



REVIEW OF BUSINESS AND ECONOMIC CONDITIONS

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THE ALASKA SHELLFISH INDUSTRY

Significant developments in the Alaska shellfish industry during 1967 and 1968 have modified the disturbances caused by the 20 per cent drop in the 1967 king crab harvest from the 1966 record and the further drop being recorded this year. The past year may well be remembered more as the year the shellfish industry expanded and diversified its resource base by beginning to utilize more Dungeness and Tanner crab, shrimp, scallops, and clams than as the year the king crab catch went downhill.

In contrast to the gloom of the king crab harvest drop in 1967, that season's ex-vessel values from the total shellfish take were decidedly above those of 1966. Harvesters of all shellfish grossed more than \$18.2 million in 1967, as compared to \$17.6 million in 1966, according to the Alaska Department of Fish and Game (ADF&G).

Shrimp production (almost 42 million pounds) was up more than 48 per cent in volume, 55 per cent at harvester level values, and up 133 per cent in wholesale values of processed products. Where the wholesale value of 1967 domestic king crab products was slightly under \$37 million, the Dungeness and Tanner crabs and shrimp were valued at slightly more than \$10.8 million. Comparable 1966 values were \$44.4 million for king crab and \$5.1 million for the other crabs and shrimp.

These data and the indicated progress do not take into account the growing scallop fishery or a potential re-birth of razor clam utilization in the state. If these are added, the development trend is even more emphasized.

HISTORY

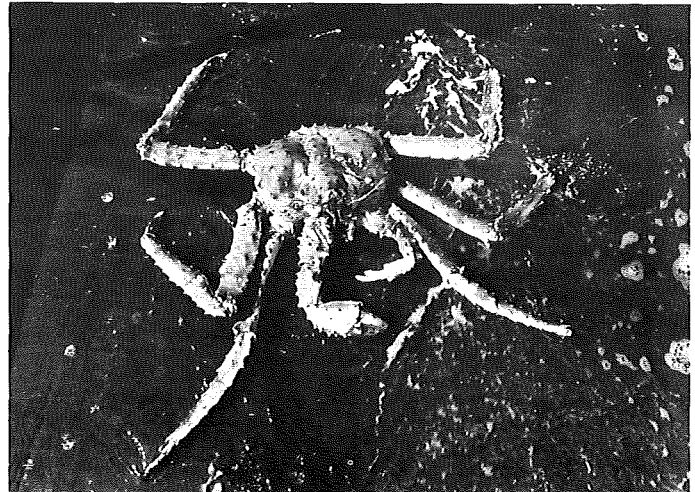
Commercial shellfish utilization has been an appreciable part of Alaska's fisheries since World War I. Dungeness crab, razor clam, and shrimp harvesting started at about the same time, although not as an integrated industrial operation. Canning was almost exclusively the means of processing these species. Freezing, which is now

a major medium, did not contribute much to production until king crab were processed in recent times.

In 1915 and 1916, operators at Petersburg, Wrangell, and Cordova started packing Dungeness crab meat as salmon fishermen of these districts devoted off-season periods to crab harvesting. They pot-fished from small seiners, gillnetters, and trollers to gain supplemental revenues to salmon fishing and to provide stocks for the canners. Production was relatively small, especially in contrast to recent years; it was also erratic due to market and supply conditions.

At about the same time, other firms started taking razor clams from diggers working beaches near Cordova, Snug Harbor on lower Cook Inlet, and, a few years later, from beaches around Kukak on the mainland opposite Kodiak Island. This industry developed as an extension of razor clamming on the ocean beaches of Washington and Oregon.

In the years from its Alaskan inception in 1916 and into the early 1950's, an average of 2 million pounds of clam meat were canned annually, with production ranging as high as 54,000 cases valued at approximately \$5



ALASKA KING CRAB

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million. Clamming's contribution to the economy of Alaska withered in the late 1950's. This was, and is, because of Alaska's inability to meet competition of machine-harvested East Coast clams and foreign imports and, more recently, because of the imposition of disputed public health regulations.

Ironically, the bulk of the value realized from harvesting razor clams in Alaska in the past three years has been from their use as crab bait. The 1967 ADF&G report of this production (53,000 pounds in-the-shell) lists 50,000 pounds as "bait."

Commercial shrimping in Alaska started at Petersburg in 1916 on pink shrimp (*Pandalus borealis*), which, although small in size, is especially prized as a cocktail item. The fresh or frozen hand picked Petersburg shrimp is well regarded for its excellent flavor, shape, color, and texture.

This specialized shrimp production grew upward from a start of 100,000 pounds (total raw weight) to approximately 900,000 pounds per year during the first three decades of harvesting. However, there was considerable year-by-year variation. With the close of World War II, production surged upward, intensifying in the 1950's to a peak of more than 7.5 million pounds of pink shrimp in 1958. Then it declined until recently.

Machine peelers entered the shrimping industry in 1959 and the industry locale shifted thereafter from the Panhandle to Western Alaska. Fishing techniques were also altered for the westward region, from "beam" trawls worked on small boats to larger "otter" trawls on more substantial vessels capable of fishing more exposed waters. The total domestic Alaska shrimp harvest (all species) climbed from 13 million pounds in 1959 to last season's peak of 42 million pounds. (*Pandalus borealis* made up the bulk of the catch.)

Foreign fleets also joined in Alaska shrimp harvesting coincident with the domestic upsurge of shrimping. In 1961, a Japanese factory-ship operating with 16 trawlers took 22.5 million pounds of pink shrimp from the Bering Sea near the Pribilof Islands. During the same season, Alaskan vessels reaped 16 million pounds. The largest overall Alaskan shrimp harvest to date was in 1963

when 84.8 million pounds were taken — 69.7 million pounds by the Japanese and 15.1 million pounds by Alaskans.

By 1964, the Russians had joined the rush and steadily boosted their take to 28.6 million pounds in 1967. The take was principally from the Alaskan regions adjacent to the Shumagin Islands and the Portlock Banks. (See Table 1.)

Alaska king crabbing was begun by Japanese expeditionary fishing fleets during the decade following World War I. King crab had been utilized since before the turn of the century on the Asian side of the Pacific. The industry provided Japan with a ready and lucrative export item to exchange for, in a large proportion, U.S. dollars. As this exchange increased prior to World War II, the Japanese ranged farther north and east to Alaskan shores. The war interrupted these operations, but they were resumed, aided by reconstruction assistance from the U.S., off the Alaskan coasts in 1953. The Japanese continue to take king crab at the present time.

