Northwest and
Alaska
Fisheries Center

National Marine
Fisheries Service

U.S. DEPARTMENT OF COMMERCE

NWAFC PROCESSED REPORT 83-16

Observations of Trawl-Sea Lion Interactions in the 1983 Shelikof Strait Joint Venture Walleye Pollock Fishery

September 1983

NOTICE

Observations of Trawl-Sea Lion Interactions in the 1983 Shelikof Strait Joint Venture Walleye Pollock Fishery

by

Charles W. West

Resource Assessment and Conservation Engineering Division
Northwest and Alaska Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
2725 Montlake Boulevard East
Seattle, Washington 98112

September 1983

Introduction

According to some estimates, 1,400 northern sea lions (Eumetopias jubatus) were accidentally captured and killed by U.S. catcher boats during the 1982 joint venture walleye pollock (Theragra chalcogramma) fishery in Shelikof Strait. During the 1983 fishery, a gear specialist from the Northwest and Alaska Fisheries Center (NWAFC) of the National Marine Fisheries Service (NMFS) was invited aboard several catcher boats to gain additional information on the incidental capture of sea lions in midwater trawls in this fishery.

The observer's specific goals were as follows: 1) to observe and record details of fishing strategies and techniques, fishing vessel characteristics, trawl construction and performance, and selected environmental observations during fishing operations; 2) to observe any interactions between the sea lions and the gear or the vessels; 3) to record any other sea lion behavior on the fishing grounds; and 4) to solicit and record any ideas or observations pertinent to this issue from fishermen or NMFS or joint venture company representatives aboard processor ships.

The observer was at sea from 10 March 1983 through 22 March 1983, and made observations from two different vessels: Sunset Bay, 10-16 March, and Neahkanie, 16-22 March. All the observations were made during fishing operations in two areas on the mainland side of Shelikof Strait. From 10 March through 19 March all observed tows took place on the grounds near Puale Bay, stretching from off Cape Unalashigvak to Cape Kekurnoi (Fig. 1). For the duration of the trip, fishing took place further north on

the grounds stretching from Cape Ilktugitak to Cape Kuliak. Since the fleet usually fishes as a unit, during most of this time all of the vessels participating in the fishery were on the same general grounds as the host vessels.

Fishing Technology and Operations

The Sunset Bay is a 108-ft steel stern trawler/crabber and is similar to many other catcher boats in this fishery. With a beam of 28 ft and draft of 12 ft, she has an 850 horsepower main engine and employs a Kort nozzle around the propeller to increase thrust. The trawl is fished from a net reel mounted just aft of the house, with spare trawls and codends stored on the net reels on the stern gantry. Like most other catcher boats, she is well equipped with electronic navigation and fishing aids. These include an echo sounder and netsonde that can be linked to a color scope for precise fish density resolution, scanning color sonar, and a video plotter linked to the Loran-C navigation system.

Like the Sunset Bay, the Neahkanie is a "Western-style" steel stern trawler. One hundred ten feet long, with a beam of 29 ft and draft of 12 ft, she has two 565 hp main engines, each turning a screw within a Kort nozzle. The trawl is fished from a net reel forward with reels on the gantry used for storage. She has essentially similar electronic gear to that described above.

Both boats fish similar gear, "#8 rope-wing" midwater trawls. So called because they utilize longitudinal ropes in the forward parts of the trawl instead of webbing, these trawls are very large. With 285-ft headropes and footropes and 210-ft

breastlines, these trawls will open vertically more than 16 fathoms when spread with 5-m square "Suberkrub" pelagic doors. Figure 2 depicts a smaller, older version of the same type of trawl, but the general outline and concept are the same.

To suit the special demands of joint venture fisheries, some modifications have been made to the gear. Perhaps the most unique is the detachable codend (Fig. 3). Secured to the main body of the trawl at the aft end of the "intermediate" section with a "zipper knot" similar to that used on flour sacks, these codends can be closed off, quickly detached, and transferred to the processor vessel where the catch is dumped and processed. Details of this procedure will be given later.

Another notable modification which has been made by some boats, including the two visited by the observer, is the installation of "blowout panels" in the aft part of the trawl intermediate (Fig. 3). These are actually longitudinal slits about 4-ft long cut into the webbing just forward of the codend zipper, reinforced along their edges with nylon line, and then laced shut with light twine. When excessive quantities of fish are captured, as frequently happens in this fishery, these slits will burst open and the excess fish will be bled off during haulback instead of causing extensive gear damage or even loss of the codend.

