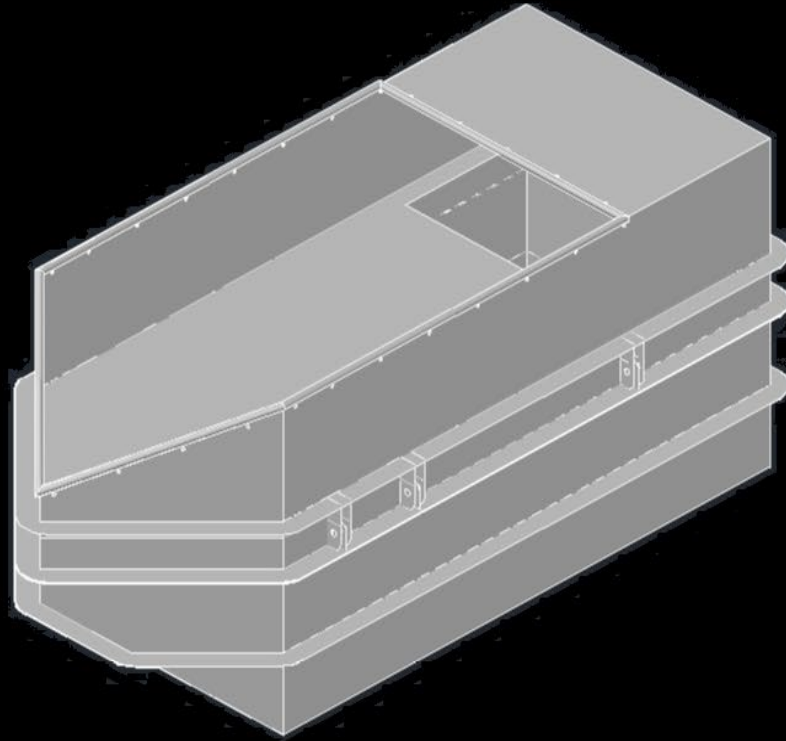


Live fish trap for pelagic trawl and problems of its use for salmon revealed at the international Gulf of Alaska expedition in winter 2019



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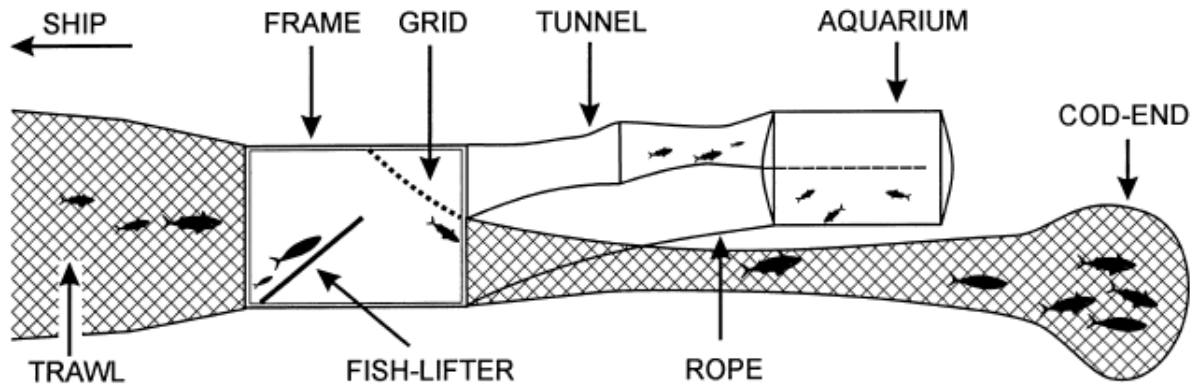
1. Polar branch of the VNIRO (PINRO), Murmansk, Russia

