

ARTICLES

JAPANESE LONGLINE FISHERY IN GULF OF ALASKA

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Since early 1964, Japanese longline vessels have maintained a fishery for sablefish in the Gulf of Alaska. This fishery remained stable at 8 ships through the first 3 years. In 1967, however, the number of ships jumped to 23, which made at least 30 trips. In 1968, the number was 21 ships and over 43 trips. The catch has increased from 4 million pounds annually in 1964-66 to an estimated 20 million pounds in 1968.

The gear used by the Japanese is capable of taking halibut. Only short distances separate their sablefish operations from some of the best halibut grounds in the North Pacific. For this reason, these ships have been boarded and inspected, whenever possible, by Bureau of Commercial Fisheries personnel, acting under the authority of the International North Pacific Fisheries Convention. To date, only one ship has been found with halibut aboard, and there is reason to believe those fish may have been taken in the Bering Sea.^{1/}

Available information indicates the Fisheries Agency of Japan did not license any longliners to fish in the Gulf until September 1967. Prior to that time, in fact, the Agency had punished some ships for fishing there without licenses.

The typical Japanese longliner works alone. It makes trips lasting as long as 3 months, dresses and freezes the catch as it comes aboard, and returns to Japan only when it has a full load. This may be as much as 300 metric tons. The vessels observed in the Gulf of Alaska have hailed from many different ports, and most are owned by small companies or individuals.

The recent increase in the number of Japanese ships in this fishery, some new and apparently designed for fishing in northern waters, may signify increased interest in the sablefish resource of the Gulf. To date, there

appears to be little decrease in fishing success, which has been uniformly high since the fishery began.

DEVELOPMENT OF THE FISHERY

The first confirmed sighting of a Japanese longline vessel in the Gulf of Alaska was in April 1964, southwest of Unimak Island. By the end of 1964, 8 different ships had been sighted in the Gulf, some as far east as Middleton Island (long. 146° W.).

By March 1965, Japanese longliners had extended their fishing to the waters off southeastern Alaska, as far east as long. 135° W. Eight individual vessels were identified in 1965.

The fishery did not expand in 1966; in fact, only 7 individual vessels were involved. The effort, however, shifted east again; almost all sightings were made east of Kodiak Island, principally on Middleton and Chichagof grounds.

In 1967, fishing effort more than doubled. Twenty-three boats were reported in the Gulf of Alaska and some made 2 or even 3 trips during the year. Fishing effort was still concentrated east of Kodiak Island, the bulk on Middleton and Chichagof grounds.

In 1968, 22 longliners were licensed by the Japanese Fisheries Agency to fish in the Gulf of Alaska. At least 21 vessels made a total of over 43 trips. Fishing effort shifted even further east: all but 7 expeditions concentrated on the Chichagof grounds.

Observations of this fishery by BCF personnel over the past 4 years indicate the catch is almost entirely sablefish (*Anoplopoma fimbria*). There also are a small percentage of rockfishes (*Sebastes* sp.) and an occasional halibut (*Hippoglossus stenolepis*).

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^{1/}In early Feb. 1969, a second Japanese longline fishing vessel 'Daiei Maru No. 85' was seized for violation of the Convention. The vessel was fishing in the eastern Gulf of Alaska and had halibut aboard.

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Fisheries Management Agents have observed halibut on Japanese longline gear on only 2 occasions since the fishery started in 1964; in both cases, the fish were shaken off the gear without being brought aboard. It appears that only a very small percentage of the catch will be halibut--as long as fishing is confined to 200 fathoms or more, as almost all is.

FISHING GROUNDS AND METHODS

Japanese longline grounds in the Gulf of Alaska can be separated into 7 major areas (fig. 1). These start in the west at approximately long. 165° W. with the banks south of Unimak Pass, progress east through the Shumagins, Chirikof, Kodiak, Middleton, Yakutat, and end with Chichagof at about long. 135° W. All are adjacent to, but outside (deeper), extremely good halibut grounds.

slope to abyssal depths. The longliners generally attempt to put their gear on this shelf.

The gear used for sablefish in the Gulf is identical to that used by the Japanese in their longline fishery for halibut in the Bering Sea. Hooks, groundlines, etc., are the same size, and squid is the preferred bait for both species. A unit of gear, called a "set," consists of 80 to 100 meters of approximately $\frac{5}{16}$ -inch diameter groundline coiled in a flat wicker and grass basket. Branch lines, or "gangings" in the U.S. fisherman's terminology, are slightly less than 1 meter long; these are placed about 2 meters apart along the groundline, giving an average of 40-50 hooks to the basket. Two hundred fifty to 300 of these sets are tied together to comprise a "longline" that may be 20 miles long.