The entire pace of fishing activity aboard any given catcher boat was dictated by the needs of the processor vessel for which it was fishing, which in turn was controlled by its own production capacity. Generally, in order to maintain high quality, the processor wanted no more fish in a single codend than could be processed in approximately four hours. Thus, six daily deliver-

ies of the required size were allocated among the catcher boats fishing for that vessel, usually in rotation. In the case of the Sunset Bay, sharing its assigned processor with two other catcher boats, 50-60 metric ton codends were delivered twice a day, while the Neahkanie delivered 35-45 metric tons three times daily. Usually the factory manager would inform the catcher boat skipper of his next assigned delivery time as soon as the current catch had been brought aboard, although these times might be adjusted later. In any case, until it was time to start fishing for the next delivery the boats would drift, jog into the weather, scout for fish, or anchor.

Due to the large size of the schools and the great density of the fish within them, little time was spent scouting for fishable concentrations. This was further affected by the high degree of cooperation of the vessels in the fleet. Catcher boat skippers would call other skippers on the radio to exchange locations of productive tows, and factory managers aboard the processors would guide the catcher boats onto schools that were especially desirable for one reason or another, such as high roe counts or unusually good tissue condition of the fish at that location. At times it seemed as if the entire pollock fleet, catchers and processors alike, had converged on the same school of fish.

Once the target school was selected and it was time to start fishing (usually 2-3 hr before delivery time), setting the trawl was a quick and efficient operation. Three men on deck, plus the skipper, were able to get the trawl and doors out and to fishing depth within 20-30 min. Using a colorscope linked to the

netsonde, the skipper would then evaluate the amount of fish entering the mouth of the trawl. If necessary, trawl depth could be adjusted by changing the towing speed or the amount of warp deployed in order to get the trawl into the more dense concentrations of fish. The skipper would tow until he judged that he had a "bagfull," which might require anywhere from 5 minutes in extremely dense schools to an hour in less advantageous conditions, plus a few additional minutes to ensure an adequate load. Haulback would then be initiated.

Hauling back usually took a bit longer than setting the gear, especially if the catch was large. In almost every tow observed, the catch exceeded what the codend could contain and the blowouts gave way at some point during haulback. When this occurred the winches would noticeably speed up. In any case, from the time haulback commenced until the codend zipper was aboard usually took between 30 and 40 min. During all observed tows the gear was brought up as quickly as was practicable, with no "washing down" of the catch near the surface as has reportedly been practiced on some vessels.

Once the trawl had been wound onto the net reel, the process of disconnecting the codend and making it ready for transfer was begun. Only the forward portion of the codend was brought aboard the catcher boat to allow the crew access to the zipper area. Leaving the codend in the water behind the boat, a whip from one of the gilson winches was used to take a strain on the heavy cable "choke strap" permanently attached to the forward end of the codend. The net reel was then slacked off, allowing the intermediate to lie on deck. At this point, if sufficient fish

had not already been bled off through the blowouts, additional fish would be released from the codend to reduce the catch to the desired weight. By undoing the shackles connecting the trawl's riblines to the codend's riblines and releasing the zipper knot, the codend was disconnected from the trawl proper. A quick releasing "pelican hook" was then hooked into the choke strap, and a heavy towing cable was attached to the choke strap and run down the stern ramp, around the starboard side of the boat, and up to the rail next to the pot hauler.

Meanwhile, the skipper would have alerted the processor, which would be steaming on the same course slightly ahead of and to the starboard of the catcher boat, trailing a light polypropylene messenger line. Using a grapnel, the catcher boat crew would hook this line and put it into the pot hauler in order to pull over the towing warp from the processor. When the end of the towing warp had been brought within reach, the towing cable attached to the codend would be shackled to it and the pelican hook released, allowing the codend to float away from the catcher boat and be towed over to the processor and up its stern ramp. Following a complementary procedure, empty codends were then transferred from the processor to the catcher boat.

Sea Lion Observations

Considerable numbers of sea lions were observed on the fishing grounds, although none were caught by the boats visited while the observer was aboard. Except for two occasions, all of the sightings took place while the host vessels were on the grounds near Puale Bay, which is a major sea lion haulout area.

During the four days spent on the grounds near and north of Katmai Bay, sea lions were sighted only twice.