Some domestic attempts to utilize king crab were started at about the same time the Japanese crossed the Pacific to expand their production. In the early 1920's, fishermen in central coastal Alaskan locations tried fishing and processing, but their feeble efforts were short-lived. They had technical difficulties with processing, and markets supplied by the Japanese did not welcome their product. Consequently, the experimenters soon returned

The Trend

Circumstances modifying the 1967 king crab decline were:

- a. The drop in production was not peculiar to the domestic portion of the Alaska king crab fishery. The total harvest, including U.S., Japanese, and Soviet catches from the Alaskan continental shelf, was down in almost the same proportion. This was significant since foreign king crabbing is not conducted in precisely the same locations as the domestic. Foreign emphasis is in the eastern Bering Sea while Alaska fishermen concentrate in areas south of the Kenai Peninsula, Kodiak Island, and along the Aleutian chain.
- b. In 1967 the raw crab production was down almost 20 per cent, but the domestic wholesale value of king crab products was down only 12.5 per cent, and the ex-vessel receipts on which vessel owners' and fishermen's earnings (or losses) are based, were only 4.5 per cent less than in the record year of 1966. However, the latter was adversely offset, as far as individuals were concerned, with an increase in the number of vessels and amount of gear used. Domestic king crab wholesale value was under \$37 million in 1967. It had reached almost \$44.4 million in 1966. Ex-vessel receipts were almost \$15 million in 1967 and slightly under \$15.7 million in 1966. Data in each instance are from the Alaska Department of Fish and Game (ADF&G).
- c. Meanwhile, harvests of other shellfish by Alaskans—notably shrimp, but also including Dungeness and Tanner crab—were up substantially in 1967 as compared with the record year of 1966. To a large extent, even if it did not completely mitigate the king crab fishing disappointments, shell-fishing in Alaska—concentrating on all species—shows promises of increased harvesting. The benefits are shared, in differing degrees, at both harvester and processor levels.

TABLE 1.
ALASKA SHRIMP UTILIZATION
and
RELATED U.S. SHRIMP CONSUMPTION

YEAR	SHRIMP HARVESTED FROM ALASKAN COAST, INCLUDING CONTINENTAL SHELF AREAS					DOMESTIC UTILIZATION OF SHRIMP IN THE U.S.		
	DOMESTIC (-----in millions of pounds, raw weight-----)	JAPANESE (-----in millions of pounds, raw weight-----)	SOVIET (-----in millions of pounds, raw weight-----)	TOTAL (-----in millions of pounds, raw weight-----)	U.S. SHARE (-----in millions of pounds, raw weight-----)	U.S. HARVEST (--in millions of pounds ¹ --)	IMPORTS (--in millions of pounds ¹ --)	TOTAL (--in millions of pounds ¹ --)
1961	16.0	22.5	----	= 38.5	41.6 %	207.8	269.2	= 477.0
1962	16.9	46.3	----	= 63.2	26.7 %	238.2	305.0	= 543.2
1963	15.1	69.7	----	= 84.8	17.8 %	301.4	234.6	= 536.0
1964	7.7 ²	50.0 ⁴	N.A. ³	= 58.2	13.2 %	266.2	399.0	= 665.2
1965	16.8	21.4	9.0	= 47.2	35.6 %	304.6	357.8	= 662.4
1966	28.2	14.0	23.3	= 65.5	43.0 %	296.4	390.0	= 686.4
1967	41.3	7.2	28.6	= 77.1	53.6 %	382.8	404.0	= 786.8
TOTALS	142.0	231.6	60.9	= 434.5	32.6	1,997.4	2,359.6	= 4,357.0

NOTES: (1) U.S. BCF reports used here as source materials quote "heads-off" weights, whereas Alaska production figures and U.S. BCF data on Japanese and Russian production is given in "heads-on" or full raw weight. In order to provide approximate comparisons, the "heads-off" quotations were doubled; the result is probably understated. Also, since some of the production listed here was re-reported, this can not be taken to be actual annual domestic consumption.

(2) In 1964 the earthquake damages to shrimp processing plants in Alaska severely reduced production.

(3) The Soviets harvested shrimp on a trial basis in 1964, but no data are available concerning their production volume that year.

(4) Japanese shrimp production started declining, chiefly in the Bering Sea, co-incidental with the Russian entry into the area. However, no information exists as to whether there is a relationship between the two incidents. It is certain, however, that the decline was not due to lack of interest or effort on the part of the Japanese.

SOURCE: Compiled from U.S. BCF reports.

to the then more lucrative fisheries such as salmon and herring.

The depression-ridden 1930's experienced a rebirth of interest in domestic king crab harvesting and marketing efforts. Fishermen and cannerymen in the Kodiak Island, lower Cook Inlet, and Prince William Sound areas again tried catching and processing king crab. By 1940, their attempts had aroused interest in government circles.

The U.S. Bureau of Commercial Fisheries, funded by a special congressional appropriation, commenced a two-year survey of the king crab potential in Alaska. The findings did not particularly invoke official enthusiasm. However, private operators, particularly Wakefield Fisheries, which concentrated in herring production at the time, went after king crab with more optimism.

Crabbing activities were accelerated in 1946, following World War II, as larger vessels and gear came on the scene. In 1947, the first significant domestic king crab catches were made, totaling more than 750,000 pounds. Trawls were used for the early years' harvests, although pots were also tried, and the venturers experimented widely with different processing methods. Most of the meat was extracted and frozen rather than canned, in keeping with the developing trend in U.S. merchandising.

Mechanical methods were devised for meat extraction.

After a full decade of pioneering, the industry was well on its way. Fishing by means of pots was found to be the most advisable because it permitted the selective harvesting of only mature male crabs. Immature males and females were returned to the sea for breed stocks. Foreign fishermen, however, use "tangle" nets which may injure the crabs and makes their return to the water more difficult.

By 1953, the domestic king crabbing yield had risen to nearly 2.8 million pounds. From then on, it rose steadily until 1966. The number of vessels and amount of gear in the fishing effort have zoomed upward. New entrants have also joined the processing phase of the industry. There has been a call from some quarters for some type of limited entry restrictions in the industry.