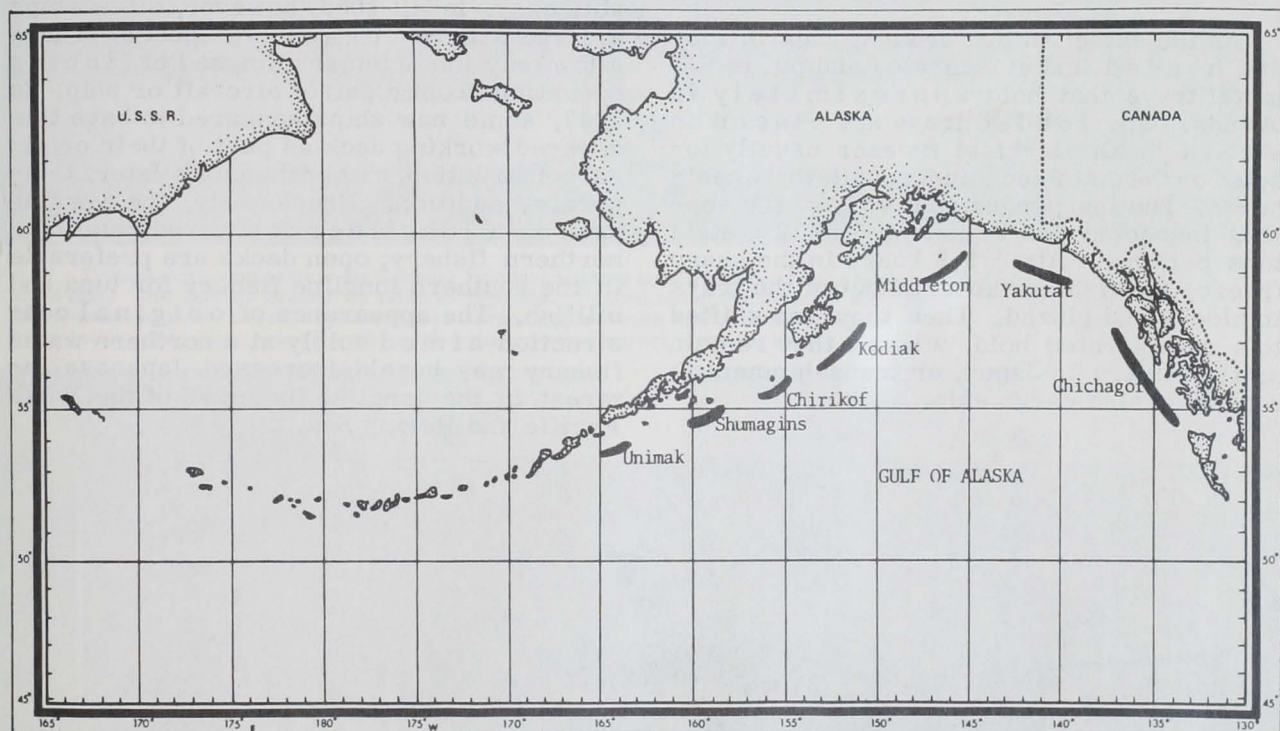


Fig. 1 - Major Japanese longline grounds in the Gulf of Alaska.

The average depth fished by the longliners has been 300 fathoms, although gear has been observed as shallow as 150 fathoms and as deep as 550 fathoms. The line is set along the contours of the bottom rather than across, so most of a set will be at the same average depth. Throughout most of the 7 Gulf areas, there tends to be a narrow shelf ranging from 250 to 350 fathoms, between the break of the Continental Shelf at 100 fathoms and the final

The gear is set through an opening at or near the stern, while the ship is underway at 6 or 7 knots; the ends of the line are marked with buoyed flags and, usually, a radio transmitter buoy. In addition, a buoyed flag may be attached every 100 baskets or sets. The ends of the mainline are anchored. A rock, about the size of a grapefruit, is placed at the junction of each set to hold the groundline on the bottom. The gear is left to soak for

around 5 hours and then picked over a power line hauler or "gurdy." Hauling proceeds at about 3 miles or less per hour, so gear recovery time runs from 6 to 8 hours. The line hauler is positioned on the main deck, usually on the starboard side just forward of the wheelhouse, along with the fish bins and cleaning tables.

