

INSHORE DRAGGING: OTTER TRAWLING WITHIN THE
TERRITORIAL WATERS OF THE ATLANTIC
COASTAL STATES

Definitions

1. The otter trawl is a large and efficient drag net for the taking of certain species of bottom-dwelling fish and invertebrates on a commercial scale. The following characteristics apply to this type of gear:

a. It catches fish in large quantities, in a more or less indiscriminate manner.

b. It is a large and heavy device and covers an extensive area of bottom during a normal tow.

c. It fishes on or very close to the bottom.

d. Being a mobile type of gear it requires adequate space in which to operate and may thus compete in this respect with other fishing methods.

2. The term inshore dragging, as used herein, may be defined as the taking of marine fish and invertebrates within territorial waters in commercial quantities by means of an otter trawl. Territorial waters may be considered as all waters lying within the 3-mile limit.

A Consideration of the Program

Due to the accessibility of the inshore area and to the fact that a diversity of marine animals of substantial commercial value is found there, competition has inevitably developed between fishermen seeking different kinds of fish, crustacea, and shellfish and employing a wide variety of gear. Fishing methods may be classified as sedentary, such as the lobster pot and fish trap, or mobile, for example, the otter trawl and shellfish dredge. There are also intermediate types, exemplified by the purse seine and gill net.

Considering the operational nature of the otter trawl, it is virtually impossible to use such gear in areas where lobstermen and others are fishing without causing damage to the property of competitive fishermen. This is a well known fact and may be considered to be the essence of the majority of complaints relating to the activities of otter trawlers in close proximity to land.

The principal claim against the otter trawl, however, is its allegedly harmful effect on the bottom. Critics state that it destroys bottom-living plant life which either provides cover for species taken by other methods or which supplies food for these fishes, either directly or indirectly. It is also maintained that benthic animal life necessary to the existence of commercially important marine organisms is detrimentally affected.

There is little direct evidence relating to this subject but that presently available does not support these contentions.

What has been done to Date

The otter trawl is a comparatively new device in the field of commercial fisheries in this country, having been in common use by both large and small vessels for approximately 45 years. It and its predecessor, the beam trawl, originated in Europe and have been in use there since the middle of the 19th century. Records going back several hundred years show that beam trawls were used by fishermen in the waters around the British Isles, long before the days of the steam engine.

Few direct attempts, all of limited scope, have been made up to the present time to determine what the trawl does to the bottom over which it is dragged. These may be briefly described as follows:

1. Fisheries Research Board of Canada, Pacific Biological Station and Pacific Fisheries Experimental Station;
November 1947.

This test was conducted over a sandy, intertidal beach, partly covered by eel grass, at the head of Departure Bay on the east coast of Vancouver Island. The dragging was done at high water and the area dragged over was inspected after the tide had gone out, leaving it dry. The principal effects observed were the tracks or furrows made by the otter boards, which were traceable over the greater part of the route taken by the trawl. There was some shearing, but not uprooting, of the eel grass on the beach but there was no further evidence to indicate that damage had been caused by the net and footrope. No trials were made on soft bottom but it was speculated that both net and otter boards

might plow the surface to a greater depth than was observed at Departure Bay and that hard sand or gravel bottoms would be affected to a minor degree.

No attempt was made during the above test to determine the effect of dragging on bottom dwelling organisms, other than the observation regarding the shearing of the eel grass.

2. U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Biological Laboratory, Woods Hole, Massachusetts; May, June, and November 1959.

A series of five survey trips was made between May 14 and June 30, followed by three fall cruises in late November. During the first series the bottom was photographed by means of the underwater television camera, observations were made on fish and invertebrates and extensive samples of the bottom and the animals inhabiting it were obtained. Heavy phytoplankton blooms and the rolling of the water by a storm hampered observations on two occasions.

During the autumn phase of this experiment, which was conducted on three successive days, an additional series of moving pictures was obtained, one before and the other after the area was dragged with a standard otter trawl. The location of the experiment was a level, sandy mud basin due north of Nashawena Island in Buzzards Bay which had been unflushed by otter trawls for many years but which is the scene of intensive lobstering operations during the summer.

Evidence provided by the moving pictures, which were taken from the television monitoring screen as a permanent record, showed that only the otter boards made marks on the bottom which could be detected 24 hours after dragging. Strong tidal currents in the test area tended to obliterate these marks in a relatively short time and it was possible to traverse the line of dragging repeatedly without seeing any evidence of the gear having passed. No effect on bottom-dwelling organisms was noted.

