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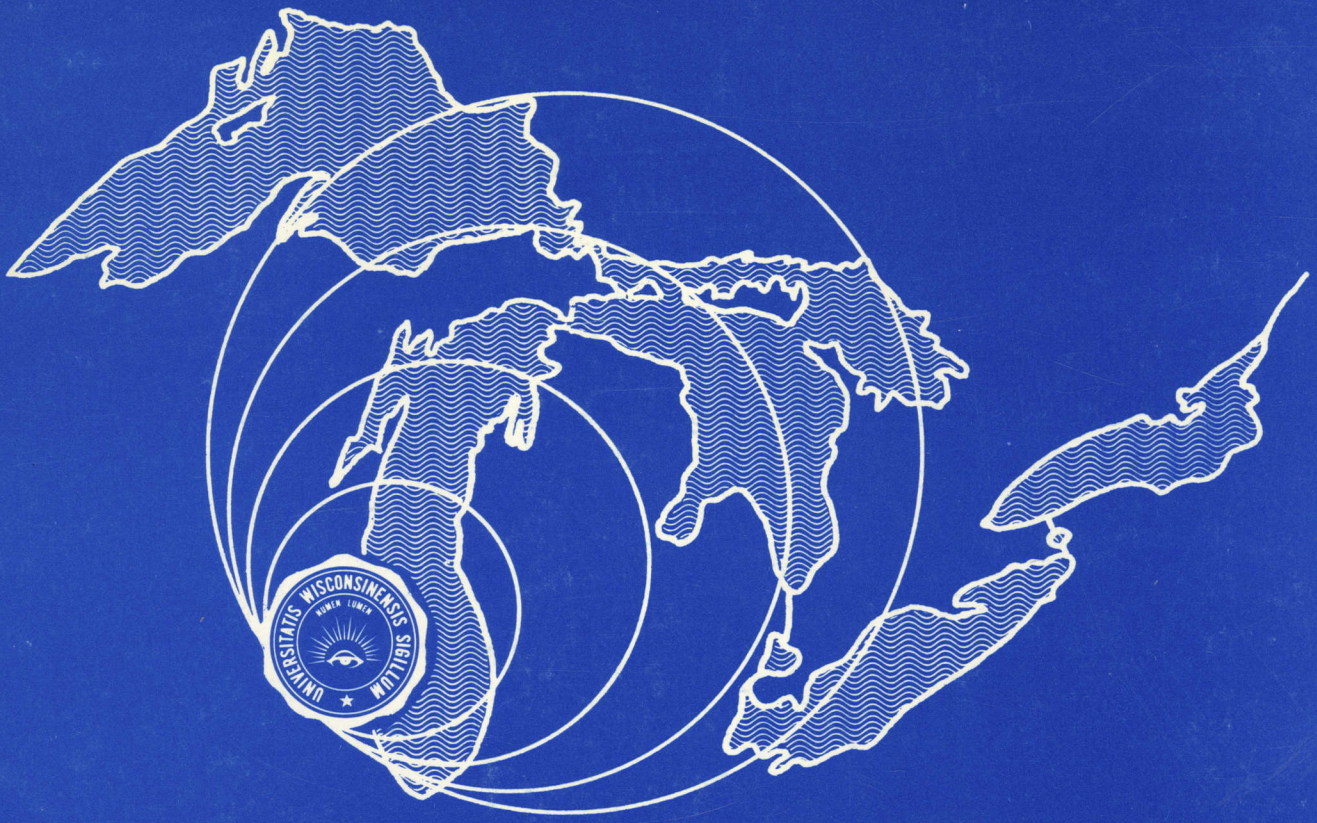

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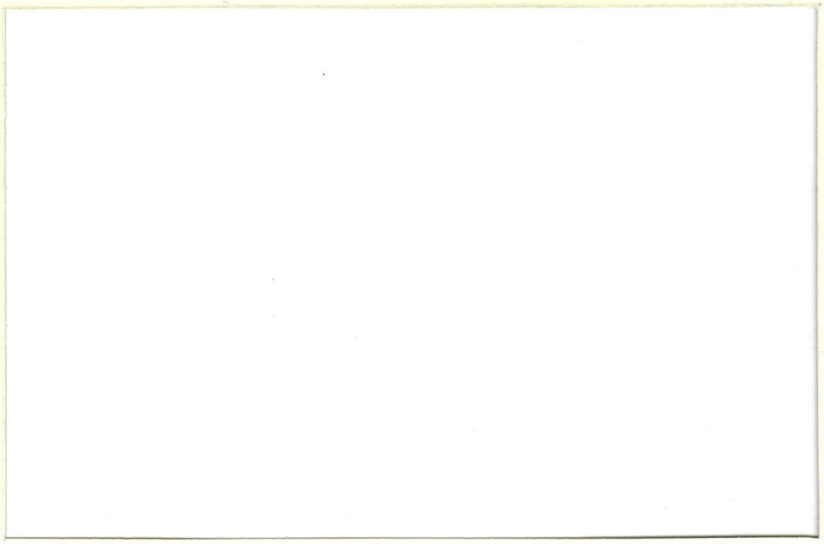

1975

WISCONSIN'S GREAT LAKES PORTS:

BACKGROUND AND FUTURE ALTERNATIVES

by

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for the
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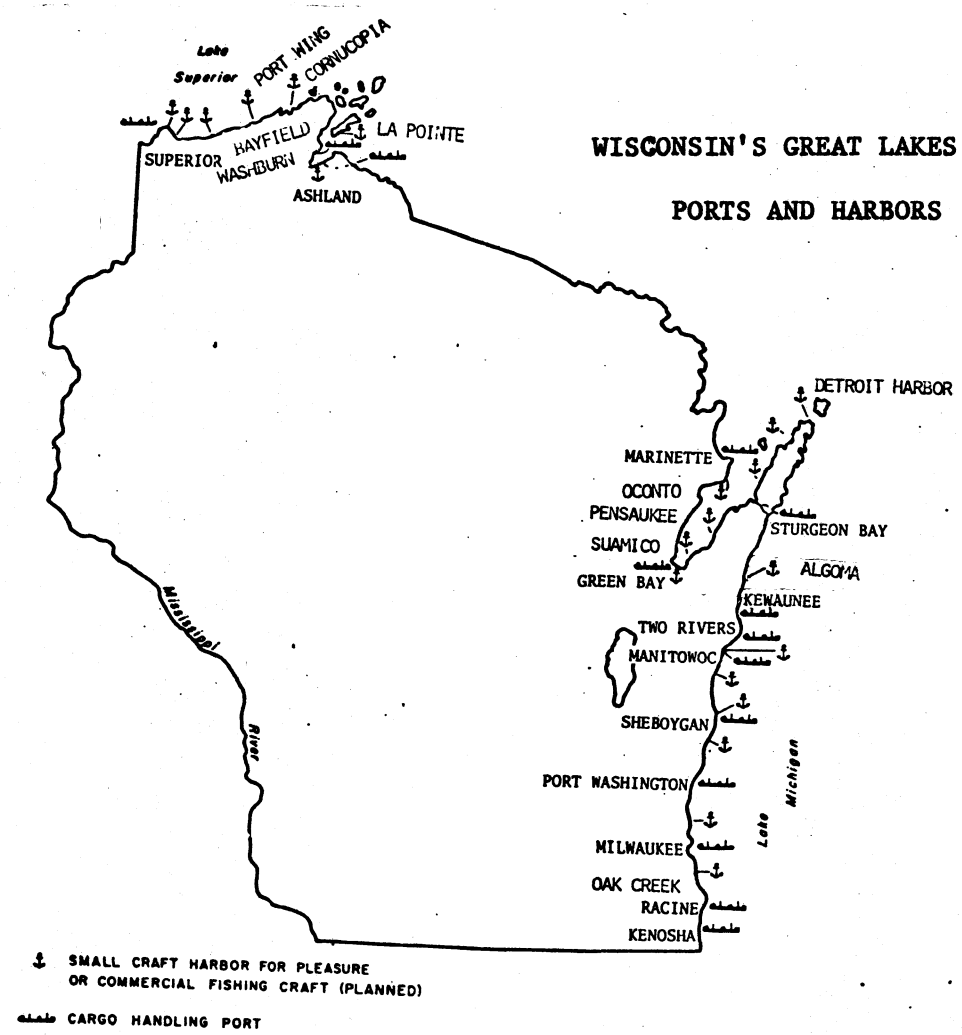

SOURCE: Wisconsin Department of Resource Development.

PREFACE

This report has been prepared by Harold M. Mayer, Professor of Geography and Associate Director of the Center for Great Lakes Studies of The University of Wisconsin-Milwaukee, in accordance with a contract between the State of Wisconsin Department of Transportation and the Board of Regents of The University of Wisconsin, as a part of the Coastal Zone Management Program.

In accordance with the contract, this report is a part of a comprehensive planning study under the Wisconsin Department of Transportation, the objectives of which are to:

1. Document available information on both the historic and current roles of commercial Great Lakes ports in an integrated state transportation system through the compilation of existing data and analyses. (Recreational ports and recreation aspects of commercial ports are not included and will be a part of a separate study, for which the DOT is not responsible.)

2. Identify alternative roles of Great Lakes ports in a future multi-modal transportation system utilizing such information as is currently available. Positive and negative aspects of each alternative will be identified.

3. Provide for further public discussion, several (3 or 4) alternative statewide public policies relating to the role of the public sector in furthering a statewide multi-modal transportation system through inclusion of Great Lakes ports and their corresponding water routes.

In the preparation of this report, the Principal Investigator has had the assistance of members of the Department of Geography and of the Center for Great Lakes Studies of The University of Wisconsin-Milwaukee, as well as of a Port Advisory Committee, the members of which are listed elsewhere in this report.

Specifically, the assistance of Thomas M. Corsi, who served as the research associate on the project, is hereby acknowledged. The typing assistance of both Shirley Baumeister and Irene Berg was greatly appreciated.

Wesley R. Harkins and Robert M. Fraser of the Fraser Shipyards, Inc., contributed valuable material on the port activity in Superior, Wisconsin. Dr. Albert G. Ballert, Research Director of the Great Lakes Commission, also supplied material on the activities of the Superior port.

Although this report was prepared as part of the Wisconsin Coastal Zone Management Program, it is an interim or first phase report and does not necessarily represent the conclusions of the Coastal Zone Management Program of the Wisconsin Department of Transportation.

The preliminary draft is to be revised as the result of suggestions by the three regional planning agencies whose areas border Lakes Superior and Michigan: the Northwestern Wisconsin Regional Planning and Development Commission, the Bay-Lake Regional Planning Commission, and the Southeastern Wisconsin Regional Planning Commission.

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As background material for the Wisconsin Coastal Zone Management Development Program, this report on the future of Wisconsin's Great Lakes ports was prepared for the Wisconsin Department of Transportation. It was written under a contract with the Center for Great Lakes Studies of the University of Wisconsin-Milwaukee, under the direction of Professor Harold M. Mayer. It is concerned exclusively with the commercial ports along the State's Lake Michigan and Lake Superior coastlines, and excludes from consideration the ports and harbors which are primarily or exclusively for recreational boating and commercial fishing.

An overview of the present situation, recent trends, and general prospects for Great Lakes shipping and ports, with special reference to Wisconsin, indicates that ports are significant contributors to the economy and employment of the cities and regions which they service. An important consideration, however, is that there is a danger of over-investment, both publicly and privately, in port terminals and associated facilities which may not always be justified by the prospective port traffic. On the other hand, in order to be competitive, ports must provide for reasonable levels of traffic, including normal peaks. The trend in recent years, both within the Great Lakes and for Great Lakes-overseas traffic through the St. Lawrence Seaway, has been, as elsewhere, for general cargo and some of the bulk traffic to concentrate at fewer but larger and more efficient ports. This is both cause and effect: it generates the need for expeditious turnaround of ships and cargoes, which, in turn, demands substantial investment in expensive port installations. These then need dependable and high volumes of traffic in order to justify the investment.

The report reviews the current situation with respect to each of the components of waterborne traffic and vessels at Wisconsin's Great Lakes ports: (1) direct overseas traffic through the St. Lawrence Seaway including both general cargo and bulk commodities, (2) internal domestic and U.S.-Canadian traffic of the Great Lakes-St. Lawrence system which is nearly entirely comprised of a few bulk commodities, notably grain, iron ore, coal, and limestone, and (3) traffic across Lake Michigan, which is carried mainly in railroad car ferries, currently threatened with extinction.

In view of recent and prospective trends, which are discussed briefly in the report, several conclusions are reached with respect to traffic prospects for Wisconsin's Great Lakes ports in the next two or three decades:

1. Wisconsin's lake ports will continue to be important contributors to the economic base of their cities, regions, and the state.

2. Direct overseas traffic will consist mainly of specialized movements: (a) bulk commodities, such as grain, which will depend in volume upon fluctuating world conditions, and (b) bulky manufactured goods and heavy equipment, that will constitute a major source of movement through one or two of the State's ports. Technological changes in both water and land transportation, including containerization, larger and faster vessels, and overland competitive modes, indicate that the volume of direct overseas cargoes characteristic of the decade of the 1960's following opening of the enlarged St. Lawrence Seaway cannot be expected in the future.

Shipping on the Great Lakes, as elsewhere, will tend to be concentrated (a) at fewer but more efficient comprehensive ports, and (b) at specialized ports handling cargoes for one or a few industries utilizing water transportation for shipment or receipt of bulk materials.

Within the State, most harbors have channels maintained by the federal government, but the preponderant number of terminals is owned and operated privately. The amount of investment required for modernization of port terminals and associated facilities, other than for individual industries, may not be offset by port revenues, and therefore public investment may be justified in terms of the economic benefits to community and region. Several options are presented with respect to public - including State - participation in port development, construction, financing and operation. The geographic extent of the various possible organizational arrangements is also discussed. The report does not recommend any particular option. State participation in port promotion and industrial development, however, is indicated as being advantageous.

CHAPTER I

WISCONSIN'S PORTS AND GREAT LAKES TRAFFIC: AN OVERVIEW

The State of Wisconsin has ports on the two western-most of the Great Lakes: Superior and Michigan. These ports together handle a substantial proportion of the total traffic of the Great Lakes, both internal and overseas. Developments of the past few years in the technology of both Great Lakes and ocean transportation and in competing and complementary overland transportation modes, and important changes in the economic geography of the United States, Canada, and overseas nations, have combined to make necessary a reassessment of the potentialities of the Great Lakes as a transportation facility. In turn, the states bordering the lakes, together with other states, are in the process of preparing comprehensive statewide transportation plans, in which the roles of the Great Lakes and of the lake ports are to be related to the overall state plans. In Wisconsin, a state transportation plan is being prepared by the Wisconsin Department of Transportation, Division of Planning, and the present report will be an input into that plan.

This report is confined to a consideration of those Wisconsin ports which handle commercial shipping traffic. Many of the harbors of the State handle primarily or exclusively recreational boating or commercial fishing, or both. Although incidental reference is made to such harbors, they are not within the scope of the present report.