The mechanics of the fishing operation are basically the same as those used by U.S. and Canadian longline fishermen. However, because of the small units of gear and the use of baskets, etc., it wastes considerably more manpower. Instead of 6-12 men aboard a comparable U.S. vessel, the Japanese ships average 26-28 men. The Japanese boats are considerably larger than those used in the North American halibut fishery, ranging from 120 to 185 feet.

As the sablefish are brought aboard, they are headed and eviscerated and put in flat metal trays that hold approximately 40 pounds. The loaded trays are placed on shelves in an air-blast freezer usually located on the main deck underneath the wheelhouse. The sharp freeze capacity of the vessels inspected has run from 6 to 12 metric tons per day. After 5-8 hours in the sharp freeze, the fish are knocked out of the trays in blocks and glazed. Then they are shifted to a refrigerated hold, where they remain until delivery in Japan, or transshipment to a refrigerated cargo ship.

VESSELS AND CATCHES

All the ships in the Gulf of Alaska longline fishery have been standard Japanese longliners. These ships have engine, quarters, and pilot house aft, a large working deck running from front of the wheelhouse forward, and equipped with one or more vertical shiv line haulers on the starboard side of the main deck, just forward of the superstructure. They have ranged from 120 to 185 feet long and from 211 to 534 gross tons. All are equipped with refrigeration, and head, eviscerate, and freeze their catch on the grounds. Refrigerated-hold capacity varies from 100 to over 300 metric tons.

Until late 1966, all ships observed in the Gulf had open working decks. These make aerial observation of their catches reasonably easy. In fall 1966, however, a few ships arrived with covered work spaces. These allow only the briefest glimpses of fishing operation from a patrol aircraft or ship. In 1967, some new ships appeared to have this covered working deck as part of their original construction, rather than as a later, temporary, addition. Presumably, the working deck on a longliner is covered only for a northern fishery; open decks are preferable in the southern longline fishery for tuna and billfish. The appearance of original construction aimed solely at a northern water fishery may herald increased Japanese interest in the longline fisheries of the North Pacific and Bering Sea.



Fig. 2 - The longliner, 'Asahi Maru #7,' hauling gear in Gulf of Alaska. Typical of most longliners fishing sablefish off Alaska: machinery and crew spaces are aft, sharp-freeze compartments underneath the wheelhouse, and open working deck. Built in 1963, it is 192 gross tons, 128 feet long, powered by a 6 cylinder slow-speed diesel, and has a crew of 24. The baiting shelter is visible on the stem; so is opening from which gear is set.

