

the **LODE STAR**

Charting the course of fisheries development today

Alaska Fisheries

Development Foundation, Inc.

Volume X No. 1, Autumn 1992

AFDF Battles the Bycatch Problem

The commercial fishing community nationwide is bent on beating the bycatch problem. In the North Pacific, the industry has asked Alaska Fisheries Development Foundation to target its resources on bycatch reduction.

AFDF has taken the broad view, and is tackling bycatch problems in several fisheries. Our current bycatch projects and proposals:

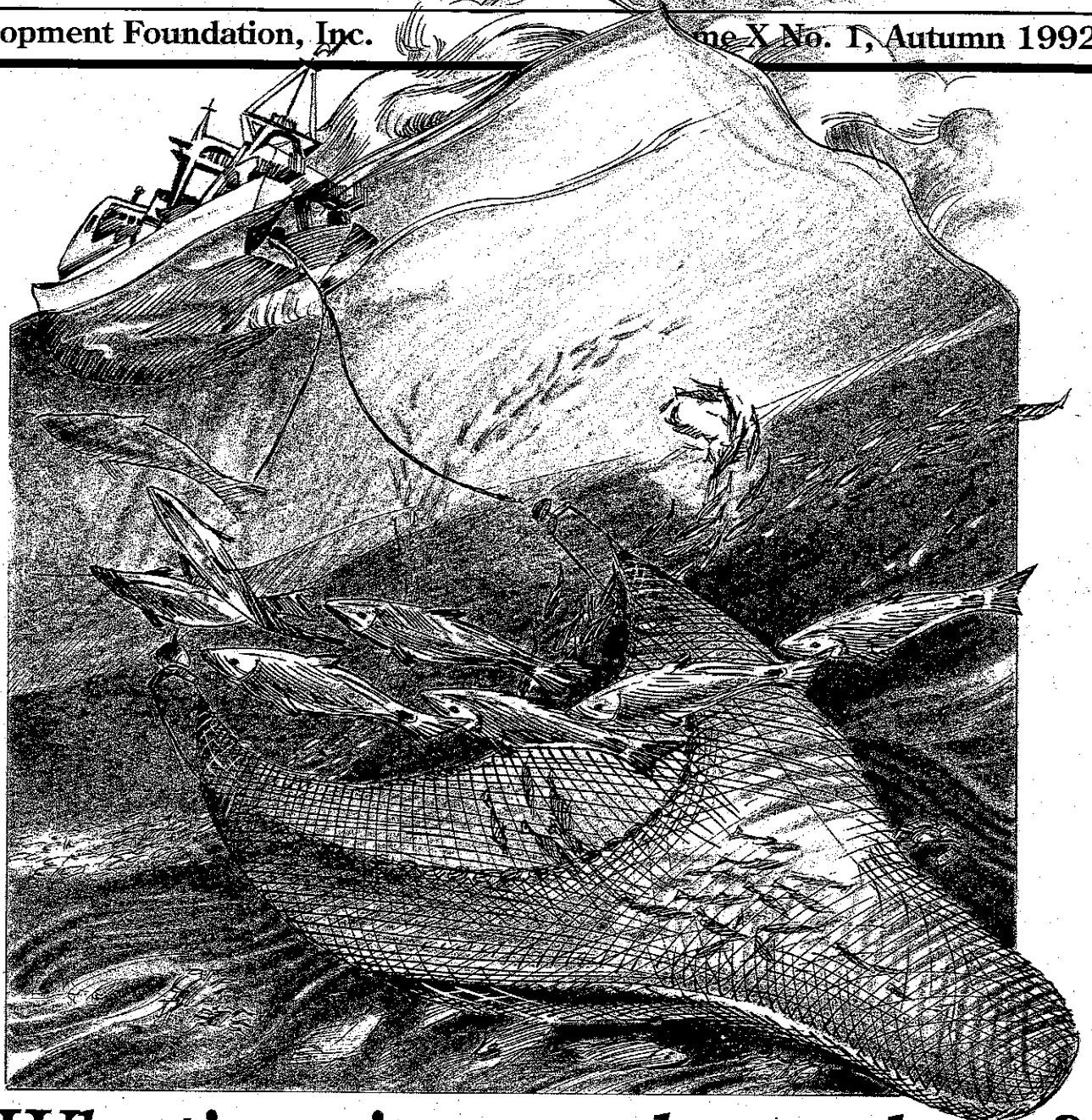
Cutting halibut bycatch in the pot cod fishery: In 1991, AFDF tested different pot modifications to find one that increased cod catches and decreased halibut bycatch in the cod pot fishery. AFDF published the results in 1991.