Economic Significance of Port Activity

With few exceptions, the ports of the United States, including most of those in Wisconsin, are subject to a degree of public control, although the great majority of port terminal facilities are privately owned and/or operated. Nationally, the trend has been toward public port development and operation. The public benefit is the underlying rationale for public involvement in ports. A public agency can insure that all prospective users who can benefit from the port facilities have access to them on equitable terms and can bear the high costs of construction and operation of port facilities, since such facilities rarely produce sufficient revenue to amortize the large investments which are needed. Commonly, such revenues do not even cover the out-of-pocket costs. Many of the benefits, as well as the costs, are "external", benefitting the community and region as a whole. Therefore, the community, region or State is justified in assuming some of the port costs in return for the benefits, that are both tangible and intangible. Although the ports generally have resisted much federal involvement, except for the provisions of harbors and channels, there has recently been a softening of that attitude, on the basis that some of the costs are imposed by federal requirements, as for meeting environmental standards, and that many of the ports benefit the nation as a whole.

However the community is defined, ports produce a "multiplier" effect, in providing directly or indirectly, employment and income to the community. The geographic area of multiplier effects may be local - confined to the city or metropolitan area - or may be much more extensive, in the case of major ports

extending into a nation-wide or even international hinterland. The community receives benefits from industries which may be attracted to the port region, in the form of employment and tax revenues, as well as from the direct employment in the construction and operation of the port itself and in the associated activities. Thus, employment is directly created by the port, and indirectly in port-oriented industrial and commercial activities. In support of those employed either directly or indirectly, there must be provision for housing feeding, clothing, educating, governing, entertaining, and supplying other needs of the population; in turn, that population must be served by others, so that the multiplier effect goes through many rounds.

Although it is difficult, and in many instances impossible, to isolate the employment opportunities and investment in port-related industrial and commercial activities, the impact of a major port is very large. It was estimated over a decade ago that the Port of New York, the nation's largest, directly employed over 200,000 people. These included employees of steamship companies, railroads, truckers, airlines, warehouses, stevedoring contractors, freight forwarders, tug operators and many others.[1/] Because indirect port-associated employment is subsumed in the entire economy of the region, it is practically impossible to estimate the total employment and economic effects of the existence of a port within a region. However, there are a few studies which have attempted to estimate the magnitude of a port's regional economic impact.

A study of the Port of Baltimore, which is a large comprehensive port handling both general cargo and bulk commodities, including substantial volumes to and from the midwest, estimated that in 1966 the port activities generated 626 million dollars of direct economic benefit and created directly employment for over 62,000 oeople.[2/] Another study concluded that the Port of Seattle generated, in 1969, 39,000 jobs and 322 million dollars in payrolls within its county, while indirectly stimulating over one billion dollars in business activity within the county. It was estimated that an average ton of cargo moving through the port generated $110 dollars in payrolls, and that the job-holders directly related to the port, together with those private enterprises related to maritime commerce produced over 39 million dollars in state and local taxes.[3/]

While the ports of Wisconsin and other Great Lakes states handle primarily bulk cargoes rather than the general cargo traffic that yields more direct employment and revenue per ton, there is nevertheless significant employment produced directly by the larger of these ports, while the indirect effects, in stimulating the location of industry in the States and the Great Lakes region, though not subject to accurate measurement, is substantial.

1/ Chinitz, Benjamin, Freight and the Metropolis. Cambridge: Harvard University Press, 1960, p. 2.

2/ Hille, Stanley J., and Suelflow, James E., The Economic Impact of the Port of Baltimore on Maryland. College Park, Md.: University of Maryland Department of Business Administration, June 1969.

3/ Seattle Maritime Commerce and its Impact on the Economy of King County. Port of Seattle Commission, 1971.

Studies of Wisconsin's three most important Great Lakes ports indicate the economic impact of those ports upon their communities.

A study of the Port of Milwaukee several years ago reached the conclusion that:

> "Income directly generated by Milwaukee waterborne commerce amounted to about $22.1 million in 1963. According to the Census Bureau, total income for the Milwaukee SMSA including Milwaukee and Waukesha counties, was $2,716 million. Thus it appears that shipping activities directly generate about 0.93 per cent of Milwaukee County's income, or 0.81 per cent of income in the SMSA."[1/]

These figures do not take into account the multiplier effect generated by the expenditure of the original 22.1 million dollars. Including the multiplier, it was roughly estimated that total income generated by the Port of Milwaukee was about $64.1 million in 1963, or about 2.70 per cent of total Milwaukee County income and 2.36 per cent of the income of the SMSA.[2/]

Estimates of the number of jobs attributable to the port were also made. Using the Census figure for median family income for the Milwaukee SMSA and applying it to the estimate of port-generated income, it was estimated that port activities directly provided income for 3,156 typical Milwaukee area families. Including the multiplier effects of their expenditures, port activities were the ultimate source of income for 9,168 families, or about three percent of the total population.[3/]

A similar study, by the same economist, was made for Green Bay.[4/] The conclusion was not very different than that for Milwaukee.

The Green Bay study concluded that general cargo, consisting principally of manufactured and high-class freight, generated 24 dollars of revenue per ton at the Port of Green Bay in 1971, while bulk commodities generated from 3.5 to 7.5 dollars per ton. It was found that:

> "Income generated directly by Green Bay waterborne commerce averaged about 11.9 million dollars annually from 1966-1970, and the total income directly generated in 1970 was 12.1 million dollars. According to the 1970 census, total income in Green Bay was $250,513,600; and total income for the Green Bay SMSA was $443,117,992. Thus port operations at Green Bay directly generated about 4.8 per cent of Green Bay's total income, and about 2.7 percent of total income in the Green Bay SMSA."[5/]

1/ Schenker, Eric, The Port of Milwaukee: An Economic Review. Madison: The University of Wisconsin Press, 1967, p. 135.
2/ Ibid., P. 137.
3/ Ibid., P. 138.
4/ Schenker, Eric, and Geiger, Joseph L., The Impact of the Port of Green Bay on the Economy of the Community. University of Wisconsin Sea Grant Program, Technical Report 16, November 1972.
5/ Ibid., P. 98.

Including the multiplier effect, it was estimated that the total income generated by the Port of Green Bay in 1970 was about 29.4 million dollars. This was 11.7 percent of the total Green Bay income, and 6.6 percent of the SMSA income.

Two studies have recently been made of the economic impact of the twin port of Duluth-Superior.

One of these studies indicated that the direct impact amounted, in 1972, to $192.9 million. Of this amount, dry bulk cargoes, which were 30.06 million tons, produced $3.11 per ton, for a total of $93.5 million; processed agricultural products and liquid bulk, 261 thousand tons at $11.06 per ton, generated $2.9 million; scrap metal and iron, 64 thousand tons, at $6.6 per ton, generated 422 thousand dollars; and general cargo and miscellaneous, 279 thousand tons at 22 dollars per ton generated directly $6.14 million dollars of income, for a total direct impact of $102.9 million dollars.[1/] There was no attempt, however, to estimate the indirect impact of port activity.

Another study of the economic impact of the Port of Duluth-Superior was made by the Seaway Port Authority of Duluth.[2/] According to that study, approximately 2,000 people in the Duluth-Superior area depend upon waterfront activity directly for their livelihood. International waterborne traffic at Duluth-Superior in 1974 was estimated to have generated a total of $37.1 million dollars of direct economic benefit to the twin ports. This traffic included general cargo ($2.4 million), bulk liquids ($518 thousand), export grain overseas ($18.6 million) and to Canada for transhipment ($10.7 million) and miscellaneous bulk and liquid, and grain by-products ($4.8 million). General cargo was estimated to have produced $30.30 per ton to the area's economy in 1972 and $37.85 in 1974.

The report does not separate from the total for Duluth-Superior the traffic for Superior alone. In 1973 Superior's share of the total traffic was 44.43 percent, and for overseas traffic it was 65.73 percent. Conservatively estimating Superior's share at half the total, its traffic would be responsible for direct economic benefit to the region of something like 18.6 million dollars in 1974. However, the traffic in that year was substantially below that of other recent years.

These figures do not include the "multiplier" or indirect effects of the port's activities. A reasonable estimate of the multiplier would be about 2.5 times the direct income. Applying that to the 18.6 million dollars of direct benefit in 1974 from Superior's port activity, a crude estimate of the economoic impact of the port traffic at Superior in 1974 upon the region would be about $46.5 million. In a normal year it would, presumably, be considerably higher.

1/ Cresap, McCormick and Paget, Inc., A Study of Organization and Development for the Duluth/Superior Ports, Vol. 1, Port Activities and Organization. Upper Great Lakes Commission, May 1974, Exhibit VI-1.

2/ The Seaway Port Authority of Duluth, "The Economic Impact of Minnesota's World Port". Duluth n.d., ca. 1975, var. pg.

The estimates of economic impact of port activity are gross figures. To derive the net effects, it is necessary to subtract the costs of port construction, operation, maintenance, promotion, and capitalization. Yet, even these direct local costs do not represent the total cost of a port operation. The above costs do not, for example, include expenditures by the Army Corps of Engineers for harbor dredging and improvement. They also do not include expenditures outside the port area that can be traced to the existence of port activities. Indeed, highways leading to the port area require more maintenance as the result of truck traffic to and from the port area. These indirect costs are necessarily extremely difficult to document and, as a result, the total cost to a region of having a port is difficult to estimate. Each port has a minimum threshold or critical level of traffic that it must generate in order to avoid causing a net detriment to the local economy.

The geographic scale at which the question of a port's net impact is measured may have a bearing on the conclusions reached. A port may have a small economic benefit measured on a local scale, but may be detrimental from a statewide or national perspective.

Figures from the Milwaukee Board of Harbor Commissioners during Calendar Year 1974 indicate the balance between revenues and expenditures for a particular Wisconsin port. Total revenues from ports operation totaled $1.2 million while total direct, non-capital expenditures equaled $981,062 - a surplus of $222,000. In addition, the Board of Harbors Commission spent $276,599 in capital improvements. In order to place this relatively small capital expenditure in proper perspective, it should be noted, for example, that the cost of one large container crane is approximately $2.5 million. A berth for container ships would also require 30 acres of backup land to store containers for loading and unloading purposes. To support such a facility, the traffic volume of general cargo would have to be many times that now handled at any Wisconsin port.

In summary, although the Milwaukee port operations and construction costs only had a slight deficit, it should be emphasized that current expenditures do not represent a level necessary to support active, modern port operations.

It is clear, therefore, that ports generate substanial employment and income for their communities and regions.

On the other hand, there are many ports serving a region or state, and they compete for the traffic generated by a common hinterland. Substantial investment is required to provide the facilities necessary to attract and handle the port traffic, and there is always the possibility of over-investment with the expectation that any given port will be more successful than its competitors in attracting traffic to and from a common or overlapping hinterland. Except for a few of the largest ports, the hinterland typically consists of a local community or metropolitan area, in which a relatively few industries are attracted or retained because of the bulk traffic made possible by the existence of the port. The trend in recent years, because of technological change and the consequent increased need for large investment of sophisticated port terminals, is, world-wide, for general cargo, which creates the most direct

employment, to be concentrated at fewer but larger and more efficient ports, while bulk traffic, specialized in nature, moves not only through comprehensive ports, but also through specialized ports which can attract and hold large industries that benefit from the waterborne receipt or shipment of bulk commodities. The increasing sophistication of general cargo handling, together with the consequent substitution of capital for labor, have resulted in a rapid decline in direct waterfront employment in the handling of general cargo, while the employment resulting from bulk commodity movements is typically indirect rather than direct, because bulk commodities require little waterfront labor. In Wisconsin, a very limited number of ports, as discussed later, have prospect of handling much general cargo, but waterfront and other industries can - and do - generate bulk traffic at more specialized port terminals.

Traffic of Wisconsin's Great Lakes Ports

The traffic on the Great Lakes - past, present, and prospective - may be divided into three general categories: (1) direct overseas traffic, carried in ocean-going vessels, or "salties", which enter and leave the Great Lakes through the St. Lawrence Seaway; (2) inter-lake traffic, both domestic between United States ports on the Great Lakes, and traffic between United States and Canadian ports[1/] moving between the United States and Canada;[2/] and (3) intra-lake traffic, which in recent years at Wisconsin ports has been principally traffic handled aboard railroad operated car ferries crossing Lake Michigan.

The ports of Wisconsin may be divided into several categories, using different sets of criteria. Such division is essential to an understanding of the roles of the respective ports.

An obvious geographic division is into ports on Lake Superior and Michigan, respectively, since the State of Wisconsin has coastlines on both lakes. On Lake Superior, one port--Superior--dominates, with over 20 million tons of waterborne traffic per year. The only other Wisconsin port on Lake Superior with any substantial volume is Ashland, which in 1973 handled 370 thousand tons. Minor Lake Superior ports, handling fish and other local traffic, includes Bayfield, Cornucopia, La Pointe, Port Wing, and Washburn harbors.

The Lake Michigan ports of Wisconsin include two with substantial volumes of direct overseas traffic as well as inter-lake and intra-lake traffic: Milwaukee and Green Bay.

The former handled in 1973, 5.64 milion tons, including 925 thousand tons of direct overseas traffic, and the latter 2.7 million tons, including 69 thousand tons of direct overseas traffic. In addition to Milwaukee, which has two cross-lake railroad car ferry routes, Manitowoc and Kewaunee are also ferry ports,

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1/ Domestic Canadian traffic within the Great Lakes, though considerable, is not directly relevent to the ports of Wisconsin, and is therefore not considered in this report.

2/ Traffic between the Great Lakes and Canadian ports on the St. Lawrence River and in the Atlantic Provinces, moving through the St. Lawrence Seaway, is here classified as inter-lake traffic, since it does not move overseas and is handled principally in lake-type vessels.

each handling between 1.2 and 1.4 million tons of traffic in 1973, most of which was moved by the railroad ferries. No other Lake Michigan port in Wisconsin handled more than one million tons. Port Washington received over 800 thousand tons, principally fuel, including coal for an electric generating plant. A private harbor--Oak Creek-south of Milwaukee, received a substantial volume of coal traffic, but in 1974, the volume was much reduced as unit trains moved most of the coal to the Oak Creek electric plant.

The tonnages handled at each of Wisconsin's Great Lakes ports in 1973, the most recent year for which detailed statistics are available, is shown in Table 1. The port traffic is divided into "lake-wise" (including both domestic and U.S.-Canadian movements), and "overseas" which includes traffic moving through the St. Lawrence Seaway between United States ports on the Great Lakes and overseas ports. Although the latter traffic in 1973 was substantially below that of some other recent years, the lakewise traffic followed essentially the same patterns and volumes as in other recent years.

The Wisconsin ports together contribute approximately fifteen percent of the total receipts and shipments of all United States ports on the Great Lakes. The latter in typical recent years has exceeded 200 million tons, and has been slowly increasing, although the Great Lakes share of total goods movement of the United States has been steady or slowly declining, due to the increased competition of other modes than water carriers. The tonnages annually since 1955 are shown in Table 2, which indicates the proportions of Great Lakes traffic that is overseas, Canadian, and domestic.

The Great Lakes--St. Lawrence System

The Great Lakes together constitute the largest body of navigable freshwater in the world. With a relatively small drainage basin of 295,000 square miles, the lakes themselves have a surface area of just under 100,000 square miles. Elevations above sea level range from 246 feet for Lake Ontario to 602 feet for Lake Superior. From the head of the lakes at Duluth and Chicago, distances to the head of tidewater at Montreal are 1,337 and 1,244 statute miles, respectively, while Montreal is 800 or 1,000 miles from the Atlantic Ocean south and north of Newfoundland, respectively.