As in the Canadian experiment, the test was limited to the observation of the tracks or furrows left on the bottom by the trawl during a normal tow, although the more important animals found in the locality were identified. The specific effects of dragging on these animals were not investigated beyond a visual scanning with the television camera which indicated no damage or injury.

3. A very instructive and enlightening description of the beam trawl fishery of Scotland in the late 19th century is referred to as follows:

McIntosh, 1894: II. Remarks on Trawling (5 sections). 12th Annual Report of the Fishery Board for Scotland.

This report deals in part with the effect of trawling on the invertebrate fauna of the sea bottom, and collateral relations with pelagic life. Particular emphasis is laid on those organisms which are important as fish food. In sections 5 and 6 Professor McIntosh discusses the effects of line trawls on the same grounds fished by the beam trawlers and what happens to the eggs and larvae of fishes breeding in areas where the beam trawl is used extensively.

The conclusion reached was that little or no harm is done to benthic animal and plant life by trawling operations. It was pointed out that the reproductive potential of the organisms concerned is so great that replacement of individuals killed or injured by fishing activities is rapid, since most bottom-dwelling creatures produce pelagic larvae which are unaffected by the gear. Burrowing animals, such as the annelid worms, are not affected by the passage of heavy equipment which sweeps over them without doing any damage. Professor McIntosh's experience also indicated that many of the invertebrates brought on deck by the net were returned to the water unharmed.

A very important consideration with respect to inshore waters is the damage done to bottom life by storms as compared with the detrimental results of fishing operations. This was reiterated on several occasions in this paper, comments being made regarding the great quantities of seaweeds, sponges, starfishes and shellfish cast ashore by gales. Thus the destructive effect of wave action in coastal waters far exceeds that of the beam or otter trawl.

Probably the most significant piece of information that can be derived from this report is the fact that the inshore areas described therein have now been intensively fished with heavy gear for over 75 years and are still producing large catches for the English and Scottish fishing fleets. It was noted in the report that many of the vessels operating in these waters were upward of 100 feet in length and towed beam trawls with a mouth opening of over 50 feet.

The observations and conclusions contained in Professor M'Intosh's report were the result of much intensive work and should receive consideration in any appraisal of the present controversy from the biological standpoint.

In addition to the above, four other references may be mentioned which touch upon the subject under consideration but which are based upon offshore, rather than inshore observations. These are as follows:

1. A. B. Alexander, H. F. Moore and W. C. Kendall, 1915. Report of the U. S. Commission of Fish and Fisheries for 1914, Appendix G, 97 pages.

No specific attempt was made by the authors to evaluate the effect of otter trawling on the bottom but the implication was that no damage results. This is essentially a general report on the otter trawl fishery, which, at that early date, had been in operation for a comparatively short time.

2. Harrington, William C., 1932. Transactions of the American Fisheries Society, Volume 62, pp. 57-63.

The conclusions reached in this paper imply that little damage is done to the bottom by the otter trawl but no specific studies with regard to the actual effect of otter trawling on the bottom were conducted.

3. Herrington, William C., 1947. The role of intraspecific competition and other factors in determining the population level of a major marine species. Ecological Monographs, Volume 17, No. 3, pp. 317-323.

In this paper the statement was made that because of the importance of otter trawls in the present day commercial fishery, the harmful effect of this device on bottom food productivity must be established beyond any reasonable doubt before this characteristic should be used as a basis for conservation measures involving any restriction on the use of otter trawls. Herrington's work as reported in this paper was concerned largely with the offshore areas in the vicinity of Georges Bank.

4. Studies conducted by the staff of the Fisheries Laboratory, Lowestoft, England, using underwater observers and cameras.

Notes on these experiments were published in "Fishing News," "Fishing Bulletin," "World Fishing," and "Commercial Fisheries Review." Observations were largely limited to the operational behavior of the net and the stirring up of bottom sediments by the net and no quantitative studies regarding the effects of the otter trawl on benthic organisms were included.

Conclusion

Up to the present time, there is no clear evidence that dragging is harmful to the bottom. In the absence of any such evidence we must assume that dragging is not detrimental to the bottom nor to any organisms except those which are taken in the gear.