AGENDA C-8
SEPTEMBER 1990

MEMORANDUM

TO: Council, AP and SSC Members

FROM: Clarence G. Pautzke
Executive Director

DATE: September 19, 1990

SUBJECT: International Fisheries

ACTION REQUIRED

Status reports.

BACKGROUND

David A. Colson, recently appointed to the position of Deputy Assistant Secretary for Oceans and Fisheries in the U.S. Department of State, will be here to fill the Council in on activities on the international front. Item C-8(a) is a series of articles from ADF&G's monthly publication that I think you will find very informative.

High Seas Driftnet Fisheries: The Controversy

by David Benton

Alaska holds a unique status as a state. We are bounded on one side by the maritime domain of the Soviet Union, and by Canada on the other. We are also a maritime state, reaching across the fisheries-rich waters of the Bering Sea and the North Pacific with a 30,000 mile coastline and a continental shelf three times the area of the shelf of the rest of the country. Because of our long history with the sea, our unique geographical location and the importance of fisheries to our people, Alaska must play in the international fisheries arena as a matter of self-defense and economic advantage.

Management of the fisheries in this area involves a complex mix of domestic and international bodies, treaties, regulations, and agreements. To be effective, Alaska has had to have a meaningful presence in Congress, in the North Pacific Fisheries Management Council, the International Pacific Halibut Commission, Pacific Salmon Commission, the International North Pacific Fisheries Commission, the US/USSR bilateral fisheries negotiations, the Driftnet Act negotiations, and numerous bilateral and multilateral talks and negotiations ranging from Leningrad to Seoul to the South Pacific. The Alaska Department of Fish and Game (ADF&G) has been given the charge of taking the lead for the State in this effort.

One of the most prominent international fisheries issues in the North Pacific has been the controversy over large-scale high seas driftnet fishing. The fleets of Japan, Taiwan, and South Korea fish roughly 2 million miles of net each year. It is estimated that tens of thousands of marine mammals, hundreds of thousands of seabirds, and millions of pounds of fish are needlessly killed and thrown overboard each year by these fisheries. The interception of Alaska salmon and steelhead by these fleets is a particular concern which affects sport, subsistence, and commercial users throughout the state and the entire Pacific Northwest. Recent actions by Japanese fishermen to circumvent attempts to control these fleets have added even more urgency to our efforts to secure an international moratorium on high seas driftnet fishing.

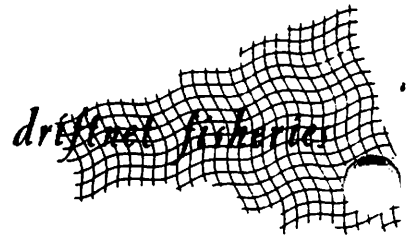
Several articles in this issue of *Alaska's Wildlife* magazine are devoted to the driftnet controversy. There is an article detailing the efforts of the National Marine Fisheries Service to understand the impacts of the driftnet fisheries on the North Pacific, an article which provides a closer look at the squid driftnet fishery and the biological and oceanographic factors affecting the interception of salmon, and a short summary of the Japanese high seas salmon fishery. There is a short piece by state Senator Johne Binkley, who is particularly close to these issues. There is also an overview article which describes some of ADF&G's activities on these and other international issues, including the evolving US/USSR fisheries relationship and our attempt to bring the unregulated Bering Sea donut hole fisheries under control.

These articles touch on only a small part of the department's activities in the international fisheries arena. Other areas where the department is making major efforts include the Pacific Salmon Commission, the Yukon salmon talks, the halibut commission, and action in Congress reauthorizing the Magnuson Act.

By working closely with the fishing industry and concerned citizens from all around the state, we have been able to play a significant role in shaping events and protecting Alaska's interests.

Finally, I would like to thank all of the people who have made so many contributions to Alaska's efforts to tackle these thorny and complex issues. It is often frustrating, the going can be slow, and there often isn't much personal reward other than knowing that you did the best you could. There are too many of you to list individually, so I'll just say thanks to all of you for all your help. Alaska is a better place because of you.

David Benton serves as Director, External and International Fisheries Affairs, ADF&G, Juneau.



ALASKA and the Fisheries of the North Pacific and Bering Sea

by David Benton

The North Pacific Ocean and the Bering Sea. To those of us who are familiar with this part of the world, it conjures up images of fierce storms, mountainous waves, ice, fog and blowing snow. It is also a world of great, and sometimes haunting beauty. It is a world at once vast and empty, yet teeming and full of life, harboring some of the Earth's largest populations of marine mammals, seabirds, and other marine wildlife. These waters also contain some of the world's most productive fisheries, and fleets from all over the world fish here for salmon, herring, crab, bottomfish, and squid.

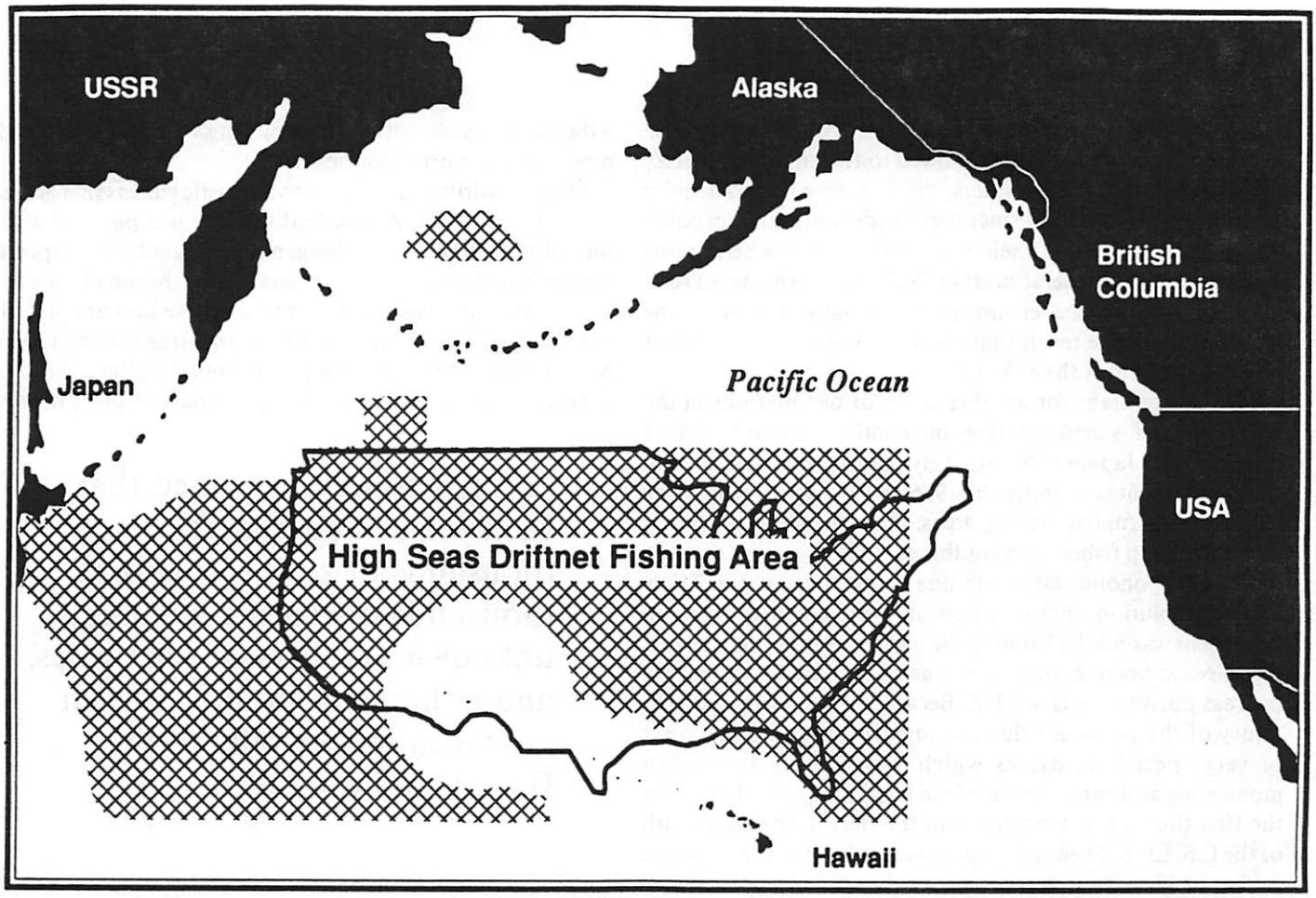
Within recent years, these fisheries have changed dramatically. As distant water fleets have been pushed out of the 200-mile zones of the coastal nations, fisheries in the international waters of the North Pacific have grown in size, area of operation, number of nations participating, and species harvested. This in turn has led to increased pressures on a broad range of fisheries and other living marine resources, and it has become apparent that traditional management agreements are not adequate to protect our fish stocks and our domestic fisheries.

This problem has been forcefully brought home to Alaska with regard to two of the North Pacific's most prominent international fisheries issues: high seas interception of North American salmon and steelhead by the driftnet fleets of Japan, Taiwan, and Korea; and overfishing of pollock by the unregulated trawl fisheries of Japan, Korea, Poland, and China which are conducted in the so-called "donut hole" area of the central Bering Sea. In both instances, large fleets operating beyond our 200-mile zone are having a dramatic impact on marine resources inside our zone and are posing major economic problems for our domestic fisheries. In both instances, existing international agreements are not adequate to manage these distant water fisheries, nor are they sufficient to protect the fish and wildlife resources of the North Pacific or the livelihood of our fishermen. The State of Alaska, through the Alaska Department of Fish and Game (ADF&G), has taken aggressive action to take advantage of new opportunities on the international front to address these problems.

THE JAPANESE HIGH SEAS SALMON FISHERIES

The interception of Alaska salmon on the high seas is not a new problem. Historically it has caused perhaps the most intense interaction by Alaskans in the international arena. The issue goes back to the 1920s and 1930s when the Japanese sent fleets of gillnetters into the entrance of Bristol Bay and were developing an offshore mothership fishery with gillnet catcherboats to fish off the coast of Kamchatka (U.S.S.R.). This offshore fishery was terminated by the start of World War II, but the Japanese fleets again put to sea in the early 1950s.

In 1952 the United States, Canada, and Japan signed the International North Pacific Fisheries Convention (INPFC) to regulate the Japanese mothership and landbased high seas salmon fisheries. This treaty established the so-called "abstention line" which prohibited the Japanese from fishing to the east of 175 degrees west longitude (the longitude of Atka Island in the Aleutians). At the time it was thought that this would protect salmon of North American origin while allowing the Japanese to continue their historical harvest of Asian salmon. The treaty did prevent the Japanese fleets from fishing on the bulk of Alaska and British Columbia salmon stocks but did not adequately protect some of our central and western Alaska stocks or coastwide steelhead stocks. In these early years



Fishing in an area larger than the continental U.S., the North Pacific high seas driftnet fleets of Japan, Taiwan and Korea will set 2,000,000 miles of nets this year taking sea birds, mammals and North American salmon and trout along with permitted species.

the Japanese fleets gradually worked their way farther and farther to the east, catching more and more high value coho and sockeye salmon, increasing their catches of chinook salmon, and dramatically increasing their overall interceptions of North American salmon.

Research conducted under the INPFC proved conclusively that significant numbers of maturing and immature salmon of primarily western Alaska origin migrated great distances to the west of the abstention line and were exposed to Japanese harvest. The impact on certain stocks, such as Bristol Bay sockeye and western Alaska chinook and coho, was severe. The estimate of the Japanese catch of Bristol Bay sockeye alone was approximately 2.5 million fish a year. In the case of western Alaska coho salmon, the high seas interception may have actually exceeded the inshore catch in many years. Taking into account drop-out, the overall impact to Alaska fisheries could have approached a loss of roughly 10 million fish per year. Unfortunately, any change in the treaty required the agreement of all three nations. A stalemate continued from 1952 through 1978.

No significant reductions were achieved in the level of interceptions until the 1978 renegotiation of the INPFC, which followed the adoption of the Magnuson Fishery Conservation and Management Act in 1976. The 200-mile limit extension gave the United States control over significant areas that had been fished by the Japanese high seas salmon fleets. In the renegotiation of the INPFC in 1978, the U.S. negotiated concessions in all of the Japanese high seas salmon fisheries while allowing them to keep a limited area in our 200-mile Exclusive Economic Zone (EEZ). This renegotiation resulted in a westward pullback of their landbased and mothership fleets by about 500 miles, and substantially reduced interceptions.

U.S. concerns over continuing interceptions of North American salmon led to a second round of negotiations in 1985-1986. These negotiations resulted in a phaseout of the Japanese mothership fishery in the central Bering Sea. Restrictions were also achieved on allowable effort in their mothership fishery, as well as some pullback in their landbased fishery. However,

western Alaska fishermen were still greatly concerned because the mothership fleet was still allowed to fish in the U.S. EEZ.

In order to fish in our waters, the Japanese had to acquire a marine mammal permit since they incidentally take porpoise, fur seals, and sea lions. Their acquisition of such a permit was challenged in U.S. federal court in 1987 by western Alaska fishing organizations and environmental groups. The Alaskans prevailed, with the result that the Japanese mothership fleet was excluded from the U.S. EEZ.

