy of the processing plant operators.

The report summarizes the situation as of July 1, 1953, as follows:

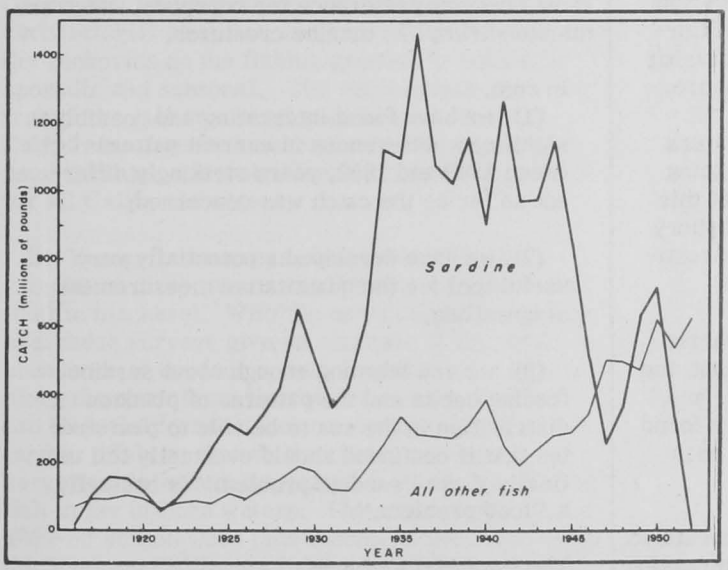


Fig. 2 - From 1922 to 1946, the catch of Pacific sardines exceeded in weight that of all other California fisheries combined, particularly so during the 1930's.

1. The bulk of the sardine population today is concentrated in the waters off Baja California, where it is largely unavailable to sardine fishermen of the United States.

2. There are fewer sardines in California waters than ever before.

3. There is little reason to hope that sardine fishing in the next two years will reach the level attained in the years of prosperity.

4. The most numerous year class present is that spawned in 1952, and evidence points to its being smaller than the 1948 year class.

5. Anchovy and jack mackerel populations appear to be satisfactorily abundant. Pacific mackerel catches, on the other hand, point toward a low abundance throughout California waters.

6. The research studies on which these conclusions are based are outlined in this report. We are able to give some clues as to the causes of the catastrophic decline in sardine landings, but are not able to isolate any single primary reason. As the studies progress, it begins to seem more and more probable that it is a combination of several factors that has brought the sardine catch to its low level and until we can identify and measure each of the most important factors, no complete explanation can be given for this or a similar crisis which may overtake any of California's marine fisheries.

The cooperating agencies in this program include: California Academy of Sciences; California Department of Fish and Game; Stanford University, Hopkins Marine Station; U. S. Fish and Wildlife Service, South Pacific Fishery Investigations; and University of California, Scripps Institution of Oceanography.

A summary of the findings regarding the environment of the sardine, the potential fishery, and the status of the adult sardine population as of July 1, 1953, follows:

The Environment of the Sardine:

1. During 1952, 1,252 hydrographic stations were occupied by vessels engaged in sardine research studies. The most intense coverage was off Southern California and Baja California, where we have found almost all spawning to occur.

2. Several special cruises were made to study sardines in the nearshore areas.

3. The year 1949 ended with a fairly good fishing season; the year 1952 ended with the worst season in history. We have found that the California Current meandered more in 1949 than in 1952, causing the appearance of the Countercurrent near shore.

4. The Countercurrent brought warmer waters along the immediate coast during the 1949 fishing season than during 1952. We do not know that this fact bears on the spectacular failure of the fishery in 1952; it is a possibility that we intend to investigate further.

5. In four years of survey cruises, we have tremendously enlarged our knowledge of upwelling, the physical factor that results in enriched water and consequent plant and animal growth. We have found upwelling to occur at more places and times than had been known before.

6. Recently we have developed a theory that allows us to give a numerical value to upwelling, expressing the amount in distance upward traveled in a unit of time. This potentially very useful method checks well with our other upwelling studies, and may point a way for relating upwelling more closely to other quantities measured on the program, such as food production, amount of spawning, and the catch.