Trawl gear modifications to exclude halibut: Lots of companies are looking at trawl modifications to decrease halibut bycatch, but AFDF has launched the first season-long, on-the-grounds test of a new design that looks promising. (See article at right.)

Making crab pot escape panels more efficient: Crabbers are required to use escape panels in their pots to decrease deadloss and allow bycatch to escape alive. But currently, they're unreliable and often release prematurely, losing a crabber's whole catch. AFDF is testing galvanic timed release devices that may increase efficiency, and make escape panels really usable. (See story page 2.)

Bycatch rates in the flatfish fishery: During our flatfish fishery development project, AFDF hired on-board observers and joined the Alaska Department of Fish & Game in studying bycatch rates in the various flatfish fisheries in the Gulf of Alaska. Resulting data was published in an AFDF report that's available by itself, and is also part of AFDF's flatfish industry manual, "Sea of Sole."

Reducing undersized pollock catches: Bycatch reduction is a priority nationwide. AFDF recently submitted a proposal to the Saltonstall-Kennedy industry grants program to test mesh size and shape in pollock trawls to reduce the catch of undersized pollock. The \$1 million proposal will be reviewed this fall.



What's going on down there? Halibut vs. the hunters of the sea

Two hundred fathoms down, where light is too weak to penetrate and the water pressure is so intense it changes the speed of sound, a groundfish trawl drags across the bottom of the North Pacific continental shelf. The sound the trawl gear makes — sometimes even the propellor noise of the vessel — alerts the nearby fish. They spring to attention in the water as though particles of a single organism, facing away from the sound.

As the trawl approaches, big rubber disks on the groundline stir up a sand cloud. Perhaps the increasing noise disorients the fish, and the sediment obscures their ability to distinguish contrasting pattern of light. Whatever the stimulus, most fish in the water column will start swimming alongside the net. Halibut and flatfish partially buried in the substrate stay put until the footrope approaches within about six feet — then with a snap of the tail, they surge forward and away from the net, and settle again on the bottom.

Continued on next page ...

By Krys Holmes

Illustration by Randy Titchenal

AFDF hopes to shed light on halibut bycatch solutions

The trawl advances. Pollock, cod and other round fish swarm around the net opening, avoiding the groundlines, doors, ropes and wires but staying even with the net, and eventually they are herded by the wings or footrope into the trawl's open jaw. Flatfish pulse forward and then glide back to the ground until they either settle out of reach or exhaust themselves and surrender over the footrope.

Once inside the net, most fish continue swimming along with it until they're pressed against the cod end by the drag of the net or the weight of the rest of the catch and swept along. If they're lucky, some may veer off to the side and slip between the fibers of the mesh. (If any cod escape, it's usually in the center of the footrope. Flatfish may escape anywhere along the length of the footrope, if they get out at all.)

Each tow might deliver up 40 metric tons of pollock or cod, along with various mixes of flatfish, halibut, skates, rays, squid, seaweed and other marine collectibles. Of course, bycatch rates vary according to the fishery, the area, the season and the abilities of the skipper.

Bycatch, especially of halibut, has been called the single biggest problem suffered by the North Pacific fisheries today. In the past three years, 180,556 metric tons of available Pacific cod went unharvested because trawlers and longliners exceeded halibut bycatch limits. During that time, 20,409 m. tons of halibut were discarded overboard as incidental catch. Since many were juveniles that would have matured, the market actually lost 32,654 m. tons of halibut to bycatch. The ultimate loss of more than 200,000 metric tons of fish costs the fisheries and the nation hundreds of millions of dollars, NMFS says. In fact,

reducing halibut, salmon, herring and crab bycatches in the trawl and longline groundfish fisheries is a top priority of federal fishery managers, the Saltonstall-Kennedy industry grants program, and the fishing community.

In June, the North Pacific Fishery Management Council set acceptable halibut bycatch levels for trawl fisheries (see box). The Council plans to incorporate a vessel incentive plan into the fishery observer program, so that individual boats that exceed the bycatch standards will be penalized.