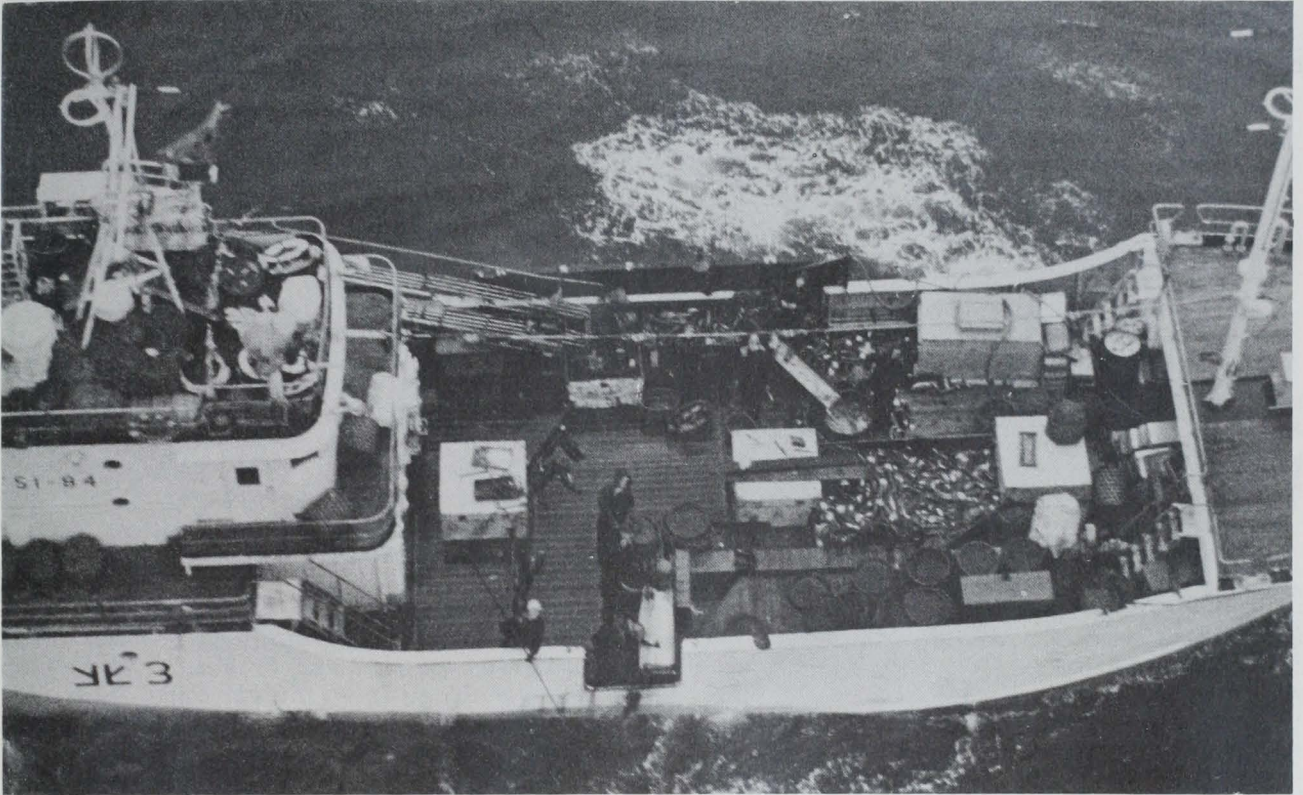


Fig. 3 - Typical deck arrangement for Japanese longliner working sablefish. The line is brought in through cut in bulwarks on starboard side. The fish are dressed on table on port side. Headed and gutted sablefish are visible in bin between #1 and #2 hatch. The rectangular metal freezer trays are visible stacked against break on foredeck. The pipe chute on portside leading aft is used to move baskets of longline gear aft to the baiting shed, where they are recoiled, baited, and reset.

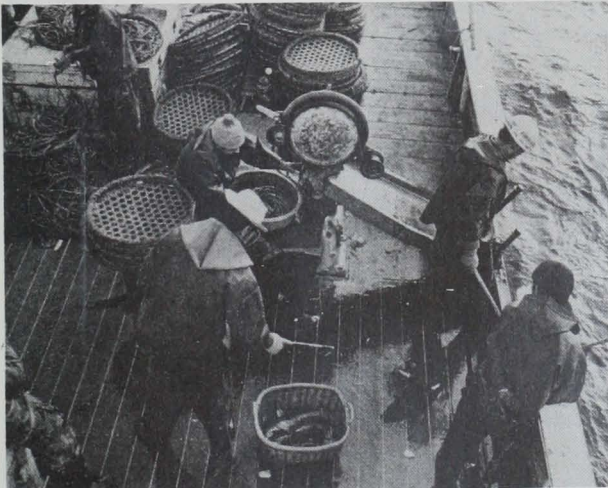


Fig. 4 - The gurdy operator watches longline as it comes aboard over vertical hauling shiv. He gaffs fish and removes them from hook. The fisherman, right foreground, uses long bamboo pole with gaff hook on end to retrieve fish that may fall from gear as they break water. Crewman sitting directly behind gurdy coils skates or sets of the longline in a metal wash pan as they come over gurdy breaking each skate as it comes aboard. When he has one skate in wash pan, he dumps it into flat wicker baskets piled alongside him. Crew member with small gaff hook and basket is picking fish off deck, where they are dropped by gurdy operator. He moves them in basket to dressing tables on portside.



Fig. 5 - The butchering table on portside with gear-return chute visible on left. Fish are headed, eviscerated, and washed with sea water. Then they go down chute on right side into tub full of circulating water. From there they go either to a temporary storage bin or directly into freezer pans. Crew member on extreme right is untying at least 6 or 7 baskets of longline probably fouled during setting operation.



Fig. 6 - The Japanese longliners dress fish by cutting off head and pectoral fins and then eviscerating without making slit in belly. Fish washed and ready for freezing are in bin in foreground.



Fig. 7 - Crew members bait longline gear with small pieces of squid. A 2-pound squid furnishes about 20 to 25 baits. Gear is set in opening, in background, by moving baskets down long wooden chute. A crew member turns baskets as they are being set, so hooks do not become tangled with gear by dragging across it.

Judging from their registry numbers, the ships observed in the Gulf over the past 5 years have come from at least 7 different prefectures in Japan. Over 13 different owners have been identified, mostly small companies or individuals, although some larger companies, such as Hokoku Suisan K.K., have been represented.