This set the stage for another series of negotiations in the INPFC forum, starting in 1988 and continuing into March of this year. The Japanese felt strongly that the U.S. had not fulfilled its obligations under the 1986 INPFC agreement. They requested alternative fishing areas, and proposed converting the mothership fishery to a landbased-style operation to make up for lost economic efficiency due to lost fishing area. There was no resolution of these issues until March 1990, when an agreement was reached among the parties to allow the mothership fleet to operate for one year as a landbased-style fishery in areas outside the U.S. EEZ. Because of the increased efficiency of the converted fleet, the agreement establishes a set of very specific measures which significantly strengthen monitoring and enforcement of the fleet. It also sets limits, for the first time, on fishing effort in the fleet in the area south of the U.S. EEZ. There are no provisions allowing the Japanese to fish inside U.S. waters.

Overall, the INPFC-regulated fisheries have been dramatically reduced since those early years, and the 1990 provisions have marked another milestone in Alaska's effort to reduce the interception of Alaska salmon by the mothership fleet. Concerns still remain, however, about continuing interceptions by both the Japanese traditional landbased high seas salmon fleet as well as the converted mothership fleet. Ending these interceptions will be a subject of continuing negotiation among the U.S., Japan, and Canada for a number of years to come, although recent talks between the U.S. and the U.S.S.R. may be setting the stage for phasing these fisheries out altogether.

THE HIGH SEAS DRIFTNET FISHERIES

The rise of the high seas squid and large mesh driftnet fleets of Japan, Taiwan, and Korea in the North Pacific have brought forth even greater concerns than those presented by the directed high seas salmon fisheries. These concerns involve not only the interception of Alaska salmon stocks, but the long-term health of major components of the North Pacific marine ecosystem itself. Starting from virtually zero in 1977, by 1983 these fleets numbered approximately 700 vessels fishing nearly 1 million miles of net a year. Five years later, fishing effort had again doubled to roughly 2 million miles of net a year. Over a thousand vessels, with some deploying 40 miles of net a night, now fish the North Pacific.

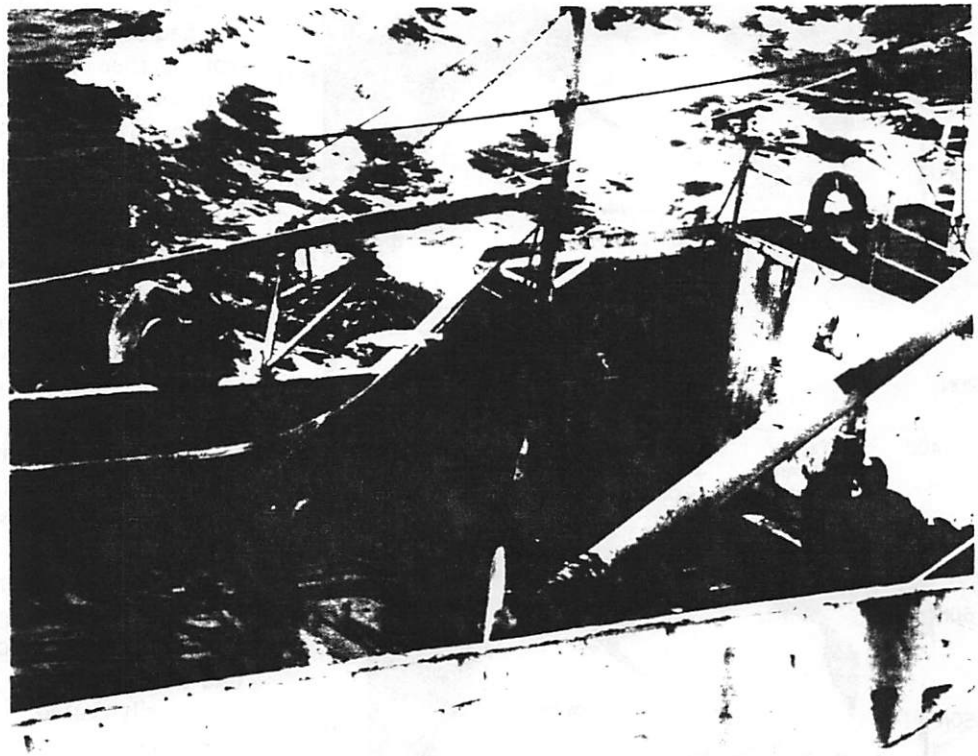
High seas driftnets are large-scale plastic gillnets that are used in the open ocean. A standard driftnet is a panel of strong monofilament plastic webbing, not biodegradable, suspended vertically in the water by floats attached to the top of the panels and weights attached to the bottom. These nets are placed in the water each night and allowed to drift freely with the winds and currents. They trap and kill just about everything that crosses their path that isn't small enough to pass through the mesh (mesh size refers to the size hole between the strands of line in the net).

....it is strongly suspected that, each year, hundreds of thousands of seabirds, tens of thousands of marine mammals, unknown numbers of sea turtles, and millions of pounds of fish are taken incidentally to the fishery and discarded.

High seas driftnet fishing differs sharply from our smaller coastal net fisheries. Inshore gillnet fisheries in Alaska are very closely monitored and regulated and generally fish in terminal harvest areas where it is possible for fishery managers to prevent overharvesting. The nets range from 300 feet to 1800 feet in length and are fished attached to the vessel where they are closely watched. The vessels range from approximately 16 feet to 30 feet in length. This compares to high seas driftnets which are 20-40 miles in length and are allowed to drift freely overnight.

North Pacific high seas driftnet fisheries can be divided into two groupings: the squid fishery which uses small mesh gear, and the large-mesh tuna fishery. Although there is little information on the actual catches in these fisheries, it is strongly suspected that, each year, hundreds of thousands of seabirds, tens of thousands of marine mammals, unknown numbers of sea turtles, and millions of pounds of fish are taken incidentally to the fishery and discarded. The potential for massive loss of marine fish and wildlife is a cause of growing international concern.

The squid fleet is the largest of the north Pacific driftnet fisheries. In the mid-1970s very large numbers of "flying squid" were discovered by the Japanese to the south of the mother-



U.S. Coast Guard 17th District

Crewmen on a Taiwanese driftnet vessel in the North Pacific throw allegedly illegal salmon overboard after being discovered by a Coast Guard helicopter.

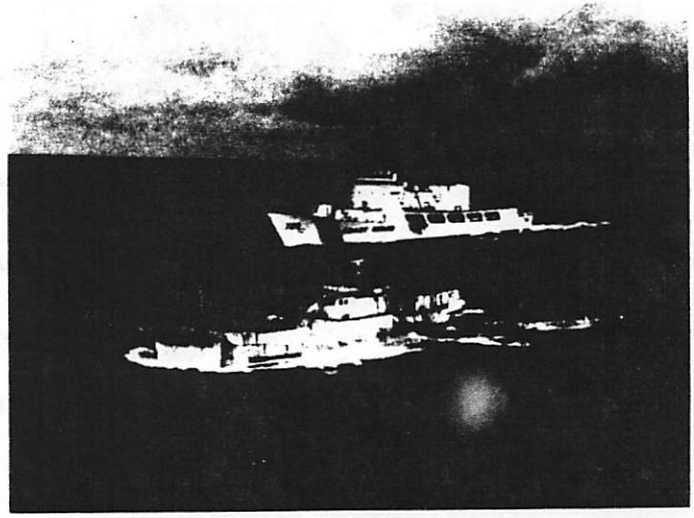
Below: The Coast Guard escorts a squid driftnet vessel to Taiwanese authorities after it was discovered fishing for salmon in the North Pacific, outside of legal driftnet boundaries.

ship and landbased salmon fishing areas. These "flying squid" are fairly large animals and the Japanese found that they could be captured with nets using the same mesh size as the nets used by the mothership and landbased fleets for salmon. As the salmon vessels were pushed out of the directed salmon fishery, they took up fishing for squid. It was a lucrative fishery, and Japan was soon joined by fleets from Taiwan and South Korea.

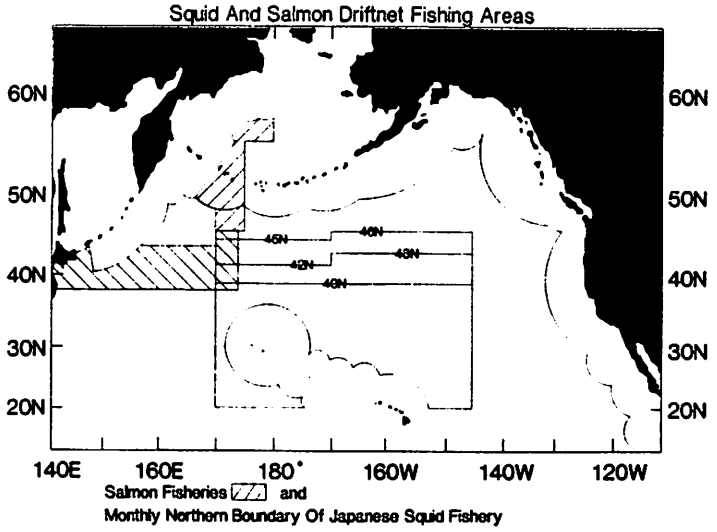
The sudden growth of the squid fleet presented a new challenge to Alaska in our efforts to protect our salmon and steelhead from interceptions on the high seas. The squid vessels use generally the same gear as that used for salmon. There is substantial overlap in the northern part of the squid grounds between areas fished for squid and waters where salmon are present, and there was a growing suspicion that some of the salmon showing up in world markets were being harvested illegally. Bringing these new driftnet fleets under control became a top priority for Alaska.

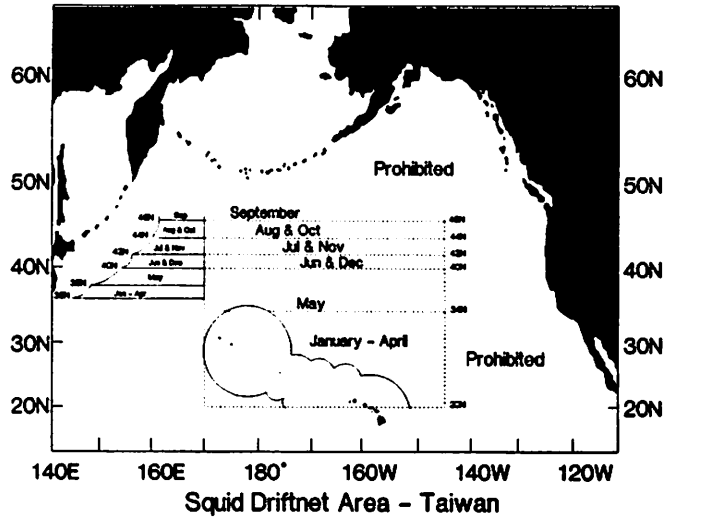
In 1987, Congress passed the Driftnet Monitoring and Control Act. The act, sponsored by Alaska Senator Ted Stevens and strongly supported by Alaska's Governor Steve Cowper, required that the Secretary of Commerce, through the Secretary of State, negotiate monitoring and enforcement agreements with nations which have high seas driftnet fleets in the North Pacific. If successful agreements are not reached, then the Secretary of Commerce is required to certify the nation (or nations) under the so-called Pelly Amendment. Certification then opens the door for trade sanctions against fishery products imported into the United States from the certified country. Bilateral negotiations began in 1988 between the U.S. and each of the three North Pacific driftnet fishing nations.

At the same time, concern over the impacts of high seas driftnets was growing in other parts of the world, most notably the South Pacific where driftnet vessels from Japan and Taiwan

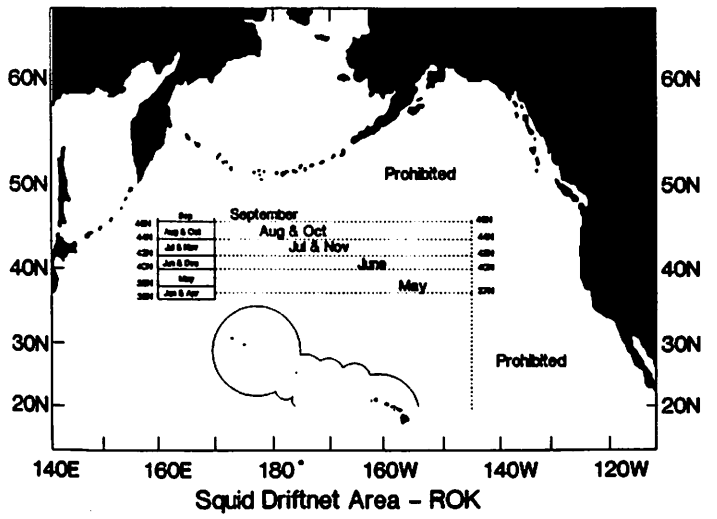


U.S. Coast Guard 17th District





Squid Driftnet Area - Taiwan



Squid Driftnet Area - ROK

were taking large numbers of juvenile albacore tuna using large-meshed driftnet gear. Early in 1989, 16 South Pacific nations got together under the auspices of the South Pacific Forum to review the situation. Much to their alarm, their scientists were coming to the conclusion that something had to be done soon, or else the albacore stocks could be gone in as short a time as three years.

