

ECONOMIC IMPACT OF LAKE ERIE ON NORTHERN OHIO

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Walleye harvested by sport anglers from the Western Basin of Lake Erie increased from about 100,000 fish in 1975 to over 3,000,000 in 1982. The total days fished increased from about one million to 1.8 million between 1975 and 1982. These and other recent changes in Lake Erie resources justify a study of the economic impact of Lake Erie. This paper summarizes the results of a recent Sea Grant study in which the economic impacts of Lake Erie on northern Ohio were estimated for 1978. First, the total economic impact of Lake Erie economic sectors is presented. Second, the total economic impact of sport fishing is discussed. Finally, the economic impacts of changes in the allocation of the Lake Erie fishery between sport and commercial fishing is analyzed.

In this study, northern Ohio consists of the 17 county regional economy most highly impacted by Lake Erie: Ashtabula, Cuyahoga, Erie, Geauga, Huron, Lake, Lorain, Lucas, Mahoning, Medina, Ottawa, Sandusky, Seneca, Summit, Trumbull, Portage and Wood counties. In 1978, these 17 counties generated output of \$150 billion, income of \$31 billion and employment of 1.7 million man-years. The output, income and employment generated directly by Lake Erie economic sectors are less than one percent of these totals. However, the importance of economic development in Ohio, the growth potential of Lake Erie

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sectors as compared to many of the heavy industry sectors in this region, and the growing importance of recreational activities in Ohio, in particular sport fishing on Lake Erie, justify studying the economic impact of Lake Erie.

Methodology

A 43-sector, open, single region, static input-output (I/O) model is the methodological basis of the study. The 1972 U.S. National I/O model updated to 1978 prices was used to derive 40 sectors of the regional model. The highly disaggregated 365 sector national model was adapted to reflect the size and structure of the region's economy. Data for marina and boat sales and charter fishing were developed from primary survey responses. Commercial fishing data was adapted from another I/O study of commercial fishing.

Six of the 43 sectors in the I/O model were considered as Lake Erie economics sectors: commercial fishing, charter fishing, water transportation, mineral extraction, marina and boat sales, and other Lake Erie recreation. Other Lake Erie recreation was part of the amusement and recreation sector in the regional I/O model; it was not a separate sector. Examination of employment data suggested that ten percent of amusement and recreation could be attributed to Lake Erie. This includes activities such as Cedar Point, recreational boating other than fishing, and recreational activities on the islands. Other Lake Erie recreation is ten percent of the amusement and recreation sector from the I/O model.

Sport fishing is not an economic sector. Sport fishing generates its economic impact through the purchase of output from Lake Erie sectors and other sectors in the regional economy.

Results

In 1978, the six Lake Erie economic sectors generated \$412.5 million of output, \$110.1 million of income, and 8,877 man-years of employment. These are the total direct effects shown in Table 1. In producing their output, these six sectors purchase inputs from other economic sectors in the region, generating increased output in the other sectors; these are the indirect or multiplier effects. The direct plus indirect effects, or the direct effects times the sectoral multipliers, are the total economic impacts. The six Lake Erie sectors generated total economic impacts of \$675.7 million of output, \$211.3 million of income and 12,312 man-years of employment in 1978 (Table 1).

The contribution of each sector to the total economic impact is also shown in Table 1. Water transportation makes the largest estimated contribution to output (42.5 percent) and income (46.1 percent), while marina and boat sales make the largest contribution to employment (37.2 percent). The two smallest sectors are commercial fishing and charter fishing.

The estimated total economic impact of sport fishing in 1978 is shown in Table 2. These estimates include private-boat and charter fishing, but exclude shore fishing. In part these estimates overlap those in Table 1 because the economic impact through marina and boat dealers and charter fishing is part of that estimated in Table 1. However, sport anglers also make expenditures in economic sectors other than Lake Erie sectors. These impacts are also reported in Table 2.