The length of a single fishing trip varies from 6 to 12 weeks; the average is around 9-10 weeks. Traveling time between Japan and the grounds in the middle Gulf of Alaska is 18 or 19 days. Prior to 1968, there was no resupply of the longliners by support ships or other fishing vessels. Recently, however, the Japanese Government has permitted both resupply and transshipment of the catch. Many fishing vessels take advantage of it to stay on the grounds for extended periods.

The average daily catch, according to captains interviewed during the boardings, ranges between 2 and 8 metric tons; the overall average is $4\frac{1}{2}$ metric tons. The size of the individual fish varies from $2\frac{1}{2}$ to over 10 pounds, with the average around 6-8 pounds. There has been little or no reported or observed decline in either daily catch or average size since the first observations in 1964. Generally, success seems to be high in this fishery. BCF personnel have made repeated observations of gear being brought aboard with as many as 75-80 percent of the hooks holding fish.

The yearly take of sablefish by Japanese longliners from the Gulf of Alaska probably averaged about 4 million pounds a year for 1964, 1965, and 1966. This jumped to approximately 12 million pounds in 1967, and again to 18-20 million pounds in 1968. These figures are based on an average vessel capacity of 200 tons and a full load for each trip. The number of trips per year that can be identified were, respectively, 11, 10, 9, 30, and 43. As a comparison, the 1965 catch of sablefish by U.S. fishermen in Alaska was 2,311,000 pounds, and 1,000,000 pounds in 1967.

U.S. SURVEILLANCE AND INSPECTION

The first Japanese longliner was detected in the Gulf of Alaska in 1964 by a joint BCF-Coast Guard aerial patrol out of Kodiak. Since then, a special effort has been made to record the presence of these ships and, whenever possible, board and inspect them for the