While a significant proportion of the Great Lakes, as well as the Great Lakes-St. Lawrence route, involves openwater navigation, the connecting channels between the lakes, and much of the St. Lawrence River, especially above Montreal, involve transit through confined channels. These place serious limitations upon the dimensions--especially the drafts-- of vessels. Also, the seasonality of the inter-lake and St. Lawrence operations impose further handicaps. Among the most significant current and prospective developments are the attempts, at least partially, to overcome these limitations.

Significant changes are now underway with respect to shipping on the Great Lakes. These changes involve internal Great Lakes shipping, including both domestic and international U.S.-Canadian trade, and external shipping between

Table 1

WATERBORNE COMMERCE OF WISCONSIN GREAT LAKES PORTS, 1973
IN TONS
(1 ton = 2,000 lb.)

Lake	Port	Lakewise	Overseas	Total
Superior	Superior	17,646,961	3,175,190	20,822,151
	Ashland	369,532	-	369,532
	Bayfield	5,057	-	5,057
	Cornucopia Hbr.	47	-	47
	La Pointe Hbr.	4,000	-	4,000
	Port Wing Hbr.	197	-	197
Total:	Lake Superior	18,025,794	3,175,190	21,200,984
Michigan	Menominee River and Harbor	185,827*	-	185,827*
	Green Bay	2,654,122	69,474	2,723,596
	Sturgeon Bay	266,910	-	266,910
	Kewaunee	1,384,863	-	1,384,863
	Two Rivers	77,380	-	77,380
	Manitowoc	1,252,220	636	1,252,856
	Sheboygan	240,822	-	240,822
	Pt. Washington	869,734	-	869,734
	Milwaukee	4,710,305	925,219	5,635,524
	Racine	93,443	-	93,443
	Kenosha	44,140	-	44,140
	Algoma	45	-	45
	Detroit Hbr.(WI)	8,709	-	8,709
	Oconto	1,479	-	1,479
	Pensaukee	3,522	-	3,522
Total:	Lake Michigan*	11,793,521	995,329	12,788,850
Total, Wisconsin Great Lakes Ports*		29,819,315	4,170,519	33,989,834

*Menominee Harbor and River includes Menominee, Michigan and Marinette, Wisconsin; separate figures for the two ports are not available. Also excludes traffic at Oak Creek, Wisconsin, a private harbor.

Source: U.S. Army, Corps of Engineers, Waterborne Commerce of the United States, Part 3, Waterways and Harbors, Great Lakes, calendar Year 1973. Figures for Superior are separated from Corps of Engineers combined figures for Duluth-Superior, courtesy of Wesley R. Harkins, Fraser Shipyards, Inc., Superior.

Table 2

U. S. GREAT LAKES CARGO TRAFFIC 1955-1973
(1 ton - 2000 lb.)
(FIGURES ARE IN TONS)

Year	Foreign		Domestic*	Total	Percentage		
	Overseas	Canadian*			Overseas	Canadian	Domestic
1955	534,980						
56	574,152						
57	488,368						
58	730,360						
59	3,937,987						
60	4,869,818						
61	5,382,505						
62	6,081,410	34,999,534	143,235,317	184,316,261	3.30	18.99	77.71
63	5,557,416	40,897,924	163,057,741	209,513,081	2.66	19.52	77.82
64	7,632,186	46,931,939	158,690,641	213,254,766	3.58	22.01	74.41
65	9,979,240	46,752,471	160,723,471	217,455,182	4.59	21.50	73.91
66	10,967,301	47,490,933	173,218,607	231,676,841	4.74	20.50	74.76
67	10,117,839	45,166,000	161,969,660	217,253,499	4.67	20.78	74.55
68	12,440,377	50,103,001	159,234,372	221,777,750	5.61	22.59	71.80
69	11,714,140	45,005,969	169,218,271	225,938,380	5.18	19.92	74.90
1970	11,371,180	50,966,658	165,884,659	228,222,497	4.98	22.33	72.69
71	15,588,039	43,862,025	149,396,186	208,846,250	7.46	21.01	71.53
72	15,919,049	44,213,580	153,842,184	213,974,813	7.44	20.66	71.90
73	15,333,679	51,424,612	165,143,612	231,901,903	6.61	22.18	71.21

Source: U. S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 3, Waterways and Harbors, Great Lakes, annual.

*From 1955 through 1961, the Army Corps of Engineers did not provide summary statistics for Canadian and Domestic cargo movements.

Table 3

MAJOR COMMODITIES CARRIED ON THE GREAT LAKES, 1971-73
(1 ton = 2000 lb.)
(FIGURES ARE IN TONS)

Commodity Year	Foreign		Domestic	Total	Percent of all traffic	
	Overseas	Canadian				
Grain						
1971	3,424,389	2,184,938	1,791,286	7,400,613	3.54	
1972	5,325,476	2,273,964	1,834,572	9,434,012	4.41	
1973	5,546,959	5,759,948	1,668,348	12,975,255	5.60	
Iron Ore						
1971	23,740	15,218,176	65,309,531	80,551,447	38.57	
1972	684	15,092,619	69,818,210	84,911,513	39.68	
1973	35,812	18,506,231	79,923,171	98,465,214	42.46	
Coal						
1971	73	17,206,859	26,105,089	43,312,021	20.74	
1972	47	17,849,361	25,272,527	43,121,935	20.15	
1973	10,149	16,087,629	23,908,519	40,006,297	17.25	
Limestone						
1971	1,892	1,401,456	28,334,549	29,737,897	14.24	
1972	1,683	1,487,075	29,508,806	30,997,564	14.49	
1973	649	2,019,933	34,000,010	36,020,592	15.53	
Total All Commodities						% all traffic--all commod
1971	15,588,039	43,862,025	149,396,186	208,846,250	100	77.09
1972	15,919,049	44,213,580	153,842,184	213,974,813	100	78.73
1973	15,333,679	51,424,612	165,143,612	231,901,903	100	80.84

Source: U. S. Army Corps of Engineers, Waterborne Commerce of the United States, Part 3, Waterways and Harbors, Great Lakes, annual.

the Great Lakes, lower St. Lawrence River ports, and overseas. This section of the report presents a general overview of some of these recent changes, changes in progress, and prospective changes in Great Lakes shipping which are relevent to policy decisions with respect to Wisconsin's Great Lakes ports.

The Great Lakes traffic consists overwhelmingly of a few bulk commodities, principally iron ore, coal, limestone, and grain. Table 3 shows, for 1971, 1972 and 1973, the tonnages of each of these commodities, as well as the total tonnages for each year, in overseas, Canadian, and domestic trade on the Great Lakes, as well as the proportion of the total traffic contributed by each of the four commodities in each of the three years.

Three types of movements especially involve the lake ports of Wisconsin: overseas general cargo, bulk movements in intra- and interlake trade, and the cross-Lake Michigan railroad car ferries.

The overseas general cargo traffic involves considerably higher values per ton than do the basic bulk commodities. It requires more labor-intensive handling and, in spite of the prominent trend toward unitized cargo handling including containerization, still provides more direct employment at the ports than do the bulk commodities movements.

The car ferry traffic across Lake Michigan, involving the ports of Milwaukee, Manitowoc, and Kewaunee, constitutes an immediate problem for the State of Wisconsin, and is discussed in some detail later in this report.

In addition to cargo, some of the lake ports of Wisconsin handle seasonal passenger traffic, although passenger movement on the lakes has been steadily declining for many years, and is now a very small proportion of the volume of several decades ago. The principal passenger movements are seasonal, and include primarily the car ferry traffic, although some local ferry and excursion traffic is handled at minor ports, such as Bayfield, near the Apostle Islands of Lake Superior, and at Gills Rock, at the tip of the Door peninsula, connecting with Washington Island.

The St. Lawrence route between the Great Lakes and overseas was not created anew with the opening of the present St. Lawrence Seaway in 1959. Small Canadian canals circumvented the rapids of the St. Lawrence, and the predecessor of the Welland Canal connected Lakes Erie and Ontario since the period immediately following the War of 1812, when Canada developed a route competitive with the Erie Canal across New York State between the Great Lakes and tidewater. As early as the mid-1850's, wheat was shipped from the upper lakes to Europe. A series of consecutive enlargements of the route culminated, in the early years of the twentieth century, in a number of canals along the present Seaway route. In 1932 the Welland Ship Canal, with eight locks, opened up Lake Ontario to the large "upper laker" bulk carriers. That canal, subsequently partially rebuilt, constitutes part of the present Seaway. In 1933 the first regularly scheduled cargo liner service, utilizing small vessels, connected the Great Lakes with Europe. Such services, except for interruption during World War II, have been continuous. Since the opening of the present enlarged Seaway, larger vessels have been used for such liner services, and numerous bulk-carrying vessels have been engaged in tramp services. The depths to which

the channels were dredged, and the dimensions of the locks along the route, however, were much more influenced by the anticipated transits by lake-type bulk vessels than by the characteristics of salt-water ships. The standard Seaway depth is 27 feet, and most of the major Great Lakes harbors have been dredged to the same depth. This normally permits access and transit by vessels of up to 25 feet 9 inches draft.1/The result of these decisions, made several decades ago, is that a rapidly decreasing proportion of the world's oceangoing vessels can utilize the Great Lakes-St. Lawrence route, and the economies of scale currently realized on most of the principal ocean routes cannot be realized for Great Lakes-overseas movements.

Until 1959, there were 22 small locks in the six canals bypassing the rapids of the St. Lawrence River in the 110 miles above Montreal. Lake vessels transiting to and from the lower St. Lawrence were designed to fit these locks. They were limited to a length of 259 feet, a beam of 43.5 feet, and a draft of 14 feet. With those dimensions, they could carry up to 3,000 tons of cargo. Over 200 such "canallers" were in operation through the St. Lawrence canals during the period between World War II and the opening of the enlarged Seaway in 1959. Virtually all of them were under Canadian registry, and they included both "package" freighters and bulk carriers. The early pre-seaway general cargo liners, which pioneered the Great Lakes-overseas direct trades between 1933 and 1959, were limited to the same dimensions, but, because of their necessarily finer lines as seagoing ships, such "salties" could not move more than 1,600 tons on canal draft. They usually topped off with an additional thousand tons in the lower St. Lawrence for the ocean voyage. Whether lakers or "salties," the vessels moved slowly through the canals and channels paralleling the St. Lawrence above Montreal. They commonly took three days between Lake Ontario and tidewater.

After five years of construction, between 1954 and 1959, the Seaway was opened. The St. Lawrence portion involved the building of two dams, a diversion dam at Iroquois, and the Moses-Saunders dam, with two million kilowatts of electric generating capacity, between Massena, New York, and Cornwall, Ontario. Without the power, the Seaway as a navigation project would probably have been econonomically and politically unfeasible because all of the construction and facilities jointly used for navigation and power are charged against the power, rather than the navigation. The costs and benefits originally were assigned for navigation on the basis of twenty-nine percent to the United States, and the remainder to Canada; later this ratio was changed slightly, and the toll revenues are similarly assigned to the two nations. Of the seven locks between Lake Ontario and tidewater, two are within, and were constructed by the United States. In addition, the United States also constructed the ten-mile Wiley Dondero Canal.

Although most of the pre-opening traffic estimates for the Seaway were initially optimistic, during the early 1970's the volume reached the projections for that period. However, in 1974, for which final figures are not yet available, a substantial decline in traffic has been noted. Throughout the entire sixteen years of its operation, the Seaway, as anticipated, has been predominantly an artery for bulk traffic, rather than for general cargo. Through the Lake Ontario-Montreal section, the Seaway proper, the predominant cargoes consisted

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1/ Vessels are normally loaded to a maximum 25'9" draft for safety reasons.

of grains downbound and iron ore, principally from the Quebec-Labrador area, upbound. These cargoes are carried in lake-type vessels, slightly modified for Seaway operation. Many of them were specifically built to the maximum dimensions of the Welland and Seaway locks: 730 feet long, 75 feet beam, and a maximum draft of 25 feet 9 inches. With those dimensions they can normally carry up to about 28,000 tons of cargo. Because of higher costs of United States-flag operation, the overwhelming proportion of such so-called "maximum lakers" are under Canadian registry, although recent additions to the American flag fleet are modifying that circumstance slightly. The complementary of the eastbound grain and the westbound ore movement is a fortunate circumstance. Many of the lakers carry grain from both Canadian and United States ports on Lake Superior and Lake Michigan to the lower St. Lawrence for transfer there to larger oceangoing vessels. The proportion of laker to "salty" vessels engaged in Seaway grain movement is in major part a function of the worldwide demand for tramp bottoms. When the demand for oceangoing, dry-cargo ships is high as during the American actions in Southeast Asia, a higher proportion of outbound grain is transshipped in the lower St. Lawrence, and fewer "salties" loaded at the lake ports.

Except for the unusual circumstances of 1974, when strikes partially crippled the movements, a collision blocked the Welland Canal during the peak of the season, and the business recession resulted in lessened industrial activity, it now appears that the long-term capacity of the St. Lawrence Seaway system will be limited, not by the ability of the system to attract bulk cargoes, but rather by the physical capacity of the system to handle the movements. In the early 1970's, the Lake Ontario-Montreal section handled nearly sixty million tons of cargo per year, very close to the early estimates of its capacity. Fortunately, the efficiency of the waterway route has been substantially improved by the trend toward larger vessels, handling more tonnage per transit; the "maximum laker" is now much more typical than the very few surviving pre-Seaway small "canallers," which have virtually disappeared. Also, additional annual capacity has been provided by the successive lengthening of the navigation season, both with earlier openings and later closings.

There have been significant shifts in both the character and the direction of the Great Lakes-overseas direct trades through the St. Lawrence Seaway in recent years. After an initial experimental period, the volume of general cargo carried by scheduled liner services peaked several years ago at about five million tons per year, with about 60 regular liner services. Since the opening of the Seaway, radical changes in the technology of both inland and ocean transportation have had almost catastrophic effect upon the Great Lakes-overseas general cargo trades.

General cargo, which moves in scheduled liners, in contrast to bulk cargo, after an initial period of expansion for several years, has been declining, precipitously in 1973 and even more so in 1974. The number of cargo liner services between the Great Lakes and the overseas which reached about 60 a few years ago, declined to about a dozen in recent years.

In the early years, and to a dominant extent, still, these movements involved break-of-bulk on the Great Lakes ports. Within the lakes, turnaround time of

breakbulk liners is slow, and the port operations are labor intensive. As elsewhere throughout the world, "load centers" developed, involving concentrations of cargoes at fewer, but larger and more efficient ports. The smaller Great Lakes ports found that, with the Great Lakes-overseas vessels transiting the Seaway several times as large as their pre-Seaway counterparts, they were largely bypassed. Then in the late 1960's, containerization became dominant on the world's major ocean routes, and inter-modal transportation rapidly replaced breakbulk movements.