The economic impact of sport fishing occurs through expenditures made by sport anglers in the regional economy. The total direct effect (spending) of private-boat and charter anglers in 1978 was estimated at \$28.7 million. The total (direct plus indirect) economic impact of this expenditure was \$52.2

TABLE 1
 OUTPUT, INCOME AND EMPLOYMENT IMPACTS OF LAKE ERIE SECTORS, 1978

	Output \$ million	Income \$ million	Employment man-years
Total Direct Effect	412.5	110.1	8,877
Total Economic Impact	675.7	211.3	12,312
Contribution by Sector			
	%	%	%
Commercial Fishing	1.5	0.5	0.8
Charter Fishing	0.7	0.7	1.0
Water Transportation	42.5	46.1	30.1
Mineral Extraction	22.9	18.8	15.0
Marina and Boat Sales	20.5	27.1	37.2
Other Lake Erie Recreation	12.0	6.7	15.8

TABLE 2
ECONOMIC IMPACT OF LAKE ERIE SPORT FISHING, 1978

Sectors	<u>Total Economic Impact</u>			
	<u>Direct Effect</u> \$ Million	<u>Output</u> \$ Million	<u>Income</u> \$ Million	<u>Employment</u> Man-Years
Total	28.74	52.23	18.32	1,616.05
	<u>Contribution by Sector</u>			
	%	%	%	%
Marina and Boat Sales	52.9	55.9	65.6	59.4
Boat, Ship Building Repair	4.5	5.1	5.8	2.5
Charter Fishing	7.1	8.8	8.2	7.6
Eat and Drink	12.2	11.9	3.3	6.4
Retail	17.6	13.1	14.4	19.5
Hotel and Lodging	5.0	4.6	2.5	4.2
Miscellaneous Services	0.7	0.6	0.2	0.5

million of output, \$18.3 million of income and 1616 man-years of employment. Over 50 percent of the economic impact of sport fishing on Lake Erie is through the marina and boat sales sector. Charter fishing contributes about nine percent of these estimated impacts, and private-boat fishing 91 percent.

Based on the I/O model and the 1978 allocation of the Lake Erie fishery between commercial and sport fishing, the reallocation of \$1 million of fish from commercial to sport fishing would result in a reduced total economic impact from commercial fishing of \$3.9 million of output, \$0.4 million of income and 41.4 man-years of employment (Table 3). If the reallocation generated no additional spending by sport anglers, the region would lose the decrease in commercial expenditures, the lower bound of the estimated net economic impacts in column three of Table 3. If sport angler spending, the direct effect, changes in proportion to the reallocation of fish, the estimated increase in total economic impact from sport fishing is \$8.2 million of output, \$2.9 million of income and 252 man-years of employment. Under this assumption, then the net economic impacts of a reallocation of \$1 million of fish from commercial to sport fishing are the upper bounds of the estimates shown in column three of Table 3.

While it is likely that commercial fishing expenditures will change in approximate proportion to the value of fish harvest, it is less likely that sport angler expenditures will change (particularly increase) proportionately. The reallocation would only make additional yellow perch and white bass available to sport anglers since the commercial industry in Ohio is not allowed to harvest walleye. Since over 70 percent of sport angler expenditures are for summer walleye fishing, it is not clear how much additional expenditure would be generated by the reallocation of yellow perch

TABLE 3

NET ECONOMIC IMPACT OF THE REALLOCATION OF \$1 MILLION
OF FISH FROM COMMERCIAL TO SPORT FISHING, 1978

	Total Economic Impacts		Net Economic Impact
	Commercial Fishing Expected Decrease	Sport Fishing Expected Increase	
Output (\$ Million)	3.9	8.2	-3.9 to 4.2
Income (\$ Million)	0.4	2.9	-0.4 to 2.4
Employment (Man-Years)	41.4	252.1	-41.4 to 210.7

and white bass to sport fishing. For the region to break even from this reallocation, sport angler expenditures must increase by at least 48 percent of the proportional increase assumption which generated the total economic impacts from sport fishing in column two of Table 3.

Conclusion

In conclusion, the total economic impact of Lake Erie on this 17 county regional economy is small when measured by this standard. However, the economic sectors of Lake Erie contain a vital link between Ohio and international water transportation and form the basis for a large recreation industry which has been growing rapidly in recent years with the return of large walleye populations. The results of the model support past reallocations of the Lake Erie fishery from commercial to sport fishing. When the remaining species to be reallocated are examined, caution about further reallocations from commercial to sport is needed because sport anglers might not increase effort to harvest additional yellow perch or white bass. Continued monitoring of the response of sport anglers to change in the availability of these species is vital to future allocation decisions.