INVESTMENT

Based on an estimate of their replacement costs, present values of facilities in Alaska that are dedicated to processing and marketing shellfish totals about \$25 million. Vessels engaged in harvesting shellfish are estimated as having a replacement value of about \$16 million, and the gear used in the fishery, at its initial cost, represents

TABLE 2.
ALASKA KING CRAB UTILIZATION

YEAR	HARVESTED BY ALASKAN FLEET		HARVESTED BY JAPANESE FLEET (Only Bering Sea)		HARVESTED BY SOVIET FLEET (Only Bering Sea)		TOTAL HARVEST (in 1000s)
	Number of crab (in 1000s)	Propor- tion	Number of crab (in 1000s)	Propor- tion	Number of crab (in 1000s)	Propor- tion	
1959	2,839	59.5%	1,292	27.5%	620	13.0%	4,751
1960	3,175	46.5%	1,610	24.0%	1,995	29.5%	6,780
1961	3,625	36.0%	3,028	30.0%	3,441	34.0%	10,094
1962	5,865	42.5%	4,951	35.5%	3,019	22.0%	13,835
1963	8,750	49.0%	5,476	30.5%	3,606	20.5%	17,832
1964	9,640	50.5%	5,895	30.5%	3,613	19.0%	19,148
1965	15,500	70.5%	4,216	19.0%	2,226	10.5%	21,942
1966	18,726	73.5%	4,202	16.5%	2,560	10.0%	25,488
1967	14,800	73.5%	3,700	18.5%	1,660	8.0%	20,160
	82,920	59.5%	34,370	24.5%	22,740	16.25%	140,030

SOURCE: Compiled from U.S. BCF and ADF&G reports.

another \$14 million. This makes a total of \$30 million invested in harvesting and an overall estimated shellfishing investment of \$55 million.

Lacking a physical appraisal, the facility dollar estimate was arrived at by compiling data on the plants involved and then consulting industry sources for replacement evaluations. Some allowances were made for instances where plants process finfish as well as shellfish, and also for portions of facilities outside Alaska that are used in processing. Vessel worth was arrived at by using a major packer's fleet for which a definite value could be established and applying it against the total fleet. Estimated worth of the vessels compiled for this report is based partly on current sales in cases of older boats and on construction costs of the new vessels in the sample fleet. This estimate assumes the sample fleet's composition is typical of the total fleet.

U.S. Bureau of Commercial Fisheries (BCF) calculations indicate that this vessel evaluation may be low. A study by BCF estimates that it would require between \$35 and \$40 million to replace the Alaskan shellfish fleet with new and modern tonnage. Their calculations, however, were based on a formula that did not take into account reduced current marketability of older and sometimes all-but-obsolete vessels, nor was any discount entered against vessels that engage in multiple fishing. A figure indicating actual capital investments in vessels presently operating "as is, where is" would be far less than the \$35 to \$40 million.

U.S. BCF data were used as the basis for estimating

gear values in the fishery. Bureau records of the volume of gear in use were applied against initial costs-per-unit figures that were obtained from industry sources.

In 1966, there were 367 boats and vessels engaged in king crabbing. The total was somewhat greater in 1967. Gross tonnage of the vessels in 1966 was 20,018. Dungeness crabbers used 57 boats and vessels with a gross weight of 1,175 tons, and there were 31 shrimpers for a total of 1,302 gross tons in 1966. Duplications were eliminated when compiling this data, according to BCF reports.

Federal records for 1966 list 41,400 king crab pots, an estimated 17,700 Dungeness crab pots, and 35 trawls for shrimping in use in Alaska. Initial costs of this gear were determined to be \$300 and \$75 respectively for each king and Dungeness crab pot and a minimum of \$1000 each for the trawl nets, exclusive of winches, warps, gal-

King Crab Value

Assuming that Alaska king crab and Alaska shrimp have the same values to the Japanese and Soviet economies as they do in the American structure, the total wholesale value of these products from the Alaskan coastal waters in 1967 was \$76.2 million.

Data published by the Alaska Department of Fish and Game placed the domestic worth of king crab and shrimp production in 1967 at \$44.7 million for the year; \$36.9 million for king crab, and \$7.8 million for shrimp.

Other data (Tables 2 and 3) show that the domestic harvest of king crab was 59.9 per cent of the total harvest and the domestic harvest of shrimp was 53.5 per cent of the total. Foreign fishermen took the remainder.

A mathematical extension of these figures produces the total production value of \$76.2 million.

TABLE 3.
ALASKA SHELLFISH PRODUCTION & VALUES
A 7-Year Summary

YEAR	RAW PRODUCTS HARVESTED BY FISHERMEN VOLUME (in 1000 lbs.)	EX-VESSEL VALUE (..... in 1000 dollars	VALUES OF PRODUCTS AS PREPARED FOR MARKETS		
			FRESH & FROZEN	CANNED	TOTALS
1961:					
King Crab	43,412	\$ 3,913	\$ 5,015	\$ 4,575	\$ 9,590
Dungeness (1)	4,498	443	945	530	2,475
Shrimp	15,981	639	293	1,568	1,861
Others (2)	532	121	2	409	411
	64,423	5,116	6,255	7,082	13,337
1962:					
King Crab	52,782	5,278	6,685	5,177	11,862
Dungeness (3)	9,001	1,003	2,245	400	2,645
Shrimp	16,943	731	1,924	1,462	3,386
Others (2)	687	79		246	246
	79,413	7,091	10,854	7,285	18,139
1963:					
King Crab	78,740	7,607	9,756	7,016	16,772
Dungeness	12,084	1,358	2,451	581	3,032
Shrimp	15,127	605	3,116	1,048	4,164
Others (2)	410	52	4	132	136
	106,361	9,622	15,327	8,777	24,104
1964:					
King Crab	86,721	8,186	15,321	5,941	21,262
Dungeness	12,722	1,467	3,031	552	3,583
Shrimp	7,727	309	830	684	1,514
Others (4)	101	21	18	74	92
	107,271	9,983	19,200	7,251	26,451
1965:					
King Crab	131,671	12,729	20,818	10,847	31,665
Dungeness	8,895	1,000	1,790	824	2,614
Shrimp	16,819	757	819	1,061	1,880
Others (5)	92	23	22	4	26
	157,477	14,509	23,449	12,736	36,185
1966:					
King Crab	159,202	15,670	31,368	13,090	44,458
Dungeness (6)	5,054	606	1,563	200	1,763
Shrimp	28,193	1,098	2,189	1,151	3,340
Others (7)	100	29	20	3	23
	192,549	17,403	35,140	14,444	49,584
1967:					
King Crab	127,716	14,970	23,710	13,238	36,948
Dungeness (8)	11,716	1,508	2,573	479	3,070
Shrimp	41,813	1,701	4,785	3,002	7,787
Others (9)	174	60	36	10	46
	181,419	18,239	31,104	16,747	47,851

(1) includes 6,800 lbs. Tanner crab.

(2) all clams.

(3) includes 11,200 lbs. Tanner crab.

(4) includes 1,090 lbs. abalone.

(5) includes 4,000 lbs. oysters; the rest are clams.

(6) includes 217 lbs. Tanner crab.