2. North Pacific Anadromous Fish Commission, Vancouver, B.C., Canada.

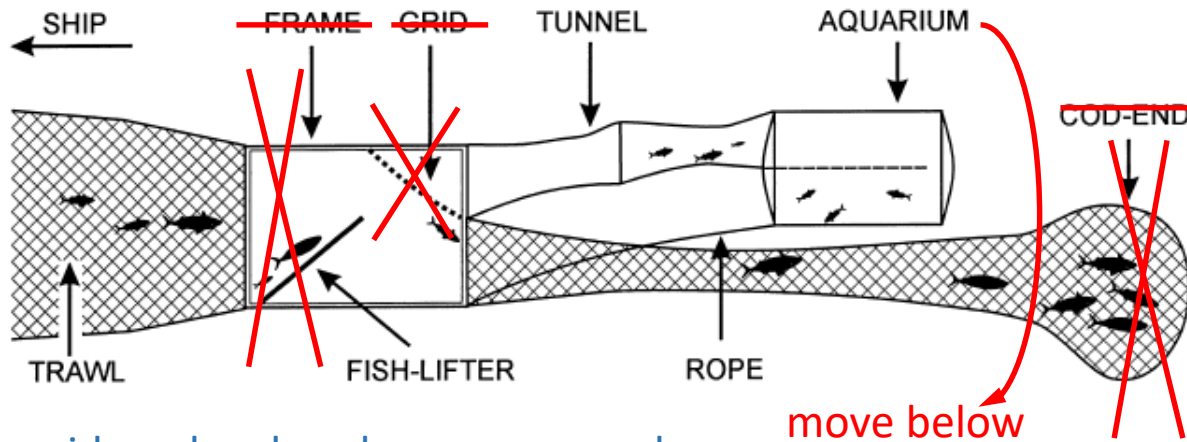
3. Far-Eastern Ecological Centre, Ltd. (FEEC Ltd.), Yuzhno-Sakhalinsk, Russian Federation

General concept

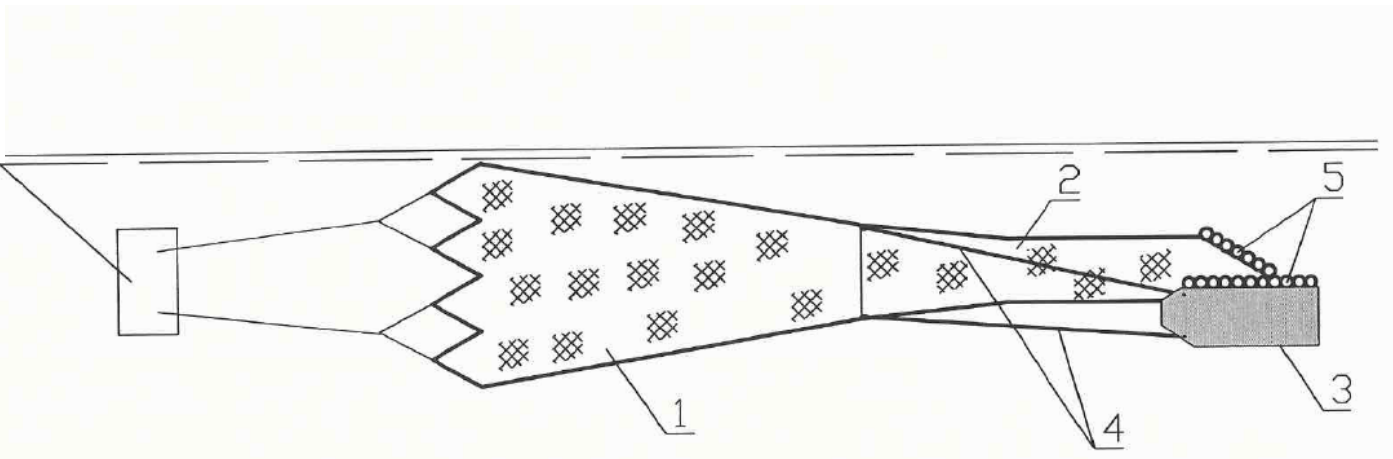
The live fish trap is a pelagic trawl device that allows holding and lifting on board a research vessel of live, undamaged fish from the trawl catch for further study and/or tagging (Jens Christian Holst and Angus McDonald 2000)