In June 1989, the Forum Fisheries Agency (FFA), a branch of the South Pacific Forum, called a meeting in Suva, Fiji, with the driftnet fishing nations of Taiwan, Korea, and Japan to discuss the matter. The problems the islanders were facing were very similar to those we were looking at in the north—the same nations, similar fishing practices, and in many instances the same vessels. Recognizing these similarities, Alaska provided the FFA with information regarding the operation of the driftnet fleets in the North Pacific, our concerns about their impacts on our fisheries, and our attempts to bring them under control. Following the Suva talks, the South Pacific Forum called for a moratorium on driftnet fishing until there was better information to manage the fishery and protect the stocks. This request was turned down by Japan and Taiwan. Korea, which had only one or two vessels fishing in the area, had already voluntarily ceased its operations.

Meanwhile, similar concerns regarding large-meshed driftnet gear were being voiced by U.S. tuna trollers on the west coast of the United States. The 300 or so U.S. tuna fishermen were seeing their catch drop from roughly 17,000 short tons to 2,000 short tons in a span of a very few years. Some estimates put recovery of the tuna stocks at 15 years. Ironically for the U.S. fishermen, virtually all of the driftnet-caught tuna were being sold in the United States.

By late 1989, international concern had grown to the point that the United States and New Zealand decided to join forces and introduce a resolution in the United Nations calling for a moratorium on all driftnet fishing. Japan introduced a counter resolution calling for more study of the possible impacts of driftnets on the marine environment. After a sharp political struggle, a compromise resolution passed the UN unanimously. The successful resolution called for an in-depth scientific review of the problem by June 1991; and moratoria on driftnet fishing starting in 1991 for the South Pacific, and 1992 for the North Pacific, unless "effective conservation and management measures" can be put into place to ensure protection of the world's living marine resources.

In 1989-90, bilateral driftnet monitoring and enforcement agreements were reached by the United States with all three driftnet fishing nations. (See summary table of agreements.) During the 1990 fishing season there will be over 150 observers (76 U.S.) on driftnet vessels in the North Pacific. This observer program, and the accompanying scientific investigations,

STATE OF ALASKA — DEPARTMENT OF FISH AND GAME

FACT SHEET

NORTH PACIFIC HIGH SEAS DRIFTNET AGREEMENTS FOR 1989 AND 1990 REQUIRED BY THE U.S. DRIFTNET ACT OF 1987

COUNTRIES	JAPAN	TAIWAN	KOREA
MOST RECENT AGREEMENT	31 MARCH 1990	25 AUGUST 1989	8 SEPTEMBER 1989
PARTIES TO AGREEMENT	U.S.–CANADA–JAPAN	AMERICAN INST. OF TAIWAN (U.S.)–TAIWAN COORD. COUNCIL	U.S.–REPUBLIC OF KOREA (ROK) (SOUTH KOREA)
FISHERIES INCLUDED FOR 1989	SQUID (NOT TUNA)	SQUID & TUNA	SQUID
FISHERIES INCLUDED FOR 1990	SQUID & TUNA		
VESSELS AND NETS			
VESSELS MUST BE LICENSED, CLEARLY MARKED, AND A LIST MUST BE PROVIDED TO U.S.	YES	YES	YES
LIMIT ON NUMBER OF VESSELS	SQUID LIMITED SINCE 1981 WILL INITIATE LIMIT FOR TUNA 1990	WILL TRY TO LIMIT FLEET	LIMIT SET AT 160 VESSELS
VESSELS MUST REPORT LOCATION	YES	YES	YES
VESSELS FROM ALL COUNTRIES MUST REPORT MONTHLY CATCH & EFFORT			
NETS MUST BE MARKED–MAY NOT BE DISCARDED	YES	YES	YES
MESH SIZE OF NETS	PROHIBITION ON CARRYING BOTH LARGE AND SMALL MESH NETS	WILL INTRODUCE LEGISLATION TO PROHIBIT VESSELS FROM CARRYING BOTH LARGE MESH GEAR (FOR TUNA) AND SMALL MESH (FOR SQUID)	WILL REGULATE
AT-SEA TRANSFER TO TRANSPORT VESSELS	PROHIBITED	ONLY TO TAIWAN VESSELS WITH TRANSMITTERS	ONLY UNDER ROK MANAGERS ON VESSELS WITH TRANSMITTERS
OFF–LOADING AT HOME PORTS	UNDER SURVEILLANCE	FOR ALL PERMITTED RESOURCES EXCEPT TUNA	FOR ALL PERMITTED RESOURCES
MONITORING AND ENFORCEMENT			
ENFORCEMENT AT SEA–1989	JAPAN WILL DOUBLE 1988 EFFORT TO 5 PATROL VESSELS FOR TOTAL OF 600 VESSEL/DAYS WILL PROVIDE REPORT AFTER SEASON	TAIWAN WILL INITIATE EFFORT WITH 2 PATROL VESSELS FOR TOTAL OF 200 VESSEL/DAYS WILL PROVIDE REPORT AFTER SEASON	KOREA WILL INITIATE EFFORT NO PROVISION FOR PATROL VESSELS WILL PROVIDE REPORT AFTER SEASON
ENFORCEMENT AT SEA–1990	SAME AS 1989	3 VESSELS FOR TOTAL OF 310 DAYS	1 VESSEL YEAR-ROUND 2 IN PEAK MONTHS
ENFORCEMENT OBSERVER EXCHANGE	1 U.S. ON 1 JAPAN PATROL 1 JAPAN ON 1 U.S. FLIGHT	1 AIT (U.S.) ON 1 TAIWAN PATROL 1 TAIWAN ON 1 U.S. FLIGHT	1 U.S. ON 1 ROK PATROL 1 ROK ON 1 U.S. FLIGHT
U.S. BOARDING AND INSPECTION	UNDER TERMS OF INPFC	TAIWAN WILL PERMIT FOR VESSELS OUTSIDE APPROVED AREAS AND UNDER CERTAIN CIRCUMSTANCES FOR VESSELS IN APPROVED AREAS	ROK WILL PERMIT FOR ALL DRIFTNET AND TRANSPORT VESSELS
COOPERATIVE ENFORCEMENT	WILL MONITOR ROK AND TAIWAN FLEETS	NO PROVISION	NO PROVISION
TRANSMITTERS ON VESSELS WITH SATELLITE SURVEILLANCE—1989	WILL CONSIDER AFTER TESTING	WILL PLACE TRANSMITTERS ON VESSELS AT NO COST TO U.S. 10% OF FISHING VESSELS 100% OF TRANSPORT VESSELS	WILL PLACE TRANSMITTERS ON VESSELS AT NO COST TO U.S. 10% OF FISHING VESSELS 100% OF TRANSPORT VESSELS
TRANSMITTERS ON VESSELS WITH SATELLITE SURVEILLANCE—1990	ALL SQUID & TUNA VESSELS	ALL VESSELS	ALL VESSELS

DRIFTNET AGREEMENTS FOR 1989 AND 1990 — *CONTINUED*

COUNTRIES	JAPAN	TAIWAN	KOREA
RETENTION OF SALMON	PROHIBITED	PROHIBITED	PROHIBITED
SCIENTIFIC OBSERVER & RESEARCH PROGRAM			
NUMBER OF U.S. OBSERVERS ON FISHING VESSELS—1989	9 U.S., 5 CANADIAN, AND 32 JAPANESE ON 32 VESSELS	1 U.S. FOR 30 NET RETRIEVALS	1 U.S. FOR 45 NET RETRIEVALS
NUMBER OF U.S. OBSERVERS ON FISHING VESSELS—1990	SQUID: 35 U.S.; 10 CANADIAN; 29 JAPANESE. TUNA: 12 U.S.; 12 JAPANESE	14 U.S. OBSERVERS (45 DAYS) 10 TAIWANESE OBSERVERS (60 DAYS) ROVING PLATFORM (2 U.S., 2 TAIWANESE OBSERVERS)	13 U.S. AND 13 ROK ON 26 VESSELS FOR 45 RETRIEVALS
SCIENTIFIC OBSERVER REPORTS – 1989 PROGRAM	DATA EXCHANGED IN 30 DAYS JUL-AUG SUMMARY REPORT – 1 FEB 90 JUN-DEC SUMMARY – 1 APR 90	WILL DETERMINE BY 28 FEBRUARY 1990	DATA EXCHANGED IN 30 DAYS SUMMARY – 1 APR 91
1989 FINAL REPORTS	30 JUNE 1990		
SCIENTIFIC OBSERVER REPORTS – 1990 PROGRAM	DATA EXCHANGE APRIL 1991		
1990 FINAL REPORTS	31 MAY 1991	31 MAY 1991	30 JUNE 1991

TIME/AREA RESTRICTIONS	JAPAN			TAIWAN		KOREA	
		170E — 145W				WEST OF 170E	
DATES	WEST OF 170 E	170E–170W	170W–145W	WEST OF 170E	170E–145W	160E–170E	170E–145W
JAN–APR	CLOSED	CLOSED	CLOSED	36N	20N	36N	CLOSED
MAY	CLOSED	CLOSED	CLOSED	38N	34N[A]	38N	37N
JUN	CLOSED	40N	40N	40N[D]	40N	40N	40N
JUL	CLOSED	42N	43N[B]	42N[D]	42N	42N	42N
AUG	CLOSED	45N[C]	46N[C]	44N[D]	44N	44N	44N
SEP	CLOSED	46N	46N	46N[D]	46N	46N	46N
OCT	CLOSED	44N	44N	44N[D]	44N	44N	44N
NOV	CLOSED	42N	42N	42N[D]	42N	42N	42N
DEC	CLOSED	40N	40N	40N[D]	40N	40N	CLOSED

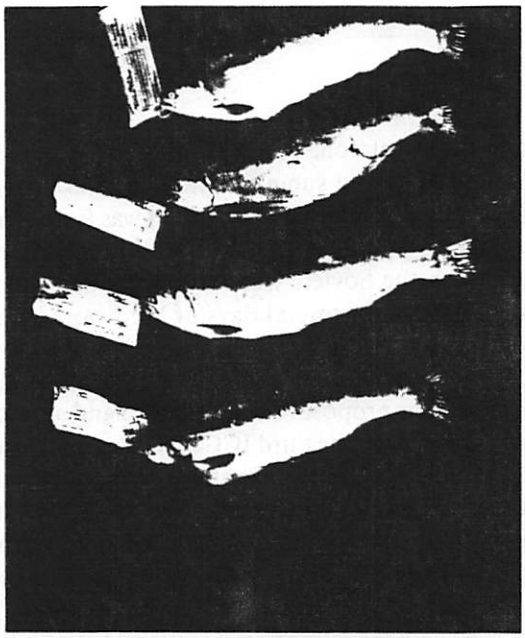
A — ONLY LARGE MESH (TUNA) NETS

B — WAS MOVED BY JAPANESE FROM 42N TO 43N IN 1988

C — WERE BOTH MOVED NORTH BY JAPANESE FROM 44N IN 1988

D — TAIWANESE REGULATIONS RESTRICTED THESE FISHERIES TO 39N IN 1985

JAPANESE AND TAIWANESE RESTRICTIONS REPRESENT NO REDUCTION IN TIME OR AREA FISHED FROM INTERNAL REGULATIONS IN PLACE PRIOR TO 1989 AGREEMENTS WITH U.S. THIS IS THE FIRST TIME KOREA HAS AGREED TO TIME AND AREA RESTRICTIONS.



U.S. Coast Guard 17th District

Sockeye salmon discovered by the U.S. Coast Guard on a North Pacific Taiwanese squid driftnet vessel that was fishing outside of legal boundaries.

represent a major effort to understand the impacts of these fisheries on a broad range of fish and wildlife. Given the schedule established under the UN resolution, this year's scientific work is of paramount importance.

However, recent actions by Japanese fishermen serve to underscore our concerns regarding the ability to control these driftnet fisheries with any measures short of a total international ban. In May of this year several driftnet vessels were observed by the U.S. Coast Guard fishing in unauthorized waters southwest of the Aleutian Islands. These vessels were flying the flag of North Korea, a nation which up to now was not involved in driftnet fishing. Acting on a tip from U.S. authorities, Soviet enforcement personnel boarded and seized the vessels, which had large amounts of illegally caught salmon on board. It turns out that these vessels—and the majority of the crew—were Japanese, operating under a secret arrangement with North Korea. This was an obvious attempt to circumvent the U.S.-Japan bilateral driftnet agreement, the INPFC, and the UN Resolution. This event has also raised the level of concern in the international community regarding the ability of flag states to control these fisheries.

THE DONUT HOLE

When the Magnuson Fishery Conservation and Management Act was passed in 1976, a process was established to move the foreign fleets out of the newly established U.S. 200-mile EEZ. In this regard, the act was a success and the foreign fleets were mostly gone in less than 10 years. However, as the foreign fleets fishing for bottomfish (mostly pollock) off Alaska were forced out of the EEZ, many of the vessels took up fishing in waters of the Bering Sea beyond the 200-mile zones of the U.S. and the Soviet Union. This is the so-called donut hole area.

Although there were strong suspicions that large amounts of pollock were being harvested in the donut hole for a number of years, the first significant documented catches of pollock were reported to be approximately 336,000 metric tons for 1985, with the majority being caught by Japan and Poland. The Republic of Korea (South Korea) and the Peoples Republic of China (mainland China) are the other major participants in this fishery. The donut hole catch has grown dramatically since then, from slightly over 1 million metric tons for 1986 to roughly 1.5 million metric tons at present.