(7) consists of 44,000 lbs. clams with \$8,793 whole value; 51,000 lbs. oysters, \$13,803; 4,900 lbs. abalone, \$6,125.

(8) consists of clams, oysters and abalone.

(9) includes 118,392 lbs. Tanner crab.

SOURCE: Compiled from ADF&G reports.

lows, and otter boards.

Profit Imbalance: Closer study of the respective monetary returns that are grossed by the shellfish harvester and processing-marketing segments of the industry is warranted. An imbalance between returns to harvesting and processing in favor of processing that could adversely effect development seems indicated.

Harvesters' vessels and gear represent an estimated \$30 million in capital layout, while processing and marketing facilities represent \$25 million in Alaska. The 1967 gross realized by harvesters is reported by the Alaska Department of Fish and Game at \$18.2 million; the processing-marketing end had \$47.9 million in gross wholesale values, representing a gain of \$29.7 million above the cost of the raw product. The larger outlay seems to be accruing the smaller return.

Labor and material factors for the two segments of the industry are, of course, not identical. Neither are they vastly dissimilar. However, the greater physical risk in the industry is clearly with the harvesters, both as to equipment risks and those of life and limb.

A demonstration of the effects of the risk imbalance occurred last year when insurance underwriters, concerned over heavy vessel losses in the crabbing fleet, sharply raised insurance rates and instituted vessel "stability" tests that disrupted fishing and were expensive to the harvesters. U.S. Coast Guard authorities assisted in these tests. The increased burdens added to disappointments that had been experienced in fishing, especially king crabbing, and some vessel owners found themselves in financial difficulties because of these factors.

Another item of potential financial difficulty for harvesters is the widely differing schedules of crew-sharing that exist in the industry. In some cases, the situation has

been somewhat alleviated by processors who extend vessel operators extra considerations that are not formally a part of the prices paid for crab shared by crew members.

This total gross profit imbalance does not mean that all processors are making more on their investments than all vessel owners. Many processing firms have even lost money, while some vessels have paid handsomely. However, in the overview, based on the best information available, there appears to be need of further economic analysis of the two segments of the shellfish industry.

THE INDUSTRY

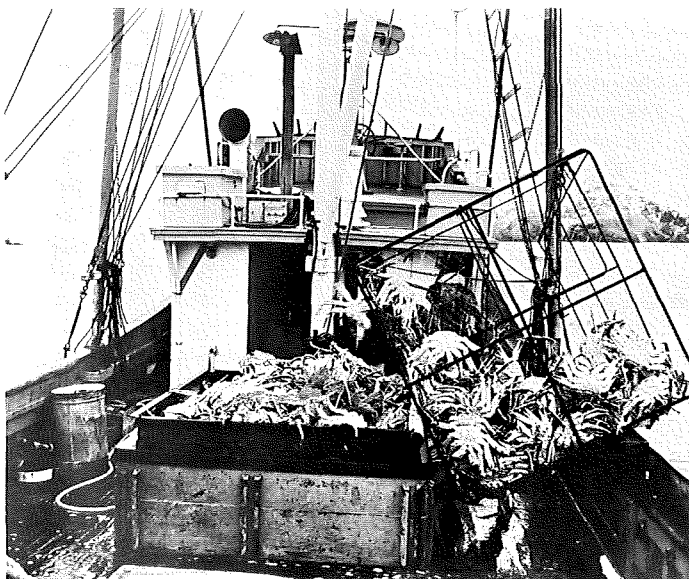
Shellfish operators in Alaska are, for the greater part, corporations headquartered out of state. They are most often financially related to brokerage or marketing firms. Some of them have been engaged in salmon and other fisheries of the state for decades.

During the past five years, there has been a trend toward consolidations of established fish packers and newer entrants into the field. Foreign operators, notably such giant Japanese firms as **Taiyo**, **Mitsubishi**, and **Ni-chiro**, have also entered the industry, usually by joint-venturing with established domestic firms. The new domestic entrants (national level rather than state level) are generally entities of the larger national food processing and marketing industries.

For example, in the past month the pioneer king crab operator, Wakefield Fisheries, announced it is in the process of being sold to Norton Simon, Inc., of Fullerton, California. Norton Simon, Inc., is associated with Hunt Foods and other endeavors. Earlier, General Mills acquired Point Chehalis Packers with plants at Kodiak and Cordova. Previous entrants through mergers of nationally active firms include Ralston-Purina and Westgate-California Foods. For longer periods, the national firms of Castle and Cooke, Vita Foods Inc. (recently absorbed by Brown and Williamson), New England Fish Company, Nakat Packing Company (which is a subsidiary of A&P chain stores), and California Packing Corporation (or "Del Monte"), through its subsidiary, the Alaska Packers Association, have been active in Alaska.

Operators that are more regional in character (Pacific Northwest and Alaska) are companies such as Washington Fish and Oyster Company, Pan-Alaska Fisheries, Ivar Wendt of Seattle ("Pacific Pearl"), Whitney-Fidalgo Seafoods, Kayler-Dahl, and Petersburg Fisheries, to name a few.

Other national corporations are also reported as seeking entry into the Alaska shellfishery, as well as the general fishing industry. Included among those reportedly negotiating have been the W. R. Grace Company (steamships, airlines, etc.), Litton Industries, Bordens, Hublein, Quaker Oats, Green Giant, and Ling-Temco-Vought, Inc., of Dallas. The motivation for this trend toward seeking participation in Alaska's shellfishery has not been clarified,



KING CRAB POT BEING UNLOADED OFF THE ALEUTIANS

but it probably stems from a combination of: (1) a national trend toward diversification of interests by large corporations, (2) a reflection of a growing interest in enterprises based in maritime production and oceanographic possibilities, and (3) the conviction that Alaska's fisheries, especially the more prized fish species such as shellfish and salmon, are destined for growth and profit potentials.

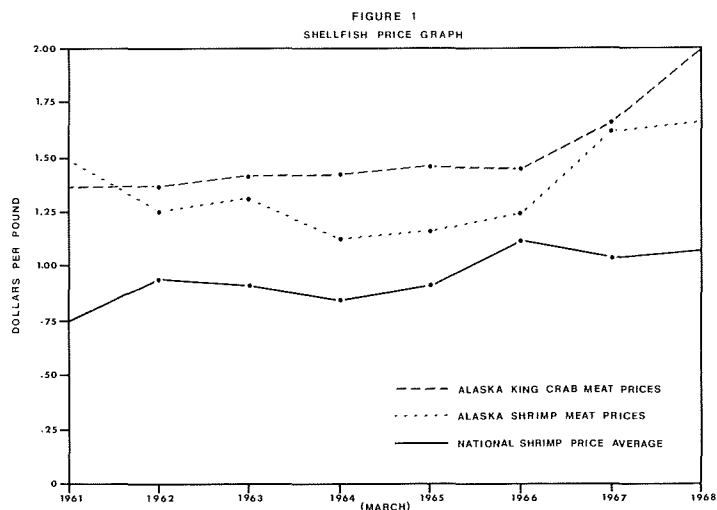
NEW MARKETS AND METHODS

Shrimp: National and world-wide market conditions, combined with apparently available stocks of raw materials, indicate that shrimping in Alaska is headed for phenomenal growth; that is, if problems that plague this segment of the shellfishery can be overcome.