AFDF will test new trawl design

This summer, AFDF started a project to test a new trawl designed to decrease halibut bycatch. After a proposal process, we signed a contract with Gourock Trawls of Seattle to develop and build a trawl modified to give halibut a chance to escape before they reach the cod end.

Gourock will test the new trawl in a flume tank in Newfoundland this fall. When the 1993 Pacific cod fishery begins, AFDF will charter a trawler to take the net out to the grounds.

"There have been a lot of experiments done with various trawl designs," said AFDF project manager Paula Cullenberg. "But we're the first to have the resources to test the trawl through the entire commercial season. Halibut catches in cod tows are so variable — affected by the

geography of the sea bottom, water temperature, depth, time of day, night and year — you need to test a trawl many times to gather enough data on whether or not gear can affect the bycatch rate."

AFDF chose the cod fishery because its bycatch rate is among the highest in the trawl fisheries.

Gourock designed the net to exclude halibut at the initial tow by employing a combination of an escape route below the footrope and a separator panel in the belly of the net. They'll also test contrasting colors as a deterrent or attractant to different species.

"When we charter a trawler in January, we'll hire someone to use the Gourock net for the regular fishing season," Cullenberg said. "We'll reimburse the boat for the time it takes to switch cod ends, and for the risk of fishing with an expensive trawl. But, the vessel will operate as usual."

Fishermen who want to get in on the ground floor of trawl redesign should look for AFDF's charter proposal solicitation, which will come out in August.

"The trawl fleet has supported AFDF's bycatch reduction project more than any other project in the past few years," Cullenberg said. "Without it, there's almost no way they could get objective information about how different trawls work in the water. The competitive situation doesn't allow that kind of exchange of information."

Trawl and longline halibut bycatch standards

In June the North Pacific Fishery Management Council altered the halibut bycatch standards for different trawl fisheries. They now are:

Midwater pollock	0.1%
Bottom pollock	0.5%
Yellowfin Sole	0.5%
Other trawl fisheries	3.0%

More info about bycatch:

International Pacific Halibut Commission: Bob Trumble at (206) 634-1838. IPHC has produced underwater videos of halibut behavior in the presence of trawls.

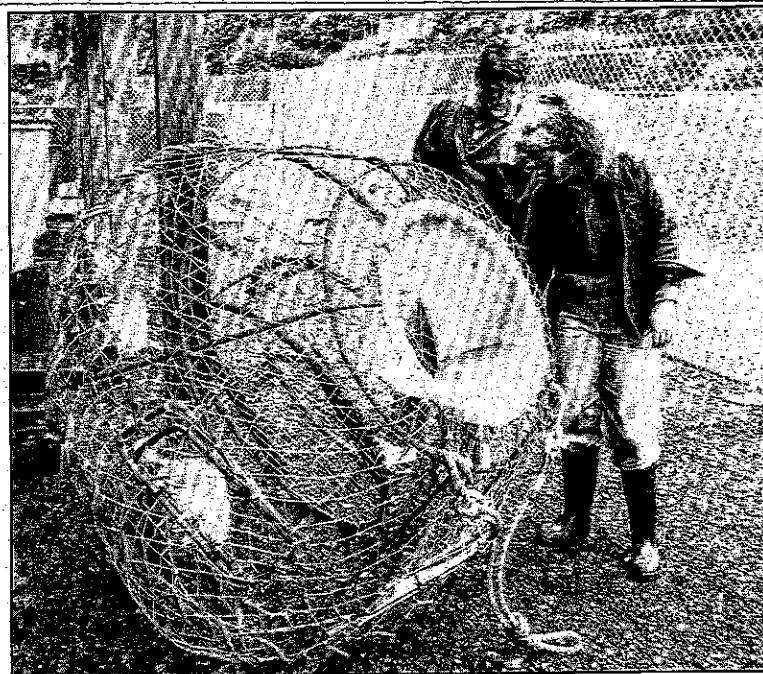
National Marine Fisheries Service: Craig Rose, (206) 526-4128. NMFS can provide underwater videos, bycatch studies and other info.

Fishery Industrial Technology Center: Chris Eubutz at (907) 486-1500. FITC has studied bycatch in cod and flatfish trawls, and can provide other information.

National Industry Bycatch Committee: Robert Shoring, 1775 NW Arbo Place, Corvallis, OR 97330 (503) 753-2700. A nationwide network of people and organizations interested in decreasing bycatch.