For containerized movement of cargo operating as well as fixed costs are so high that they require very fast port turnaround and large concentrations of cargo volume. The infrastructure of inland transportation, including railroad piggyback and container operations and faster freight trains, the building of the interstate highway system and the rapid expansion of intercity trucking, and in general, the adoption of new technology at ports for inter-modal interchange of containerized cargoes and roll-on-roll-off inter-modal movements, all combined to facilitate the capital investment--justified only by heavy traffic volumes--at the coastal ports. A modern container ship represents as much as twenty-five thousand dollars per day, a container crane may cost up to two million dollars, and an efficient berth for a container ship embraces from 30 to 50 acres of land. Even if all of the general cargo Great Lakes-overseas traffic of the peak recent year were concentrated at a single port, it would scarcely justify the huge investment that would be required. Furthermore, the limited navigation season, the hazards of operation in confined channels, and the necessarily long turn-around time between entering and leaving the Great Lakes-St. Lawrence route in competition with "load centers" at salt-water coastal ports constitute additional needs for improvements to fully develop the potentials of Great Lakes-overseas all-water traffic.

This pessimistic picture was compounded in 1973 by a precipitous decline in general cargo traffic, and in 1974 by an even greater decline. In the past year, certain sporadic, previously mentioned, events led many to believe that the decline was unusual. In spite of these events, several of the major Great Lakes ports are preparing and developing plans for greatly expanded overseas general cargo traffic. Meanwhile, in 1974, direct overseas general cargo traffic declined by about half at the Port of Chicago from 1973, which itself was a poor year, with volume running substantially under 1971, the peak year. At Milwaukee, similarly, the 1974 total overseas tonnage was less than half of the volume of the previous year.

Thus, the conclusion is clear that the Great Lakes-overseas general cargo traffic is no longer as vital as it once was, and the optimistic projections of the pre-Seaway years will not be realized in the foreseeable future.

This conclusion, however, does not mean that the overseas trade through the Seaway will not continue in substantial volume. The traffic will, even more than previously, be bulk traffic, in spite of the fact that a declining proportion of the world's ships are physically able to transit the Seaway, the connecting channels within the Great Lakes, and the major lake harbors. Just as the Panama Canal inspired a cluster of vessel sizes of the maximum able to transit the waterway, so the Seaway is producing a "handy size" bulk carrier,

built to the maximum dimensions admissable in the Seaway. Some of the Great Lakes ports are in a strategic position to handle specialized cargoes. Major metropolitan industrial areas on the lakes, including Milwaukee, produce heavy and bulky manufactured products, such as mining and construction machinery, locomotives and many other items which cannot be transported overland because of their bulk or weight. Heavy-lift traffic at Milwaukee represents a movement of considerable consequence, and with excellent prospects for the future, involving specialized port terminal facilities, and in some cases, specialized vessels, through the Seaway. Also there is some possibility of expanding container feeder services, as well as Lash and Seabee barge services, directly between Great Lakes ports and those of the Gulf Coast and the lower St. Lawrence. American flag liners have been engaged in direct Great Lakes-overseas services since the early years following the Seaway opening, although a number of operators tried it and gave up. The last unsuccessful effort occurred in 1969. A high proportion of the current service is by vessels of eastern European nations: the Soviet Union, Poland, and Yugoslavia.

Cargo preference laws make it mandatory that half of the cargoes involving government programs, including not only military cargoes but also foreign-aid cargoes under Public Law 480, be carried in vessels registered in the United States. The lack of availability of American bottoms in direct Great Lakes-overseas trade, due in part to high costs and in part to lack of suitable types of vessels, has seriously handicapped the major Great Lakes ports in competition with saltwater coastal ports in these types of traffic.

Early in 1975 it was announced that, for the first time in this decade, an American flag operator--Lykes Lines--will schedule several direct Great Lakes-overseas voyages with American flag ships. Lykes applied for and received approval to make from three to ten subsidized sailings to and from the Great Lakes in 1975. The first such voyage underscored the unique attributes of the Port of Milwaukee as a port which has important opportunities to specialize in "heavy lift" traffic: movements of manufactured and other goods that are too heavy or bulky to move overland to coastal ports by rail or truck. Late in April 1975, the first Lykes ship called at Milwaukee to load approximately 350,000 cubic feet of cement mill and related machinery, manufactured in metropolitan Milwaukee, for Odessa, USSR, with six other similar shipments to follow.

Another company has announced that it is seeking subsidy for three new versatile American flag vessels which it may build for the Great Lakes-overseas trade. These vessels, built to the maximum length, beam, and draft admissable by the Welland and St. Lawrence locks, would have capability not only for conventional breakbulk cargo, but also for a substantial number of containers, as well as roll-on-roll-off cargoes, including large vehicles, military equipment, heavy machinery and other items that cannot be handled either by conventional methods or in containers.

All of these prospects are, of course, tentative. Their ultimate development will in large measure depend upon exogenous forces; the economic, political, social, and military conditions not only in the Great Lakes region and the nation, but throughout the world. Projection, and even more, prediction, is

dangerous. Innumerable studies have been made of each of the aspects of Great Lakes-overseas transportation mentioned here, but continuous monitoring and revision of such studies is an indispensable prerequisite to planning and management.

Internal Great Lakes Traffic

Although neither increasing nor decreasing rapidly in the long-term, the internal Great Lakes traffic is changing in character, and with it the vessels and ports are changing. The dominant bulk commodities, however, have not changed significantly for decades. General cargo, or "package freight" as it is called within the lakes, has, with the exception of a small amount of Canadian domestic traffic, disappeared with the onset of World War II. Virtually all of the internal domestic and U.S.-Canadian international Great Lakes traffic is either associated with heavy industrial development in and near the lakes, or involves fossil fuels moving to the utility plants along the shores.

Along the shores of Lakes Ontario, Erie, and Michigan, and in the nearby hinterlands of these lakes, is the world's largest concentration of basic iron and steel production, and innumerable associated metal fabricating, machinery, and other establishments that utilize the output of the iron and steel plants. Geographers have long recognized the lower lakes area as the "core region" of the United States and Canada. Great Lakes transportation is the vital link connecting this area with the sources of raw materials: ore, limestone, and coal. Major changes have taken place in recent years, and are continuing, with respect to the direction and character of movement of these materials, and, in the cases of ore and coal, of the characteristics of the materials themselves. These changes are reflected, in turn, in the characteristics of the vessels and of the port terminals.

Direct shipments of iron ore from the ranges around Lake Superior, the principal source of iron ore for over a century, began with the opening of the first canal that circumvented the rapids of the St. Marys River and connected Lake Superior with the lower lakes in 1855. The subsequent series of enlargements of locks at Sault Ste. Marie have been accompanied by increments of larger ship sizes. With the opening of the present Welland Canal in 1932, with locks identical in demensions to what was then the largest of the "Soo" locks and the later locks of the St. Lawrence Seaway proper, the "maximum lakers" gained access, first to Lake Ontario, and later to the lower St. Lawrence. The ranges around Lake Superior have provided the overwhelmingly dominant source of ore, but with opening of the Seaway, the ores of the Quebec-Labrador area have become competitive at the Canadian plants of Lake Ontario, and through the Welland Canal, in the Cleveland-Youngstown-Pittsburgh area. Since 1959, the "maximum lakers" no longer were confined to the area of the Great Lakes proper; some carry grain eastward to the lower St. Lawrence, returning with ore, as mentioned earlier. Some vessels were designed for ocean service as well as for operations within the lakes, and they commonly engage in worldwide tramping during the short closed season of the lakes.

Until very recently, virtually all of the world records for rapid loading of bulk cargoes were held by the upper lake ports, principally involving hematite, the principal direct-shipping ore. Ports such as Duluth-Superior and Two

Harbors, Minnesota, highly mechanized, are links in an integrated chain of transportation, involving railroads from the mines to lakehead ports, water movement through the lakes, and either termination at waterfront plants in lower lake ports or further rail movement to nearby inland points such as Pittsburgh and Youngstown. Ton-mile costs of this transportation have traditionally been among the lowest in the world.

Lower lake ports, particularly those along the south shore of Lake Erie, and to some extent South Chicago, handled return cargoes of coal; the former from the Appalachian region, and the latter from central and southern Illinois and western Kentucky, to the thermal electric utilities of the upper lakes, including plants along the Wisconsin shore of Lake Michigan at Oak Creek, Milwaukee, and Port Washington. While these complementary ore and coal movements are still important, they are now supplemented by other growing movements which are producing new requirements in terms of vessel and port terminal design, as well as in channel improvements.

The grain movement in the Great Lakes has fluctuated from year to year, but the development of larger canals and locks along the entire Great Lakes-St. Lawrence system has shifted the movements substantially. Buffalo was, until 1932, the easterly head of lake grain movement, except for the small "canallers" previously mentioned. With the opening of Lake Ontario to the large upper lakers in that year, the decline of Buffalo as a major flour milling center accelerated, as did the role of Baltimore, the closest rail-connected United States salt water port, as an exporter of grain. Transfer of grain between lake and canal vessels took place at Prescott, Ontario, and Ogdensburg, New York, which between 1933 and 1959 constituted the lower head of navigation for the lake vessels, and at other ports of the upper St. Lawrence and Lake Ontario. In such instances, another transfer of export grain took place between "canallers" and oceangoing ships at Montreal or other lower St. Lawrence ports. With the opening of the enlarged St. Lawrence Seaway, direct Great Lakes-overseas movement of grain in oceangoing vessels was supplemented, as mentioned earlier, by transfer between lakers and ocean ships in St. Lawrence ports below the canals. The balance between direct Great Lakes-overseas and transfer movements, depends now upon the relative rates for lakers and salties, which in turn is in large part a function of the world tramp market. In the Great Lakes grain can be handled in either of the two principal types of lake vessels; the "straight-deckers," which have no unloading equipment on board, and the "self-unloaders," which can discharge cargoes independent of shore-based equipment.

Several developments of recent years have shifted the character of the typical lake vessels from the "straight-decker" to the "self-unloader."

The development of iron ore concentrates, particularly taconite, is rapidly changing the character of the Great Lakes iron ore traffic. The proportion of concentrate to direct shipping ore--principally hematite--between the upper lakes and lower lake ports, has made it possible for greater efficiency through use of self-unloaders in the iron ore trades. Taconite, unlike the direct shipping ores, is dehydrated. Formerly, it was not possible to utilize self-unloaders in the ore trade, in part because the water content would produce freezing of the ore during cold weather early and late in the season, and

partly because of the nonuniform sizes and shapes of the ore. With taconite concentration plants located in the upper lakes region, an increasing proportion of the ore moving in the lakes is of concentrate. As a result, although the amount of iron involved is increasing year by year, the total volume of ore has remained fairly constant. Currently the proportion of total ore tonnage movement within the lakes is about ninety percent taconite and ten percent direct-shipping ore.

For a number of years, virtually all of the new bulk carriers on the Great Lakes have been self-unloaders, which are equally available for the ore, coal, stone, and grain trades, while a significant number of the older vessels have been retro-fitted as self-unloaders.

A second relatively recent development of great significance is the completion of the Poe Lock at the Soo, which was opened in 1970. In contrast to the other, and parallel locks, which limit the dimension of the vessels operating between Lake Superior and the other lakes to Seaway size, the Poe Lock admits vessels of up to 1,000 feet length, and 105 feet beam; such lakers can carry over 56,000 tons on normal lake draft or more than twice as much as any prior lakers. Almost immediately, vessels of these dimensions were under construction. U.S. Steel's Roger Blough, built at Lorain, Ohio, was the first of the craft exceeding the earlier dimensions, although not of maximum possible length, and Bethlehem Steel's Stewart J. Cort, assembled at Erie, Pennsylvania, became the first of the lakers at the new maximum size.

Subsequently, other vessels of similar size were ordered, some of the older vessels were enlarged, and a new generation of lake ships is well underway. Once again, however, a portion of the Great Lakes fleet, for the first time since 1932, is unable to operate east of Lake Erie, because the vessels exceed the dimensions of the locks in the Welland Ship Cannal as well as the Seaway proper.

Virtually all of the new large vessels are self-unloaders, being designed primarily for movement of taconite, but able as well to handle other bulk cargoes.

Two other major developments affecting the character of internal Great Lakes traffic are of great significance. One is the changing energy picture, together with the sudden awareness of the impacts of power plants, and the fuels which they utilize, upon the environment. The emphasis upon use of low sulphur coal is producing a rapidly expanding traffic which is the reverse of the previous lake coal movement: namely, a downbound movement of western low-sulphur coal from Lake Superior for receipt at the lower lake ports. Unlike the upbound movement, which has dominated in the lake trades for many decades, the new coal movement is in the same direction as the ore movement, and is thus in phase with, rather than complementary to, the principal commodity flow on the lakes. Major loading facilities are under construction and planned for lakehead ports. These ports are connected with the western coal fields by unit trains which greatly reduce the costs of long-haul movement. Unit trains, in fact, constitute a significant prospective, and in some degree actual, competitive element to lake shipping by offering low rates for the through movement between mines

and consuming plants, competitive with rail-lake costs. Commitments have been made in several instances for long-term investments to handle downbound lake coal movements so that there is a high degree of assurance that the movement will increase, but competition of through unit-train movement may be in the long run a competitive constraint.

Plans were recently announced for the construction of a coal loading facility at Superior, to transfer low sulfur western coal from unit trains operated by the Burlington Northern to lake vessels for downbound movement, principally to utility plans in the Detroit area. This facility is projected to add as much as twenty million tons annually to the traffic at the port at Superior.

To some degree, this is not unlike the situation with respect to petroleum movements from the refinery district of northwestern Indiana to other Lake Michigan ports, including Milwaukee and Green Bay, Wisconsin, which are now served by pipelines paralleling the lake shore. Similarly, unit trains between the Appalachian coal fields and utility plants north of Lake Erie, most notably in the Detroit area, consitute a challenge to the very short-haul movements across western Lake Erie. In each of these instances the relative levels of all rail versus rail-lake movement are critical, and the final results are not yet clear. Finally, of course, the proliferation of nuclear power plants in the Great Lakes region, now temporarily slowed up by environmental constraints and the current economic recession as well as technological difficulties, may significantly affect the total future demand for Great Lakes coal transportation.

Another potentially significant development affecting Great Lakes shipping is the prospect of continued extension of the navigation season. Overseas shipping has about a month longer available within the lakes than during the early years of the Seaway, while internal interlake shipping has been extended in some instances from scarcely over eight months to ten months. Some lakers currently operate into February and resume in March. The Coast Guard icebreaking service, bubblers in critical harbors and channels, including Superior, aerial reporting of ice conditions, and other methods indicate that substantial additional annual capacity can be generated by continued extension of the season. Whether all-year operation of interlake shipping will be practicable is not yet determined.

To summarize the internal Great Lakes bulk traffic trends, it may be stated that new conditions of operation, new types and directions of traffic flow, and fewer but larger and more efficient bulk-carrying vessels represent the current trend, as well as the short and immediate range prospects for the future.

Implications for Employment

Most of the trends, both technological and geographic, are mutually reinforcing in that they all point to relatively less employment in proportion to the volume of waterborne commerce than in the past. Fewer but larger vessels mean that more tonnage can be handled per man-hour. More efficient handling of both general and bulk cargoes at the ports means that the "throughput", or tonnage per manhour across the wharves is greatly increased. Decline of general cargo traffic between the Great Lakes and overseas, like the previous decline and eventual elimination of internal Great Lakes package freight, also tends to reduce the manpower requirements at the Great Lakes ports.

The labor picture at the ports around the lakes, however, is not dismal. As we have seen, ports contribute substantially to the economic base of their communities and regions, both directly and indirectly, wherever the traffic is available in sufficient volume to justify the operation of a modern port. There is always the possibility that indirect employment associated with port-oriented industries may increase, even in the face of declines in direct employment. The emphasis in the larger Great Lakes port cities and their nearby hinterlands can thus be shifted to industrial development, including the location and expansion of those industries that can effectively utilize water transportation. These include "heavy" industries on the waterfronts, as well as other industries in the port cities and beyond.