Adjustment for salmon research case



1. Frame, grid, and cod-end were removed
2. Live fish box was moved below of the trawl net

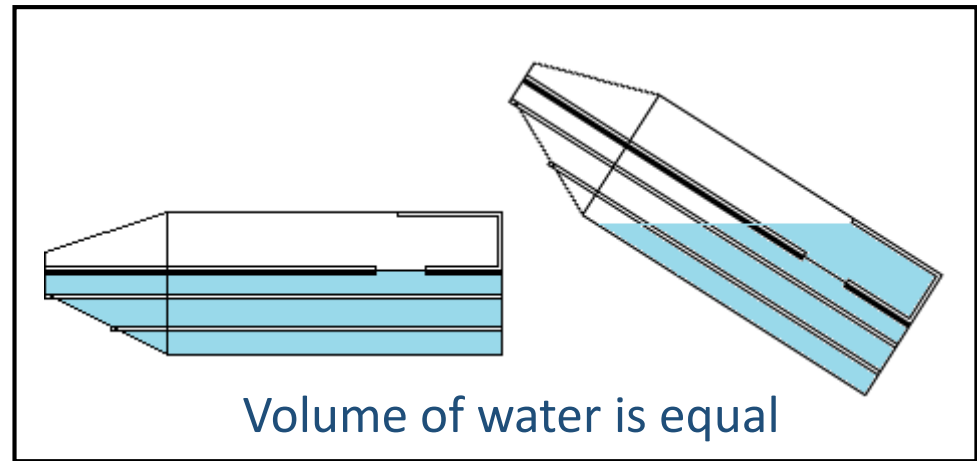
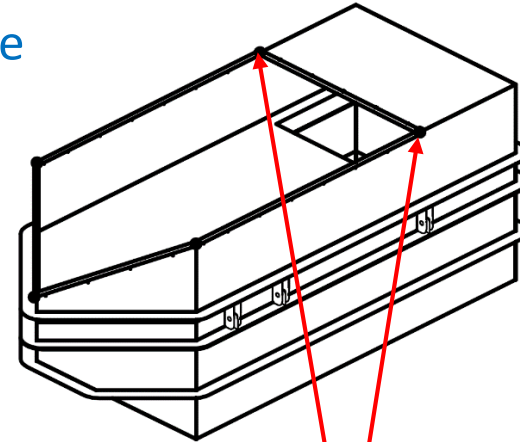
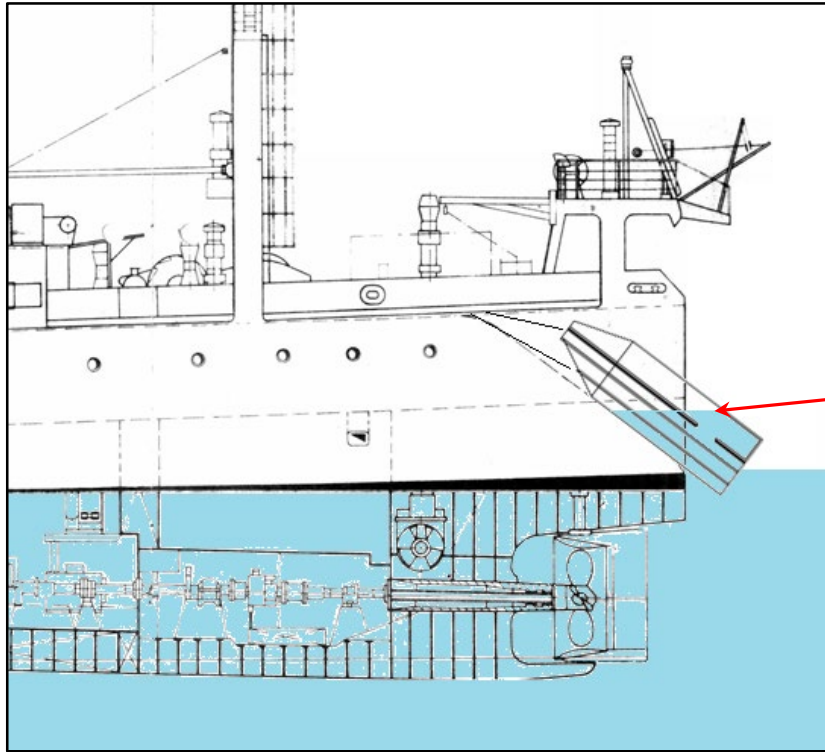