This rapid expansion in the take of pollock raised concerns in both the United States and the Soviet Union regarding the overall health of the Bering Sea pollock resource. Both countries were coming to the conclusion that they had to work together to bring these fisheries under some kind of control. Mounting evidence of illegal fishing by vessels staging forays out of the donut hole into U.S. waters provided further incentive to move on the issue.

In May of 1988, the United States and the Soviet Union signed a comprehensive fisheries agreement which opened the way for further cooperation. After consultations with the Soviets, the United States hosted a major scientific symposium on the status of Bering Sea pollock in July 1988 in Sitka, Alaska. Representatives from the U.S., Japan, Korea, Poland, Canada, China, and the U.S.S.R. met for three days to review the scientific information available regarding stock abundance, stock identification, oceanography and migration, and reproduction. There was considerable disagreement among the various national sections on many of these topics, but numerous information needs were identified which set the stage for further research to address the issues posed by the new fishery.

The Soviets and the United States met again formally in February 1989 in Washington, D.C., and in September 1989 in Leningrad to discuss a number of fisheries topics. At each of these meetings the donut hole issue was a major topic of discussion. A work group was established to review and coordinate matters between the two countries. This group, called the Bering Sea Fisheries Advisory Body (BSFAB), met in November 1989 in Seattle. They were charged with identifying and assessing the pollock resources of the Bering Sea, establishing a common databank, and determining appropriate overall harvest levels.

The BSFAB findings were startling. Scientists from both countries agreed that the pollock resource of the Bering Sea is declining by about 10 percent per year. More importantly, when the harvest levels from the U.S. zone, the U.S.S.R. zone, and the donut hole are added up, the scientists found that the overall harvest of pollock may be exceeding the biologically

appropriate level by as much as 700,000 metric tons per year. The BSFAB found the large, unregulated pollock fishery in the donut hole to be "biologically irrational," noting that if this trend continues, then all fisheries will eventually suffer.

Unfortunately, no international mechanism now exists for addressing this problem or to bring the donut hole fisheries under control. Continuing discussions with the U.S.S.R. show promising signs, however. At talks held this March, the U.S. and the U.S.S.R. informally discussed the possibility of a new international regime to manage the fisheries in this area. Principles and concepts were explored, and both sides agreed that there needs to be a serious attempt to "harmonize" fisheries management in the Bering Sea. Further work on developing a possible management regime for this area is slated to occur later this summer.

US/USSR FISHERIES RELATIONS

New international alignments are taking shape on the world stage which present new challenges and opportunities for Alaska. One of the more promising areas in international fisheries is our emerging fisheries relationship with the U.S.S.R.

As noted earlier, in May of 1988 the United States and the Soviet Union signed a comprehensive fisheries agreement which includes provisions for cooperation on scientific research, fisheries management and conservation, and trade. The agreement includes provisions for cooperation to manage and conserve anadromous stocks of the North Pacific and pollock fisheries in the Bering Sea. The agreement also establishes an Intergovernmental Coordinating Committee (ICC) as the organizational structure to implement the agreement.

The U.S./U.S.S.R. fisheries agreement was adopted by Congress in the fall of 1988 as a Governing International Fisheries Agreement (GIFA). The implementing legislation, with strong support from Senator Stevens and the State of Alaska, also established the North Pacific and Bering Sea Advisory Body consisting of ten representatives from the fishing industry, five each from Alaska and Washington, as well as the heads of the two states' fisheries agencies.

The first official meeting of the ICC was held in Washington, D.C., in February 1989. At this meeting, the new direction North Pacific fisheries matters might be taking became apparent. The U.S.S.R. floated two draft proposals—one to manage Bering Sea pollock fisheries, and a second proposal for a North Pacific/Bering Sea multilateral salmon agreement.

The Soviet salmon proposal would prohibit salmon fisheries outside the 200-mile zones of coastal states and establish a framework to address fisheries within the zones of the parties. If such an approach were agreed to by the major salmon producing nations of Japan, Canada, the U.S.S.R., and the United States, it would virtually eliminate interceptions of U.S.-origin salmon. The U.S. advisors took the Soviet proposal, revised it, and submitted it to the U.S. federal government for consideration. The revised text was further modified and adopted as a U.S. negotiating position for the next round of talks with the Soviets which occurred in Leningrad in September 1989. After several days of hard work, the U.S. and U.S.S.R. negotiators had an agreed-upon text for a new proposed salmon treaty. Some minor technical problems remained to be resolved, and the proposal was completed and agreed upon in March of this year at the third ICC meeting which occurred in Washington, D.C. The document was subsequently forwarded to Japan and Canada for their consideration. Negotiations among the four nations on this proposal should begin sometime this year.

The U.S. advisors also played a major role in shaping the course of events involving the donut hole talks with the Soviets. As with the salmon proposal, the donut hole proposal put forth by the Soviets in February was used by the U.S. advisors to develop a donut hole proposal for consideration by the U.S. federal agencies. This eventually evolved into the BSFAB, which was established at the Leningrad meeting.

Subsequently, the results of the BSFAB formed the basis for another paper prepared by the advisors which laid out principles for a proposed management regime for the donut hole. This paper became the basis for informal discussions with the Soviets at the March 1990 meeting regarding concepts for managing these unregulated fisheries. After several rounds of informal talks, substantial progress was made concerning the possibility of establishing some type of management regime for the donut hole fisheries. Formal talks may occur sometime this summer to more fully develop a proposal.

CONCLUSION

Competition for the world's finite ocean resources is mounting, and international concern over their conservation and use is growing dramatically. Throughout the 90s the fisheries of the North Pacific and the Bering Sea will continue to be the focus of intense international transactions. As world politics and economics shift, the complex fisheries relationships among the United States, Japan, Canada, and the Soviet Union will provide challenging opportunities. New fisheries management regimes could emerge from this period which will have profound, long lasting effects on Alaska and the nation. As these events unfold, Alaska can play a strategic role in the negotiations that will determine the future of the marine resources of the North Pacific and Bering Sea. Unlike many parts of the world, we still have the opportunity to do things right here—if we pay attention.

David Benton serves as Director, External and International Fisheries Affairs, ADF&G, Juneau.

Soviets Assist Alaskans in Protecting Salmon by Senator Johne Binkley

A recent survey printed in national newspapers indicated that nearly two-thirds of the American people now believe our Cold War with the Soviet Union to be over—a thing of the past.

Western Alaska fishermen could have told you that two years ago when we first started working with the Soviets on the issue of high seas salmon interceptions. The Soviets are proving themselves to be strong allies of ours in ridding the open ocean of 20th century fish pirates.

In fact, we are now putting the finishing touches on an agreement aimed at protecting North Pacific salmon stocks that we are hopeful the other salmon-producing nations of Canada and Japan will also endorse.

Although his name won't appear anywhere on that document, a long-time resident of my hometown of Bethel is in large part responsible for the agreement's existence and will be watching closely what gets included in it. That man is Harold Sparck.

Like others who live in the Yukon-Kuskokwim Delta, Harold was concerned about the empty nets being pulled in by local fishermen. Hard-to-come-by cash was even harder to come by. Subsistence fishermen were often not getting enough salmon to meet their families' needs. In the ocean, the Japanese were helping themselves to salmon from Alaska, with little opposition from our government.

A year of study at the University of Virginia's School of Law under John Moore, one of the crafters of U.S. ocean policy and former U.S. Ambassador to the International Law of the Sea conference, sparked Harold's interest in the Soviets as potential allies in eliminating high seas driftnetting.

The Japanese had been fishing Soviet salmon stocks hard for more than a century. In fact, in 1937, before the Soviet agreement with Hitler, the Soviets and the United States were discussing ways to stop Japanese ocean salmon fishing. Bristol Bay fishermen had already reported seeing Japanese boats fishing within sight of land on frequent occasions, and U.S. newspapers were quoting fishermen ready to go to war over salmon.

But Japan went to great efforts to keep the Soviet Union and the United States apart. And World War II and the subsequent collapse of any semblance of good relations between the two nations ensured that the two would not be on the same side of a negotiating table for a long time.

In spite of the increased numbers of salmon returning to Alaska waters—due to the state's successful hatchery program and the renegotiation of the International North Pacific Fisheries Commission treaty in 1978—western Alaska salmon were still being hammered out on the high seas.

Harold began writing letters to state leaders, suggesting that the Soviets were the key to Alaskans seeing relief on the high seas. A lot of people thought Harold was crazy, but he persisted. He started writing about Soviet concerns and got others interested, including myself when I first ran for the Legislature in 1984.

A coalition of Native fishing organizations and environmental groups filed suit in federal court claiming that Japanese salmon fishing within the United States' 200-mile limit was violating the Marine Mammal Protection Act.

The group's lawsuit was opposed by the Reagan administration, which supported the treaty allowing the Japanese to fish in U.S. waters, but amazingly, the fishing groups won their case all the way to the U.S. Supreme Court. All Alaskans can thank western Alaska fishermen for ridding U.S. waters of Japanese fishermen.

That success showed western Alaska fishermen, most of whom live in small, remote villages, that they indeed could be major players in this arena of international fisheries affairs.

In 1980, as a representative of western Alaska, I was appointed to a five-member industry group to advise the U.S. State Department during early negotiations with the Soviet Union and, in October 1989, travelled to Moscow.

There I heard first-hand from the Soviet Deputy-Minister of Fisheries, Dr. V.K. Zilanov, that the Soviets have made ending the interception of their salmon by foreign fishermen one of their top priorities.

Much of this interception in the past has come from the Japanese mothership and land-based fleets fishing for salmon. Now it's feared that illegal fishing by the ever-expanding foreign squid fleets is a major contributor to the loss of Alaska and Soviet salmon.

I have been impressed by how serious the Soviets consider the salmon interception problem.

Both countries have now reached the conclusion that fishing for salmon outside of our 200-mile zones is wasteful and must be stopped, and are taking aggressive steps to achieve this goal.

We've come a long ways in the last two years. Alaska fishermen and our state Department of Fish and Game have been the leaders and movers in these efforts. Fishermen in Alaska can justly be proud of their efforts. If we keep the momentum going, we should finally see an end to the piracy of Alaska salmon on the high seas.

Johne Binkley of Bethel has served two years in the Alaska State Legislature as Representative and four years as Senator.

The High Seas Salmon Fisheries of Japan, 1989

by Michael L. Dahlberg

One of the real success stories of the 1980s has been the reduction in the amount of Alaskan salmon caught by Japanese high seas salmon fisheries. Total catch and fishing effort in the salmon fisheries in 1989 were 15 percent and 18 percent of what they were in 1977. And, more importantly, interceptions of Alaskan salmon in 1989 were 15 percent of 1977 levels. These reductions have stemmed from a series of independent actions by Canada, the Soviet Union, and the United States that reduced species quotas and available fishing grounds.

MOTHERSHIP SALMON DRIFTNET FISHERY

The mothership salmon fishery consists of one or more factory vessels (or motherships), each with a fleet of smaller catcher boats (96-127 gross tons) that fish in an array near the mothership and deliver their catches each day. Fishing grounds are located in the Bering Sea and northwestern Pacific Ocean (Figure 1, Mothership Areas 2a, 3, and 4). After renegotiation of the International North Pacific Fisheries Commission (INPFC) treaty in 1978, the mothership fishery consisted of 4 motherships, each with 6 scout boats and 37 catcher boats. Two factors reduced the fishery by 1988 to a single mothership fleet: recent reductions in salmon quotas set by the Soviet Union, and the prohibition of fishing inside the U.S. Exclusive Economic Zone (EEZ) (Figure 1, Area 3) due to an injunction against their incidental take permit under the Marine Mammal Protection Act.