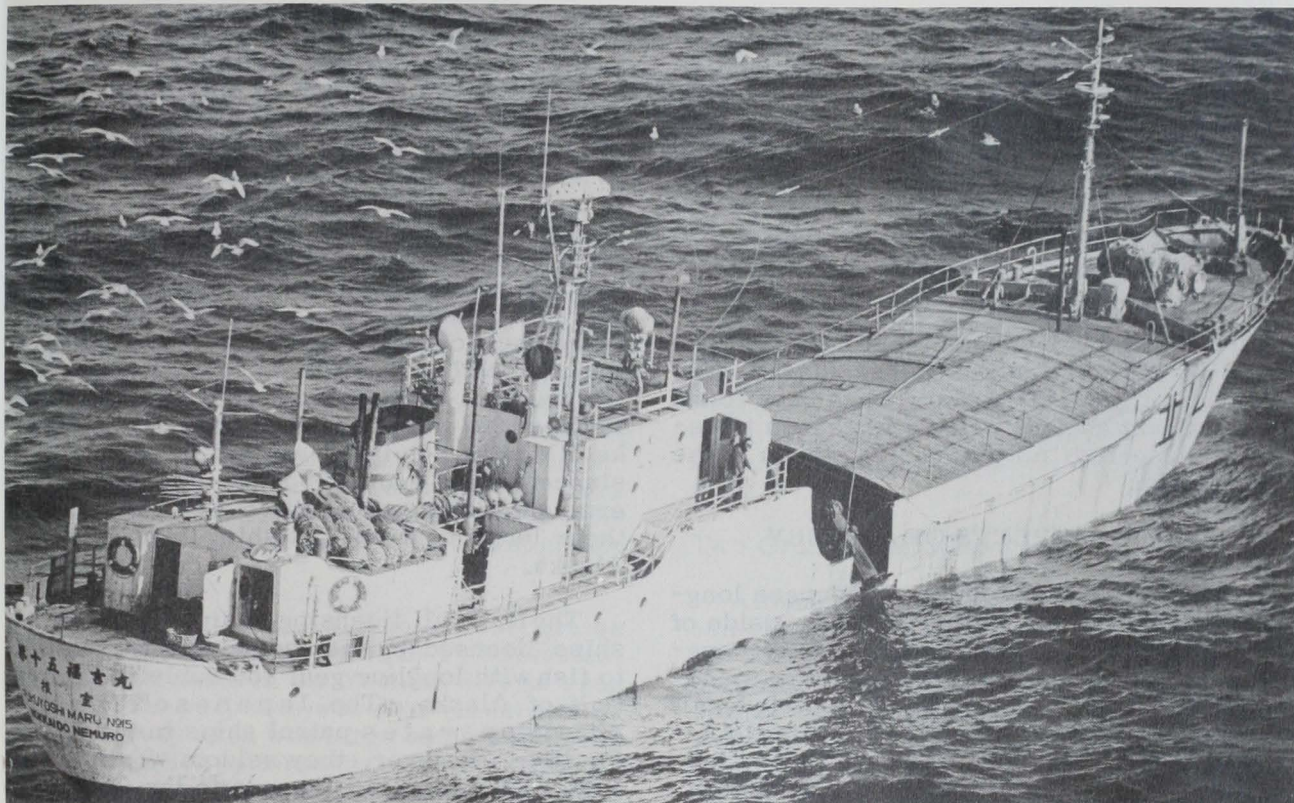


Fig. 8 - A common modification of standard Japanese longliner in Alaskan waters is temporary shelter deck over main working deck. The 'Fukuyoshi Maru #15' was built in 1954. It is 297 gross tons, 135 feet long, powered by a 650 hp. slow-speed diesel, and carries 28 men. The gear is coming over starboard side. The butchering area is out of sight under shelter deck.



Fig. 9 - The 'Eikyu Maru #58' was built in 1967, primarily for the northern water longline fishery. Shelter over working area is permanent and part of original construction. Baiting and gear-setting areas are also enclosed in hull, rather than placed in temporary house on upper deck. The ship is 299 gross tons, 124 feet long, powered by a 700 hp. slow-speed diesel, and has crew of 28.

presence of halibut. Under the International North Pacific Fisheries Convention, parties to which are the U.S., Canada, and Japan, Japan has agreed to refrain from taking halibut of North American origin in the eastern North Pacific. The terms of the Convention authorize the inspection of the ships of one country by officials from another party when there is reasonable cause to suspect a violation.

Of the many Japanese longliners checked by BCF Agents in the Gulf of Alaska, only one vessel, the 'Eitan Maru,' has been found with halibut aboard. There is reason to believe these fish may have been taken in the Bering Sea.

LEGAL ASPECTS OF FISHERY

From the U.S. standpoint, a Japanese longline fishery in the Gulf of Alaska outside of the 12-mile contiguous fishery zone for species other than halibut (*Hippoglossus stenolepis*) or salmon (*Oncorhynchus* spp.) is legal. It is in accord with the provisions of the International Convention for the High Seas Fisheries of the North Pacific Ocean. However, because the Japanese gear used for sablefish and other demersal species in the Gulf is

identical to that used for halibut, any such fishery is bound to be a matter of great concern to the U.S. A shift of only a few miles on the fishing grounds could change the Japanese take from almost 100 percent sablefish to nearly 100 percent halibut.

The Government of Japan, which issues licenses to its fishing vessels to fish in specific areas of the world's oceans, apparently did not issue any licenses for longliners in the Pacific east of long. 175° W. until September 1967. Therefore, by Japanese law, the vessels sighted from 1964 through September 1967 were fishing in the Gulf of Alaska illegally. It is known that in several instances, in 1964 and 1965, the Japanese Government took some punitive action against their longliners found fishing in the Gulf of Alaska.

The first full licensing year, 1968, saw 22 ships licensed by the Japanese Government to fish with longline gear for sablefish in the Gulf of Alaska. The Japanese Fisheries Agency operates patrol ships in the North Pacific. However, they seldom work as far east as the longline grounds in the Gulf. As far as is known, none of these ships patrolled the 7 major fishing grounds prior to 1968.



WHY DO TIDE RANGES IN THE SAME GEOGRAPHICAL AREAS OF THE WORLD DIFFER SO GREATLY?

In addition to effects of the moon and sun, tide ranges are affected by shape and dimension of the coastline and sea floor. In some restricted water areas (bays, channels, etc.), heights may build up to 50 feet and tidal currents of as much as 10 knots occur.

Tides moving upstream in an estuary are slowed down by bottom friction, and the following water piles up. The water rises more rapidly than it falls, and the flood stream has higher velocity than the ebb.

Some areas of great tidal ranges are the Bay of Fundy, Bristol Channel, and the Sea of Okhotsk. The famous Bay of Fundy tidal bore moves more than 100 billion tons of water a day.

There are also areas in the world that are almost tideless; among these are the Mediterranean, Baltic, and Adriatic Seas, and the Gulf of Mexico. ("Questions About The Oceans," U.S. Naval Oceanographic Office.)