North Pacific Fishery Management Council Bycatch Committee: Brent Paine at (907) 271-2809. Discussing various management alternatives to deal with bycatch in the Council-managed fisheries.

Alaska Sea Grant: Contact Keith Criddle, (907) 474-6519. Studying ways to improve bycatch estimates in the trawl fisheries.

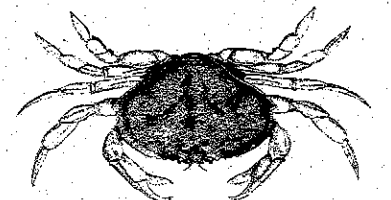


Judy McDonald from the Seward Marine Center and Arni Thompson of the Alaska Crab Coalition look over a crab pot to be fitted with a GTR. McDonald is studying crab survival and the use of GTRs, and Thompson is on the project's advisory committee.

New crab pot release may cut deadloss and increase catch

AFDF's project down at the Seward Marine Center will tell us if galvanic timed release (GTR) devices could help crabbers increase their catch and stay within current pot gear regulations. State regs require escape panels in crab pots to be sewn with #30 cotton thread. The thread is designed to disintegrate eventually so that if a pot is lost it won't continue ghost fishing. Trouble is, the thread gives way unpredictably, and crabbers too often lose their catch before they can retrieve their pots.

Most crabbers deal with the problem by refusing to use the #30 twine. Alaska Fish & Wildlife Protection officers inspecting the crab fleet last year said 60% of the boats were fishing with illegal gear. But the Bering Sea crab fleet loses about 10% of its pots per year — 20% in a bad year — to ice movement, storms, rough bottom terrain, trawl gear tangles and other forces. The Alaska Department of Fish & Game estimates there are 20,000 to 30,000 lost pots out there, and that they kill about 2.7 million crabs per year over the allowable harvest.



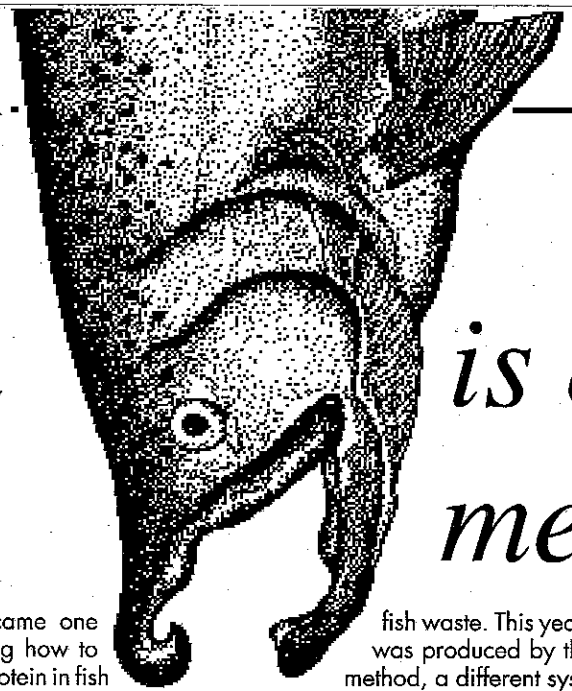
The GTR devices are galvanized cylindrical links that hold the mesh panel shut. Unlike cotton twine, a GTR device visibly indicates when it's about to fail so a crabber knows when to change it. If a GTR-equipped pot is lost, the galvanized loop will break and the escape panel will open. The diameter of the GTR determines how long it will last in saltwater. You can order GTRs to last any length of time — one day, thirty days, whatever — depending on

the length of the fishery.

"If these things work, they'll really benefit the crab fleet," said AFDF's Mel Mosen. "If you have a visible way of detecting when to change the escape panel mechanism, you'll probably see higher compliance with the regulations."

Mosen said that a field study one escape panel looped with the #30 thread gave way in the first set, demonstrating its lack of dependability. "We couldn't even get through our first experiment without getting frustrated by the unpredictable timing of the thread," he said. "I think the key to the GTRs is that they're predictable because you know when they're going to release."

GTRs have been used elsewhere, but not in waters as cold as the North Pacific. Part of the Seward Marine Center's study will be to test how long the galvanized metal lasts in such cold temperatures. They'll also be studying how long a crab caught in a lost pot might live. AFDF will publish results in early 1993.