FISHING SEASON AND EFFORT

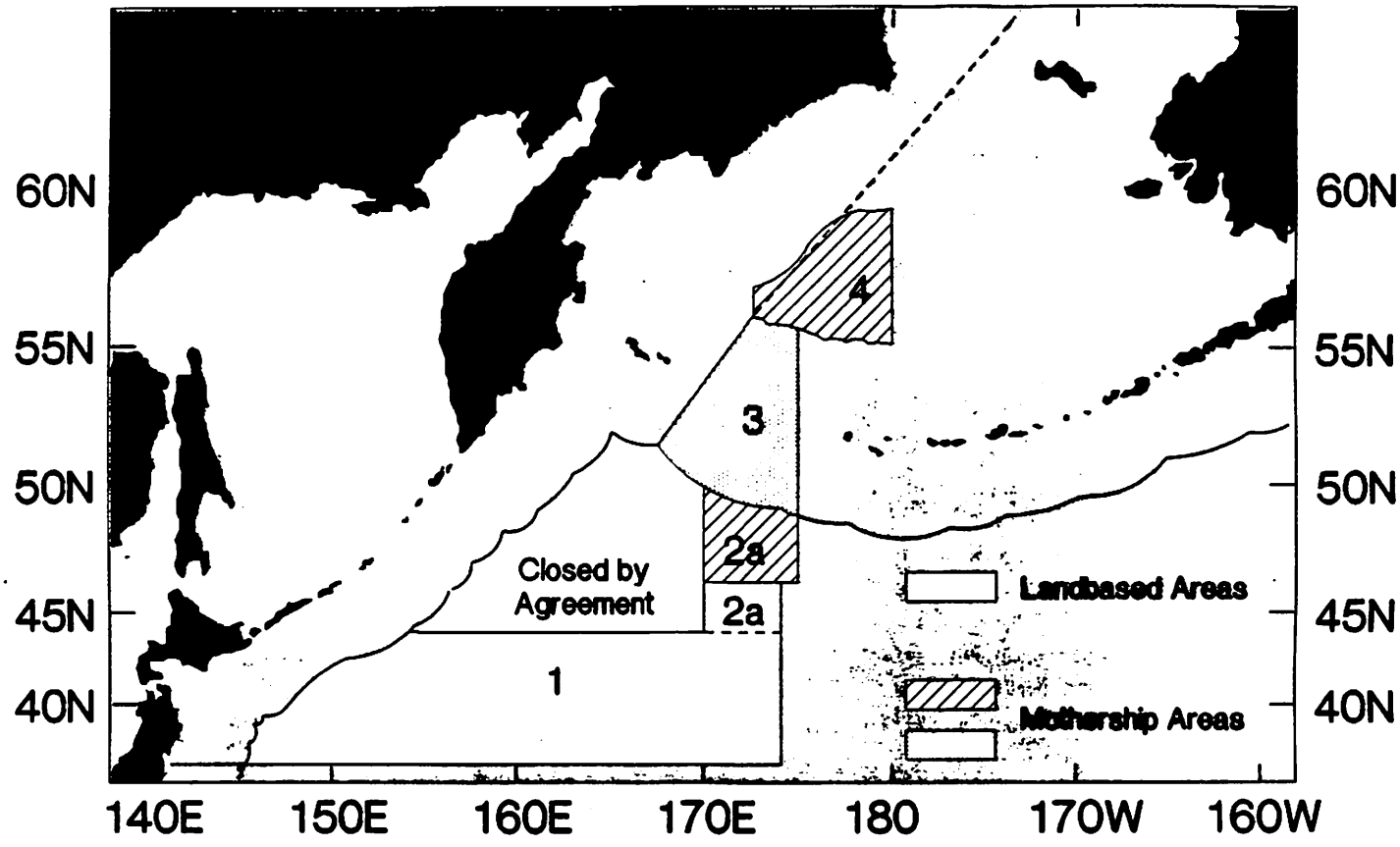
The Nikkeiren (Federation of Japan Salmon Fisheries Cooperative Associations) chartered the factory trawler *Zuiyo maru* from May 9 to August 8 to serve as the mothership during the 1989 fishing season. Motherships in previous years had been operated by large Japanese-owned fishing companies

Table 1.—Catch statistics of the Japanese high seas salmon driftnet fisheries, 1987-89. (Catch in thousands of fish and cumulative fishing effort in thousands of tans).

	All Species	Species					Fishing Effort
		Sockeye	Chum	Pink	Coho	Chinook	
1987							
Mothership	3,530	667	1,822	966	35	39	1,282
Landbased	7,677	140	936	6,068	459	74	1,156
Total	11,207	807	2,758	7,034	494	113	2,438
1988							
Mothership	1,199	225	892	56	<1	26	482
Landbased	6,289	116	751	5,083	292	47	793
Total	7,488	341	1,643	5,139	292	73	1,275
1989							
Mothership	1,209	244	607	339	2	16	316
Landbased	6,448	102	746	5,339	208	51	781
Total	7,657	346	1,353	5,678	210	67	1,097

Source: INPFC Documents 3132 (Rev. 1), 3269 and 3375.

Figure 1.—Japanese high seas salmon fishing areas established under the Japan/Soviet salmon fishery agreement.



Graphics by Susan Fowler

which no longer found the fishery as profitable after quotas were reduced. The cooperative was able to operate the *Zuiyo maru* at one-tenth the cost of past motherships because of its smaller size.

The *Zuiyo maru* (2,459 gross tons) and 32 catcher boats departed from Hakodate, Japan, on May 29, and fished in Area 2a during June 2-25. The mothership then moved to Area 4 where it was joined by a new fleet of 24 catcher boats which fished during June 29-July 11. They arrived back in Hakodate and other ports on or about July 20.

The total 1989 fishing effort in Area 2a was the same as in 1988: 16 standard fleet days, where 1 fleet day equals 14,190 tans of net deployed (a tan equals one panel or piece of driftnet about 50 meters in length). However, the 1989 effort in Area 4 was considerably less than in 1988—6.7 compared to 18 standard fleet days.

Catch

The total 1989 Japanese mothership catch was 2,219 metric tons—only 78 percent of the 2,834 metric ton quota allowed under the Japanese/Soviet bilateral negotiations for the mothership salmon fishery. Poor catches in Area 2a were primarily responsible for the 615 metric ton shortfall in the catch. The fleet reportedly left the fishing grounds when the pink salmon quota was achieved, leaving about 30 percent of the other species quotas not filled.

Retention of Salmon Aboard Catcher Boats

At the April 1989 bilateral salmon negotiations with Japan, the Soviet Union approved a Japanese request to allow salmon

(Continued on page 40.)

The North Pacific

Common Ground for Flying Squid, Salmonids, and Squid Driftnet Fishermen

by Steve Ignell

The emergence of large-scale, driftnet fisheries for neon flying squid (*Ommastrephes bartramii*) in the late 1970s brought concern for how these fisheries might impact other marine resources. The concern was first voiced by fishermen and scientists who noted that squid driftnet vessels operated near, and sometimes in, salmon fishing areas, and used mesh sizes similar to those used in the Japanese driftnet salmon fisheries.

Over ten years later, this concern still remains, articulated through advocacy groups such as SEACOPS, environmental groups, and other interested citizens. It remains because there is continued evidence of intentional salmon fishing by squid driftnet vessels north of permitted squid-fishing areas. There is also a general sense that fishermen targeting flying squid within permitted fishing areas may incidentally catch a significant number of salmonids.

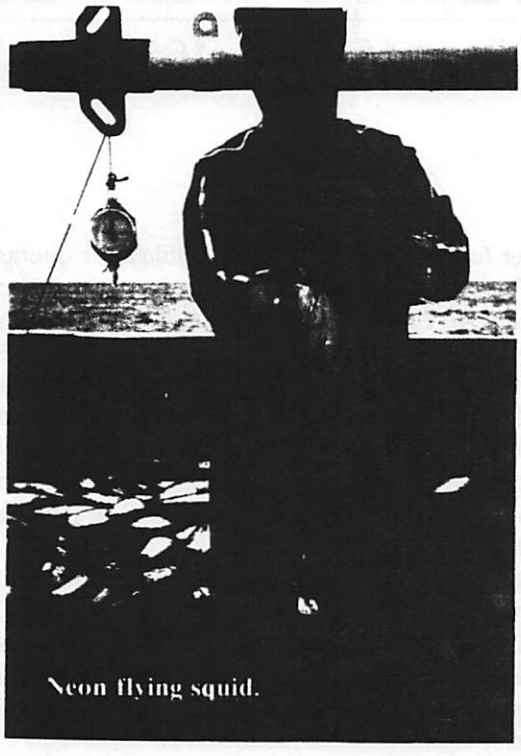
Why do these incidental interceptions occur? At first glance it would appear that squid fishermen would not encounter salmonids: salmonids are found in northern waters, flying squid are found in southern waters, and fishermen follow the resource. However, there is a small band across the North Pacific called the Subarctic Frontal Zone (SFZ) where salmon and the largest—and most valuable—flying squid can overlap in distribution. Moreover, the meandering nature of the SFZ's northern boundary allows cooler, more northern waters to penetrate the permitted driftnet areas. Fishermen, who are trying to maximize profits, are drawn northward to the SFZ and away from waters further south where flying squid are more abundant but smaller. This fishing may bring fishermen into waters inhabited by salmonids—and into conflict with coastal users of North Pacific salmonid stocks. The answer thus lies in understanding the common ground, or interrelationship, among salmonids, flying squid, and squid driftnet fishermen in the North Pacific Ocean.

OCEANOGRAPHY OF THE NORTH PACIFIC OCEAN

The North Pacific Ocean is composed of two large regions of water or "domains" (Figure 1): the Subarctic Domain to the north, with cool, low-salinity waters; and the Subtropical Domain to the south, with warm, high-salinity waters. Between these two domains lies the Transitional Zone where subarctic and subtropical waters mix. At the northern and southern boundaries of the Transition Zone are the Subarctic and Subtropical Frontal Zones—areas characterized by sharp delineations in temperature and salinity.

The SFZ ranges from about 40° to 44°N latitude, and is characterized by a meandering and highly variable boundary, and angles slightly northward towards the Eastern Pacific. West of 170°E latitude, the SFZ is distinguished by an intense current where the Kuroshio and Oyashio currents meet. This differs from the Eastern Pacific SFZ which is characterized by weak currents and a diffused frontal structure.

Annual changes in ocean temperature and salinity are greatest in the upper 100 meters of the ocean and are primarily related to changes in atmospheric circulation patterns. Years with strong low-pressure systems along the Aleutian Islands are characterized by intensified westerlies along the northern portion of the squid area. Because surface waters are transported to the right of the wind direction, the intensified winds cause increased movement of cold water from northern waters into the squid area (Figure 2).



Neon flying squid.

Photo courtesy NMFS

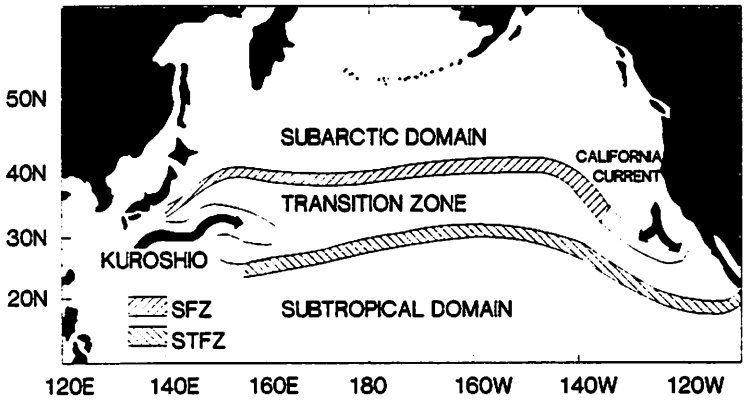


Figure 1.—Locations of the Subarctic and Subtropical Domains, the North Pacific Transition Zone, and the associated Subarctic and Subtropical Frontal Zones. Black arrows indicate boundary currents.

Global weather-related disturbances such as El Nino (unusually warm waters off Peru around Christmas time), appear to be related to the annual variability in surface water temperatures near the squid fishing area. El Nino events are generally coincident with strong North Pacific atmospheric sea level pressure patterns, and cooler than average sea surface temperatures (SST) in the central North Pacific Ocean where squid driftnet vessels operate. These associations are believed to arise from an atmospheric coupling or link between the tropical Pacific Ocean and the North Pacific Ocean and may explain why ocean conditions in the central North Pacific are inversely related to those in the equatorial Pacific Ocean.

Sea surface temperatures in the central North Pacific near the northern boundary of the squid driftnet fishery have generally declined since the start of the fishery in 1978 (Figure 3). This decline is associated with a widespread cooling in SST for the whole North Pacific Ocean since 1969.

Cooling can also vary by season and area. Sea surface temperatures were unusually cool during the first half of 1986, but had increased to over 2.5 °C above the long-term mean by November. Surface water temperatures cooled again in 1987, coinciding with the onset of an El Nino event. In the eastern portion of the fishery, SST was more than 3 °C lower than the long-term average. Sea surface temperatures warmed in 1988, but were still 1-2 °C below average along the northern portion. Warming continued in 1989, resulting in warmer-than-average surface temperatures throughout much of the fishing area and season.

BIOLOGY OF FLYING SQUID

Squid driftnet fishermen in the North Pacific Ocean target on neon flying squid—large decapods with 8 arms and 2 tentacles. Flying squid are widely distributed in subtropical and temperate waters throughout the world. They are perpetual swimmers which inhabit surface waters at night and deeper layers during the day. On occasion, smaller individuals leap or "fly" through the air, probably to avoid predators.

Flying squid are voracious predators, feeding at night on fish, cephalopods, and crustaceans. Growth rates are high, exceeding 8 cm/month in length for some individuals. Although their lifespan is short—only 1 or 2 years—mantles of females reach lengths of 50 centimeters and weights of 2 kilograms.

Flying squid spawn in Subtropical waters (Figure 1) during winter or early spring. In the northwestern Pacific, spawning grounds are located in Kuroshio waters south of 35 °N and west of 155 °E. In central Pacific waters, spawning may range widely north and west of the Hawaiian Islands.

After hatching, flying squid apparently are transported northward, across the Subtropical Frontal Zone (STFZ), under the influence of the prevailing currents—generally northeasterly. Flying squid from the south reach the vicinity of the SFZ by mid-summer. The migration route reverses in the fall as the squid move south and west towards the spawning grounds. Squid moving south are thought to be deep in the water and unavailable for capture by surface driftnets.