Another striking feature of the sea lion observations is the strong day-night difference (Table 1). The largest group of sea lions ever observed under daylight conditions was an estimated eight animals, but one or two, or none at all, was more common. On the other hand, groups estimated at 20 to 100 were frequently seen during nighttime tows.

Sea lions were never seen except during haulback operations at the end of a tow. At this time they could be observed swimming near the codend, apparently feeding on fish spilling from the open blowouts and escaping through the codend webbing. These fish were killed or incapacitated from overinflated swim bladders and made easy prey for the sea lions. When the codend had been brought to within 50-60 ft of the boat, the sea lions usually turned aside and were quickly lost from sight, not to be seen again until the next haulback. The sea lions swam right alongside the codend, even swimming up on top of it, and at times bit at the heads of fish protruding through the meshes. However, sea lions were never seen biting at or tearing the webbing itself, as has been reported, and no damage to the codends by sea lions occurred while the observer was aboard.

Discussion

Conversations were held with host vessel crews and other fishermen to gain the benefit of their observations and opinions. It was their consensus that sea lions were not as numerous on the

grounds in 1983 as in previous years, and that they had become much more wary and reluctant to approach the catcher boats. Further, they all agreed that the numbers being caught in the trawls were down considerably from before, and this belief was supported by reports from NMFS observers and joint venture company representatives stationed on the processors. Many of the fishermen felt that the sea lions caught in previous years were being caught during haulback, when the trawl was near the surface and the wings of the trawl had not yet been brought aboard, thereby closing the mouth of the trawl.

This hypothesis is supported by observations made by marine mammal observers stationed aboard processor vessels, as reported by Loughlin and DeLong (1983). They found that 35 out of 54 sea lion carcasses sighted in codends were located near the top of the bag adjacent to the zipper area, as would be expected if the animals were being caught during the final stages of the tow or during haulback operations. Further support for this idea comes from uncomfirmed reports that some vessels not visited by the observer did catch "substantial" numbers of sea lions during the 1983 fishery, and that in most cases these vessels consistently had problems hauling their gear in quickly, either due to mechanical limitations or suboptimal deck layout.

From these observations, the following factors may be considered to influence the likelihood of incidentally capturing sea lions. Obviously the density of sea lions on the fishing grounds is a major consideration. If fishing fleet operations take place in times and places where sea lions are scarce, then incidental captures will be infrequent. Given that the fleet and

the sea lions are utilizing the same resource, this will not always be the case. The fact that the fleet did at times fish in areas of apparently high sea lion abundance, with some vessels consistently catching sea lions and other vessels fishing alongside them catching very few or none, suggests that there are factors associated with each vessel's fishing operations that affect the likelihood that it will capture sea lions. The available evidence suggests the sea lions are most susceptible to capture during haulback operations, and that any strategy or gear used by individual catcher boats to expedite haulback will reduce the incidental capture rate. Improved deck gear and increased experience in the fishery have undoubtedly had an effect, as has the spreading use of the blowout slits described above. Since unintentionally excessive catches of pollock delay haulback by exceeding the capacity of the deck gear, the increased use of trawl instrumentation will continue to improve both the efficiency of the fleet and should reduce the problem of sea lion captures. Specifically the use of color displays linked to the netsonde and, even more, the use of catch-load indicators which register codend fullness on the netsonde display will allow skippers to "fine-tune" their operations. It is perhaps a bit early to say, but it appears that the problem of incidental capture of sea lions is disappearing with the maturation of the fishery.

Acknowledgments

The author wishes to thank the skippers and crews of the fishing vessels Sunset Bay, Neahkanie, and Vanguard for their

hospitality, without which this trip would have been impossible. In addition Frank Steuart and Joe Gnagey of Steuart Fisheries provided valuable assistance in coordinating the visits, and the staff of Marine Resources Company and Capt. Barry Fisher provided background information and support. Gourock Division of Wire Rope Industries Inc. furnished the plan of the midwater trawl and NorEastern Trawl Systems provided a drawing of a codend from which Figure 3 was prepared. Thomas Loughlin and Robert DeLong of the NMFS National Marine Mammal Laboratory, Seattle, Washington, participated enthusiastically in the "brainstorming" that preceded the trip, and provided much valuable information on sea lions.

References

Loughlin, T.R., and R.L. DeLong. 1983. Incidental catch of northern sea lions during the 1982 and 1983 walleye pollock joint venture fishery, Shelikof Strait, Alaska. NWAFC Processed Rep. 83-15, 37 p. Natl. Mar. Mammal Lab., Northwest and Alaska Fish. Cent., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way N.E., Seattle, WA 98115.