U.S. BCF spokesmen indicate that 400 million pounds of shrimp can be harvested annually from Alaskan waters on a sustained-yield basis. However, they do qualify this by urging additional systematized surveying of the state's shrimp stocks. Production experiences, plus the inadequate research already done, tend to sustain the predictions. Most of the domestic shrimping attempted so far has been done in very restricted areas close inshore. Foreign trawling, while conducted outside the politically-described territorial waters of the state, has also been confined to a few locations. Nevertheless the growth of total harvest has been impressive. (See Table 1.) Shrimping has reached as high as nearly 85 million pounds a year without signs of appreciable diminishment.

The exception is the Japanese efforts in the Pribilof area. There has been a distinct reduction in harvests there, but explanation is lacking as to its exact cause—a circumstance that enforces the arguments for additional research. Some experts blame the Pribilof decline on natural causes rather than over-exploitation.

Shrimp prices and the demands by the United States



Source: U.S. Bureau of Commercial Fisheries

International Implications

With foreign fishermen sharing the Alaskan shellfish resources with domestic fishermen, the matter of international diplomatic relations and the application of international laws are a distinct concern to the state's shellfish industry. It is noteworthy, even if it is not accepted as having governing significance, that as the domestic utilization increases, the foreign participation diminishes. This is especially to be seen in the king crab industry and less clearly in the taking of shrimp. (Tables 2 and 3.)

No doubt, economic aspects partly affect this, but it is also due to legal and diplomatic activities. When the International Convention on the Continental Shelf went into effect, both Russia and Japan restricted king crabbing even though Japan was not a party to the convention and does not agree to its validity.

Enforcement of the 12-mile limit (instead of a previous 3-mile boundary for territorial jurisdiction), by virtue of U.S. unilateral legislation, also caused greater restrictions against foreigners. It principally affected shrimp harvesting by sending the foreign expeditionary fishing fleets farther off shore. Shrimp, incidentally, are not considered to be "creatures of the shelf" because they can swim in the waters over the bottom that constitutes the shelf.

During the past summer, preparations for renegotiating the treaties with the Soviets and the Japanese have been conducted by U.S. State Department and Department of Interior officers. The present treaties expire with the current year and U.S. officials have been discussing with fishermen and industry people their desires for terms in the agreements about to be renewed. The State of Alaska's new Office of Foreign Fisheries Affairs has also been participating.

and other world markets have been steadily rising. Economic affluence is credited for this. Average annual shrimp prices in the United States have risen at the wholesale level from 75¢ to \$1.05 a pound since 1960, according to studies recently published by U.S. BCF. (These data are for a "typical" shrimp as normally marketed and include averages of canned, frozen-meat, "heads-off" stocks, breaded shrimp, etc.) A significant factor in U.S. shrimp consumption is that imports from foreign harvests constitute more than one half the domestic market. These factors bolster the belief that there should be markets for Alaskan shrimp production. (See Table 1.)

Foreign countries have also experienced increases in their domestic consumption of shrimp, and this adds to the potential since it will tend to raise import prices. Japan, for example, is currently an importer of shrimp for domestic use. A generation ago, her internal consumption was negligible. What Japan then harvested was used as a foreign trade item. Similar situations are cited by economists as prevailing in the nations of Western Europe and even in some of the "underdeveloped countries."

Another factor motivating increased Alaskan shrimping is the need to provide expanded occupations for manpower and equipment engaged in king crabbing in order to spread the burden of their costs. The 1967 experiences demonstrated this dramatically to all elements in the industry. They had applied more manpower, vessels, gear, and processing equipment than in previous years and then encountered diminished king crab production. Further diminishment faces them in 1968 when state management authorities drastically reduced the harvest period as a

measure to protect the king crab stocks from depletion. This has prompted a search for added resources to exploit, with shrimp and Tanner crab being high on the preference list. King crab vessels and plants, as well as personnel, can be readily adapted to fishing and processing Dungeness and Tanner crabs, and, with a little more difficulty, can handle shrimp.

An interesting and significant feature is to be found by comparing the characteristics of domestic and foreign shrimp fishing. (A similar comparison can be made concerning domestic and foreign king crabbing operations.) Both the Soviet Union and Japan employ huge fleets of factory ships, large trawlers, and auxiliary vessels which travel thousands of miles across the Pacific, while Alaskans use modest-sized fishing boats and work close to home. In 1966, for example, 14 small 50-ton domestic fishing vessels trawled areas immediately adjacent to Kodiak to produce the bulk of the domestic shrimp harvest. The Japanese and the Soviets, on the other hand, operated from 28 to 33 large trawlers, some of whose individual tonnage exceeded that of all the Alaskan fleet combined. Yet the total shrimp production of the Alaskans exceeded that of either the vast Japanese or Russian operations.

As compared with a factory aboard ship, a shore plant can be better designed for efficiency at considerably less cost. The problems of supply are less with a shore plant than when materials must be transported and stored aboard ship. Processing personnel from towns established ashore have fewer problems than do workers quartered on a ship away from homes and normal community life. The all-around advantages of Alaskan operations greatly surpass those of the foreign fleets presently competing with domestic fishermen.

While the prospects are bright for the development of the shrimp fishery in Alaska, there are also distinct problems that have retarded it and that must be solved if shrimping is to reach its potential.

Foremost of such problems is the need for better domestic shrimp processing to yield a product that will be more acceptable in the marketplace. Quality must be improved to compete with production from abroad and from other areas in the United States where labor costs are lower than in Alaska. Improved mechanization is needed in processing, as is better handling of the raw product between the times when shrimp are taken from the sea and when they are marketed. There is almost universal agreement on these points in the industry and among government agencies concerned with fisheries.

Except for the hand-peeled shrimp that are processed in limited volume in Alaska, most of the production is from shrimp that are peeled by machine. The machines are capable of removing meats from bodies and shell only after the shrimp have been conditioned by being held to the point where they are no longer strictly fresh. This

conditioning is sometimes termed "curing" or "ripening." The result is a change in the color of the product and a distinct alteration in flavor. Both results make for marketing resistance.