7. Using past studies as our basis for comparison, we have not been able to demonstrate that the plant population of the ocean has changed significantly during the past few years. This negative result by no means closed the door on further investigation of the productivity problem; it is useful in that it indicates our method may be faulty and suggests better ways to get the information.

8. Studies of adult sardines have shown them to be primarily filter-feeders, straining out any organisms present in the surrounding water.

9. Larval sardines are unable to strain food; they seize it with their mouths. Larval sardines show a definite preference for copepods, which are minute shrimplike marine creatures.

In sum,

(1) we have found interesting and possibly significant differences in current patterns between 1949 and 1952, years strikingly different so far as the catch was concerned;

(2) we have developed a potentially very useful tool for the quantitative measurement of upwelling;

(3) we are learning enough about sardine feeding habits and the patterns of plankton distribution in the sea to be able to plan studies that if continued should eventually tell us finally if the "sardine problem" is basically a "food problem."

The Potential Fishery:

1. Since 1949, sardine spawning has progressively lessened both in amount and extent off California.

2. There has been no noticeable decline in the abundance of either eggs or larvae off central Baja California.

3. Young-fish surveys indicate that no great numbers of sardines have survived from spawnings since 1948.

4. By 1952 all age groups of sardines were reduced to a low level except the six-month-old 1952 year class; these fish are too young to contribute a large tonnage to the California fishery in the 1953-54 season.

The Status of the Adult Sardine Population:

1. In the past four years we have witnessed a decrease in numbers of sardines of all sizes on the California fishing grounds, and a maintenance, but no marked increase, in the numbers in Baja California waters south of Ensenada.

2. By 1952-53, too few sardines of any age group remained on the California grounds to support a fishery.

3. A contraction of the area in which the sardines are caught has been paralleled by a series of poor year classes.

4. Between 1951 and 1952, estimated mortality rates increased greatly over the preceding year's estimate.

5. The success or failure of the fishery in the immediate future will be largely determined by the number of sardines that may move from the Baja California waters onto the fishing grounds.

6. There is evidence for a vastly increased availability in the 1949-50 season, with a declining availability since then.

7. Estimates of population size have yielded information that indicates a variable net northward movement from Baja California to Southern California of sardines in the fall, and this variability accounted in part for the failure of the 1952-53 season.

8. A new technique has been introduced for the study of the problem of subgroups.

A summary of the findings on the status of what the report terms "substitute sardine populations" follows:

The Status of the Substitute Fish Populations:

1. Landings of anchovies, especially in central California, would indicate that this population is satisfactorily abundant, although the appearance of the anchovies on the fishing grounds is somewhat sporadic and seasonal. The same seems to be true of the jack mackerel population in Southern California. Pacific mackerel catches, on the other hand, indicate a low abundance of these fish throughout all California waters.

2. Young-fish surveys, designed primarily to sample sardines, also sample anchovies, jack and Pacific mackerel. With the exception of jack mackerel these surveys give an estimate of the relative abundance of the four species and their distribution along the coast from Northern California to southern Baja California. Jack mackerel schools occur farther offshore than do the other species and the surveys only reflect the relative abundance of these fish in the inshore waters. This was evident in the 1952-53 season when jack mackerel were scarce on the Southern California fishing grounds but the fishermen were able to bring in good tonnages from the offshore banks. This offshore fishery, however, did not yield any appreciable tonnages of sardine or Pacific mackerel.

3. The lowest abundance of all species occurred off central California. The numbers of Pacific and jack mackerel declined steadily in the Southern California waters throughout the three years of the surveys but showed a slight increase off Baja California. Anchovies were more abundant off Southern California and Baja California than off central California. Off California their greatest abundance occurred in 1950. They were slightly more abundant in 1952 than in 1951.

4. From 1950 to 1952 the decline of sardines on California grounds was steady and rapid. Pacific mackerel, at a lower level at the beginning, disappeared almost completely by 1952. Anchovy and jack mackerel also declined but at a slower rate. Throughout the three years their abundance exceeded that of sardines.

