

Observed and Perceived Impacts of Distant Water Fishing: Oregon Otter Trawl Case

COURTLAND L. SMITH

ABSTRACT—Distant-water fleets appeared off the Oregon coast in 1965. Change in the growth, equity, and diversity of Oregon otter trawl landings between 1965 and 1972 indicated that the observed well-being of otter trawl fishermen did not change significantly. Fishermen, however, perceived the foreign competition as a significant threat to their industry.

INTRODUCTION

Distant-water fishing fleets are operating off the coasts of most nations. One of the issues to be worked out in international conferences is the rights of local and international fishermen to fisheries of the continental shelf. In most cases distant-water fleets are larger, better equipped, and take a larger share of the resource than local fishermen, and this results in a feeling among local fishermen of being disadvantaged. Very often, however, local fishermen blame problems on distant-water fleets which require regional and national solutions directed at people's perceptions, priorities, and cultural tastes.

One case which fits this category is the Oregon otter trawl fishery. Local fishermen perceived that distant-water fleets operating in the region had severely diminished their fishery. Observation of changes in the fishery during the period 1965-1972 indicated that the distribution of catch among otter trawl fishermen had not changed significantly. Open entry was a local problem partly responsible for the lack of growth experienced by the fishermen in the fishery. In addition, a look at national priorities and at the consumption patterns of people in the United States showed fishing lacked recognition as

being important in food production. While these conclusions are not to diminish the impact of distant water fleets on local fisheries, they do suggest that even rapid and favorable results from international conferences may not bring relief to local fishermen.

OREGON OTTER TRAWL FISHERY

Since 1965 Soviet trawlers have been fishing off the coasts of Oregon and Washington. These trawlers compete with otter trawl fishermen for some species of groundfish, e.g. sole and other flatfish, Pacific Ocean perch, and other rockfish. The Oregon Otter Trawl Commission has maintained data on the gross value of landings for Oregon licensed vessels since 1964. No causal link can be established between the appearance of distant water fleets and measures of the well-being of Oregon otter trawl fishermen, but if the competition directly or indirectly affected commercially valuable species, this result should be observed in the value of otter trawl landings, unless other factors had a compensating effect.

Observing change through time in the shape of a frequency distribution of the value of otter trawl vessel landings gives a gross indication of well-being. Change through time in such descriptive statistics as the average, skew, and kurtosis are indicators of growth, equity, and diversity. Growth measures increase or

decrease in the value of landings. Equity and diversity indicate changes in the distribution among otter trawl vessels. Equity measures distortion, and diversity measures the degree of concentration.

Growth was measured by evaluating the change in the average gross value of landings per otter trawl vessel per year. The average values were regressed as a function of time and the slope of the regression line was used as an indicator of growth (Fig. 1 and Table 1). A positive slope to the regression indicates growth, a negative slope, decline. For the period 1965 to 1972 the average gross value of landings per vessel increased at a rate of 2 percent per year. Correcting this for inflation during the period and re-evaluating the slope of the regression line showed decline at a rate of 3 percent per year.

This approach to evaluating growth overlooked the possibility that growth was due to changes in the number of vessels. The number of vessels increased from 66 in 1965 to 109 in 1972, and the total value of the catch increased from \$1.9 to 3.6 million.

Another concern is the use of gross value of landings per vessel as a measure of well-being. From an economic view, net profit or returns to labor and capital would be better measures. The question, however, was about the point of view of fishermen in relation to observed changes. While there are certainly better measures of well-being, the measure used had to bear a relation to the perceptions of fishermen.

Most of the fishermen interviewed¹ did not share the economic view of how their well-being should be figured. Fishermen tended more to evaluate their success by the quantity of fish caught. As one fisherman stated, "The true fisherman does not figure money. He figures catch and the money takes care of itself." After quantity the next most common measure of fishing success, in the fishermen's view, was gross income. Gross income is the product of the quantity of fish caught times the price paid. Between 1965 and 1972 the average prices paid for otter trawl catch

¹Data on fishermen's attitudes came from observation of their behaviors, review of published statements, meetings, and open-ended interviews with 120 Oregon commercial fishermen from 1 July to 30 December 1972. These commercial fishermen fished salmon, albacore, crab, shrimp, and ground fish.

Courtland L. Smith is Associate Professor, Department of Anthropology, Oregon State University, Corvallis, OR 97331.

did not change significantly. For comparison between observed and perceived well-being, gross income provided a unit of measure comparable to the way fishermen evaluated their success.