Table 1. Summary of northern sea lion observations during the 1983 Shelikof Strait joint venture pollock fishery.

Tow[a]	Date	Time[b]	Ambient light	Nearest point of land	Sea lions: Est. no. present	Sea lions: Activity and proximity to observer[c]
1	3/12	0136-0353	Day	C. Kekurnoi	7	Feeding, distant
2	3/12	1500-1710	Day	C. Kekurnoi	12	Feeding, distant
3	3/12	2210-2347	Night	C. Kekurnoi	100	Feeding, distant
4	3/13	0820-1054	Day	C. Kekurnoi	None	
5	3/14	0240-0513	Night	C. Kekurnoi	12	Feeding, distant
6	3/14	1030-1311	Day	C. Aklek	None	
7	3/14	1700-1931	Dusk	C. Unalashigvak	6	Feeding at stern
8	3/16	2008-2148	Night	C. Unalashigvak	None	
9	3/17	0414-0630	Night	C. Unalashigvak	7	Feeding at stern
10	3/17	1150-1332	Day	C. Unalashigvak	1	Feeding, distant
11	3/17	1930-2137	Night	C. Unalashigvak	2	Feeding, distant
12	3/18	0355-0550	Night	C. Unalashigvak	45	Feeding, distant
13	3/18	1100-1317	Day	C. Unalashigvak	3	Feeding, distant
14	3/18	1940-2201	Night	C. Unalashigvak	25	Feeding, distant
15	3/19	0414-0553	Night	C. Unalashigvak	35	Feeding, distant
16	3/19	1150-1336	Day	C. Unalashigvak	2	Feeding, distant
17	3/19	2330-0118	Night	C. Kubugakli	45	Feeding, distant
18	3/20	0600-0749	Day	C. Ilktugitak	None	
19	3/20	1348-1547	Day	C. Atushagvik	None	
20	3/20	2140-0026	Night	C. Atushagvik	None	
21	3/21	0450-0655	Dawn	C. Atushagvik	None	
22	3/21	1100-1323	Day	C. Atushagvik	None	
23	3/21	1800-2045	Night	Takli Island	20	Feeding, distant
24	3/22	0045-0326	Night	C. Ilktugitak	None	
25	3/22	0723-0942	Day	C. Ilktugitak	None	

a. Tows 1-7 were observed on the Sunset Bay, Tows 8-25 were on the Neahkanie. Tows 1-16 were made on the grounds near Puale Bay, Tows 17-25 were made on the grounds north of Katmai Bay.

b. The times given here are the times from when the trawl was first set until the full codend was delivered to the processor.

c. "Feeding, distant" describes the situations when the sea lions were feeding at the codend during haulback but would not come closer to the boat than 50 feet or so, while "Feeding at stern" means they came much closer.