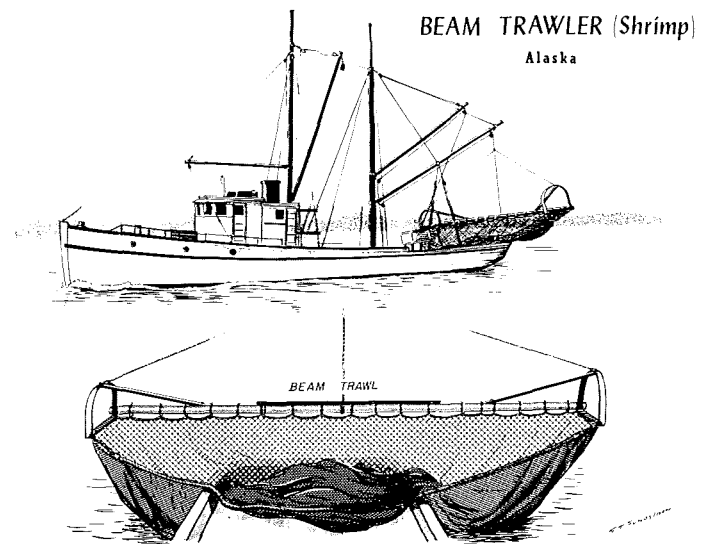
Domestic Alaskan shrimp processing also has problems in sorting shrimp according to sizes that will be accepted by existing machinery. There is also the problem of separating "trash" fish and debris from the shrimp as they are taken in trawls. Such obstacles are receiving attention, however, and considerable progress has been made to overcome them.

The BCF is engaged in working out better shrimp-conditioning for mechanical peeling and devising trawling gear that will reduce the incidence of catching unwanted fish and debris. Progress has been reported in these efforts, but complete success is still to be achieved.

Improved models of mechanical peelers have been devised by private industry and this too offers hope. Most Alaskan shrimp plants are now equipped with older peelers. The newer ones, processors have complained, are scarce and are expensive to secure and maintain.

The industry has been intently watching development of a new type peeling machine being developed by an Alaskan inventor, John Willis of Juneau, with the assistance of Kayler-Dahl Fisheries. If everything about this new machine is realized that is claimed for it, it could revolutionize the industry. It is designed to accept either fresh raw shrimp or cooked shrimp and puts out a meat that compares favorably to hand-picked shrimp. A prototype is now in operation at the Kayler-Dahl plant in Petersburg.

Tanner Crab: King crab's decline in 1967 forced fishermen and processors to give attention to another crab species long known to be abundant in the North Pacific. This crab is the Tanner or "queen" crab, first com-



mercially harvested in 1951. It is considerably smaller than the king crab, and removal of its meat from the shell is much more difficult. Therefore, while king crab remained abundant, Tanner crab was passed over.

The Japanese first started accepting this crab two years ago when they encountered trouble catching the quantities of kings from the Bering Sea that they desired. Their vessels saved the Tanners they caught and, after evisceration and freezing in the shell, used them to fill cargo space to be marketed at home "in the shell." They were enthusiastically received at lower prices than kings. The next step was the development of methods of meat extraction, which was attained with a reportedly acceptable degree of success.

Last season, Kodiak and Unalaska processors started accepting the Tanner crab and experimented with marketing as well as with meat extraction. BCF technologists worked out improved pre-cooking methods to aid the effort, and one firm, B & B Fisheries of Kodiak, secured information from Japanese sources that proved fairly successful in preparing the crab for market. Trial sales were offered in sea-foods-accustomed regions such as Northern Atlantic Coast cities and Southern California. A "wringer"



TANNER CRAB

type extractor to remove meat from the shell was devised and also aided the program. The product sold about on par with king crab meat, which it resembles in appearance and taste.

Fishermen were offered 10¢ a pound for the raw product, as compared with the 1967 price of 16¢ a pound for king crab. King crab pots adapted for Tanner crab harvestings are adequate for the time being, at least until the experimental phase of this new operation proves that specialized gear is warranted. The earliest efforts with this crab in 1967 brought in only 118,000 pounds. Efforts were intensified in the first half of 1968 with about 2 million pounds harvested. Harvests are expected to be appreciably greater in the future if nothing intervenes to discourage development.

Dungeness Crab: The other crab species that has received increased attention with king crab's decline is the Dungeness, the first crab commercially harvested in Alaska. Its potential is being eyed for possible increased production in a different light, however. There is speculation about improving its market status and, consequently, its value potential.

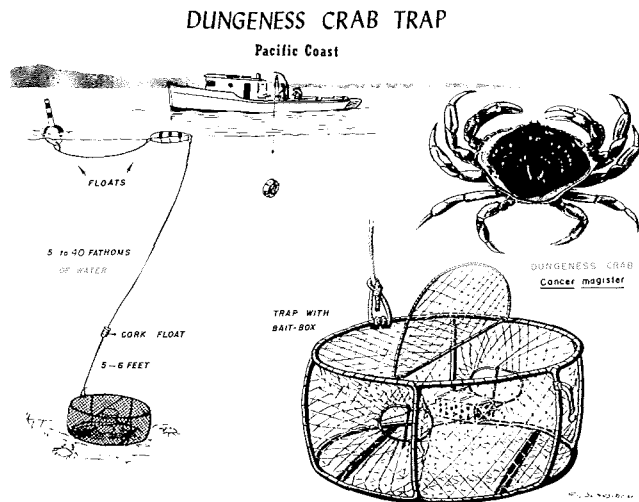
As a canned product, Dungeness crab meat commands a much lower price than that of king crab. Where a case of 24 half-pound cans of the latter currently is worth an average of \$24, a case of Dungeness is quoted as \$17, and the amount of meat is less in each can. Based on these factors, Dungeness crab as a canned product is valued at about 80 per cent of king crab value.

The marketing of Dungeness crab, however, has been more as a frozen "in-the-shell" item in recent years. Much of this selling has been concentrated in Pacific Coast cities where they are already known through local production. Best occasions for selling Alaskan Dungeness crab have been when Oregon, Washington, and California production has temporarily declined — a characteristic of the industry. At such times, the demand for Dungeness crab from Alaska goes up, along with prices, and Alaskan fishing efforts intensify.

King crab operators, who have been looking at Dungeness as an added volume possibility, are investigating bringing a new stability into the scene through broader marketing, better presentation to the consumer, and quality improvements. By using techniques developed in king crab processing, there is a belief that improvements can be made to benefit all elements in the industry.