1. Pelagic trawl; 2. Net part of live fish trap; 3. Live fish box (aquarium); 4. Towing cables; 5. Purse seine floats

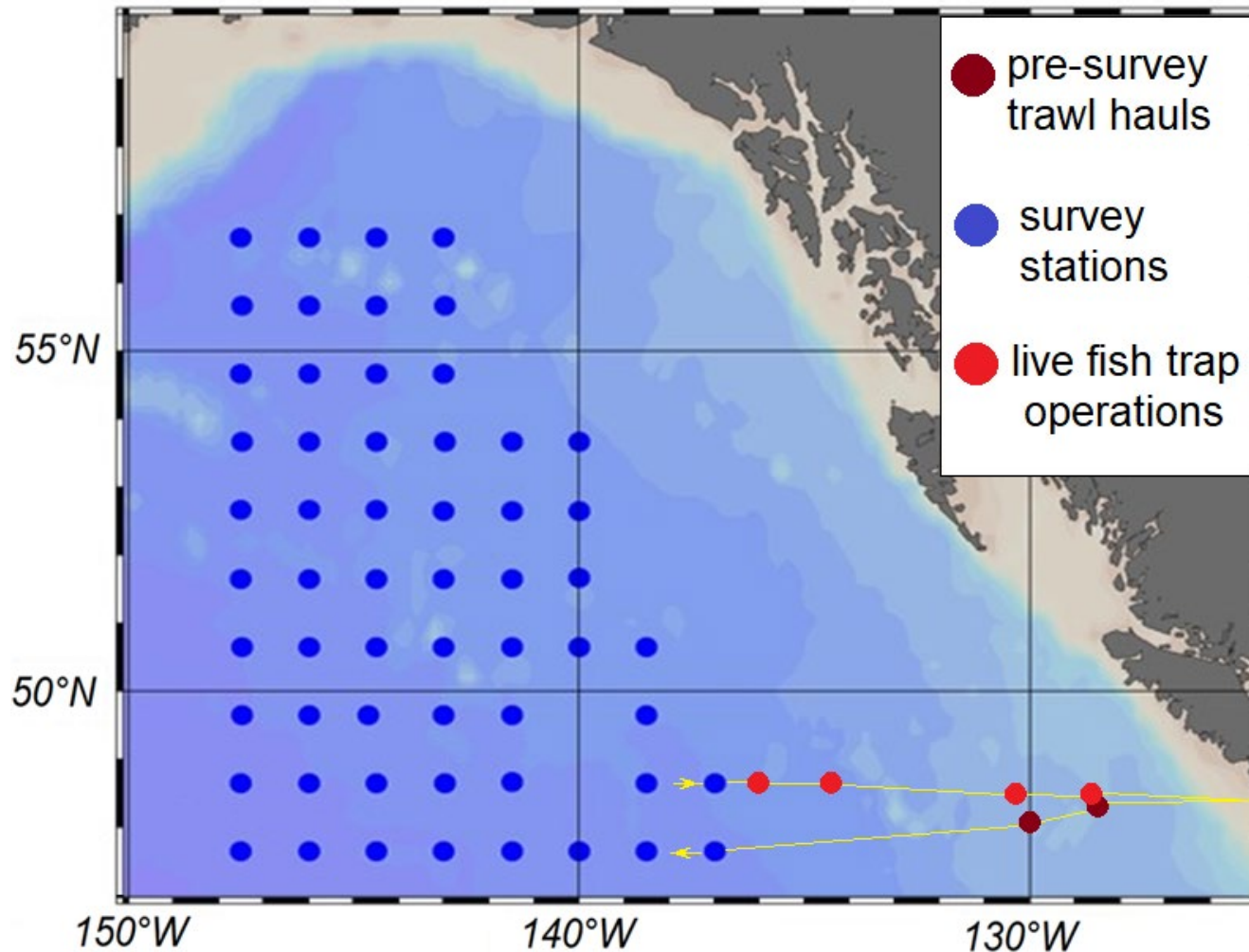
Cutting out of net part of live fish trap is individual task for each trawl net and vessel type

Modernization for salmon research case

End cover was added to the upper part of the live fish box to prevent water pouring out the box during its lifting on the trawler deck