Water transportation may be signficant even though not extensively utilized. The existence, or potential existence, of water transportation services may impose upon competitive overland carriers, both domestically and in connection with ocean services through coastal ports, a ceiling upon the rates which they may charge shippers. This gives the regions around the Great Lakes, including Wisconsin, a competitive advantage in attracting and retaining industry that they would otherwise not have. For example, even though relatively little freight traffic moves across Lake Michigan on the car ferries, their existence means that Wisconsin industry has a rate parity with Chicago on movements to and from the territory east of the lake, thus overcoming, even on all-rail or truck movements, the locational disadvantage that the interposition of the lake would otherwise impose.

Another advantage of the availability of the Great Lakes and the St. Lawrence Seaway to Wisconsin is the existence of a route by which the vessels built in Wisconsin for service elsewhere can reach salt water. Three large shipyards in Sturgeon Bay and one in Superior, for example, can not only build and repair vessels for Great Lakes service, but can also build ships for elsewhere. Large ferries have been constructed in Wisconsin, for example, for service in Alaskan waters, and substantial naval construction has been handled in Wisconsin shipyards. With devaluation of the dollar and increasing foreign costs it may be possible in the future to develop export markets for Wisconsin-built vessels.

Competitors of Wisconsin's Great Lakes Ports

There are many variables affecting the volume and character of traffic to, from, and within the Great Lakes, and, consequently at the ports, individually and collectively. Among them are the economic, political, and military state of the world that will inevitably affect the volume of foreign trade, and the changing domestic economy that affects both foreign and domestic traffic. There are also technological changes in both water transportation and in the competing transportation modes. Finally, there is inter-port competition which affects the character and volume of traffic moving through any given port or group of ports.

It is beyond the scope of this report to assess or project the exogenous variables that are world-wide or nation-wide in scope. However, there are some variables that can at least be recognized as having special relevance to Great Lakes traffic, both internal and overseas, and some which may peculiarly affect the major ports of Wisconsin.

Maritime and Port Technology

We have already pointed out, and will again later emphasize, the technological advances in both ship and shore technology that are rapidly altering the nature of port operations, and that tend toward (a) substitution of capital for labor at the ports in order to expedite ship and cargo movements and minimize turn-around time for both, and, as a consequence, (b) increased concentration of cargoes at fewer but larger and more efficient ports, that develop as "load centers" where sufficient volumes of traffic can be assembled in order to justify the greatly increased need for capital expenditures for the ever-increasingly sophisticated, and hence expensive, port installations. Thus, pressures on the smaller ports are such that few of them can afford to remain competitive for general cargo, but, rather, must rely upon specialized bulk cargoes, handled through private terminals and directly to and from waterfront industries if they are to survive as commercial ports at all.

Another aspect of technology reflected in the concentration of traffic at fewer but larger and more efficient ports is the impact upon the inland freight rate structures. In particular, the Great Lakes ports have in the past been handicapped in that the inland carriers have been reluctant to grant import-export rates between inland points and the lake ports, while such rates - lower than domestic rates for the same commodities moving to and from the same port regions - have been common at salt-water ports on the three United State "ocean" coasts. (The Great Lakes are officially recognized as the fourth U.S. Seacoast.) Thus, much of the traffic originating and terminating in the midwestern area surrounding and beyond the Great Lakes - the natural hinterland of the lake ports - has been financially advantaged in moving through competitive salt-water coastal ports.

The rapidly increasing sizes of ocean-going ships, both in the bulk trades and in the general cargo liner trades, has been increasingly unfavorable to Great Lakes ports. Economies of scale, providing that the traffic is available in sufficient volume, are inexorable. Such larger ships must turn-around faster in ports, for they represent ever-increasing costs in capital and labor, and few can afford to take the long time-consuming round-trip into the Great Lakes through the Seaway, when they can make many more voyages per year by serving coastal ports. Even at that, an increasing proportion of the world's merchant ships is too large to transit the Seaway, and thus is unavailable for Great Lakes trade.

Intermodal Transportation

The rapid rise of intermodal transportation, facilitated by development of containerization and the Roll-Roll-off ship, in which general cargo is handled in standardized units - containers or truck semi-trailers - has greatly expedited movement through ports, by substitution of large units and sophisticated transfer equipment between land and water carriers for the older labor-intensive break-bulk methods. Also, with longer and faster freight trains, and with fast truck movement over the Interstate and other modern highways, transit time, and in many instances, costs, has been substantially reduced and thus become more competitive with water movement both within and to and from the Great Lakes.

Package freight movement between U.S. ports on the Great Lakes declined in the 1930's and was never resumed after World War II. Direct Great Lakes-overseas general cargo movement is now feeling the same effects.

Highway access between Wisconsin ports and their hinterlands within the state by motor truck, especially for general cargo, is significant. The State has an excellent system of major highways, including Interstates and freeways, serving all parts of the State. However, in one respect, a limitation is placed upon goods movement over these highways: Wisconsin, unlike its neighboring states with competitive ports, does not permit "double bottoms" (semi-trailer with trailer, or double trailer units) on its highways. The extent to which this constrains traffic through Wisconsin's ports is not known, but it may be a competitive factor.

Unit Trains

Just as unitization of general cargo, in the form of containers and railroad piggyback, has produced economies of scale and unfavorably affected Great Lakes shipping and ports, so unit trains and trainload rates have, in recent years, become increasingly competitive with Great Lakes traffic. Much of the traffic involves rail movement to and from Great Lakes ports in trainload quantities, especially for such commodities as coal, ore, and grain. Unit trains, increasingly, handle such traffic at lower costs than formerly, and at rates that are competitive with rail-water movement. A unit train is a train consisting of equipment permanently assigned for a particular movement, as between one or more coal mines and an electric generating plant, in which intermediate switching and yarding is eliminated. The trains commonly are loaded and unloaded while in motion, and the equipment is often owned by the shipper. Here, again, the economics of scale are significant.

Unit trains are increasingly used to and from ocean ports, that are competitive with Great Lakes ports. Even more significantly unit train movements between inland origins, such as coal mines in Appalachia and electric plants bordering the Great Lakes, are replacing rail-water movements between such origins and destinations, since the through unit-train costs are competitive with rail-water rates through the ports of southern Lake Michigan and Lake Erie. Railroads have been unwilling to short-haul themselves by granting unit train rates for rail portions of such rail-water movements,. The result has been the by-passing in many instances, of the traditional ports, such as Toledo and South Chicago, where coal was transferred between rail and Great Lakes carriers. The matter of unit train and trainload rates for movements to lake ports for transfer to vessels is in litigation.

On the other hand, unit trains offer opportunities for Great Lakes ship operators and for lake ports to develop new traffic flows, as, for example, between western coalfields and lakehead ports for lake movement to the lower lakes; the new flows through Superior constitute an outstanding example.

Unit trains, and low import-export rates by rail offer substantial competition to the Great Lakes ports in that the United States salt-water ports on the Pacific, Atlantic, and Gulf of Mexico, as well as ports in eastern Canada, can

more effectively compete with the St. Lawrence Seaway route for bulk movements between the Great Lakes hinterland and overseas areas. A governing consideration is the total through rate, including the overland (or Seaway) cost, plus transfer charges at the ports, and the ocean rate, through coastal versus Great Lakes ports, between ultimate origin and destination. The major coastal ports have competitive advantages, also, in more frequent scheduled liner sailings, year-round operation, and shorter voyages to overseas areas, in comparison with the Great Lakes-St. Lawrence Seaway route.

Inland Waterway Barge Transportation

The availability of thousands of miles of federally-improved rivers and canals, especially of the Mississippi River waterway system, is a major competitive element for Great Lakes ports. Wisconsin has the advantage of access to the Upper Mississippi River on its western border, but the river, as well as the Illinois Lakes-to-Gulf waterway in the neighboring state, constricts to a major degree the effective hinterland of Wisconsin's Great Lakes ports, by offering an alternative low-cost route to the ports of the Gulf of Mexico, not only by barge, but also by competitive overland carriers which parallel the inland waterway routes.

Chicago: Wisconsin's Major Great Lakes Competitive Port

While most of the barges of the inland waterway system are not designed for movement on the Great Lakes, there are several types of vessels, including barges and tow boats, that have been designed for combined inland waterway-Great Lakes service, and are thus capable of moving through the Chicago area and providing service to Lake Michigan and other Great Lakes ports, including those of Wisconsin. However, the Port of Chicago, the principal competitor on the Great Lakes of Wisconsin's Lake Michigan ports, is uniquely situated, not only as the port at the southwesternmost penetration of the Great Lakes into the continental interior but also as the only port on the two waterway systems: the Great Lakes-St. Lawrence and the Mississippi system. Modern barge navigation to and from the lakes became practicable with the completion of improvements on the Illinois Waterway in 1933, utilizing the Chicago Sanitary and Ship Canal--which never was a ship canal--to gain access to metropolitan Chicago. Subsequently, the Calumet-Sag route, enlargement of which was authorized in 1946, begun in 1955, and now nearing completion, provides a second major connection, serving the Calumet region of metropolitan Chicago, which has one of the world's largest concentrations of heavy industry.

The ports of metropolitan Chicago have been for many years leading bulk ports on both waterway systems. In addition, they handle the greatest proportion of the Great Lakes-overseas direct general cargo traffic. It is a fragmented port, involving several local agencies, but it has prospects of remaining as the dominant inland port of North America. The development of barge-carrying ships--the Lash and Seabee vessels--gives Chicago as well as nearby ports on the Lake Michigan shore, from Burns Harbor, Indiana, on the east to Milwaukee and other Wisconsin ports on the north, the opportunity to develop direct overseas services via the two competitive routes, one to the Atlantic and the other to the Gulf. Both can optionally involve transfer at deepwater ports near the sea, or direct barge service without break-of-bulk, the barges being carried

across the oceans by Lash or Seabee ships. Until now, these "kangaroo" services have been primarily to facilitate turnaround time for the large vessels, and the barges normally do not venture far inland, although some have reached Chicago, St. Louis, and other upriver ports from New Orleans. The other alternative, using Lash and Seabee barges through the Great Lakes-St. Lawrence route to the lower St. Lawrence, has not yet been developed, but its potentials await exploration. Meanwhile, much bulk traffic is transshipped in the lower St. Lawrence. One general cargo operator uses small ocean-type feeder vessels for container traffic in connection with its larger vessels at Montreal, shuttling the containers between Montreal and Chicago and other ports on the St. Lawrence-Great Lakes system.

Although it is conventional to regard the Port of Chicago as being confined to the State of Illinois, there is actually a complex of harbors and waterways in what is officially known as the Chicago-Northwestern Indiana Standard Consolidated area, the two-state continuous urbanized region along the southwestern and southern shores of Lake Michigan. The annual waterborne commerce of the total port complex of that metropolitan region exceeds 80 million tons or more than twice the total combined traffic of all of the Wisconsin ports of both Lake Michigan and Lake Superior. Table 4 shows, for 1972 and 1973, the total traffic of the several harbors and waterways within the metropolitan complex of Chicago. The totals include overseas direct traffic, internal Great Lakes traffic both domestic and Canadian, traffic through the Seaway to and from eastern Canada, and barge traffic of the Illinois-Mississippi waterway system. The total makes Chicago the largest and busiest inland port complex in the world. The Wisconsin ports of Lake Michigan, in the shadow of this giant, can compete only with superior service, favorable rates, adequate terminals and channel depths in the harbors, access directly by specially designed vessels to the inland waterway system, and vigorous promotion of those assets that the Wisconsin ports can offer as competitive advantages.

Energy Effectiveness and Conservation

The current emphasis upon the efficient use of energy and of its conservation is having, and will continue to have, considerable effect upon Great Lakes shipping and ports.

Transportation by water is generally the most efficient way to move goods, where it is available, in terms of energy effectiveness. Energy effectiveness of the various modes of transportation can be measured either in terms of the British Thermal Units (BTU's) required to move a ton-mile of goods, or the number of ton-miles produced per unit of fuel, such as a gallon. Table 5 shows the relative efficiency of each of the major transportation modes by both measures. It will be noted that, except for pipelines, which are available only for specialized movements, waterways are the most efficient users of fuel.

These figures must, however, be used with caution, because there are some limitations and constraints. Waterways utilize vessels, which are large units, and therefore require large volumes of cargo to achieve economies of scale. Terminal costs at the ports, whether the terminals are of the older labor-intensive types or the newer capital-intensive types, also require large

Table 4

WATERBORNE COMMERCE OF METROPOLITAN CHICAGO
1972 and 1973
(tons)

WATERWAY OR HARBOR	1972	1973
Waukegan Harbor, Ill.	436,710	590,436
Chicago Harbor, Ill.	548,305	403,945
Chicago River, Main and North Br.	3,968,587	3,480,644
Chicago River, South Branch, Ill.	4,957,536	4,636,427
Chicago Sanitary and Ship Canal	25,570,393	25,603,691
Calumet-Sag Channel, Ill.	5,882,220	6,111,949
Lake Calumet, Ill.	2,085,342	2,281,365
Calumet Harbor and River, Ill.	25,431,158	26,677,117
Total, Illinois	68,880,251	69,785,574
Waukegan Harbor, Ill.	436,710	590,436
Port of Chicago, Ill. *	46,838,259 *	47,381,242 *
Indiana Harbor, Ind.	17,610,662	17,897,777
Buffington Harbor, Ind.	1,731,519	2,365,758
Gary Harbor, Ind.	8,751,620	10,204,108
Burns Waterway Harbor, Ind.	4,759,827	5,520,080
Total, Illinois-Indiana Standard Consolidated Area	80,128,597	83,959,401

* Total, with elimination of double counting of traffic between portions of the port area

Source: U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States, Part 3, Waterways and Harbors, Great Lakes (Chicago: U.S. Army Engineer District, Calendar years 1972 and 1973).

volume movements in order to achieve economies of scale, as compared, for example, with trucks, which are smaller and more flexible units. Finally, waterways, including the Great Lakes-St. Lawrence system, are not everywhere available, and where they are available they are generally circuitous in comparison with overland modes, thus necessitating more ton-miles for a given movement between origin and destination than do the competitive overland modes in many instances. Within the Great Lakes region, these constraints make shipping, whether internal or overseas, more competitive with railroads especially for bulk commodities. Improvements in railroad technology, and in rate practices, notably the unit train and import-export rates overland to and from the ports, may shift the balance as between rail and water movements.

Fossil fuels constitute major cargoes on the Great Lakes. Although the movement of petroleum products has declined in recent years due to the construction of pipelines connecting the refineries and the principal consuming centers around the lakes, the coal movement continues to be of great significance, especially to the electric power utilities. A recent development springing from the environmental constraints upon use of Appalachian and eastern interior (Illinois and western Kentucky) coal in the generation of electric power, is the movement of low-sulfur western coal from Lake Superior to the lower lakes. A new coal-loading facility at Superior for transfer from rail to water, together with unit trains from the west, promises to add substantially to the volume of coal moved on the Great Lakes. It will, in large measure, compensate for the decline in movement of shipments from the lower lakes, especially from South Chicago. These shipments have decreased due to environmental constraints and to the inauguration of unit trains that by-pass Chicago and deliver coal directly to plants on the west shore of Lake Michigan.1/

1/ A more detailed study of the impact of the changing energy situation upon Great Lakes shipping and ports is underway at the Center for Great Lakes Studies, University of Wisconsin-Milwaukee.