5. In Baja California waters, jack mackerel decreased slightly and anchovies more markedly. Pacific mackerel did not decline and showed a minor increase in 1952. They were the least abundant of all species, however, on the Baja California grounds as well as off California.

* * * * *

YELLOWFIN TUNA GROW RAPIDLY: The first concrete information on the growth rate of tuna was revealed when a tagged yellowfin tuna was landed at San Diego, California, on January 19. The fish was tagged by marine biologists of the California Department of Fish and Game off the Gulf of Guayaquil, Peru, in 1952; it had grown more than one inch a month and gained more than two pounds a month in the 372 days elapsing between tagging and capture.

Cans--Shipments for Fishery Products, January-November 1953

Total shipments of metal cans for fish and sea food during January-November 1953 amounted to 99,973 short tons of steel (based on the amount of steel consumed in the manufacture of cans). Comparative data for 1952 are not available.

NOTE: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Fishery Products Marketing Prospects for 1954 and Review for 1953

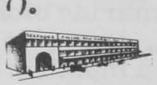
PROSPECTS FOR 1954: Current indications for the first half of 1954 are that United States civilian consumption of fishery products probably will not equal the per-capita rate of a year earlier. Supplies of the frozen and the canned commodities will remain smaller than a year earlier at least until after mid-spring, when the 1954 commercial fishing season will be well under way. Except for a few species, stocks at the end of 1953, which represent the bulk of the total supplies available for distribution until well into the spring season, were much smaller than a year earlier, and imports of the major fishery products are likely to be about the same as in the first half of 1953. The smaller supplies will likely be reflected in retail prices of fishery products during the first half of 1954 which at least will be equal to those of a year earlier.

REVIEW OF 1953: United States civilian consumption of fishery products per person in 1953 was not quite equal to that of a year earlier, with small declines occurring both in the canned and the fresh and frozen commodities. Supplies of edible fishery products were somewhat smaller than in 1952, largely as a result of the reduced catch. Judging from wholesale prices in the principal primary markets, retail prices of fish and shellfish generally averaged close to those of 1952.

The commercial catch of edible fishery products was about 7 percent smaller in 1953 than a year earlier. This decline resulted from a combination of factors, among the most important of which were poor runs of fish in some of the major commercial fishing areas and unfavorable weather. A large part of the catch decline was reflected in smaller packs of the important canned fish than in 1952--i.e., salmon, Maine sardines, California sardines (pilchards), and mackerel. The decline in total canned fish output in 1953 was to some extent offset by substantially larger imports of canned salmon, sardines, and tuna.

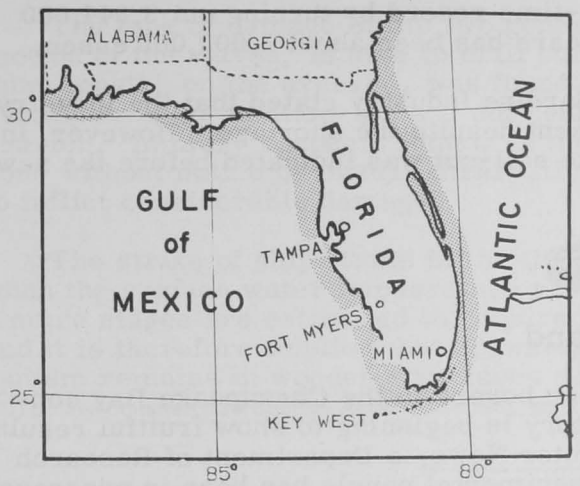
The total volume of commercial fishery products which moved into domestic distribution during 1953 was close to that of 1952. The substantial reduction during the year in stocks of frozen fishery products and in packers' stocks of canned fish largely offset the effects of the decline in production. Imports of important fishery products were a little larger than in 1952, with the decline in receipts of the major fresh and frozen products more than offset by a substantial increase in imports of canned fish. Exports of canned fish, which comprise the bulk of the total edible fishery products which we ship abroad, were substantially smaller than last year as a result of short supplies of canned California sardines (pilchards).

This analysis appeared in a report prepared by the Bureau of Agricultural Economics, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's February 10, 1954, release of The National Food Situation (NFS-67).