Flying squid are distinguished by four size groups which are separated by latitude and differ in sexual composition: LL (extra-large), L (large), S (small), and SS (extra-small). The LL

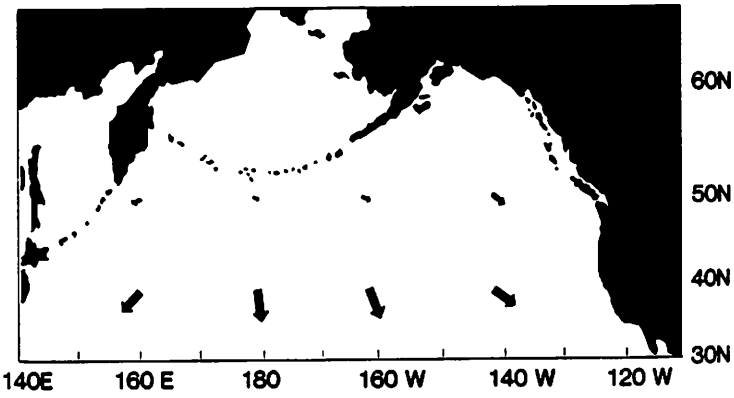
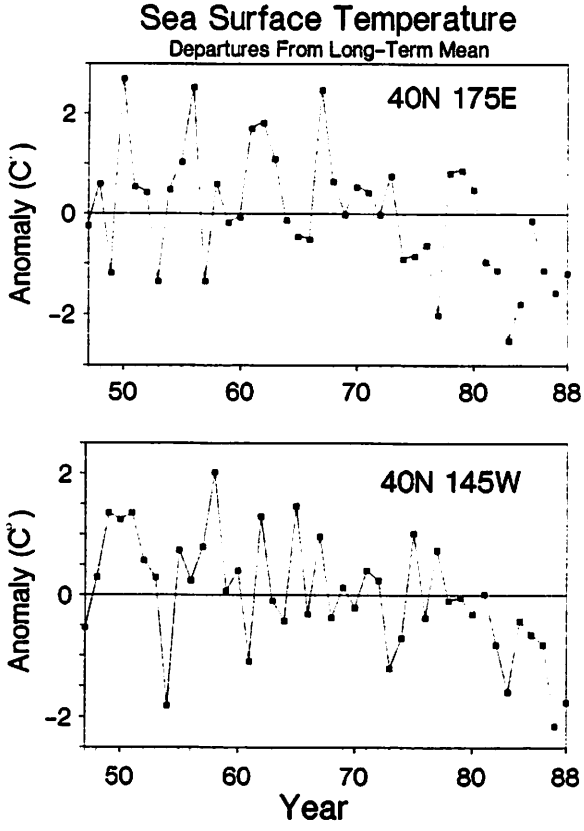


Figure 2.—Direction of long-term mean of wind-driven surface water transport in the North Pacific Ocean during February.

Figure 3.—Variation in sea surface temperatures along 40°N in the North Pacific Ocean, 1947-1988. Data from Dan Cayan, Scripps Institution of Oceanography, Climate Research Division.



group is found within the SFZ and consists primarily of females. L, S, and SS squid are found farther south with sex ratios near 1:1.

FISHING PATTERNS OF DRIFTNET VESSELS

Squid driftnet fishermen set out their nets at sunset along an east-west direction. The fishermen prefer areas with abrupt temperature changes and position the vessels using SST satellite summaries and other cues, such as plankton and seabird densities. Driftnet vessels often fish together, spacing nets about 2-4 kilometers apart. Net retrieval begins before sunrise.

Most fishing begins in May or June, although some Taiwanese and Republic of Korea (ROK) vessels formerly started fishing in April. The vessels generally follow the migration pattern of the flying squid: moving northeast at the start of the season, and southwest during the fall. Fishing is concentrated along the northern border of the permitted fishing area, especially during the summer. Here, the vessels target on the LL group of squid which migrate north into the SFZ. Japanese driftnets tend to catch large squid due to regulations requiring mesh sizes to be greater than 100 millimeters. During the fall, the fisheries, especially Taiwanese and ROK vessels, are distributed in more southwesterly waters.

Fishing in the northern portion of the fishing grounds is limited by a moving regulatory boundary which approximately coincides with the mean monthly position of the 15°C sea surface temperature isotherm. This provision was established to restrict fishing to areas where salmonids are not abundant, thereby minimizing the potential impact of this fishery on salmonid stocks.

IMPLICATIONS FOR SALMONID BYCATCH IN THE FISHERIES

Salmonids are part of the fish community associated with the Subarctic Domain—they are seldom found south of there and then only within the northern portion of the SFZ. Flying squid, on the other hand, are principally found south of the SFZ and do not penetrate into the Subarctic Domain.

When salmonids migrate south of subarctic water and into the SFZ, they encounter and mix with the LL group of flying squid that have migrated north into the SFZ. This mixture often occurs within the permitted squid-fishing area. Salmonids found north of the SFZ can also migrate into the permitted fishing area due to the meandering nature of the SFZ's northern boundary.

The extent to which salmonids are vulnerable to the squid fishery depends upon yearly ocean conditions and geographic factors. During years with cooler-than-normal ocean temperatures, such as 1987, areas where squid and salmon overlap move southward, thereby increasing vulnerability of salmonids to squid driftnets. The reverse is true during years with warmer than average conditions, such as 1989.

The trend towards cooler ocean conditions since the late 1970s means that the vulnerability of salmonids to squid driftnets is generally increasing. Despite a movement south of more than 2° latitude in the southern distribution of salmonids since the late 1970s (Figure 4), the northern boundaries of the fisheries have remained constant or have been moved northward.

There are also geographic differences in salmonid vulnerability to squid driftnets. In the northeastern portion of the fishery (175° W to 145° W longitude), densities of salmonids in squid areas are generally low. In the northwestern portion (170° E to 175° W), however, densities may be high, resulting in high catch rates of salmonids similar to those in more northerly waters. These geographical differences in salmonid abundance are probably related to differences in frontal location and con-

(Continued on page 40.)

The High Seas Driftnet Fisheries of the

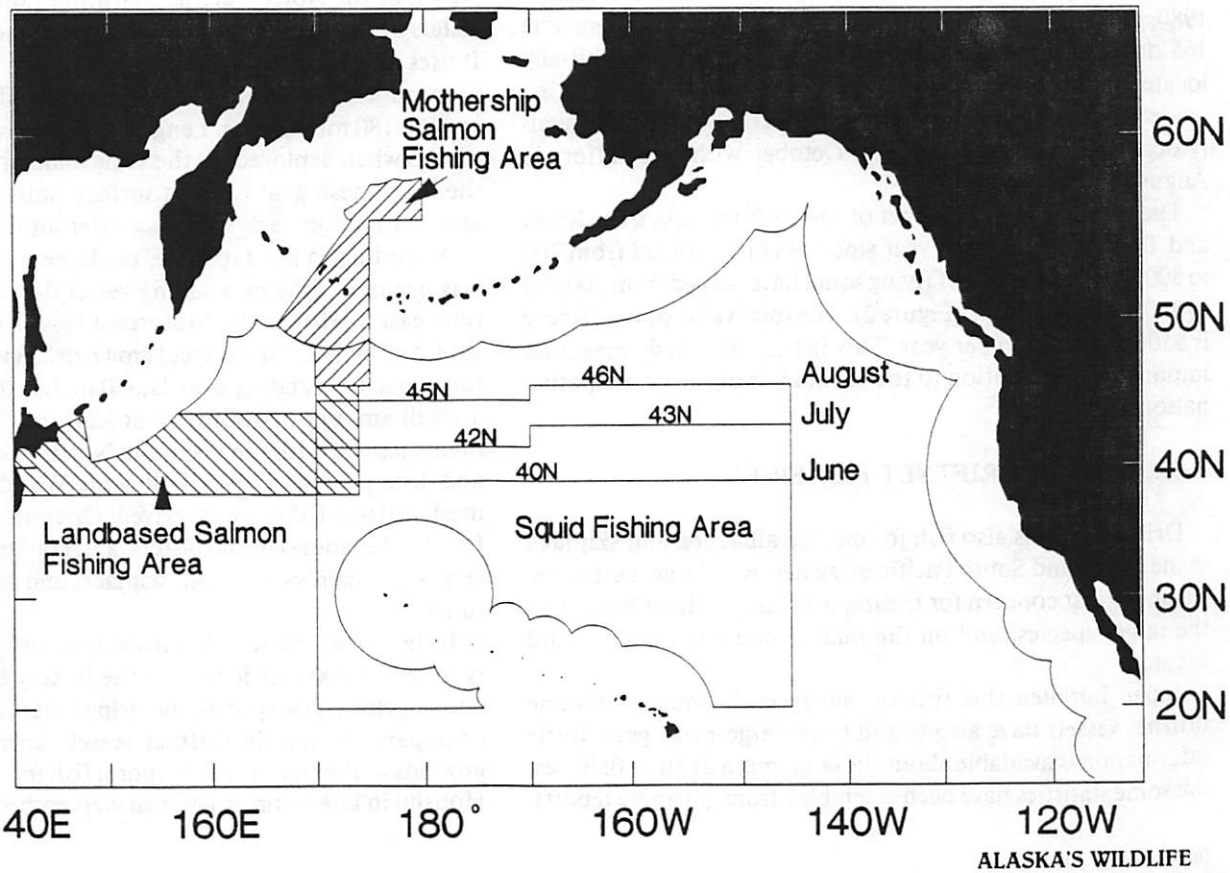
Pelagic, or open sea, driftnetting has been controversial since its inception early in this century. Chief among the conflicts have been the Japanese high seas salmon fisheries and the high seas driftnet fisheries (Figure 1) targeting squid and albacore tuna (see article p. 13). In the past, lack of information has hindered successful negotiations to limit these activities. Recent U.S. efforts are aimed at gathering more reliable bycatch information and improving our scientific understanding of fishery impacts to aid our efforts to establish appropriate management regimes.

HIGH SEAS SQUID DRIFTNET FISHERIES

Four major events in the late 1970s caused the growth and development of the North Pacific squid driftnet fisheries: 1) the price of fuel increased, causing other competing fishing techniques such as jigging to be less economical; 2) coastal nations of the world adopted exclusive economic zones to 200 miles offshore, forcing many distant-water fleets to develop new, high seas fisheries; 3) falling tuna prices stimulated tuna longline vessels to explore other fishing opportunities; and 4) a number of driftnet vessels were idled due to reduced salmon allocations as a result of the passage of the Magnuson Fisheries Conservation and Management Act of 1976, amendments to the Annex of the International Convention for the High Seas Fisheries of the North Pacific Ocean in 1978, and decreased Japanese salmon quotas from the Soviet Union.

The Japanese driftnet fishery for flying squid started in 1978. Salmon catcher boats displaced from the Japanese mothership salmon fishery were the first to enter the squid driftnet fishery, followed by vessels from tuna and other fisheries. Japan's annual catch of flying squid by the driftnet fishery increased from 46,308 metric tons in 1978 to a peak of 216,000 metric tons in 1983. Beginning in 1984, catches have fluctuated between 123,000 and 208,000 metric tons (Figure 2). Annual squid driftnet fishing effort averaged about 33,000 vessel days and 498

Figure 1.



North Pacific Ocean

by Steven Pennoyer

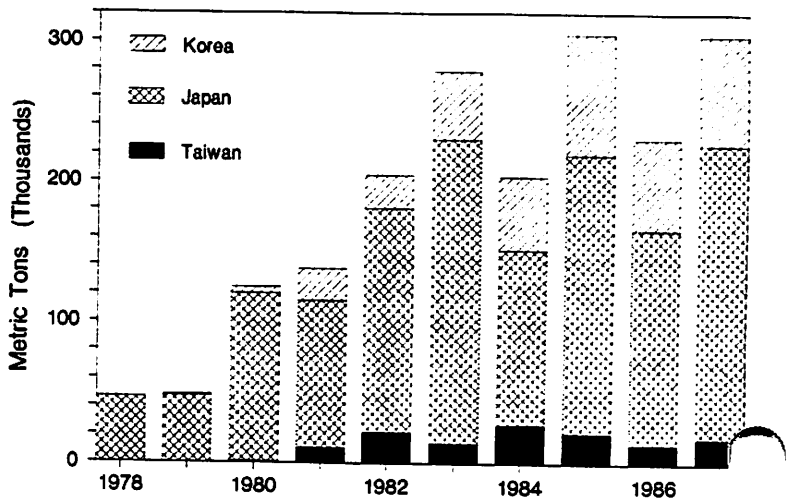
vessels from 1983 to 1987. Fishing effort is usually concentrated in the northern 2° latitude of the regulatory area.

Most driftnet operations occur between June and October with peak effort in August. An operation consists of 450-1500 single panels of net, typically joined in 150-panel sections, set each day. Length of panels varies from 40 to 50 meters; stretched mesh sizes are restricted to 100-130 millimeters. These nets are of a design similar to monofilament high seas salmon gillnets.