TABLE 5

RELATIVE ENERGY EFFICIENCY OF FREIGHT TRANSPORTATION BY MODE

Mode	BTU per ton-mile	Ton-miles per gallon
Pipeline	---	300
Waterway	500	250
Railroad	750	200
Truck	2,400	58
Airplane	63,000	3.7

Sources: BTU per ton-mile: William E. Mooz, "Energy Trends and Their Future Effects Upon Transportation", Proceedings, Fourteenth Annual Meeting, Transportation Research Forum, Cleveland, Ohio, October 15-16-17, 1973 (Chicago, 1973), p. 707. Ton-miles per gallon: Thomas D. Larson and Roger E. Carrier, "Energy for Transportation-How to Anticipate the Future", Idem, p. 764

CHAPTER II

PORT DEVELOPMENT AND ISSUES IN THE UNITED STATES

The Great Lakes ports of Wisconsin constitute interfaces, as do all ports, among transportation carriers. As such, they are nodes in the nested hierarchy of transportation networks, both on land and on water. These networks extend not only throughout the state but also throughout the nation, the continent, and the world. Each port with more than purely local internal traffic, therefore, must be developed and operated within the context of the total transportation system, and each must be concerned that its policies are compatible with the policies of the larger areal and governmental units within which the port exists.

It is therefore an indispensable prerequisite, in considering the prospective roles of the state, to assure that the state's and the nation's policies and practices are not mutually inconsistent.

The port policies and practices of the United States have been recently subject to intensive and objective study in two related, but independent, projects, among others. Both studies prominently involved the Center for Great Lakes Studies at The University of Wisconsin-Milwaukee, and both, together, constitute an objective evaluation of port development policies within the United States. These projects, the results of which are of special relevance to the consideration of the Great Lakes ports of Wisconsin in the context of a state plan for transportation, are: (1) an international conference on port planning and development, sponsored by the Center for Great Lakes Studies of the University of Wisconsin-Milwaukee and the U.S. Department of Transportation and held in Milwaukee on November 27 to 30, 1973;[1/] and (2) a report, now in press, on port development in the United States that was prepared by a panel on Future Port Requirements of the Maritime Transportation Research Board, a part of the National Academy of Science, which, in turn, is an independent agency whose principal function is to advise the U.S. government and other organizations and individuals on matters of public policy that involve scientific research and findings, including the social sciences.[2/]

Decentralized Responsibility

Each port has its own set of distinct relationships with respect to other ports, to its hinterland, to its labor force, and to the economic base of the locality, regions, states, and overseas areas that are served, and to the environmental problems and conditions.

The United States is unique among the nations in that there is a fragmentation of responsibility among many agencies at several levels of government as well

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1/ Schenker, Eric and Harry C. Brockel (editors), Port Planning and Development as Related to Problems of U.S. Ports and the U.S. Coastal Environment. Cambridge, Md.: Cornell Maritime Press, Inc., 1974, 327 pp.

2/ Maritime Transportation Research Board, "Port Development in the United States," a report of the Panel on Future Port Requirements of the United States. Washington: National Academy of Science, June 1975.

as private enterprise for port planning, development, construction, operation, protection, and financing. In general, the provision of harbors and channels, except alongside terminals, is a federal responsibility, while the provision and operation of port terminals and associated facilities is non-federal, divided at various ports among state, regional, and local public agencies as well as private companies and interests. Very commonly, a lack of coordination exists. Although port planning at the national level, the panel found, is not practicable or desirable, there are many instances in which regional port planning and development is essential.

In port planning and development, as in many other matters; the determination of the nature and extent of a region is not easy. For some matters, the region may be more extensive than others. As far as Wisconsin's Great Lakes ports are concerned, they constitute part of the total complex of ports of the Great Lakes; in competition with seacoast ports for international traffic they have common interests. On the other hand the State's ports compete with other Great Lakes ports, as previously mentioned, so that all of the ports of the State may constitute, for some purposes, a region. For some purposes the state's ports on Lake Superior constitute a different regional port system than do those on Lake Michigan. At a more localized scale, the Lake Michigan ports of the state may be divided along the lines of the two regional planning agencies whose areas border Lake Michigan, while for other purposes the ports of the respective metropolitan areas may constitute a region. This matter is discussed further in Chapter III.

Port Capacity

There is considerable misunderstanding relative to the requirements for port capacity. If a facility seems to be idle part of the time, or not all of the berths are subject to intensive or continuous use, it does not mean that the capacity is in excess of need. Capacity must be available to handle reasonable peak traffic demands that may be recurring at regular intervals, may be seasonal, or may occur sporadically. Yet, it is not possible to provide for extreme peaks, and in this respect ports resemble other transport facilities and modes in that some exceptional peak traffic may be subject to diversion or delays. Furthermore, it is held that the shipping public as well as the carriers must have options with respect to routes, ports, and services. They must not be dependent upon individual facilities more than necessary, especially when they may not have complete control over their operation. However, ports must compete for financing with many other public functions, as well as with the private investment market. A reasonable balance must be reached between the provision of facilities to handle peak loads and the ability to secure financing and locations for port development and operation.

Port Competition and Ownership

Ports, generally, are competitive with one another. As in any competitive enterprise, patronage of a port is contingent upon the level of service that the port can provide in comparision with that provided by other ports. Ports generally cannot develop traffic that would otherwise not move; they share in a volume of traffic that is determined by forces over which individual ports,

or groups of ports, have little or no control. On the other hand, a successful port can develop and increase its traffic relative to other ports by means of good service at competitive rates. How port investment can be optimized to provide such level but at the same time not be excessive is rarely subject to accurate quantitative determination. Typically, the projections of traffic to be moved in the future through a given port or group of ports assumes capture of the traffic of other ports in their common hinterland. The total projections for all ports serving a hinterland may be several times in excess of that which could actually move.

Within the United States, the provision of port terminals has traditionally been by private enterprise, including railroads competing for overseas and coastwise vessel traffic inland, by industries handling bulk fuels and materials across the waterfronts, and by terminal operators as private entrepreneurs. In recent decades, however, port terminals have not been generally profitable when under private ownership and operation, and there has been a proliferation of public agencies to plan, build, and often operate, the port terminals, especially those for general cargo, although many port agencies also operate bulk terminals. Commonly, the terminals are leased to private interests, including stevedoring operators, and sometimes carriers and individual industries.

There are many forms of public port agencies in the United States, but few of them have complete ownership or control of the terminals within their respective port areas. Some agencies, including the prototype Port Authority of New York and New Jersey, are interstate. A number of the states, including Maine, Maryland Massachusetts, and South Carolina, among others, operate port terminal facilities and engage in port development and promotion. On the Great Lakes, Indiana has recently developed Burns Waterway Harbor on Lake Michigan. Other agencies may be special-purpose under state and/or city, as the Chicago Regional Port District, they may be county agencies as in the Port of Cleveland, or municipal as at Milwaukee and the Navy Pier terminal in Chicago. Even most of those ports, however, are fragmented with respect to the ownership, operation, and jurisdiction over the port terminal facilities.

The Federal Role in Port Planning and Development

The federal government provides many services associated with port development and operation. The U.S. Army Corps of Engineers, under authorizations of Congress, provides and maintains the harbors and channels in most instances. The Customs, Immigration, Public Health and similar services are federal. The Coast Guard is responsible for maritime safety and the operation and maintenance of aids to navigation. The Environmental Protection Agency and others are responsible for assuring that the environmental requirements of port construction and operation are observed.

Yet, the ports as a whole have long resisted any planning at the federal level which could possibly imply centralization of development or control, or any imposition of inhibitions upon the number and character of port developments. The American Association of Port Authorities, representing the port organizations

of the nation, has until very recently been firm in its opposition to any involvement in port planning by the federal government. Recently, however, its stand has been modified, and the ports now believe that the federal and state governments should compensate, in some way, the port bodies for the expenses involved in conforming with the new regulations regarding environmental protection. There is also considerable dissatisfaction on the part of port authorities with the multitudinous federal and state agencies that require permits or clearance before construction or operation of facilities and/or services can begin, and there is a general belief that many regulations are excessive.

Port Financing

Federal funding of ports, except for channels, has generally been resisted by the ports. The port agencies believe that federal aid could lead to federal control that would restrict interport competition.

On the other hand, ports are having increasing difficulty in funding their development and operation. Few ports can break even on their operations, even after amortizing their investment in facilities. Public interest may dictate some subsidies to ports, based upon their positive impact upon the economies of the local area, the region, or the state. However, ports must compete with numerous other--and increasing--public functions, facilities, and services for the limited amount of funding which may be available, and port operations are not as visible to the public, or to most of the decision-makers, as are many other facilities and functions. Since the benfits of port activity are both regional and national as well as local, some argue that port development is a regional or national responsibility, and that the states and the federal government should share in the financing of ports. It is pointed out that a precedent exists for federal funding of ports in the Economic Development Administration (EDA) program of public works and technical assistance grants and loans for communities with high unemployment rates. Even though the EDA program is not specifically aimed at ports, substantial amounts of money have been devoted to ports under this program since 1965.

Adding to the financial burdens of the ports are many recent regulations and laws regarding environmental protection, safety of port workers, and security of cargo. Port agencies are required to expend substantial amounts of money for compliance. There is commonly a confusion of different agencies requiring many kinds of certificates, permits, and other documentation, which, in turn, may not only cause delays, but may also involve much clerical and other operational expense. Of particular concern to the ports are the requirements for environmental impact statements for any new construction, expansion, or dredging. Such statements may require years to prepare, and many ports are not equipped with the personnel or financial resources to prepare such statements. Often the regulations conflict or are mutually incompatible. Often a port with the prospect of additional carrier service, cannot comply sufficiently quickly, and the carrier, especially the water carrier, may divert its operations to other ports not immediately faced with the same constraints.

Load Centers and Mini-Bridge

Because of the economies of scale, especially with the increased need for more sophisticated capital equipment for handling of unitized general cargo, the tendency for port traffic to be concentrated at fewer but larger and more efficient ports has been accentuated. The trend has been toward the development of "load centers": one or two ports in each region serving as major terminal centers, with the cargo being assembled at and distributed from such ports by feeder services, including rail, highway, inland waterway, and coastal shipping services. Each of the load center ports thus extends its hinterland, and the smaller ports may lose direct long-distance shipping services. Some of these ports have attempted to maintain direct calls by ship operators through the regulatory process. The struggle to maintain and increase traffic flow through any given port may result in excessive capital investment by that port, because the equipment has to be available for handling of cargoes if the port is to have any chance of remaining competitive. In the Great Lakes, before the opening of the St. Lawrence Seaway, some of the smaller ports had direct overseas services by the smaller vessels then in service, but when larger ships became prevalent the calls at such ports became unprofitable and the traffic declined or disappeared. In Wisconsin, nearly all of the general cargo is handled at Milwaukee and Green Bay, with some at Duluth-Superior, but even these ports are in the shadow of Chicago, the dominant "load center" of the western Great Lakes for direct overseas general cargo services. It is therefore essential that, if the Wisconsin ports desire to compete for overseas traffic, they must develop as specialized ports, without competing directly either with a larger Great Lakes ports or with the huge "load center" ports on the ocean coasts, such as New York, Baltimore, New Orleans, or the Canadian ports of Montreal, St. Johns, or Halifax.

Related to the "load center" concept is that of the "mini-bridge," in which traffic from inland points or points across the continent from the overseas origin or destination is moved overland to intermediate ports. Thus, traffic to and from the Far West need not be handled through a Pacific Coast port and the Panama Canal enroute to Europe, and traffic bound to and from the Far East from the eastern United States can move overland to a Pacific port rather than via an Atlantic port and the Panama Canal. The Great Lakes ports, especially those on the west shore of Lake Michigan and the Lake Superior lakehead, can handle some of this "mini-bridge" traffic if the rate structures permit. On the other hand, such ports, even given a favorable rate structure, face the same disadvantages in competing for minibridge traffic as they do in normal traffic originating and terminating in the Midwest. The development of import-export rates through Great Lakes ports, however, could encourage some such traffic.

In determination of policies for the ports of Wisconsin, the possibility of mini-bridge traffic exists, but such ports would be handicapped in competition with coastal "load center" ports, as well as with Chicago, which, on a smaller scale, has developed into a "load center" for much of the Midwest direct overseas general cargo traffic moving through the Great Lakes-St. Lawrence route.

Traffic Diversion Through Canada

The major lake ports of Wisconsin, as well as other Great Lakes ports, are losing traffic through diversion via eastern Canadian ports. Cargo that could

move through Milwaukee, Superior or other Wisconsin lake ports is moving through Halifax, Montreal, and St. Johns. The National Harbors Board of Canada directly operates many Canadian ports; there is no counterpart in the United States, as previously indicated. Thus, the ports of the United States, and especially those of the Great Lakes, must individually compete with the government-supported ports of Canada on overseas movements to and from the Midwest hinterland. For example, the Canadian National Railway--whose American subsidiary, the Grand Trunk Western, currently serves Milwaukee via Lake Michigan car ferry--has been offering full container service directly to the Port of Halifax.

The foreign ship lines serving Halifax have been absorbing the rail cost between Montreal and Halifax, a distance of more than 800 miles. This enables the Midwest shipper to pay only the rail cost from origin to Montreal, getting the movement from there to Halifax free. Thus, many shippers and consignees in the Great Lakes region route overseas traffic through eastern Canadian ports in order to take advantage of these lower rates.

Differences in economic policy and rate regulation between the United States and Canada facilitate this diversion from United States ports, both on the Atlantic seaboard and on the Great Lakes. Canadian carriers and ports not only have lower costs, but also can use these lower costs in adjusting the rates and services to the advantage of the individual shippers. The ocean carriers serving the eastern Canadian ports and handling traffic to and from the midwestern region of the United States can absorb inland transportation costs, can provide lower rates on volume shipments, can issue through bills of lading, and can enter into "agreed charges" with large-volume shippers, a practice which is illegal in the United States.

These advantages of routing shipments through Canadian ports to and from the Great Lakes region result directly from differences in rate-making philosophies of the two nations. Canadian railroads enjoy much greater flexibility in rate-making than do their United States counterparts, in conjunction with ocean carriers. This flexibility is reflected in lower volume rates, as well as in container rates which enable them to capture some of that type of traffic which would otherwise move through United States ports including, in some instances, those of the Great Lakes.

Wisconsin ports may in some cases suffer from this diversion. The ports on the western shore of Lake Michigan, except for the car ferries which are threatened with imminent extinction, must move traffic enroute to and from eastern ports through the Chicago gateway. In effect, they are disadvantaged by the distance between Chicago and the Wisconsin and other hinterland points of origin or destination. At the same time they have only inter-line movements instead of direct single-carrier movement.

Both of the major Canadian railroads now offer car ferry service to and from Wisconsin ports. The Grand Trunk, affiliated with the Canadian National, has car ferry service between Milwaukee and Muskegon, Michigan, and reaches Canada via Port Huron, Michigan-Sarnia, Ontario. The Canadian Pacific, through a joint-venture subsidiary, recently initiated car ferry service between Thunder Bay, Ontario, and Superior, Wisconsin, points which have no other direct rail

connection. The Milwaukee-Muskegon service, as discussed later in this report, may be abandoned in the near future, while the Thunder Bay-Superior service was recently initiated with a new and modern vessel. In both instances, car ferries could constitute a competitive advantage for the two largest Wisconsin ports and their respective hinterlands.