Florida

FLORIDA RED TIDE STUDY TO CONTINUE: A determined effort to find an effective control of the Florida red tide is receiving the attention of Secretary of the Interior Douglas McKay. On a recent trip to Florida Secretary McKay met with representatives of the affected areas and discussed the problem. Since returning to Washington he has discussed the matter with Assistant Secretary Orme Lewis, who was with him on his recent visit to Florida, and with Fish and Wildlife Service Director John Farley.



Lewis reported that the Service is presently conducting research at Galveston, Texas, and Ft. Myers, Florida, with an annual appropriation of $35,000, and has reported that due to current conditions in the area affected it appears that further research, through the use of a scientifically equipped boat, will be of much benefit. The approximate cost of the additional work will be $20,000 annually, in addition to the cost of purchasing and equipping the boat.

Secretary McKay stated that the Department is determining the possibility of allotting funds from current appropriations to finance the cost of the additional research work. The Department is also studying the possibility of making a request for a supplemental appropriation in the event the requirements for such an appropriation can be met.

Great Lakes Fishery Investigations

LAMPREY CONTROL BY LARVICIDE: One phase of the research program undertaken by the U. S. Fish and Wildlife Service in the near future will be concerned with discovering some means of destroying sea lampreys that have already reached the larval stage in the streams. The imperative need for an effective larvicide was emphasized in the summer of 1953, when more than 1,600 spawning-run lampreys were captured in the 10 control structures which were operated during part of the spawning season. The presence of spawning-run lampreys in as great number as this indicates that streams of Lake Superior may even now be well seeded with larval lampreys. As these ammocoetes spend 4 to 5 years in the stream bottom, it is quite possible that during the next few years the number of parasitic-phase lampreys occurring in Lake Superior--the last of the Great Lakes to have a good-sized stock of lake trout--may be sufficient to bring disaster to the lake trout fishery even though any further spawning of the sea lampreys is prevented.

Maine

SARDINE PACK, 1953: The pack of Maine sardines in oil and mustard sauce during the 1953 season totaled 2,165,000 actual cases; 1,845,000 standard cases (100 $\frac{1}{4}$-oil cans with $3\frac{1}{4}$ oz. net per can) and 320,000 actual cases of 5-, 8-, 15-, and 16-ounce cans in oil, mustard sauce, and various packing mediums, according to figures released by the Executive Secretary of the Maine Sardine Industry. This was the

second shortest pack since 1938, with the 1951 pack of 1,600,000 cases still the lowest on record for the 16-year period.

In 1952 Maine's canning plants packed the equivalent of 3,458,000 standard cases of sardines, while in 1950 they broke an all-time record by turning out 3,844,000 cases. The average pack for the past ten years has been about 3,000,000 cases.

The Executive Secretary of the Maine Sardine Industry stated that the industry's nationwide market was well supplied at present despite the shortage. However, inventories were dwindling fast and a complete sell-out was indicated before the new packing season opened in April.

Maryland

SHIPWORM STUDY: The study of marine borers in the Chesapeake Bay conducted at the Chesapeake Biological Laboratory is beginning to show fruitful results, reports the December 1953 Maryland Tidewater News, a Department of Research and Education publication. Collection of experimental panels has been in progress since May 1950 and most of the panels have been examined. These have been collected from 18 sampling stations throughout the Bay and on the Atlantic coast of Maryland. Two genera of shipworms have been encountered in the Bay, namely Bankia and Teredo. Bankia has been found in waters of lower salt content while Teredo apparently is limited to waters of greater salinity.

Large tubes made by Bankia and small tubes made by Teredo on piling.

Salinity appears to be the limiting factor with the genus Bankia. No specimens of Bankia have been collected from areas in which the year-round average salinity drops below 9.4 parts per thousand. This probably means that an average year-round salinity of at least 9 parts per thousand is necessary for survival of this shipworm population, but does not necessarily indicate that the organisms cannot tolerate lower salinities over short periods of time. Stations on the upper Patapsco River showed no infestation, a situation that may be due to pollution of waters. The year-round average salinity, from the data collected by the Laboratory, is between 7.7 and 7.9 parts per thousand (at the surface) in the Patapsco River. At Gibson Island, where probably no pollution occurs, no shipworms have been found in the course of this study. The average year-round salinity at this point is 7.5 parts per thousand.