Republic of Korea (ROK) high seas driftnet vessels began fishing for squid in 1979, and the number of ROK registered vessels and amount of gear set nightly have risen steadily since then (Figure 3). The fishing season lasts from April to January. Most of the catch comes from the "eastern grounds" located between 143° E and 169° E, which are primarily fished from mid-August through December. "Western grounds" are located between 160° W and 170° E and are fished late spring and summer. Stretched mesh sizes are recorded to be 86 millimeters or larger. The Taiwanese driftnet fishery began with 12 vessels in 1980, growing to almost 150 vessels by 1984. In 1988, there were 165 driftnet vessels. Although fishing grounds were initially located in the western North Pacific, the fishery gradually extended eastward, reaching 160° W by 1983. Fishing has generally occurred from May through October with peak effort in August and September.

The combined total number of vessels from Japan, the ROK, and Taiwan fishing each year since 1983 has ranged from 700 to 800. Annual catches of flying squid have ranged from 200,000 to 300,000 metric tons (Figure 2). The total value of the fishery is $500-600 million per year. This fishery obviously makes an important contribution to the economies of the participating nations.

Figure 2.— Catch of flying squid by driftnet fisheries, 1978-1987.



LARGE-MESH DRIFTNET FISHERIES

Driftnet vessels also fish for marlin, albacore, and skipjack in the North and South Pacific using nets with large mesh sizes. There is great concern for the impact this activity is having on the target species, and on the marine mammal and sea bird bycatch.

Japan initiated this fishery, but recently some Taiwanese driftnet vessels have also begun to set large-mesh gear. Little information is available about the large-mesh driftnet fisheries, but some statistics have been assembled from Japanese reports.

The large-mesh driftnet fishery of Japan operates in a broad region of the North Pacific Transition Zone from the coastal waters of Japan to the waters northeast of the Hawaiian Islands. It uses multifilament nylon driftnets, each made up of 300 or more panels of webbing 8-10 meters deep with meshes measuring 170-180 millimeters. Length of panels range from 33 to 36 meters when deployed. In the same manner as squid driftnets, the large-mesh gear is set in surface waters in late afternoon and retrieved in early morning after an overnight soak.

According to the Japanese, the large-mesh driftnet fishery was begun in 1905 by a sailing vessel fleet fishing for bluefin tuna east of Hokkaido. Motorized vessels were introduced in 1914, and by 1929 the fleet had grown to 258 vessels (15-20 metric ton capacity), landing over 11,500 metric tons of bluefin and a small amount of swordfish at Kushiro, Japan. The fishery then declined with the declining North Pacific bluefin stock, and disappeared by 1940. Following World War II, the large-mesh driftnet fishery was revived. Operations were again confined to Japanese coastal waters, and landings were very small, consisting mainly of sailfish, skipjack, and unidentified juvenile tunas.

In 1973, the large-mesh driftnet fishery landings rose sharply to over 5,000 metric tons as the fishery expanded offshore and targeted a new species, the striped marlin. In coastal waters of Japan, the marlin driftnet vessels operated on the same grounds as the traditional harpoon fishery, from northeastern Honshu in late summer (August-September), to southwestern

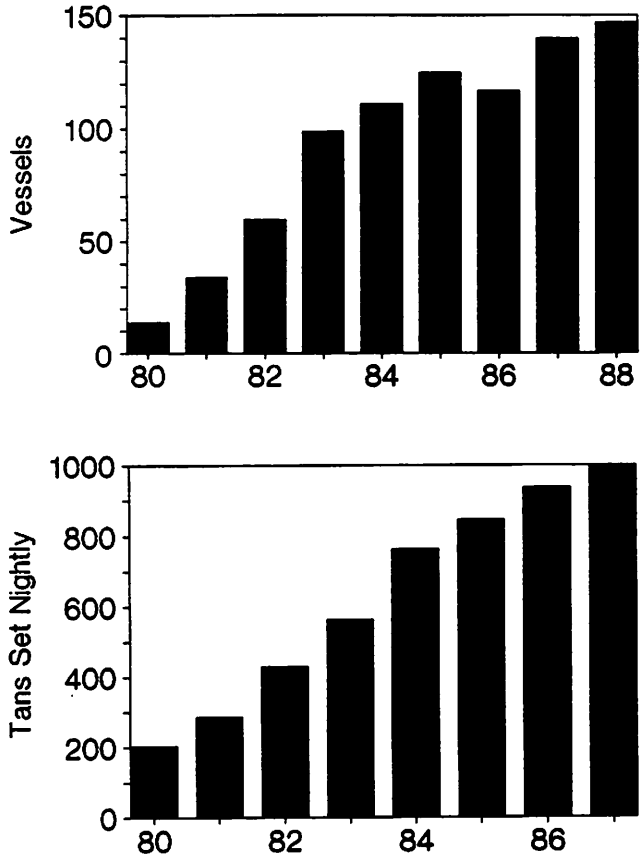


Figure 3.— Trends in ROK squid fishing effort, 1980-1988.

Kyushu during the winter months (December- April). Its other primary target was broadbill swordfish. It also ranged offshore as far east as 170° E longitude in the area between 35° N and 40° N latitude. During the late 1970s and early 1980s, the large-mesh driftnet fleet continued to expand its operations eastward from Japan coastal waters into the central and eastern North Pacific. The growth of a distant-water fishery was accompanied by changes in vessel size during the 1980s, with the percentage of vessels larger than 200 gross tons increasing. The number of registered vessels peaked at 717 in 1982, then declined to 470 by 1985. As the fishing grounds shifted eastward, fishing effort shifted towards albacore. During the 1980s, billfish landings decreased, while albacore and skipjack landings increased. Albacore is now the major component of the large-mesh driftnet catch.

Taiwan, a major harvester of albacore tuna, appears to be developing a large-mesh driftnet fishery for this species in the North Pacific. This fishery would complement their albacore longline fishery, and their Indian Ocean and South Pacific Ocean albacore driftnet fisheries. Taiwanese research vessels have conducted exploratory albacore driftnet surveys in the North Pacific, presumably to assess the potential for commercial operations. Early in 1988, reports by Japanese pole-and-line fishermen published in Japanese trade journals indicated that a Taiwanese large-mesh driftnet fleet was operating in the North Pacific albacore grounds. Reports from Taiwanese sources also indicate that many Taiwanese squid driftnet vessels carry large-mesh albacore gear in addition to squid gear, and switch gear and targets depending on local catch rates.

DRIFTNET FISHERIES RESEARCH

In early 1985, the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), began a research program designed to increase understanding of the catch, fishing effort, and bycatch of the Japanese, ROK, and Taiwanese high seas squid driftnet fisheries. This program includes the following activities:

- Arranging for, and placing U.S. observers on board commercial driftnet vessels.
- Advising U.S. negotiators engaged in talks with driftnet harvesting nations and developing scientific programs for monitoring driftnet fishing.
- Arranging for, and placing U.S. scientists on board foreign and domestic research vessels in the North Pacific.

Observer Placement

The first direct observations of commercial squid driftnet operations were made in 1982, but from only one vessel for a limited time. In 1985, 11 commercial driftnet retrievals were observed from a U.S. Coast Guard cutter or its motor launch in close proximity to a squid driftnet vessel. Based on this information, U.S. scientists concluded that observer placement on commercial vessels was more cost effective and resulted in more accurate data than other means of observing net retrievals.

A pilot observer program was designed in 1987 and implemented in 1989 to provide basic information on fishery operations, data collection, and incidental take of salmonids, marine mammals, and seabirds. The program was also structured to collect data on the distribution and abundance of marine mammals and seabirds in the squid driftnet fishery area. Nine U.S., 5 Canadian, and 32 Japanese observers were deployed on 32 Japanese commercial squid driftnet vessels during June-October, 1989. This program formed the basis for the design of the more comprehensive negotiated agreement for 1990.

Cooperative Research

Scientists from the United States have, since 1986, participated in squid driftnet research cruises at the invitation of scien-

tists from Taiwan, the ROK, and Canada; U.S. scientists also accompanied two Japanese research vessels in 1987. Current 1990 plans call for U.S. scientists to participate on 1 Canadian, 1 Taiwanese, 1 ROK, and 7 Japanese research vessels. These cruises have allowed scientists to conduct driftnet operations and collect oceanographic data in an effort to understand the biological and oceanographic factors affecting the distribution of marine species in the squid driftnet fishing area.

REGULATION OF DRIFTNET FISHERIES

Regulation of the fisheries is hindered by lack of information. The data on directed fishing effort and incidental catch by species, time, and area is limited. Vessel distribution is poorly understood, and enforcement to prevent illegal salmon targeting is inadequate. The information and resources needed to design a management and enforcement program that could allow the driftnet harvest of pelagic squid while minimizing bycatch is not available. Nor is it known if a fishery that uses driftnets for squid can reduce its bycatches to acceptable levels.

Programs have been initiated in recent months that address these issues. The following sections summarize domestic and international efforts to provide some management control over these fisheries.

Squid Driftnet Fisheries

Financial losses by Japanese squid jigging vessels and high catch rates by the growing fleet of squid driftnetters led to the 1981 establishment of Japanese regulations including a limited-entry system for the Japanese squid driftnet fleet. The regulations included time and area restrictions, limitations on mesh sizes, a ban on the retention of salmon, and a permit system for two vessel classes and two time periods of operations. The time and area restrictions established a northern boundary that moved 2° latitude monthly in order to minimize the incidental harvest of salmonids in cooler waters.

Korean driftnet vessels were virtually unregulated prior to 1989, and although in 1987 Taiwan adopted domestic regulations similar to those of Japan, domestic enforcement of measures by all countries was woefully inadequate.

Since 1981, the United States has sought information regarding driftnetting. Discussions with foreign governments, directed at placing U.S. observers on board commercial driftnet vessels, began in 1986 but met with limited success. Although the driftnet nations allowed U.S. participation on their research vessels and provided limited information on driftnet activities, fishery impact assessments were impeded by lack of agreements on observer placement—only two U.S. observers were placed 1986-1988.

The scope and intensity of these discussions were expanded in November 1987 when the marine mammal incidental take permit, issued under the Marine Mammal Protection Act and needed by the Japanese mothership salmon fishery to fish within the U.S. Exclusive Economic Zone (EEZ), included a condition that U.S. observers were to be accepted on board high seas squid driftnet vessels. An observer program was agreed to on April 11, 1988, calling for four U.S. observers. The Japanese made implementation of the 1988 observer program conditional upon continued access of the mothership salmon fishery to the U.S. EEZ. This access, however, was denied by a court order (the *Kokechik* decision). A U.S. governmental request for a stay of that order was denied on June 9, 1988. As a result, U.S. scientists were not placed on Japanese squid driftnet vessels that year.

On December 31, 1987, the President signed into law the "Driftnet Impact Monitoring, Assessment and Control Act of 1987" (Title IV of Public Law 100-220), or the Driftnet Act. The Driftnet Act directs the Secretary of Commerce, through the Secretary of State, to negotiate cooperative agreements with those countries authorizing high seas driftnet fisheries that take U.S. marine resources from the North Pacific Ocean. The cooperative agreements were to include: 1) deployment of scientific observers on driftnet vessels for a statistically reliable assessment of the impacts on resources of concern to the United States, and 2) enforcement arrangements for controlling areas and seasons where significant numbers of U.S. marine resources, particularly salmonids, may be taken. (The Act defines U.S. marine resources as those resources that are found in, or which breed within, areas subject to U.S. jurisdiction, including the U.S. 200-nautical mile EEZ.)

The Act also requires that if a country failed to implement a driftnet agreement with the United States by June 29, 1989, The Secretary of Commerce is required to certify such fact to the President for the purposes of the Pelly Amendment (i.e., Section 8(a) of the Fishermen's Protective Act of 1967). Under the Pelly Amendment, when it is determined that nationals of a foreign country are (directly or indirectly) conducting fish-

Table 1.—Fishery products trade balance, 1986-1988, between the U.S. and the three primary pelagic driftnet nations.

Nation	Year	VALUE OF FISHERY PRODUCTS (1000s) U.S. Imports	U.S. Exports	Balance
Japan	1986	$566,293	$876,764	+$310,471
	1987	$501,435	$1,074,911	+$573,476
	1988	$453,817	$1,599,190	+$1,145,373
Korea	1986	$165,196	$32,728	-$132,468
	1987	$282,510	$42,732	-$239,778
	1988	$249,515	$45,898	-$203,617
Taiwan	1986	$327,285	$12,777	-$314,508
	1987	$445,036	$19,964	-$425,072
	1988	$372,169	$30,486	-$341,683

ing operations under circumstances which diminish the effectiveness of an international fishery conservation program, the Secretary of Commerce shall certify that fact to the President. Upon certification, the President may direct the Secretary of the Treasury to prohibit the importation of fish products into the United States from the offending country for as long as he determines it appropriate and to the extent allowed by the General Agreement on Tariffs and Trade. The exercise of the President's embargo authority is discretionary; however, if the President does not embargo all of the offending nation's fish products, he must report his reasons to Congress. The Secretary must periodically determine if the reasons for certification still exist. If they do not, he must decertify.

The Pelly Amendment, as an effective source of leverage, relies on a negative trade balance in fishery products and a national resolve to impose trade barriers. The U.S. has had a negative balance with Korea and Taiwan but a positive balance with Japan (Table 1).