National Port Policy Recommendations

The present policy of the United States with regard to port development has evolved in a piecemeal fashion, and is currently being subjected to examination in several quarters. All agree that ports are in the national interest of the United States. There is no comprehensive national plan for ports, which have developed competitively. It is now apparent that ports should develop within a local, state, or regional framework. Since ports benefit the nation as a whole, it is reasonable that the federal government should participate in the costs of port development. On the other hand, federal financial participation should not inhibit competition among ports, but, at the same time, should inhibit excessive development. Since ports are a public utility, the benefits of which are not always reflected in a profit and loss statement of the port agencies, the public benefits may justify subsidies for port development, construction, operation, and maintenance.

As mentioned elsewhere, recent developments in technology and in rate structures have enlarged port hinterlands, and thus increased competition among ports, concentrated traffic - especially general cargo - at fewer but larger and more efficient ports - "load centers" - and brought distant ports in competition with one another. The major ports of the Great Lakes, for example, insofar as overseas traffic is concerned, are competitive with those of the Atlantic, Gulf, and Pacific coasts, which, in turn, are also in competition with each other.

Most port specialists, including those who recently served on the Maritime Transportation Research Board's Panel on Future Port Requirements of the United States, agree that the role of the federal government should be confined to guidance and coordination, with port planning primarily at the local and regional levels.1/ On the other hand, the federal government should improve its data gathering and collation, as a basis for decision-making at these levels, as well as for federal participation in assisting the ports.

Port planning, a whatever level, must take into consideration that efficiency of a port cannot be judged by the availability of some apparently under-utilized port facilities, since some reserve capacity is desirable for competitive flexibility and normal peak loads.

Market competition operating in a local decision-making setting commonly fails to allocate resources properly, and is therefore ineffective as a mechanism for balancing economic and other considerations, including environmental considerations, in port development. It is very difficult, and often impossible, to specify the acceptable economic costs for conservation and preservation of

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1/ The report of that Panel is in final editing, and should be available shortly.

desirable coastal environmental conditions and human values. Coastal zone managment cannot rely solely on the market mechanism. Environmental issues will play an increasingly important role in decisions relative to port development. The port agencies must be active in developing coastal zone management programs, with coordination at the State level. In Wisconsin, such a state-wide program is now emerging.

CHAPTER III

ALTERNATIVE ROLES OF THE STATE OF WISCONSIN IN PORT DEVELOPMENT

As elsewhere, the Great Lakes ports of Wisconsin vary greatly in their organizational status, methods of financing, and ownership and operation of port terminal and other facilities. With the exception of one private harbor - Oak Creek - the ports of the State benefit from the harbor improvements and maintenance provided by the federal government, under authorization of Congress, through the Army Corps of Engineers. A few of the port terminals are under public ownership and operations, one is under public ownership with private operation, and most are under private ownership and operation.

Similarly, the nature of the local official port agencies varies. In Wisconsin, the practice has been to provide, under enabling legislation, for the creation of local public agencies to be concerned with the individual ports. In 1960, an amendment to the state constitution provided for state participation in internal improvements for ports. Similar provision was made earlier for highways and airports. The provision for state aid to ports is mainly a "paper provision, because funds have not been appropriated, and the necessary enabling legislation has not been established". (Assembly Bill 191, introduced in this current session of the Legislature, would provide state money to local governments for port development.)

Recent History of Wisconsin's Concern for Ports

Under recent federal legislation, each of the fifty states has been required to inventory the facilities, traffic and cost data for its major ports, (i.e., those with three million or more tons handled annually). These studies were conducted as part of the National Transportation Needs studies of 1972 and 1974. Thus, the federal government, for the first time in any systematic way, expressed its concern for the states' roles in connection with ports.

Interest in ports on the part of the State of Wisconsin began somewhat earlier. The Department of Resource Development issued a statement of port development policy in 1966 as follows:

> "Port and harbor development in Wisconsin will remain a responsibility of local government. There is very little need for intrusion from the state level, aside from providing some advice and assistance to communities who are unable to regularly draw upon such advice and assistance from other sources. Communities, in turn, will have to determine the amount of local public investment they care to make to attract private investors in port, waterfront industrial, and marine facilities. Local governments will still be quite dependent upon the program of the U.S. Corps of Engineers for providing breakwaters and channels."

"A number of communities should also explore the various programs of the U.S. Urban Renewal Administration. Properly applied, they could result in federal funds paying a major portion of cost of harbor area improvement programs that otherwise might have to be paid by the local government".[1/]

The local government responsibility for ports is granted to municipalities through the state statutes. The authority may be exercised directly by the governing body of the minicipality, or through a Board of Harbor Commissioners. However, operation of publicly owned or leased wharf and terminal facilities must be through a Board of Harbor Commissioners. In any case, whether directly or through a specialized board, the financial aspects of the ports are dependent upon the respective municipalities.

The Wisconsin Department of Transportation (Wis.DOT), created in 1967, was assigned responsibility for intermodal transportation planning in 1969, under legislation as follows:

"All planning in the area of highways, motor vehicles, traffic law enforcement, aeronautics, mass transit systems, and for any other transportation mode... The Department may direct and undertake planning for ports, harbors and waterways when requested by a state, regional or municipal agency or harbor commission."

Informational and port protection activities are assigned to the Department of Business Development.

"Study the Impact of the St. Lawrence Seaway on the Economy of the State, conduct research on port development, and new businesses for port communities, communicate the results of such studies to appropriate port, public and business agencies and formulate, coordinate and direct a program of port development for the State. The Department shall serve as a liason agency between local port authorities, state and federal agencies and individuals or private agencies who need or request information relative to the ports of the State. The department shall appear before federal, state and local agencies, whenever it deems such action advisable in the matter of the welfare of the ports of the State,"

The Department of Business Development because of budgetary limitations, has been restricted in the extent of its activities relative to ports. It provided financial assistance for a study of the port of Green Bay, and has published a handbook of Wisconsin ports at various times.[2/]

1/ Wisconsin Department of Resource Development, State Transportation Planning, Madison, 1966, p. 24.

2/ Wisconsin Department of Business Development, Wisconsin Ports. Madison: State of Wisconsin Department of Business Development, n.d., ca. 1972.

The Department of Natural Resources (DNR) is charged with responsibility for regulation of material and structures placed or removed on or from the bed of navigable waters within the State, and for establishing pierhead and bulkhead lines. The federal government, through the Army Corps of Engineers, performs similar functions for interstate navigable waters. Surface carriers by water operating interstate, of course, are under regulation by the Interstate Commerce Commission,[1/] international carriers are subject to the Federal Maritime Board, and intra-state carriers are regulated by the Wisconsin Public Service Commission.

Thus, the State of Wisconsin specifically designates the major functions of port planning, development, financing, and operation - where the latter function is not private - to local bodies: either directly by municipalities, or through a Board of Harbor Commissioners which is fiscally dependent upon the local government. Appendix D contains a description of state legislation relating to Wisconsin ports.

Relation of the States to Port Planning and Development

The State of Wisconsin has, in the recent past, exercised relatively few of the functions in connection with its ports than have some of the other states in relation to their respective ports. As mentioned earlier, some states, including Maine, Massachusetts, Maryland, Virginia, North and South Carolina, and Alabama, own and operate extensive port terminal facilities; others exercise more functions than does Wisconsin, but do not actually operate facilities.

Port administrative agencies, including those of the states among others, may engage in any or all of the following functions:

1. Dredging of slips along publicly owned docks and supplementary channels to accommodate draft of vessels.

2. Construction of bulkheads along improved waterfront.

3. Maintenance of publicly-owned waterfront facilities.

4. Collection of harbor dues and charges (except customs) assessed against vessels and cargo.

5. Leasing of publicly-owned facilities.

6. Maintenance of limited records on port traffic, revenues, and expenditures.

7. Promotion of traffic through the port.

8. Making rules and regulations covering safety in handling and berthing of ships and other protective measures.

1/ Such regulation does not apply to water carriers transporting commodities in bulk; I.C.C. Act, Section 303(b).

9. Representation of the port in obtaining federal aid in harbor and channel improvement.[1]

In addition to those basic functions, the public port administrative body may also perform the following additional functions:

1. Acquisition, by condemnation when necessary of waterfront areas and facilities.

2. Construction and replacement of facilities.

3. Physical planning and economic development of the port as a whole and possibly power to regulate private terminal interests.

4. Survey of harbor areas and taking soundings in slips and channels.

5. Harbor and dock policing.

6. Provision, maintenance and operation of fireboats, dredges, and other auxiliary harbor craft.

7. Assignment of vessels to berths and anchorage.

8. Maintenance of accounts, statistics, insurance, legal advice, and personnel policies in support of the broader responsibilities of the formal authority.

9. Public relations including legislative representation.

10. Provision of equipment for handling ships and cargo.

11. Control over operations of waterfront facilities, grain elevators, and other bulk freight terminals.

12. Regulation of ferries, bridges, and other adjuncts.

13. Operation of waterfront supporting facilities.

14. Training and licensing of pilots, stevedores, and harbor master.

15. Raising of capital for acquisitions and improvements.

16. Complete operation of the terminal facilities which may include stevedoring and car loading and unloading.[2]

Many of these functions can be reduced to certain general categories, which one authority lists as: (1) informational - port promotion, research, etc., (2) enabling - creation of port agencies or authorities, (3) supportive - appropriation

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1/ Fair, Marvin L., Port Administration in the United States. Cambridge, Md.: Cornell Maritime Press, 1954, p. 20.

2/ Ibid., pp. 21-22.

of funds, (4) constructive - building of port facilities, (5) protective - regulation of water and rail rates, and (6) negotiation - commercial treaties, etc.[1/]

Port Planning

Many recent trends indicate that Wisconsin, along with many of the other states, must play increasing roles in relation to port planning and development. Since few, if any, ports can raise the capital which is required to compete effectively with other ports, and since at least some competition is generally desired for the reasons given earlier, it is clear that financial assistance for either the states, or the federal government, or both, may be indispensable. As in the case of possible centralized planning of ports by the federal government, there is local resistance to the possibility of the additional controls and direction that may accompany increased state roles in relation to ports.

In particular, there is much concern that, if any state financial assistance to ports, or any centralized state planning for ports, is involved, the assistance may be inequitable as among the various ports within the state.

This fear may, in part, be justified, but it is virtually impossible to distribute aid equitably, since the nature of port traffic is that it will inevitably tend to flow through certain ports and bypass others. Traditionally, groups or ranges of ports have had equalization of inland rates to and from their competitive hinterlands, but this has not prevented the traffic from flowing through those ports which have superior service, in terms of minimal delays, quickest turnaround of ships and cargoes, freedom from strikes and other interruptions, including weather and ice conditions, and the widest choice of water and land carriers and routes. The concept of "load centers" reflect these considerations. In Wisconsin, overseas traffic moves primarily through three ports: Milwaukee, Superior and Green Bay, while the other ports, except for specialized traffic, stand little chance of capturing much of the overseas movements. Furthermore, even these larger Wisconsin ports face intense competition, as noted previously, from nearby Chicago, and beyond that, from U.S. salt-water ports on the Pacific, Atlantic, and Gulf of Mexico.

Any centralized planning or allocation of funds by the State must take into consideration the realistic probability of uneconomic return if the funds are too widely distributed among the ports. A major port is a gateway for a hinterland involving a substantial portion, or all, of a state and for a considerable territory beyond the boundaries of the state.

The dilemma which the state faces is that, on the one hand, the results of its port planning and supporting activities should not favor any particular port

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1/ Hazard, John, Michigan Commerce and Commercial Policies Study, East Lansing, Mich.: Michigan State University International Business Studies, 1965, p. 151; cited in Wegmann, op. cit., p. 31.

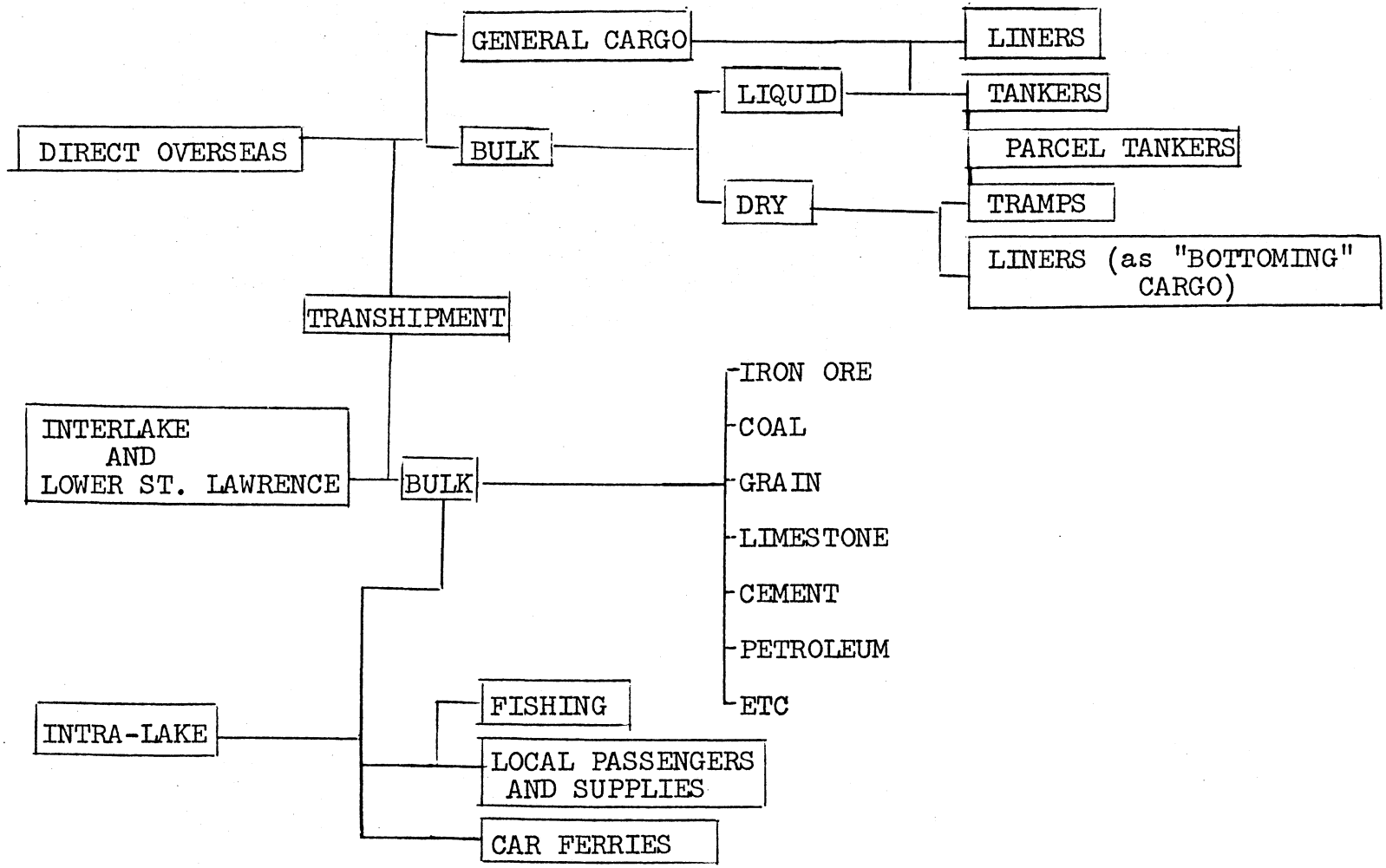


FIGURE 1: TYPES OF GREAT LAKES SERVICE AND VESSELS

TABLE 6

A TAXONOMY OF WISCONSIN GREAT LAKES PORTS
CLASSIFIED BY TYPES OF SERVICES AND VESSELS

Comprehensive (Major Ports)	Direct Overseas	Intra-lake, Interlake and Lower St. Lawrence	Car Ferry	Local Traffic only
Milwaukee	Superior	Superior	Superior(International)	Bayfield
Superior	Green Bay	Ashland	Kewaunee	Cornucopia
Green Bay	Milwaukee	Marinette Green Bay	Manitowoc	La Pointe
	Kenosha	Sturgeon Bay	Milwaukee	Port Wing
		Two Rivers		Algoma
		Kewaunee		Detroit Harbor (WI)
		Manitowoc		Oconto
		Sheboygan		Pensaukee
		Port Washington		Washburn
		Milwaukee		Suamico
		Oak Creek Racine		
		Kenosha		

or ports, but on the other hand, it should not result in an unrealistic level of support for those ports which either could not compete effectively or which could cause diversion of traffic to the detriment of the earlier well-established ports, both within and outside the state.