A small strike of Bankia occurred at Annapolis during July and early August 1953, and a similar strike occurred at Kent Narrows. The average year-round salinity at these points is 9.4 and 9.7 parts per thousand, respectively. The data seems to show that the northernmost limit of Bankia in the Chesapeake Bay is near 39° N. latitude. Data on Cambridge harbor is incomplete, but a small strike was recorded there at the end of the summer of 1951. One of the worst areas encountered in the study thus far was at Solomons Island near the mouth of the Patuxent River. Bankia causes considerable damage in that area during the summer months at which time the strikes are heavy. For example, in one 2x4x6 inch panel submerged from May to the beginning of August, 22 shipworms were found ranging from 0.6 to 12.0 inches in length.

Crisfield harbor showed a light strike during the months of July and August 1951. The further distribution southward of the genus Bankia is not known at this time although none has appeared in panels from Gloucester Point in the lower York River.

At Gloucester, however, panels left submerged for the summer, were completely riddled by Teredo. This seems to be correlated with higher salinities. Panels on the Atlantic Coast at Ocean City harbor and in the Chincoteague Bay have shown only Teredo. The intensity of strike is very heavy in this area.

The type of damage of the two genera differs somewhat. Bankia, by the lateral motion of the valves, is able to drill burrows of larger diameter, and their maximum length, on the average, was found to be greater. The burrows of Teredo are usually smaller in diameter and not nearly as long but the "strike" is usually much heavier. In many respects Bankia is more dangerous since much damage can be done without notice by casual observation, and a strike of fewer organisms is able to inflict considerable damage.

The strike of shipworms in the Chesapeake Bay takes place usually during July when the surface water temperature reaches between 75° F. and 80° F. The immature stages are estimated to require from four to five weeks for development, and it is therefore implied that spawning begins in late May or early June. The organism remains in wooden structures during the remainder of its life.

NOTE: See Commercial Fisheries Review, July 1951, pp. 17-18.

Pacific Salmon Investigations

AGE READINGS OF SALMON OTOLITHS: Age readings of otoliths (ear stones) definitely confirm the finding by Service biologists that 3-year old fish predominated in the large run of Okanogan River blueback (red or sockeye) salmon in 1953, although blueback salmon of this river are normally 4-year olds.

Otolith age readings from 91 bluebacks sampled in October 1953 showed 93.4 percent were 3-year olds and 6.6 percent 4-year olds. This finding compares well with age readings from scale samples made in August 1953 in which 98.4 percent were 3-year old fish, 1.1 percent 4-year fish, and 0.5 percent 5-year fish. Reasons for predominance of 3-year fish in the run are unknown, reports the Service's Branch of Fishery Biology.

Shrimp Canners Propose Revised Standards for Canned Shrimp Sizes

In order to discuss, amend, and adopt tentative industry standards for sizes and size designations of canned shrimp, members of the National Shrimp Canners and Packers Association met on January 6 in New Orleans, La. The resolutions unanimously adopted at the meeting covered the following:

An industry standard for grade counts on canned shrimp.

Tentative counts on canned shrimp as follows:

1. Colossal - Less than 2-1/2 shrimp per ounce.
2. Jumbo - Less than 3-1/2 shrimp per ounce.
3. Large - 3-1/2 to 5 shrimp per ounce.
4. Medium - More than 5 but not more than 9 shrimp per ounce.
5. Small - More than 9 but not more than 17 shrimp per ounce.
6. Tiny - More than 17 shrimp per ounce.

Term "extra large" deleted from the labels and the word "jumbo" substituted.

Recommendation for all grade sizes to be shown on labels.

A tolerance for cleaned or deveined shrimp of +8 percent of each count of regular pack in order to offset deveining loss.