Fish is on the menu

This year AFDF came one step closer to learning how to use hydrolyzed fish protein in fish and farm feeds — technology that could add profits and create new uses for fish processing wastes.

AFDF has experimented with two different hydrolysis techniques in the past three years, and with a variety of raw materials. We conducted feed trials on chinook and pink salmon and weanling piglets, all of them fed a modified diet of hydrolyzed fish protein made from different fish processing wastes.

The latest feed trial at the University of Washington, in which chinook salmon fingerlings were fed a diet of hydrolyzed groundfish processing waste, showed mixed results: The salmon dropped in weight during the third and fourth week, and never again caught up with the control group fed a Moore-Clark OMP IV diet. But there was little statistical difference between the two groups.

Dr. William Hershberger, who ran the feed trials at the University's School of Fisheries, said he suspected that palatability of the experimental feed may be the problem.

"It's hard to compare this year's feed trial with last year because '92 has been a miserable year for us environmentally," Hershberger said. (Hot, dry weather in Seattle killed off many of the hatchery's fingerlings.) "But it's clear that the material we used this year wasn't quite as good as what we had last year. For some reason, we saw a slow initial growth by the experimental group, and they just never did catch up."

Last year's feed trial featured a diet of hydrolyzed pink salmon heads — a raw material Hershberger thinks might have been more attractive to the little kings than ground-

fish waste. This year's hydrolysis was produced by the BioProteus method, a different system than Advanced Hydrolyzer Systems' equipment, which was used two years ago.

"The trouble was that we had two big variables for these two feed trials — the raw material, and the hydrolysis process itself," Hershberger said. "Last year's results showed no differences between the groups fed traditional feed and those fed hydrolyzed pink salmon heads."

Hershberger said he's optimistic about hydrolyzed fish protein as a fish feed material. "With the increase in aquaculture, and in our requirement for fish food, we're going to have to find alternative sources of fish meal," he said. "One of those sources is the raw material we've been throwing away. I think these feed trials show that this material can be at least equivalent to the regular diets. That's the important thing. We just have to sort out the specifics."

At the University of Alaska Fairbanks, weanling pigs grew at the same rate whether fed hydrolyzed cod processing waste produced by the Bio-Proteus method or traditional feed. Researcher Fred Husby, who conducted the feed trials this year and two years ago, reported that the piglets on the test diet wobbled a little in their weight gain — he thought it was because the produce smelled a little burnt — but caught up quickly with the control group.

AFDF will publish a final report in the fall. In the meantime, read our interim reports:

"Hydrolyzer Demonstration Project Final Report," \$7 (\$10 foreign).

"Chinook Salmon Feeding Study," \$5 (\$8 foreign)

What next? Making surimi from arrowtooth flounder

There are 270,000 metric tons of unemployed arrowtooth flounder in the Gulf of Alaska and the Bering Sea, and if AFDF has its way with them a few will go into surimi next year. This fall, AFDF will engage a surimi processor to commercially produce 100,000 lbs. of arrowtooth flounder surimi that we will distribute to users for testing in seafood analogs and other surimi-based products.

In a four-year project to research the under-used arrowtooth's potential, AFDF targeted surimi and an injected fillet as the two hottest prospects. We studied and produced both products on a trial basis two years ago. Last year, processors urged AFDF to demonstrate commercial-scale production of arrowtooth surimi that would reap quantities large enough to distribute to users for a real market test.

"If AFDF can demonstrate that arrowtooth surimi is really economically feasible, it will be great for Gulf of Alaska trawlers," said Al Burch, director of the Alaska Dragger Association in Kodiak and a long-time Gulf of Alaska trawler. "We already harvest thousands of pounds of arrowtooth in our trawling operations targeting on other flatfish. If we could bring those home for a few extra dollars, we could increase revenues and decrease discards as well."

Arrowtooth produces higher yields than pollock surimi — 38.8% compared to pollock's 28% from round-to-fillet — and rates closely in color, gel strength and shelf life to pollock surimi, though it is less elastic.