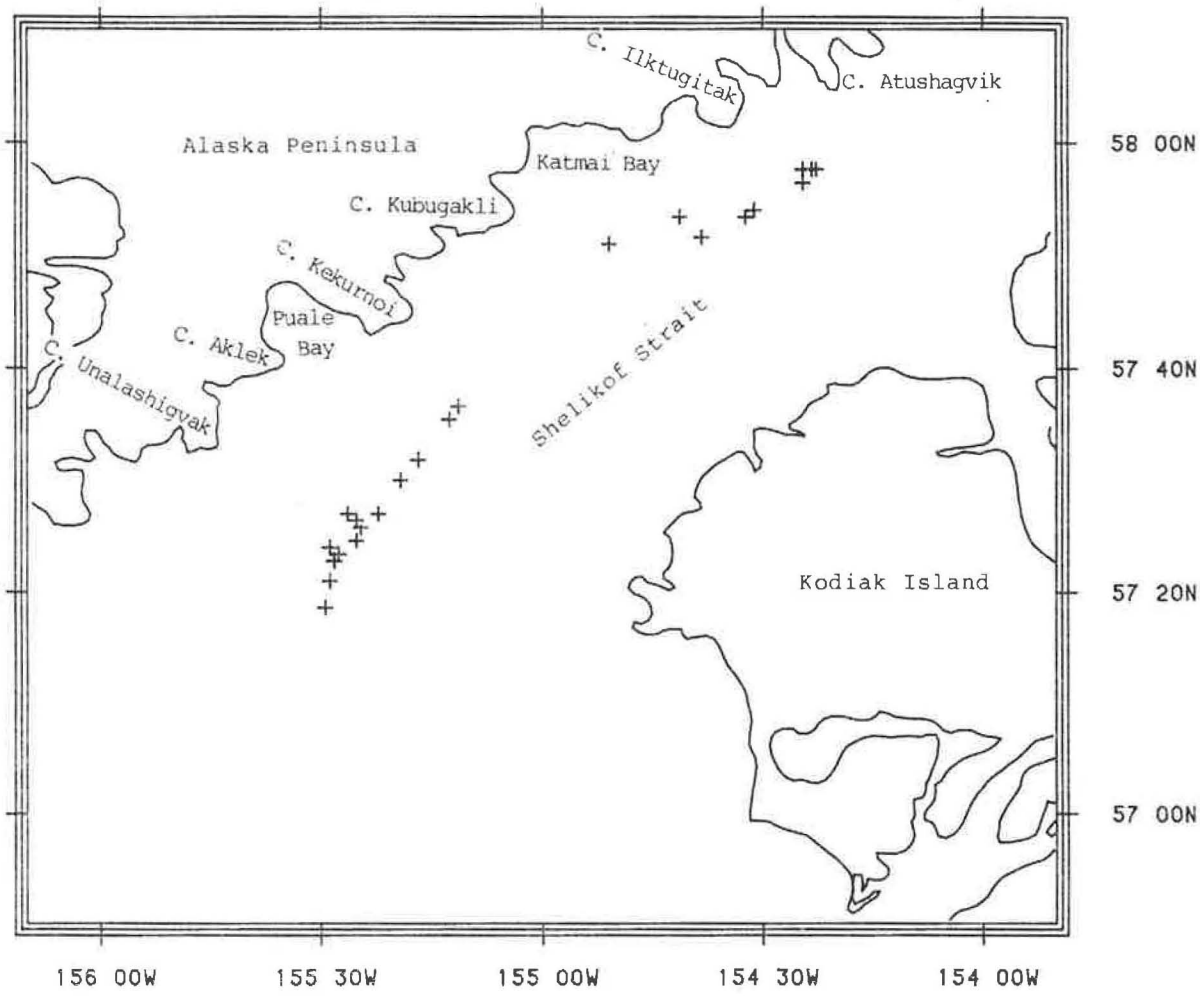

Figure 1. Positions at haulback of tows made during period of observation.

