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From 13 September 1977 through 22 September 1977 the VIMS Ichthyology Department participated in a net mensuration cruise sponsored by N.M.F.S. The purpose of the VIMS segment of the cruise was to evaluate the fishing capabilities of our 13.7 m semi-balloon otter trawl. This trawl is being employed in the food habits and community analysis study on outer continental shelf fin fish of the mid-Atlantic Bight, which we are presently investigating for the Bureau of Land Management.

If an attempt to quantify the abundance of organisms in a study area is to be made, certain factors must be known. One of these is the distance the net travels on the bottom, and the other is the configuration of the net while it is fishing. By the use of Loran A readings made at the time the net is set and at the time of retrieval an adequate estimate of distance traveled can be obtained. However, the net dynamics are still unknown. The use of a multiple transducer system in conjunction with an ELAN depth recorder, as was used on the net mensuration cruise, enables us to evaluate the net dynamics under various conditions.

The basic method uses three transducers. Two, one on each wing, are mounted so as to project their signals at each other, while the third is fixed on the headrope so that the

signal is bounced off the bottom. A single co-axial cable is used as a telemetry wire and is connected to each transducer and back to the ELAN. By calibrating the ELAN and the transducers, the distance between the wings and the height of the headrope off the bottom can be directly read off the trace. By trawling with, across, and against the surface current, and varying ship speed and scope (ratio of amount of wire out to depth) a picture of the net capabilities is obtained. The tests were done in 64 m of water.

The results of the cruise are as follows:

1. At approximately 1.8 knots the doors are unstable and tend to collapse toward each other thereby not effectively fishing the net. This is apparent at all scopes.
2. The effective swath of the net appears to slightly increase as the scope increases. This is probably due to the tendency of the force vectors on the doors from the wire becoming parallel to the bottom as the scope increases. The average wing separation was 21.1' at 2:1, 21.5' at 3:1 and 22.4' at 4:1.
3. The net tends to "fly" off the bottom at 2:1 scope if towed faster than 3.5 knots, at 3:1 scope the net will stay down up to 4.5 knots and at 4:1 scope the net would not leave the bottom even at 5.5 knots.

4. As vessel speed increases the headrope shows an apparent increase in height. This is probably a combination of horizontal and vertical distance not strictly a vertical component. In conjunction with this the swath of the net decreases as speed increases, and is probably due to increasing frictional drag on the net.

5. The optimum vessel speed for maximum volume appears to be 2.5 knots at which time the headrope is 8.5 feet off the bottom and the swath is 22 feet. There is apparently no variance with increased scope at this trawl speed. However, many active species of the continental shelf appear to be able to avoid the net during the day at speeds less than 3.5 knots.