One of the biggest obstacles arrowtooth faces is bycatch. Deepwater flatfish, of which arrowtooth is the largest group, has the highest halibut bycatch rate of all the trawl fisheries. More than 25% of the total halibut bycatch in the Gulf of Alaska is taken in the deepwater flatfish fisheries, though those species make up only 4.2% of the total groundfish catch. In the Bering Sea, deepwater flatfish account for 0.8% of the total groundfish catch, but nearly 5% of the total halibut bycatch mortality. (In the Bering Sea, cod trawlers take so much arrowtooth they're considered to be targeting arrowtooth, and so the bycatch rate is assigned to the arrowtooth fishery even though the vessels are targeting on cod.)

"Arrowtooth faces some major stumbling blocks to development," said AFDF's Mel Monsen. "We're hoping to answer most of the unanswered questions about processing arrowtooth in this project. Our aim is to help create a new opportunity that will be ready for development when the fishing community gets its bycatch problems straightened out."

AFDF has applied for a special fishery permit to harvest arrowtooth flounder in the Gulf of Alaska for the surimi project after other flatfish trawl fisheries are over for the year. If it's granted, AFDF will hire a Kodiak trawler to fish for the project.

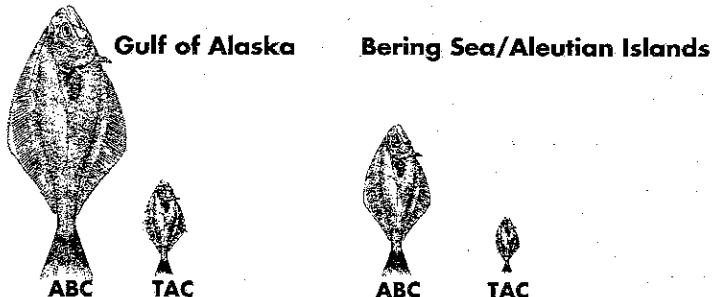
"With this project we hope to solve three problems," Monsen said. "We're hoping to develop a new raw material for surimi users, to decrease waste in the flatfish fishery that's now harvesting and discarding arrowtooth, and to broaden the fishing opportunities for the North Pacific fleet."

For more information on arrowtooth flounder surimi:

Commercial Utilization of Arrowtooth Flounder: Final Report (1991) available for \$7 (\$12 foreign) from AFDF.

Sea of Sole: Development of the Flatfish Fishery from the Ground Up (1992) available for \$50 (\$60 foreign) from AFDF.

Arrowtooth flounder in the North Pacific



	Gulf of Alaska	Bering Sea/Aleutian Islands
1992 ABC	303,880 m.t.	82,300 m.t.
1992 TAC	25,000 m.t.	10,000 m.t.

ABC = Acceptable Biological Catch - the total amount of fish that can be taken from the resource and still allow the maximum sustainable yield from the biomass.

TAC = Total Allowable Catch - the current harvest quota

MEMBERS ONLY

The seafood industry is Alaska's biggest private employer, and is well represented on Alaska's list of top 100 employers. This year the list includes eight AFDF members: **National Bank of Alaska** (7th); **UniSea** (12th), **All Alaskan Seafoods** (16th), **Peter Pan Seafoods** (33rd), **Wards Cove Packing** (47th), **North Pacific Processors** (60th), **Alyeska Seafoods** (63rd) and **Cook Inlet Processing** (92nd).

ProFish International has changed its name to **Premier Pacific Seafoods, Inc.** The company owns and operates the mothership *SS Ocean Phoenix* and the factory trawler *F/T Valiant*, and keeps offices in Dutch Harbor and Seattle.

Trident Seafoods Corp. recently acquired two Farwest Fisheries salmon canneries in Bristol Bay and Ketchikan. Along with the plants, Trident also acquired Farwest's canned salmon labels in an effort to strengthen its position in the U.S. canned salmon market.

Marel of Reykjavik, Iceland is marketing new salt cod technology to Alaska cod producers that they claim increases yield, reduces manpower, cuts salt production and produces more high-grade product. **Larus Asgeirsson, Marel**, Hofdabakka 9, IS-112 Reykjavik, Iceland; phone (354) 1-686-858 or fax (354) 1-672-392.

Atlantic cod fright

Iceland will reduce its cod catches 28-34% in the next quota year — from 265,000 tons in 1991-92 down to 205,000 tons during the 1992-93 season — bringing Iceland's cod landings to their lowest levels since 1942. The government predicts that the cod quota cuts will shut down plants, decrease the nation's revenues by \$167 million (U.S.), boost unemployment to 20% in some villages, decrease Iceland's GNP by 4%, and bring on the worst depression in Iceland since 1968. There's some good news for the North Atlantic island, though: they expect to increase capelin catches to 500,000 tons this year.