Live fish trap test



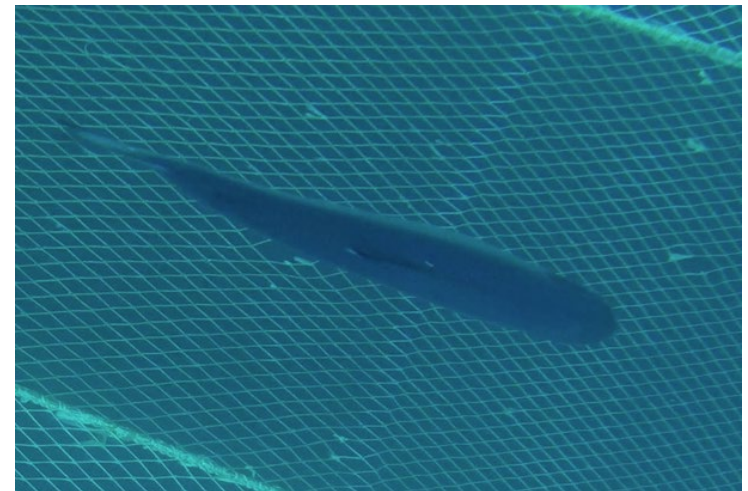
Four trawl hauls with the live fish trap were conducted in $48^{\circ}35 - 48^{\circ}43$ N $128^{\circ}34 - 136^{\circ}11$ W on March 14-15, 2019. The live fish trap was towed at speed of 3.9-4.8 knots during 20 to 30 min with upper trawl panel kept on the surface.

Live fish trap catches composition



	Date & time, GMT	Time, hours	Coordinates		Towing speed, knots	SST,°C	Opening, m		Wires, m	
			W	N			vert.	hor.		
1.	14.03.19 19:14	0.5	136°11	48°42	4.4	7.65	34.5	40.5	250	day-time
2.	15.03.19 3:43	0.5	134°26	48°40	4.2	8.05	33.3	38.3	250	night-time
3.	15.03.19 23:48	0.5	130°22	48°37	3.9	8	31.7	38.3	250	day-time
4.	16.03.19 10:29	0.33	128°26	48°35	4.8	8.3	25.5	38.5	250	night-time

1. No catch
2. **Two coho salmon**, mesopelagic fish, squid, pteropods
3. Jelly-fish
4. Jelly-fish, pteropods



Live fish trap test results

Positive results:

- Several fish, squid and macrozooplankton species were taken on board alive
- Captured myctophid fish behaviour was observed for the first time
- Two coho salmon specimens were tagged by the disk tags

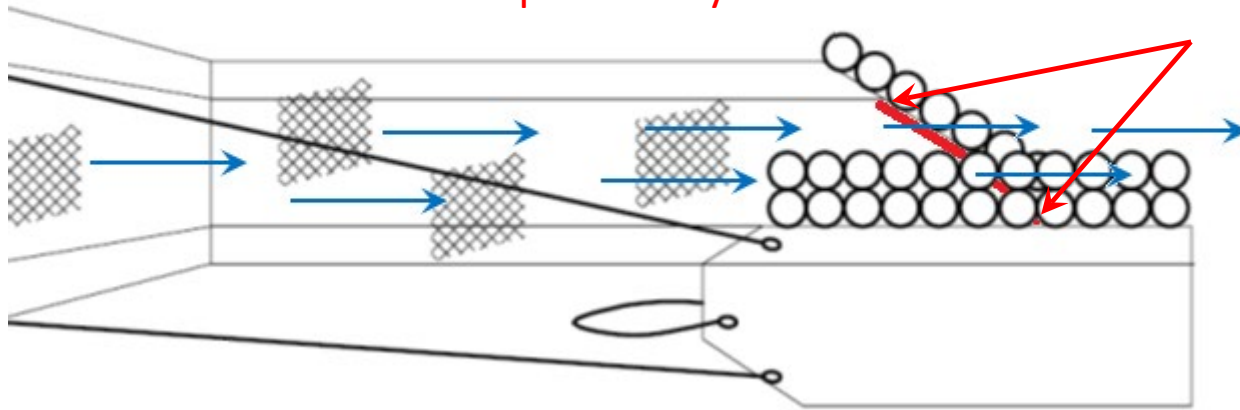


Negative results:

- Both salmon lost too much scale for successful return to rivers
- Jellyfish specimens had clear net imprints on exumbrellas that evidences on hard contact of captured animals with the net part of live fish trap

Discussion

Part of trap where animals, the most likely, are pressed by water flow to the net and receive injuries



Potential decisions:

- Installation of a spacer device (frame) atop of the live fish box;
- Replace harsh polypropylene net in that part of trap by a softer material (e.g., silicon net);
- Examine a water flow and fish behavior inside the live fish box (set a fluorometer and GoPro camera) since high water turbulence also can be a source of fish injuries;
- Find a way to re-direct the water flow within the live fish trap system





Thank you for your kind attention. Questions ?