Razor Clams: Alaska razor clams are another resource being considered as a potential to increase Alaskan shellfish production. However, renewed utilization of clams is speculative and experimental because of several obstacles.

The first hurdle to overcome is the high costs of harvesting in Alaska in order for the product to be competitive with East Coast machine-harvested clams. Secondly, techniques must be perfected to provide a product in keeping with consumer desires such as "heat-and-serve"



or "ready-for-the-pan" items to replace the traditional canned products.

Then, there is the matter of facing up to state health authorities' contentions that "all beaches in Alaska are suspect and may have toxic clams." The validity of this contention is challenged, but not forcefully; consequently, the ban instituted by the Alaska Department of Health and Welfare prevails. The ban permits razor clam utilization only when extremely cumbersome and expensive inspection procedures are complied with.

The crux of the ban is that razor clams are "suspected" of being capable at times of containing a deadly alkaline residue. This is a type of poison that differs from a bacterial contaminant, which can be eliminated with heat sterilization. It is, however, effectively avoided by complete evisceration — a preparation that is always applied to razor clams. This very likely accounts for the poison never having been detected through the 50-odd years that razor clams were marketed in the past under the surveillance of the U.S. Pure Food and Drug inspection procedures.

The existence of toxin in razor clams has not been established, but only suspected. The health authorities banned utilization, except from beaches they have tested and approved on a continuing basis. The burden of this sustained testing is imposed on the clam user because the health authorities do not have the facilities or financing for the task, nor have they sought legislative assistance to do more than issue regulations against clam utilization. To date, the matter has literally languished in a mire of bureaucracy.

Efforts to adapt a type of mechanical clam harvester from an East Coast model have been made in Alaska, but so far the results are still short of being feasible. The adapted Atlantic dredge, which works under water with

hydraulic action to minimize injury to immature clams, was boomed from a vessel working razor clam beds at high tide. But, among other problems, it could not be kept from reflecting the vessel's motion in the ocean surge and kept wrecking itself on the bottom. Continued gear research and experimentation, however, should be able to provide a solution.

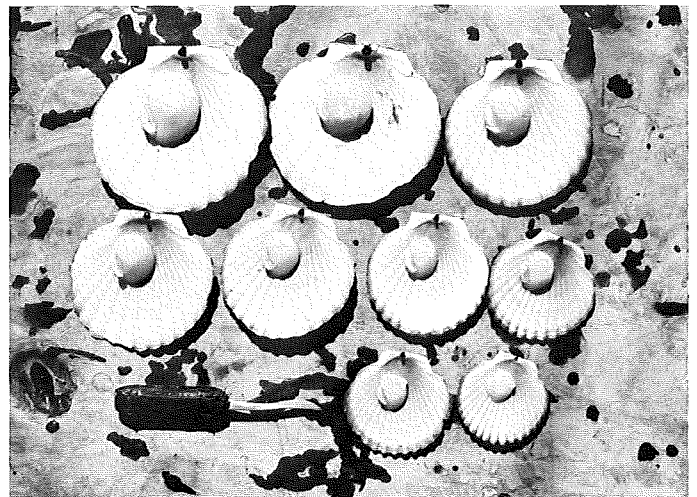
Scallops: Any doubts about a future for scalloping in Alaska, a venture that was little more than a hope before 1968, were reduced to concern about the marketing aspects of the fishery by this fall. Production by the end of September had exceeded 1.1 million pounds of scallop meats landed at state ports. This was about 12 million pounds total raw weight worth about \$1.5 million.

Only six vessels participated in this fishery, and they were in production for barely more than three months. Scalloping can be done almost year-round, even in the stormy waters of the North Pacific.

Commercial scalloping started in Alaska late in 1967 near Kodiak. King crabbers, pressed for new fishing, prospected for scallops, and they were so successful that federal and state agencies contracted a 40-day exploration by an East Coast scalloper that was completed in late June. This led to the immediate entry of three more East Coast vessels into Alaska scalloping, and two more vessels were re-rigged from the king crab fleet.

The East Coast group formed its own processing firm and leased facilities at Seward. The bulk of all production has been handled at this facility. Fishing was done first in the eastern portions of the Gulf of Alaska, close to the coast between Capes Spencer and St. Elias. In September, the fleet moved toward Kodiak and found extensive scallop beds 30 miles off that island. The veteran East Coast scallop skippers in the new Alaska fleet have expressed certainty that beds of substantial size will be located along the entire Alaskan coast.

The "fishing-ease" of the Alaska scalloping effort



SCALLOPS —BCF Photo



THE "VIKING QUEEN," 90-FOOT NEW BEDFORD SCALLOPER, CHARTERED BY THE STATE OF ALASKA FOR SURVEY OF ALASKA SCALLOP RESOURCES
—BCF Photo

has been little short of astounding, in spite of the fact that it has been conducted in unsurveyed waters that are known for notoriously foul bottoms which raise havoc with fishing gear. The first trip that landed set a record for U.S. scallopers—a total of 49,000 pounds of meats from nine days of fishing. The first seven trips brought in an average of 37,000 pounds, which is better than twice the average experienced by Atlantic fishermen.

In September, one of the scallopers set another all-time production record from fishing grounds that had not been prospected prior to that time. She landed 65,300 pounds after eight days of fishing, and, her master reported, the crew had left port short-handed.

In producing 1.1 million pounds in three months, the six fishing boats pioneering the Alaskan grounds produced an estimated 8 to 10 per cent of the entire U.S. scallop yield for the season to date. Consequently, preparations are being made for the entry of more scalloping boats into the fishery, and practically every firm active in king crabbing, especially the operators utilizing freezing processing, are making plans to participate in the apparent bonanza. As a result, the spring of 1969 should witness a production upsurge.

Concern is felt, however, that full scale production can flood the market and depress proceeds. Normal scallop utilization in the U.S. has ranged between 25 and 35

million pounds a year. Imports, principally from eastern Canada, make up from 10 to 17 million pounds with the remainder coming from the U.S. Atlantic seaboard. Both sources are still in production, and there are also growing imports from Australia.

QUALITY CONTROL BOARD

A unique institution that directly concerns the Alaska shellfish industry is the State of Alaska's King Crab Marketing and Quality Control Board. If proponents within the industry prevail, it could soon become the governing agency for all economically oriented phases of the shellfishery. At present, it is still confined to king crab processing.

The board, which functions with full legal force and authority, was established by the Alaska Legislature in 1965. Its purpose is to promote the industry and to regulate the quality and purity of products. To this end, the police powers of the state are extended to the board. The board was also given what amounts to a self-taxing authority to finance its functions. Six persons from the processing segment of the king crab industry, plus the state commissioner of fish and game, comprise the board. The private members serve by gubernatorial appointment, after industry nomination and subsequent legislative confirmation. Members of the harvesting segment of the industry (e.g., fishermen) do not participate on the board, nor do representatives of the public sector (e.g., non-industry people).