Any shrimp pack consisting of less than 50 percent broken by weight be classified as "whole and broken," or with the appropriate size designation plus the word "broken," or as "broken;" and that more than 50 percent by weight be classified as "broken."

Present industry practice of allowing a tolerance of not more than 5 percent of broken shrimp in any grade size be continued.

Grade sizes be based on cut-out weight per ounce after processing.

August 1, 1954, be set as the date for adoption of these standards.

United States and Alaska Commercial Fisheries Catch Increased in 1953

CATCH: The 1953 catch of commercial fish and shellfish in the United States and Alaska totaled about 4.4 billion pounds as compared with 4.3 billion pounds in 1952, according to a preliminary report issued by the Service's Branch of Commercial Fisheries. The catch includes fish and shellfish for human consumption and for production into byproducts.

The increase was due to a spectacular gain in the catch of menhaden, one of the least known but most important species of commercial fish. A substantial supply of menhaden on the Atlantic Coast and a heavy demand for menhaden meal for poultry and swine feeding were responsible for the increased landings.

LEADING FISHING PORTS: The outstanding fishing port in 1953 in volume of landings was Lewes, Del., where 360 million pounds of menhaden (almost entirely utilized for producing fish meal, oil, and solubles) were landed. San Pedro, Calif., which held first place for many years, was second with landings of 328,000,000 pounds, principally tuna, Pacific and jack mackerel, and sardines.

Other leading ports for which poundage figures are available were: Gloucester, Mass., with 186,000,000 pounds, mainly of ocean perch, whiting, haddock, and pollock; Boston, Mass., with 152,000,000 pounds, principally of haddock, cod, pollock, whiting, ocean perch, and flounders; Reedville, Va., with 152,000,000 pounds of menhaden; and San Diego, Calif., with 128,000,000 pounds, chiefly of tuna.

The outstanding ports with respect to value of the catch were San Pedro with landings worth $32 million and San Diego with a catch valued at $20.3 million. The value of the catch at these two ports far outweighed other domestic ports.

PRODUCTION OF FISHERY PRODUCTS AND BYPRODUCTS: Ups and downs marked the output of fishery products and byproducts in the United States and Alaska last year. Declines occurred in the production of canned salmon, canned Maine sardines, canned Pacific and jack mackerel, and frozen products, while there were gains in the output of canned tuna, canned shrimp, canned anchovies, fish meal, and fish oils.

The total pack of canned fishery products for human consumption was about 10 percent less than the 647 million pounds packed in 1952. The output of canned salmon came to about 3.9 million cases as against 4.5 million cases in 1952. The Maine sardine pack amounted to approximately 2 million cases as compared with more than 3.5 million cases in the previous year. Production of canned Pacific and jack mackerel dropped to about 593 thousand cases from the 1952 pack of 1.5 million cases. The tuna pack amounted to about 9.5 million cases, or approximately 400 thousand cases more than in the previous year, for an all-time high. Production of canned shrimp showed an increase of about 10 percent over the 1952 pack of 818 thousand cases. The output of canned anchovies increased sharply, but this will have little effect on the over-all supply of canned fish for domestic consumption since most of this pack is exported.

Production of increasingly important fish meal came to about 241 thousand tons as compared with 221 thousand tons in 1952. The 1953 production is believed to represent an all-time record.

The yield of fish oils amounted to about 20.5 million gallons, or more than 4 million gallons above the previous year's yield.

The output of frozen fishery products totaled about 275 million pounds as compared with 313 million pounds in 1952.

The principal reasons given for production drops were failure of fish to appear in normal numbers and a lack of demand for certain products.

As a result of the declines in the production of processed edible fishery products, supplies of a number of items will be below normal in 1954.

U. S. Foreign Trade in Edible Fishery Products, October 1953

United States imports of fresh, frozen, and processed edible fish and shellfish during October 1953 totaled 64 million pounds (valued at $16.7 million), according to the October United States Foreign Trade, a Department of Commerce publication (see table). This is an increase of 7 percent in quantity and 4 percent in value as compared with September imports of 60 million pounds (valued at $16 million). However, October 1953 imports were down 22 percent in quantity and 13 percent in value from a year earlier.