Newfoundland has called a moratorium on all cod fishing for two years, and is working with fishermen to compensate them for some of the losses. Many fishermen say they'll defy the ban despite the drastic drop in cod stocks, because they can't make a living otherwise.

Don't drown

Alaska's drowning rate is the highest in the nation. The Alaska Marine Safety Education Assoc. in Sitka reports that the most important factor in

INDUSTRY News

surviving a marine emergency is safety training. The association sponsors training workshops, safety instructor courses, and other safety info. Contact director Jerry Dzugan, P.O. Box 2592, Sitka, AK 99835; (907) 747-3287.

You're looking lovely

"Thanks, it's my shark liver oil lotion." Deepwater shovelnose dogfish liver oil harvested off New Zealand and Australia is being used in cosmetics by Japanese producers, according to INFOFISH. The crude oil is bleached, deodorized and fractionated to produce several classes of oil, which are used in lubricants, bacteriocides, pharmaceuticals and cosmetics. New Zealand researchers rendered shovelnose dogfish liver oil, then degummed, bleached and deodorized it, and hydrogenated it to an iodine value of 2.5. Then they made hand lotion and sunscreen lotion from it, stored it for six months at ambient temperatures, and ran some test trials. Users found the

shovelnose dogfish liver oil ointment had no off odors, was easily absorbed, and left no greasy residue.

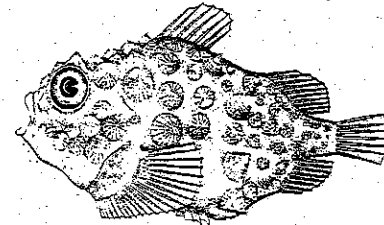
Fish waste is OK

Somebody's waste is another body's protein, or so biologists have concluded after a year-long study of the ocean floor off Kodiak. Marine life apparently is unharmed by the millions of pounds of fish processing waste dumped into the offal zone each year, said National Marine Fisheries Service biologist Brad Stevens. Most of it is disseminated, decomposed or eaten within six months of dumping, except for the bones, he said. For information: 487-4961.

Japan wants more Russian surimi

Japan may import twice as much Russian surimi as last year — possibly 24,000 tons — through three major

companies. Nissui is advising the Russian factory trawler *Dalmoreprodukt*, and will import about 12,000 tons. Taiyo will make 3,000 tons of surimi aboard its own factory trawler operating in Russian waters. The joint venture company Okean, made up of Japan's Kyokuyo and a Russian factory trawler, will import the rest.



The Lodestar

is published for Alaska Fisheries Development Foundation, Inc.
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Volume X No. 1, Autumn 1992

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"True magic inheres in the ordinary, the commonplace, the everyday, the mystery of the obvious."

— Edward Abbey

Read our fine print

What's new and informative from the AFDF bookshelves

Sea of Sole: Developing the Flatfish Fishery from the Ground Up - Edited by Krys Holmes. A review of the three-year AFDF flatfish development project, including 11 chapters on flatfish stocks, harvesting, filleting, quality characteristics, microbiology, product development, marketing, arrowtooth flounder surimi, and misc. species-specific notes — everything the flatfish producer needs to know. \$50 (\$75 foreign).

Surimi Testing Manual - Outlines the industry standards for surimi quality. Invaluable for U.S. surimi producers. Limit 1 per person, available to AFDF members only. \$7 (\$12 foreign).

By-Product Utilization of Non-Fillet Flesh from Alaska's Fisheries - Final Report - By Rae McFarland, et al. Results from a cooperative project conducted by Diamond Stainless, the Fishery Industrial Technology Center and Brigham Young University to recover usable meat from frames left over after filleting. The report covers primary processing, product development and market investigations. \$10 (\$20 foreign)

Groundfish Quality Package: Includes a report by Izabela Bernatt-Byrne of a year-long study of the factors affecting groundfish quality and how they change through the year. Also includes a waterproof poster illustrating groundfish quality factors through the year. \$20 (\$35 foreign). (\$15 for report and \$5 for poster, if ordered separately.)

Flatfish Processing Yield Improvements - By Rae McFarland, et al. A look at mince recovery from mechanically-filleed flatfish frames and from undersized flatfish. \$10. (\$15 foreign).

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