For equity, the skew in the distribution of the annual per-vessel value of

otter trawl landings was calculated and regressed against time. A progressively positive skewing of the distribution would indicate that fewer fishermen were doing very well while more were doing poorly with regard to the distribution of catch. The slope of the regression line for skewing plotted against

Table 1.—Oregon otter trawl fishery.¹

Year	No. Vessels	Growth		Equity	Diversity
		Uncorrected \$/Vessel	Corrected \$/Vessel	Skew	Kurtosis
1972	109	33,180	25,000	0.80	2.9
1971	94	30,800	23,970	0.69	2.7
1970	99	28,610	23,220	0.69	2.6
1969	83	25,420	21,860	0.34	2.0
1968	80	30,180	27,360	0.45	2.3
1967	72	28,240	26,670	0.96	3.5
1966	64	26,650	25,900	0.84	3.4
1965	66	29,095	29,095	0.69	3.8
Slope of regression		544	-645	-0.01	-0.15

¹Source: Data provided by the Oregon Otter Trawl Commission. Corrected \$/vessel based on change in consumer prices in U.S. Bureau of Labor Statistics, 96 Monthly Labor Review 112(1973). For the regression models fit is not significant, and no relation with time can be demonstrated. These conclusions are expected, since time is used to indicate pattern. Lack of significance and the absence of a relation with time do indicate that the pattern observed is not fixed and can be expected to change.

time showed no change (Fig. 1 and Table 1). The average was +0.7, indicating a slight tendency in the direction of a few fishermen being very well off while the majority were doing poorly. These data indicate that inequities in the value of per vessel otter trawl landings did not change significantly during the period of competition from distant water fleets.

Diversity took the kurtosis for the frequency distribution and evaluated its change over time. Kurtosis measures the peakedness of a distribution. A very peaked distribution indicates concentration toward a single pattern of well-being. A platykurtic, broad curve, indicates more diversity. Kurtosis measured for otter trawl vessels between 1965 and 1972, indicated a slight increase in diversity. Kurtosis declined from just over 3.0 at the beginning of the period to just under 3.0 at the end of the period (Fig. 1 and Table 1). The increase was at a rate of 5 percent of the average per year and was not significant.

These data indicate that during the period analyzed per-vessel landings observed in the Oregon otter trawl fishery did not change significantly in terms of growth, equity, or diversity. This analysis does not mean that the distant-water fleets had no impact. The Pacific Ocean perch landings in Oregon dropped from over 5,900 metric tons in 1965 to less than 450 metric tons by 1969². This decline was attributed to