United States Foreign Trade in Edible Fishery Products, October 1953 With Comparisons

	October 1953		October 1952		Year 1952	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	Million $	1,000 Lbs.	Million $	1,000 Lbs.	Million $
Imports:						
Fish & shellfish:						
Fresh, frozen & processed 1/	63,719	16.7	82,075	19.2	705,118	183.1
Exports:						
Fish & shellfish:						
Processed 1/ only (excluding fresh and frozen)	3,197	0.8	7,130	1.7	56,604	13.5

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed edible fish and shellfish (excluding fresh and frozen) in October 1953 amounted to over 3 million pounds (valued at $0.8 million), lower by 43 percent in quantity and 33 percent in value from September exports of almost 6 million pounds (valued at $1.2 million). Compared with October 1952, exports were down 55 percent in quantity and 53 percent in value.

Wisconsin Great Lakes Commercial Fishing Regulations

The Wisconsin Conservation Commission recently adopted Order No. F-405(Revised 8) relating to open and closed season and other regulations for commercial fishing in Great Lakes' waters of Wisconsin, a November 27 bulletin from the Wisconsin Conservation Department reports. The changes from the previous order were only few and they were as follows:

1. The closed season on suckers, walleyes, and northern pike was extended to May 31 instead of May 19 (season will now be April 10 to May 31).

2. The so-called "Sebago Salmon" is recognized as the brown trout and taken off the commercial fishing list.

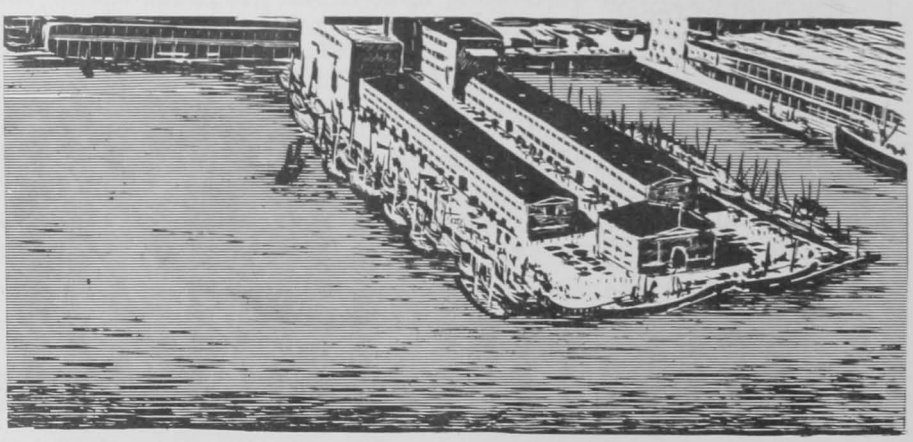
3. Permits will be issued for $2\frac{1}{4}$-inch stretched mesh herring nets in Green Bay in the spring of 1954.

4. Drop nets will be permitted for fishing through (under) the ice in Southern Green Bay in less than 50 feet of water, and lifted in a heated enclosure.

The Superintendent of Fish Management explained that public hearings on the proposed order had been held at several places on the Great Lakes during August 1953, and that the State Commercial Fishery Advisory Committee favored the proposed changes. The item which received the most comment by commissioners was the removal of the "Sebago Salmon" from the commercial fishing list. The Superintendent stated that there was not much evidence that many of these lake-run brown trout were taken by anglers, but in recent years the commercial harvest ranged from 4,000 to 9,000 pounds annually. This is not of importance to the commercial fishing industry as a whole, but is significant for the few commercial fishermen who do fish for them. He also stated that over the years commercial fishermen have been deprived of certain species and areas in favor of anglers and that as a group the commercial fishermen have been good sports about it.

Wholesale Prices, January 1954

January fresh fish and shellfish landings continued seasonally light, the demand for most fishery products was good, and wholesale prices for these products were higher than in December. Prices were also higher than in January 1953. The over-all edible fish and shellfish (fresh, frozen, and canned) wholesale index for January 1954 was 113.9 percent of the 1947-49 average (see table)--4.1 percent higher than in December 1953 and 3.1 percent above January 1953, the Bureau of Labor Statistics of the Department of Labor reports.