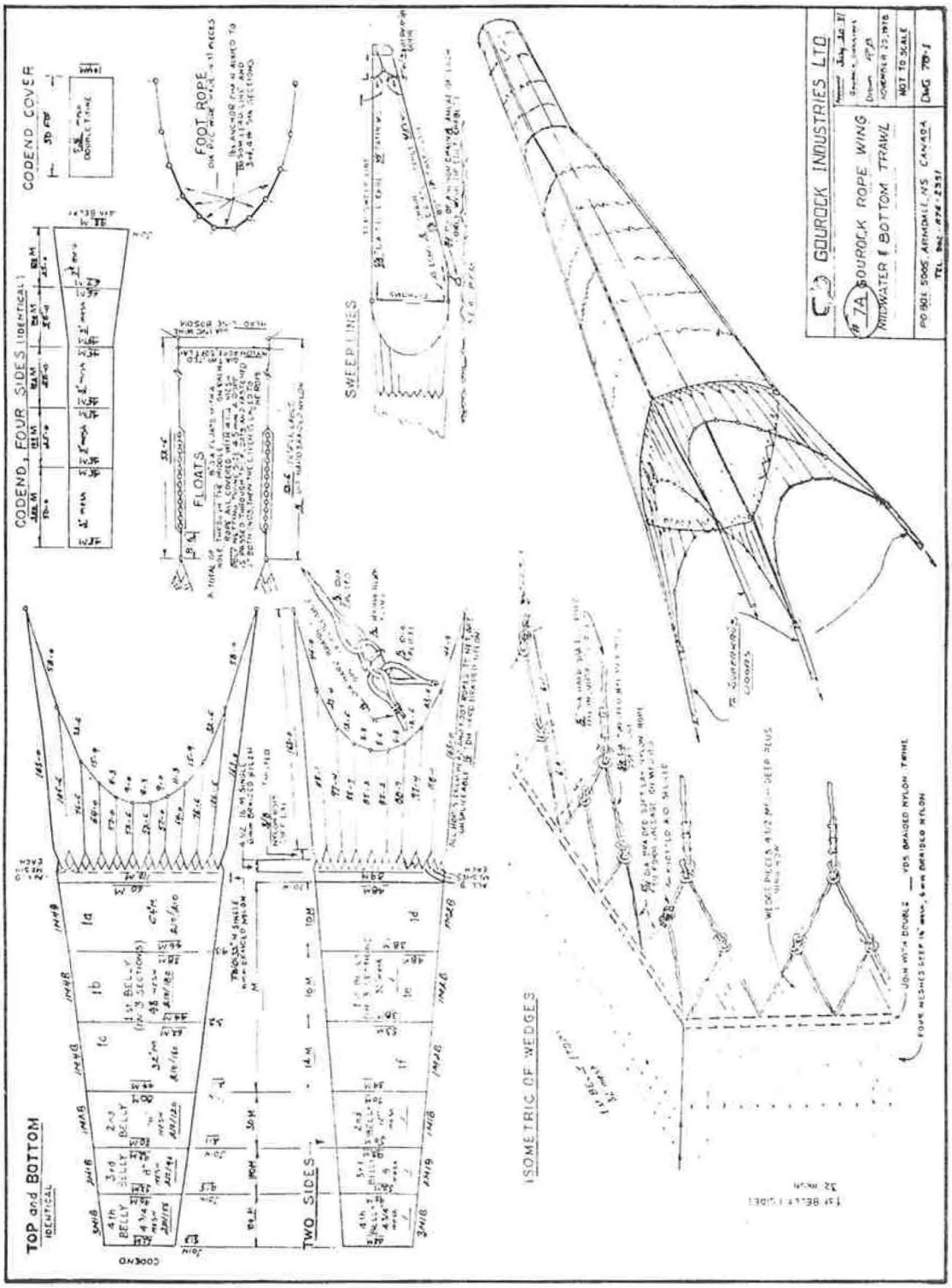

Figure 2. Rope-wing trawl similar to those used in the 1983 Shelikof Strait joint-venture walleye pollock fishery.

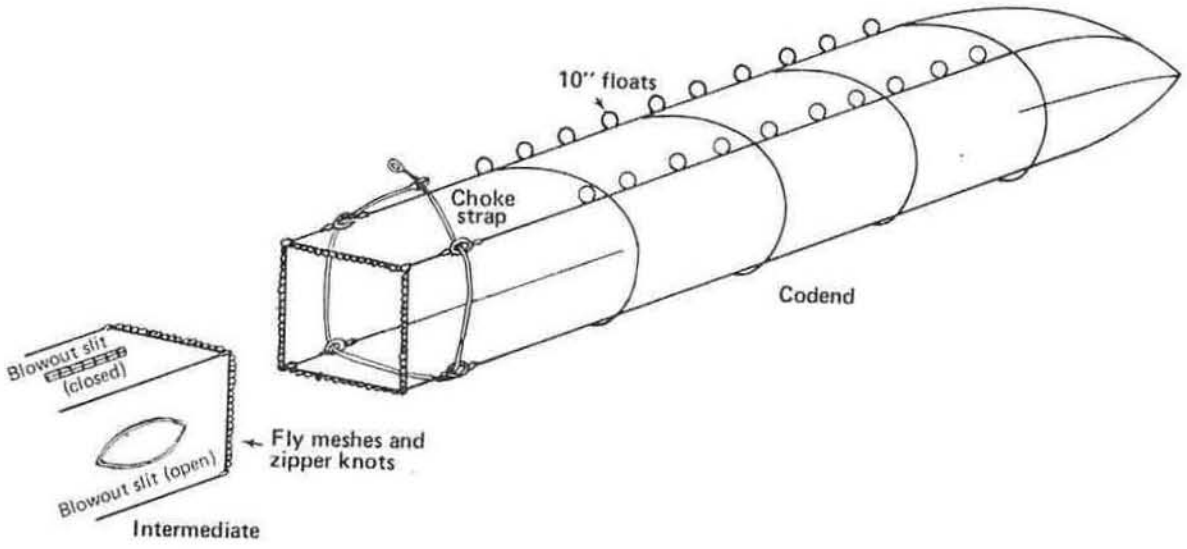

Figure 3. Codend and intermediate sections of a walleye pollock joint-venture trawl, showing the blowout slits.