The board has the power to perform certain quasi-

Research

Need for research as the foundation for over-all planning in industry, especially where such industry is based on a renewable resource, is now widely, although not universally, accepted as an obligation of public agencies. While there is still some opposition to government research participation in economic and social aspects of private utilization of resources, it has diminished in recent years. This is especially true since the federal government initiated programs of assistance in these areas.

State and federal agencies conduct research on Alaska shellfish. There is also some research by private industry. The latter is almost exclusively in processing and marketing. The state (Alaska Department of Fish and Game) has a research program that is confined to supporting a management-conservation function.

Federal (Bureau of Commercial Fisheries) research is also conducted in the biological field in a coordinated effort with the state. Additionally, the BCF conducts exploratory fishing, technological processing research, and studies of foreign offshore fishing near Alaska in conjunction with its foreign surveillance chores. For all but surveillance, its budget for 1968 is \$545,000. Also, BCF secures and makes available marketing and related economic information, helps finance State of Alaska shellfish development, and manages the federal aid-to-fishermen programs.

The state program for shellfish biology, as described by ADF&G staff, amounts to approximately \$354,000, or about half of its total 1968 research budget of \$708,000. This is in addition to a smaller portion of the general fisheries research and developments funds of \$328,000, of which \$246,000 is provided through federal BCF matching funds. Fifteen state shellfish biologists are engaged in the program, with assisting staff and facilities that include a laboratory at Kodiak devoted to crab and shrimp studies.

judicial functions. It can, for example, close a processing plant for violation of its regulations relating to quality (or purity) standards. It is authorized to employ a staff and to enter into contracts to perform its work as a regulating and policing agency. The staff is to be paid out of funds assessed from the industry. During its three-year life, the board has contracted for advertising and promotional services, as well as some technical assistance, but has not yet established a staff.

Advisory committees, one for promotion and another for technical work, have been made adjuncts to the board. These advisory groups are made up of industry operators and executives who need not be Alaska residents, as is required of board members. Measures considered by the board are usually referred to it from the advisory committees.

Fisheries production on a national level soon seems certain to face regulation against substandard quality in the same way that the meat industry has been regulated. One obvious purpose of the board's existence anticipates these new regulations and possible restrictive features that could develop with them. By self-regulation, assisted by the authority of the state government, industry leaders are moving against what they fear could be unduly restrictive requirements that might stifle the industry.

The board also controls standards for king crab production labeling. These standards prescribe the proportionate amounts of meat that must be in packages labeled "fancy" king crab, as well as maximum tolerances of bacterial impurities, the relative absence of shell and other objectional materials, net weights per package, moisture volumes allowable, and requirements as to the product's flavor, odor, color, and texture.

Other activities of the King Crab Marketing and Quality Control Board have been chiefly concerned with advertising and promotion of king crab products. These

have been conducted with an annual expenditure of about \$70,000, or about \$200,000 in a three-year span. This promotion has been of an "institutional" nature, as opposed to "brand" advertising. Industry sources estimate that the latter, carried on by individual firms, has amounted to about \$900,000 since Alaska king crab has been domestically produced.

Funding of the board's work is from an assessment paid by the processors of 1 per cent of the sum paid to fishermen for raw crab. The rate is established by the board and collected through State of Alaska tax collecting mediums and then annually re-appropriated to the board by the legislature.

The board is also working toward broadening king crab processors' interests into other shellfish resources in Alaska. This proposal, adopted by the board at its two 1968 sessions, would seek extension of its regulatory and promotional authorities to include all shellfish caught and processed by domestic fishermen. A committee of board and industry members has been assigned the task of preparing specific legislation to present to the state legislature for this purpose.

There are complications that must be faced if the proposal is to be implemented. King crab is, except for some foreign production, an exclusively Alaskan-produced item. State-level regulation of it is, therefore, comparatively simple. However, other shellfish are also produced and marketed from other states, which would necessitate coordination in order for regulation to be effective. Also, the formula for financing the king crab regulating activities is not likely to be universally applicable to the other shellfish species.

The trend toward expansion and diversification of the industry seems definite. The fact that consideration is being given to regulating other shellfish, in addition to king crab, is a definite demonstration of this trend.

Return of King Crab

Will Alaska king crab production ever return to its 1966 figure?

There can be no clear-cut prediction, but it seems that there is hope that it will improve in a year or two when presently immature crabs grow and can be harvested. Research investigations by both U.S. and foreign crab scientists show immature king crabs to be relatively abundant in the southeastern Bering Sea—an area not heavily exploited by U.S. fishermen.

Research investigations by the U.S. and foreign scientists on immature king crab have been carried out in the Bering Sea only.

Early king crab fishing harvested older and consequently larger animals, but, as fishing was intensified during the past decade, the average age and size of harvested crab declined. Foreign investigators detected and reported reductions in abundance before they were experienced by Alaskan fishermen. The Soviets attributed it to two causes: (1) apparent overfishing and (2) changes in "the hydrological regime . . . characterized by higher temperatures of water."

In 1967, the Soviets stopped king crabbing before they had attained their hoped-for quota and reportedly did so again in early 1968. Japan missed its quota by only one case in 1967. Japan did not stop fishing early in 1968, and it is not known at this time whether they reached their quota or not. However, it is known that for the past three years, 8 to 10 per cent of their king crab catch has been

made up of blue king crab caught in the Pribilof Islands area. Blue king crab is a stock distinct from that found in the eastern Bering Sea.

There is improvement expected for 1969 and 1970, even if catches do not come up to 1966 levels. Meanwhile, both Russian and Japanese king crabbers in Alaskan waters are doing what the domestic industry is contemplating — "broadening the base" and taking Tanner crab. Bureau of Commercial Fisheries surveillance in early June 1968 found one Japanese fleet had processed 28 per cent Tanner crab.

Alaska Department of Fish and Game authorities are proposing severe restrictions in future king crabbing, especially in the Kodiak area where the reduction in stocks has been most apparent. In an emergency measure instigated this fall, the first step in these restrictions, requiring larger minimum size legal crabs, went into effect for the region west of Kodiak.

State researchers have concluded that there are insufficient vigorous males left after past harvesting to fully fertilize female stocks. Therefore, they have increased the legal limit to seven-inch males (carapace width) for districts where smaller limit size had prevailed. They are also proposing that the fishing season be reduced from nine and one-half to four months from 1969 on, with emphasis in areas most severely affected by past reduced harvests.