Boston Fish Pier

The largest increase was in the drawn, dressed, or whole finfish subgroup index--8.7 percent higher than December and 11.8 percent above January 1953. January prices for all items in this subgroup were up from December, except salmon at New York and lake trout at Chicago which sold at lower prices. Compared to a year earlier, prices for ex-vessel haddock at Boston and whitefish and yellow pike at New York were up considerably; there was a moderate price increase for whitefish at Chicago; halibut and salmon prices were down; and lake trout prices at Chicago remained stable.

In the fresh processed fish and shellfish subgroup, January prices were up slightly (1.2 percent) due to increases in haddock fillets (2.5 percent) and oysters (2.4 percent). Shrimp prices were down slightly (0.2 percent) as production continued good. Compared to January 1953, haddock fillets and oyster prices were up, while shrimp prices were down.

There were only minor changes from December to January in frozen processed fish and shellfish prices--flounder fillets were unchanged, fillets of haddock and ocean perch rose slightly, and shrimp prices were down a little. Although haddock fillet prices this January were up 13.2 percent from a year earlier, prices for all other items in this subgroup were below January 1953.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1954 and Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Jan. 1954	Dec. 1953	Jan. 1954	Dec. 1953	Nov. 1953	Jan. 1953
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					113.9	109.4	106.1	110.5
Fresh & Frozen Fishery Products:					125.8	2/119.4	114.0	119.3
Drawn, Dressed, or Whole Finfish:					131.4	120.8	112.8	117.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.17	.15	170.1	148.2	126.4	131.7
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.30	95.9	93.4	91.8	103.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.49	.50	109.0	111.2	115.7	110.7
Whitefish, L. Superior, drawn (drsd.), fresh	Chicago	lb.	.61	.37	150.0	90.5	85.5	142.5
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.65	.63	131.5	126.4	101.1	99.1
Lake trout, domestic, No. 1, drawn(drsd.)fresh	Chicago	lb.	.61	.61	124.0	125.0	107.6	124.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.50	.40	117.2	93.8	102.0	96.1
Processed, Fresh (Fish and Shellfish):					123.4	121.9	119.3	125.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.41	.40	139.5	136.1	129.3	131.0
Shrimp, lge. (26-30 count), headless, fresh or frozen	New York	lb.	.72	.73	114.2	114.4	107.9	122.5
Oysters, shucked, standards	Norfolk	gal.	5.25	5.13	129.9	126.8	129.9	126.8
Processed, Frozen (Fish & Shellfish):					109.3	108.7	107.0	113.6
Fillets: Flounder (yellowtail), skinless, 10-lb. pkg.	Boston	lb.	.31	.31	108.7	108.7	108.7	119.2
Haddock, sml., skins on, 10-lb. cello-pack	Boston	lb.	.28	.27	104.1	100.4	100.4	92.0
Ocean perch, skins on, 10-lb. cello-pack	Gloucester	lb.	.23	.23	112.0	110.7	105.9	114.4
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.72	.72	110.3	111.1	109.9	121.1
Canned Fishery Products:					96.4	94.5	94.5	97.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	case	17.70	17.70	93.9	93.9	93.9	104.4
Tuna, lt. meat, solid pack, No. 1/2 tuna (7 oz.), 48 cans/cs.	Los Angeles	case	16.20	15.30	101.1	95.5	95.5	90.5
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	9.25	9.25	108.0	108.0	108.0	106.8
Sardines, Maine, keyless oil, No. 1/4 drawn (3 1/4 oz.), 100 cans/cs.	New York	case	8.20	8.20	87.3	87.3	87.3	79.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs.
2/Revised.

Canned tuna prices increased 5.9 percent from December to January and this accounted for the 2.0-percent increase for the canned fishery products subgroup index; other canned items remained unchanged. The market for canned fish was very good. Maine sardines with a less-than-normal pack met little competition because the California sardine pack was practically nil. All canned fishery products prices this January were up from a year earlier, except pink salmon prices which were down 10.1 percent.