Cooperative Monitoring Agreements

Initial agreement was reached on May 2, 1989, for placement of 46 observers (9 U.S., 5 Canadian, and 32 Japanese) in the Japanese squid driftnet fishery in 1989. The 46 observers were deployed during the summer of 1989 in a pilot observer program. The 1990 monitoring program, signed on March 19, 1990, called for placement of 74 observers (35 U.S., 10 Canadian, and 29 Japanese). This program will provide approximately 3,740 observations of fishing operations throughout the squid driftnet area in 1990. Provisions are also made for improved monitoring and enforcement of Japanese fleet activities.

On August 25, 1989, U.S. and Taiwanese authorities reached an agreement addressing Taiwanese high seas driftnet fishing activities in the North Pacific Ocean. The agreement includes: time and area restrictions on squid driftnet fishing (Figure 4); installation of real-time automatic satellite position fixing devices on all vessels beginning in 1990; a ban on harvesting anadromous species; an enforcement agreement—including boarding rights; and a monitoring program which deploys U.S. and Taiwanese scientific observers to obtain statistically adequate data on the catch of target and non-target species.

Details of the 1990 monitoring program were addressed in a further agreement on February 24, 1990. This second agreement provides for deployment of 14 U.S. and 10 Taiwanese observers on board 24 Taiwanese commercial fishing vessels for 45 and 60 days, respectively.

Negotiations for monitoring and enforcement of the squid driftnet fishery conducted by the ROK were concluded on September 27, 1989. The agreement includes a monitoring program in which 13 U.S. and 13 ROK observers will be deployed on board 26 ROK commercial vessels in 1990 for at least 45 days to observe 45 or more driftnet retrievals. The regulatory program with the ROK also includes licensing, limiting fishing time and area (Figure 5), regulating mesh size, marking fishing gear, reporting fishing catch and location, banning the harvest of anadromous species, installing real-time automatic satellite position fixing devices on ROK vessels (10 percent in 1989 and 100 percent in 1990), and cooperative enforcement patrols with U.S. officials.

Large-Mesh Fisheries

In August 1973, the Fishery Agency of Japan (FAJ) imposed regulations on large-mesh driftnet fishery vessels larger than 10 gross tons, in order to reduce direct competition between fishing gear types and to control exploitation rates. Restrictions were placed on net length (12 kilometers maximum) and mesh size (150 millimeters minimum); double panels of webbing (trammel nets) were forbidden, and a standard net marking system was imposed. Time and area restrictions were also im-

Figure 4.— Time and area regulations for the Taiwanese squid driftnet fishery.

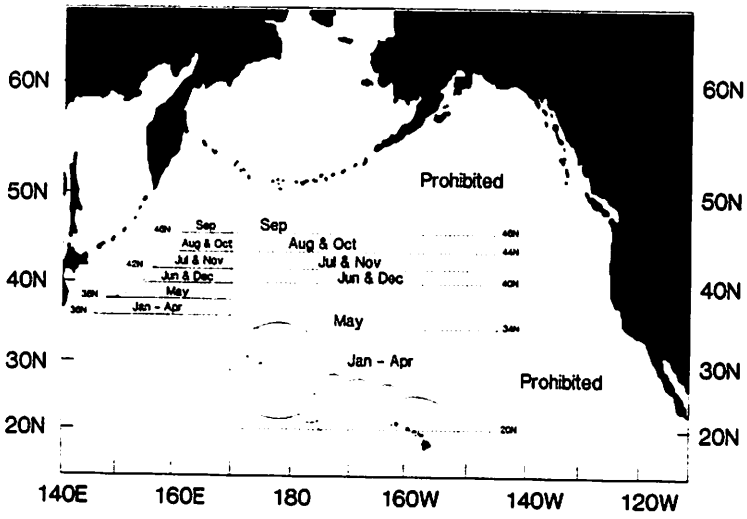
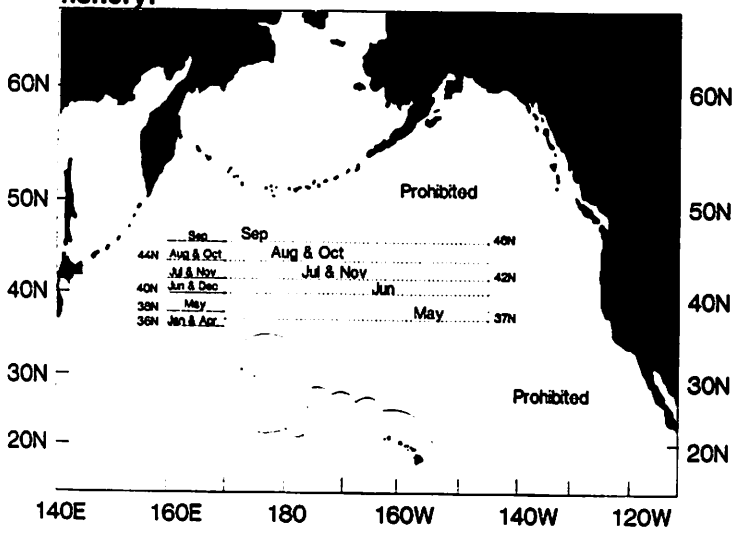


Figure 5.— Time and area regulations for the ROK squid driftnet fishery.



plemented to reduce conflicts with coastal and offshore tuna fisheries (Figure 6). Japanese vessels fishing large-mesh driftnet are now domestically regulated by the same time-area restrictions as are applied to the Japanese squid driftnet fleet.

Cooperative monitoring of the large-mesh fleet was agreed to on March 19, 1990, and will be instituted in 1990 as part of the joint U.S., Canadian, and Japanese observer program. The agreement calls for deployment of 12 North American and 12 Japanese observers on board 24 large-mesh driftnet vessels from May 1990 through April 1991.

These large-mesh agreements have been sought because impacts of large-mesh driftnet fisheries on U.S. marine resources of the United States are likely similar to those associated with the squid driftnet fishery. However, bycatch species composition and incidental mortality levels probably differ. Little is known about the activities of the vessels fishing large-mesh driftnets since none have been monitored. No reliable assessments, or comparisons with the impacts of squid driftnets can be made. The impacts on populations of marine mammals, seabirds, and salmonids are unknown.

ENFORCEMENT

Recognizing that the foreign high seas driftnet fishing fleets operating in the North Pacific were intercepting salmon, NOAA Fisheries Enforcement and the U.S. Coast Guard (USCG) dedicated field enforcement efforts to monitor those fisheries. In 1988, aerial and surface patrols detected 92 driftnet vessels operating in areas closed under Japanese and Taiwanese domestic regulations to squid fishing. Sixty-one vessels were identified as Japanese, 5 as ROK, and 2 as Taiwanese.

One Japanese vessel was boarded by NOAA and USCG officials while it was operating in an authorized squid fishing area. The Japanese vessel delayed the boarding for several hours, and when the boarding party gained access to the vessel, three salmon and two steelhead trout were found. The fish had been gutted and were partially frozen. It is suspected that the vessel was discarding salmon during the time the boarding was delayed.

Patrol efforts in 1989 were greatly expanded. Through September 15, 1989, 138 aerial surveillance flights and 171 surface patrol days resulted in sightings of 522 foreign driftnet vessels; 75 of these vessels were outside areas authorized by Japanese and Taiwanese domestic squid regulations. Of the 75 vessels, 37 were identified as Taiwanese, 26 as Japanese, and 12 as ROK.

In one instance, a sting operation, conducted by NMFS enforcement agents assisted by the U.S. Customs Service and USCG, apprehended a Taiwanese fish broker who was attempting to sell 500 metric tons of illegally taken North Pacific salmon from 4 to 8 Taiwanese fishing vessels. There have been numerous other cases: seized shipments of high seas caught salmon being "laundered" through U.S. firms, offers of sale on the international market of illegally caught salmon, seizures by the Soviet Union of Taiwanese vessels with salmon on board, and U.S. boardings of Taiwanese vessels with salmon on board.

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The North Pacific

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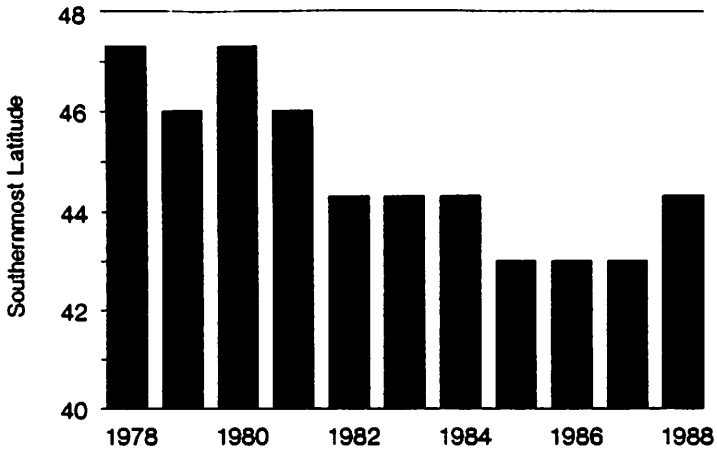

Figure 4.—The southernmost latitude in which salmonids were encountered along the 175°30′ E meridian, 1978-1988.

ditions. The northward angling of the SFZ from the western to the eastern North Pacific probably means that the southern boundary of salmonid habitat will similarly vary in latitude.

Although we know—based on general knowledge and on the results of a 1989 observer program—that salmonids are caught in the driftnet fisheries, we still do not know how many are caught. Warm ocean conditions in 1989 and non-random deployment of observers limit the usefulness of the 1989 data. In particular, there was little or no 1989 observer coverage in the portions of the fishery where and when salmonid interceptions are most likely (the western portion of the fishery during the first part of a month).

These problems mean that additional care must be taken in designing future observer programs. Bias in observer data must be accounted for and, if necessary, independently estimated. Additional years of data must be collected to account for interannual variability in ocean conditions. Improved models of the distribution of salmonids near the squid driftnet fishing area are needed to provide a "second opinion" on the vulnerability of salmon to the fishery. Then, and only then, will we begin to understand the extent to which regulated squid driftnet fishing impacts the salmonid resources of Alaska.

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Fisheries of Japan

(Continued from page 26.)

processing on some of the catcher boats instead of on the mothership. Approval was also given for the processed salmon to be brought back to Japan aboard some of the catcher boats, providing the salmon were inspected by Japanese and Soviet inspectors before the salmon were removed from the fishing area. Eighteen of the 56 total catcher boats therefore processed their own catches by salting them in a manner similar to that of the Japanese landbased fleet, and delivered them to Japan (at Hakodate, Kushiro, Hanasaki, Nemuro, and Akkeshi) for sale, much to the alarm of the traditional landbased salmon fishermen there. The date for landing and auctioning the product was adjusted to avoid an auction on the same day as the landbased fleet. The remaining catcher boats transferred their catches to the mothership where the salmon were frozen. Two transport vessels brought frozen salmon back to Japan from the mothership.

Table 2.—Estimates of interceptions of North American salmon by the Japanese mothership salmon fishery in thousands of fish, 1986-1988.

	Species					
Year	Sockeye	Chum	Pink	Coho	Chinook	Total
1986	142	29	1	16	47	235
1987	134	26	1	9	32	202
1988	117	42	1	0	23	183
1989	133	23	4	0	14	174

Source: Michael Dahlberg, Auke Bay Laboratory, National Marine Fisheries Service, NOAA, P.O. Box 210155, Auke Bay, Alaska 99821. INPFC Documents 3132, 3269 and 3375, February 5, 1990.

LANDBASED SALMON DRIFTNET FISHERY

The Japanese landbased salmon fishery consists of small catcher boats (30-127 gross tons) operating out of ports on the east coast of Hokkaido and northern Honshu. This fishery uses gear similar to the mothership catcher boats, but operates south and west of the mothership fishery (Figure 1, Landbased Areas 1 and 2a). Catches are landed either salted or frozen.

The landbased salmon fishery caught almost all its 1989 allocated quota: 7,700 out of 7,866 metric tons. The propor-

tions of sockeye and pink salmon caught in 1989 were slightly higher than in 1988 (Table 1).

RECENT TRENDS

Despite a 15 percent quota reduction between 1988 and 1989, the total salmon harvest increased slightly because of the increased pink and sockeye salmon harvest by the landbased fishery.

Interceptions of North American salmon by the mothership fishery dropped slightly (5 percent) in 1989, primarily because fewer chum salmon were intercepted (Table 2). This drop is consistent with recent trends; since 1986, mothership fishery interceptions of North American salmon have declined approximately 26 percent, an average drop of 8.6 percent each year. Reliable estimates of interceptions by the landbased salmon driftnet fishery are not available at present but should be once studies are completed on the stock identification and continent of origin of salmonids south of 46° N latitude.

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Driftnet Fisheries
(Continued from page 37.)

Many of the violations—particularly those by Japanese vessels—have been of the northern boundary, apparently to harvest larger, more valuable squid, but these violations increase the chance of salmon bycatches. It is also obvious that some vessels are retaining bycatches and others—particularly the Taiwanese—are engaged in a directed illegal harvesting and marketing of salmon. Although current data are unavailable either on the magnitude of bycatches, directed illegal harvest of salmon, or the proportion of North American fish in these catches, computed research data expansion and industry records of illegal fish sales show that the total number of fish caught could run into millions annually. Improved enforcement is a key element of the new driftnet agreements with Taiwan, Korea, and Japan.

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Figure 6.— Time and area regulations for the Japanese large-mesh driftnet fishery.