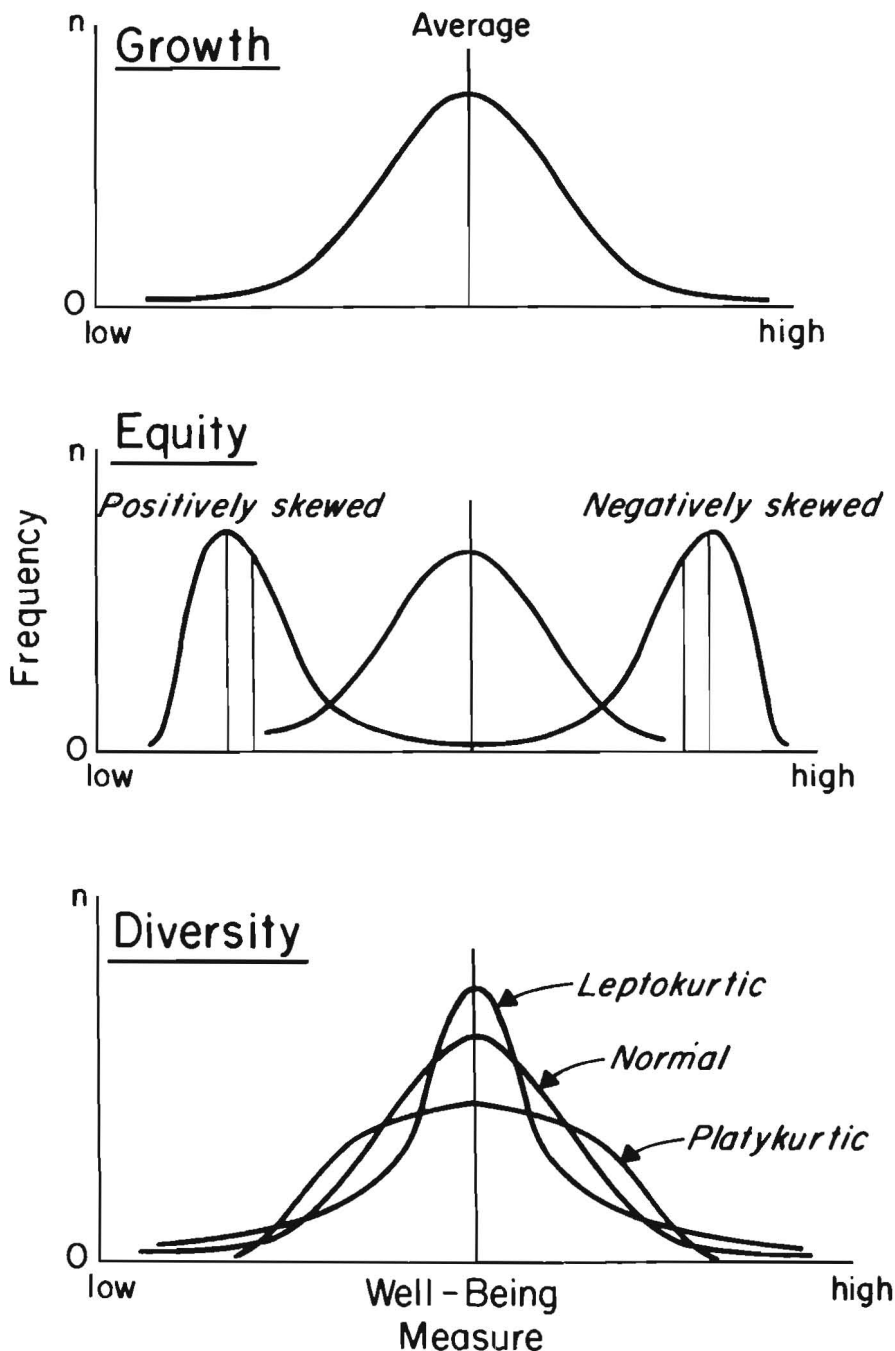


Figure 1.—Well-being indicators. Growth is change in the average through time, equity is change in skewedness, and diversity is change in kurtosis.

²Fish Commission of Oregon, *Biennial Report*, 1968-70 (1970).

distant water fishing effort. By exploiting other groundfish resources, the per-vessel landings of otter trawl fishermen did not experience the same decline. Instead, shifts occurred in the relative importance of the species harvested. For example, during the 1965-1972 period, a sevenfold increase in Oregon shrimp landings occurred. The number of otter trawl vessels harvesting shrimp increased from 24 to 67.

Even though these data did not indicate significant change in the observed well-being of otter trawl fishermen, the fishermen's perception of the situation was very different. They perceived the intrusion of foreign vessels as the most critical problem facing their fishery. Most felt betrayed by their government for not having kept "the foreigners off our fish." Many had a very pessimistic view for the future.

Why were distant-water fleets perceived as a threat to the fishery? Pursuing this question in depth with fishermen generally resulted in their pointing to the low priority the government gave to commercial fishing. The failure to do something about distant-water fleets which were "taking our fish" was one indicator to many fishermen of their low priority. In some contexts this low priority was actually verbalized by government officials. Fishermen were told that ocean priorities were national security, seabed mineral exploration, and ranked third was fisheries.

Statements and inaction told fishermen where they stood. Fishermen's perceptions reflected their frustration at not being recognized as important by policy makers. Otter trawl fishermen felt that the distant-water fleets had adversely affected the potential for growth. The data, however, showed an increase in otter trawl vessels from 66 to

109 between 1965 and 1972. Gross earnings from the fishery increased at an average rate of eight percent per year. The failure to realize the growth potential did not appear to be as much a consequence of the distant water fishing effort, but was the result of the influx of more otter trawl vessels.

Added to the problem of low priority and more otter trawl vessels was the place of fish in the consumption patterns of people of the U.S. While each fishery has specific markets it supplies, the overall implications of Table 2 are ines-

Table 2.—Per capita consumption fish and beef¹.

Year	Fish lb/capita	Beef lb/capita
1970	11.4	113.7
1960	10.3	85.1
1950	11.8	63.4
1940	11.0	54.9

¹Source: U.S. Department of Commerce, 93 Statistical Abstract of the United States 84 (1972).

capable. Beef consumption more than doubled during the period 1940-1970. Per capita fish consumption remained constant and declined from one fifth to one tenth the quantity of beef consumed. Certainly the argument can be made that with population growth the total demand for fish increased in spite of constant per capita demand. The implications of the decline in the relative importance of fish with respect to beef in U.S. consumption patterns, however, has wider implications. In policy decisions greater concern is given to those industries which produce the major portion of people's food requirements.

CONCLUSIONS

International law of the sea is but one aspect of problems facing local fishermen. Other aspects to the problem requiring regional and national attention

are the relation between fishermen's perceptions and observations of the local situation, the quantity of resource available, and the relative priority of fishing in policy making and consumption patterns.

Clearly limited entry programs represent regional attempts to solve some of these problems. These programs if properly designed and implemented can improve the livelihood of fishermen and reduce the cost of fish to the consumer, making fish more competitive with respect to other foods. Here again, however, the perceptions of local fishermen are sometimes at variance with the observations of economists. Fishermen are concerned with opportunities for their children; they believe in free enterprise; and they reject not allowing others to have an opportunity to make a living.

Changes in the international law of the sea and limited entry cannot solve the problems faced by local fishermen. At the heart of their problems are fishermen's perceptions and peoples' priorities and tastes. Without accompanying dramatic social and cultural change to accompany legal and economic proposals the net result may be very little total gain.

ACKNOWLEDGMENTS

This work is a result of research sponsored in part by the Oregon State University Sea Grant College Program, sponsored by the Office of Sea Grant, NOAA, U.S. Department of Commerce, under Grant #04-5-158-2.

Special acknowledgment to Carl Brown, John P. Harville, Paul Heikila, A. Paquet, and Fred Smith for helpful and critical comments. The opinions expressed, however, are the author's and are not necessarily shared by those commenting on the paper.

MFR Paper 1134. From Marine Fisheries Review, Vol. 37, No. 4, April 1975. Copies of this paper, in limited numbers, are available from D83, Technical Information Division, Environmental Science Information Center, NOAA, Washington, DC 20235.