The Wisconsin ports can be classified into several general types in terms of the commodities, services, and characteristics of vessels which serve them, or which potentially would serve them in the future. Figure 1 is an attempt roughly to categorize the traffic by type of movement, vessel and service. Each port is particularly in a position to handle and to generate traffic of one or more of these types. In these terms, the ports of Wisconsin may be characterized as in Table 6, in accordance with the nature of the traffic which they normally handle.

In terms of overseas direct traffic, the scheduled cargo liners call principally at Duluth-Superior, Green Bay, and Milwaukee, with the latter port substantially more important in traffic volume than the others. On the other hand, waterfront industries of specialized character could attract bulk traffic, both overseas and lakewide, involving shipment and receipt of fuels and raw material commodities of a specialized nature. Because of the established traffic patterns, and the trends noted previously, it would appear most economic to concentrate the State's financial aid for general cargo facilities, if any, at one, two, or all of the three major ports. Bulk terminals characteristically are owned and operated by private industries or in a few instances by carriers except for grain elevators, which may be public as well as private.

Need for Data

Projection or forecasting of future traffic flows is a dangerous business, as it is subject to sometimes violent and unpredictable shifts. The surge in export grain as a result of the recent deal with the U.S.S.R., the shifts due to the changing energy picture, are but two of the many examples recently which could be cited. It appears to be desirable to provide some additional capacity, which may be unused much of the time, to handle such unexpected rapid shifts, although in some instances it may be advisable to discourage such traffic rather than to place substantial investments in rarely used facilities.

In any event, it is necessary to have a detailed understanding of not only the flows, but also the origins and destinations of the various types of traffic.

The U.S. Bureau of the Census collected data on international vessel and air traffic for "liner type" commodities in the year 1970, on a sampling basis. These tapes were used by the Center for Great Lakes Studies of the University of Wisconsin-Milwaukee in analyzing the states of origin and destination, with the expectation that such analysis would indicate the relative volumes of traffic which would be amenable for movement through Great Lakes ports, including those of Wisconsin. The results were very disappointing. It was found that:

> "The effect of the sampling process is that the information on the tape is heavily biased in favor of high weight items for vessels and high value items for air."

"The use of such samples as the basis for the formation of such a unique data base was highly unfortunate. Since the relationship between the distribution of weight (for vessel shipments) and value (for air shipments) and other characteristics of the population of traffic is unknown, the same cannot be used to estimate anything except vessel weight and airborne value. For example, it is impossible to say anything about the actual distribution of destinations within the U.S. of a particular import. Since the sample is biased toward large weight shipments, it is to be expected that the relationship between points receiving large shipments and those attracting primarily small shipments would be unreliable."1/

One of the important roles of the State could be in investigation of origins and destinations not only of shipments moving through the State's ports, but also of movements originating and terminating in the state but moving through ports outside the state. Coordination with such federal studies and data collection and collation, whenever available, would be essential, but until the federal government engages in an adequate national program of gathering and analyzing traffic flow data, it would be in the interest of the State to carry on such operations on a continuing basis.

Such a study involving continuous gathering, collation, and interpretation of flow data would differ from the usual port-hinterland studies that are conducted by individual port bodies throughout the United States and the world, in that they would include not only movements through each of the individual ports, but also movements through other ports of the State as well as movements through ports elsewhere in the United States and Canada. Operation of these investigations could be through either the Department of Transportation or the Department of Business Development. By broadening out beyond the usual type of data collection and interpretation which is customarily made by individual port bodies, overstatement of the hinterland area and of the traffic potentials of individual ports, characteristic of studies in the past, can be avoided, and the tendency for over-investment in port facilities thereby reduced.

Options with Respect to State of Wisconsin Involvement

There are many possible alternatives with respect to the extent and nature of involvement of the State of Wisconsin in port planning, development, financing, maintenance, operation and promotion. The combinations are almost infinite. Here we present some of the possible alternative schemes. There are two extremes. On the one hand, the State could have no involvement with ports except for the usual land use and environmental controls which are applicable to all activities and land uses. On the other hand, the State could be completely involved with the total planning, financing, operation, maintenance and promotion of all the ports within the State, or could phase out some ports and be completely involved with others, where the traffic would be concentrated.

1/ "Analysis of International Great Lakes Shipping and its Hinterland", Special Report No. 23. Milwaukee: Center for Great Lakes Studies, the University of Wisconsin-Milwaukee, April 1975.

Private Ownership and Operation of Ports and Harbors

At present, nearly all of the harbors are public while the port terminals and auxilary facilities are public, private, or some combination of both. Along the Lake Michigan shore, there are some harbors that are private. These include the harbor at Oak Creek, Wisconsin, which is used exclusively by Wisconsin Electric, the utility company serving southeastern Wisconsin, and Gary and Buffington harbors in Indiana, which are private harbors used exclusively by the United States Steel Corporation.

There is always a possibility that additional private harbors may be established by industries which would receive or ship bulk commodities and fuels at waterfront plants, or would transship between vessels and overland carriers. Such harbors would, of course, need to conform to all applicable regulations affecting any land uses, including zoning, environmental controls, and other regulations, federal, state and local. Since such plants would tend to be quite large, they also presumably require specific environmental impact studies. In addition, federal agencies, including the Corps of Engineers and the Coast Guard, would govern navigation and the disposal of dredged material from the harbor. More specifically, such developments could fall within the Coastal Zone Management provisions of federal and state law for Wisconsin. There is no decision yet as to the extent, if any, of specific provisions for coastal zone management. Except for these matters, the State would not be directly involved in the planning, development, or promotion relative to these harbors. The waterfront facilities would be entirely private.

An extreme option would be the turning over of all existing public harbors and shoreside port terminal facilities to private owners and operators, with of course, full compensation to the existing public owners. The tremendous complexities, together with the fact that relatively few such facilities could pay their way without subsidies, make such a change in ownership impracticable, even it it were desirable. This option runs entirely counter to the national and worldwide trends in harbor and port ownership and operation which have been characteristic for many decades and receives no further discussion in this report.

Complete State Ownership and Operation of Harbors and Terminals

At the other extreme from complete private ownership and operation of harbors and port terminals is complete public ownership and operation. This could be by the national government, by the states, by local port bodies, by municipalities, regional agencies, or any combination of these bodies. In many other nations, the harbors and ports are completely under government ownership and operation; in others there is complete public ownership, with some private operations of terminals and ancillary facilities under various forms of contractual arrangement.

Within the United States, several of the states own and directly control their major ports. In each instance, justification for this degree of involvement of the state in port matters is justified by the economic and other benefits to the state and its residents. In some instances, the state took over (by purchase) previously-existing facilities which had been developed and were

owned by railroads, industries, and private shipping and terminal companies. In other instances, the state planned, financed, constructed and developed the ports from their beginning.

There are several advantages to state ownership and operation of its major ports.

One very important advantage is that, if local political pressures can be resisted, the State can avoid over-investment in too many ports, some or all of which may be mutually competitive. In view of the rapidly increasing sophistication of port equipment and operations, and the consequent high costs, this may produce many economies, not only in the ports themselves, but also with respect to the inland transportation access and other infrastructures. This concentration of development and hence of capacity, at fewer but more efficient ports, is completely in conformance with current and prospective trends in cargo handling and port traffic patterns, nationwide and worldwide.

Were the State to exercise the complete degree of control over its ports that would accompany State ownership, it could much more effectively relate its ports to other programs and capital improvements, including, for example, highways, urban renewal, and coastal zone management programs.

Another argument in favor of state operation of ports is the fact that ports are intermodal terminals in transportation systems, some of the other elements of which are state owned, and others of which are state regulated. Major landward links in such systems are the highways, which are developed and owned in large part by the states, and over which the states exercise complete control, either directly or by delegating some of the authority to counties and local governments.

Local public port bodies are much less able, in general, than the states to provide either the expertise and specialized personnel that port planning and development may require, and - even more importantly - are usually less able than is the state to have access to the financial power, as represented by the ability to issue bonds backed by the state and thus able to secure more favorable interest rates, than are either local public bodies or private corporations.

There are three principal methods by which public bodies can finance major capital improvements, such as port terminals and permanent equipment such as wharves, cranes, transit sheds, and internal railroad and highway facilities. These are: (1) "pay-as-you-go" out of the general funds of the state, county or municipality, or special-function ad hoc agency such as a port authority; (2) general obligation bonds, backed by the faith and credit of the issuing government; and (3) revenue bonds, secured by the anticipated revenues derived from charges to the users of the facilities. In general, the high costs of port development and construction and the competition of other intensive demands for public funds make "pay-as-you-go" impracticable for ports. General obligation bonds usually imply that the ports involved are not directly profitable, but that public ownership, whether or not involving public operation, is financially justifiable because of the "externalities": the benefits to the state, the region, or the local jurisdictional area. Revenue bonds are in effect a lien on future revenues, and their issuance implies that the facilities which such bonds finance will have sufficient earnings to pay off the obligations

within the amortization period, and at the same time cover operating and maintenance expenses, and provide funding for eventual replacement. Both general obligation bonds and revenue bonds are customary methods of financing port development. It is customary for the states to delegate to local governmental bodies the authority to finance capital improvements through such bonds.

In Wisconsin, an amendment to the state constitution gives the State the authority to finance port development in these ways, in addition to providing direct financial assistance, to local bodies. Thus there appears to be no insurmountable legal obstacle which would prevent the State of Wisconsin from engaging directly in port development and operation.

There are, however, some major objections to the direct State ownership and operation of ports and port terminals.

One possibility is that, under local political pressures, State funds might be used to buttress some of the smaller ports which have outlived their economic usefulness, and thereby inhibit to some degree the realization of scale economies. Thus, local interests in preserving the status quo, even counter to inexorable trends, could take precedence over statewide interests. The same objection could be raised to state subsidies to local port bodies as to direct state ownership and operation of ports and terminal facilities.

Another possible objection is that competitive demands for State funding of other than port facilities, including all of the social programs as well as highways, state institutional buildings and other facilities would dilute not only funding but the effectiveness of State promotional support for its ports. Again, this same objection can be raised to any form of state financial participation in port development.

Lack of local autonomy, some people would argue, would involve a lesser degree of intimate knowledge of local conditions which would be inherent in "absentee" decision making. This argument is not necessarily valid because, in any event, regardless of ownership or control, public participation, including public hearings, could be an indispensible prerequisite to any major decisions regarding policy with regard to each of the local ports. In any decisions involving local public facilities, services, or improvements, the regional and statewide interest have to be balanced against the local interests, and presumably the local agencies would not be able to consider such balances as effectively as would agencies concerned with entire regions or states.

Public Port Agencies or Authorities Below the State Level

There are many available options for port agencies or authorities below the state level. Although in many matters individual port interests are mutually interdependent, ports compete for traffic of overlapping hinterlands. In reaching decisions as to the clustering or grouping of ports within jurisdictional areas the areal extent of jurisdiction of each port authority or agency, it is important to balance the competitive and interdependent interests of individual ports.

There are three principal options with respect to the degree of specialization of public agencies in the planning, development and operation of ports, and there are several levels of geographic area within which they may operate. This is illustrated by a matrix (Figure 2) which presents 21 combinations some of which, by definition, are not possible. There may also be other possibilities.

For almost any appropriate geographic area, there are three principal forms of port organization which are possible. All three are present within the United States. They are (1) general purpose government in which the port activities constitute only one - and generally a small - part of the complex of governmental activities, (2) a general transportation authority - often, incorrectly, called a "port authority" - which is concerned with the port or ports among other transportation functions, which may include airports, local transit, commuter railroad services, industrial development, and railroad and bus terminals, and (3) specialized ad hoc port agencies or authorities, which are exclusively concerned with ports and very closely related facilities and functions.

In Wisconsin, as mentioned previously, the ports are under the respective local municipalities or counties, either directly or through an appointed Board of Harbor Commissioners. The general purpose government in other states may be a municipality, county, metropolitan or regional government or the State.

In general, a transportation agency may or may not be primarily a port agency, but its concerns are confined rather closely to transportation and clearly transportation-related matters. In addition to ports, it may own, operate, or contract for other transportation and transportation-related facilities and services.

The specialized ad hoc port authority is an agency, covering any appropriate geographic area, which is exclusively, or almost exclusively, concerned with port matters and with waterborne traffic, although it may in some instances also own or operate other types of transportation terminals, such as airports, not directly involving water transportation. The distinction between the general transportation agency and the specialized port authority is not always clear, and some so-called "port authorities" may in fact be general transportation authorities.

A port may include all or portions of several harbors, as for example, the Port of Chicago, and a harbor may include several ports, as for example, San Francisco Bay, and the interstate harbors of Wisconsin: Duluth-Superior and Menomonee-Marinette.

Similarly, a municipality or county whose port includes only a portion of a shoreline or harbor, the development of which extends beyond municial boundaries, may not be an appropriate geographic unit for port development and operation. In Wisconsin, typically the ports are within the boundaries of a single municipality (Milwaukee, Kenosha, etc.). In such instances, the municipality may be an appropriate geographic unit.

The individual county may be an appropriate unit where the harbor and port are located entirely within the county boundary. The outstanding example in Wisconsin is Green Bay. Elsewhere on the Great Lakes, the Cleveland-Cuyahoga County Port Authority is a prominent example.

NATURE AND AREAL EXTENT OF POSSIBLE PORT AGENCIES

Areal extent	General-purpose Government	General Transportation Agency	Ad hoc Port Authority
Municipality	X	X	X
County	X	X	X
Metropolitan Area *	X	X	X
Region *	X	X	X
Coastline *			X
State	X	X	X
Interstate *		X	X

*These types of governments are not now present in Wisconsin

FIGURE 2

Economic community of interest or physical configuration among two or more adjacent counties may justify, in some instances, a multi-county or regional port organization.

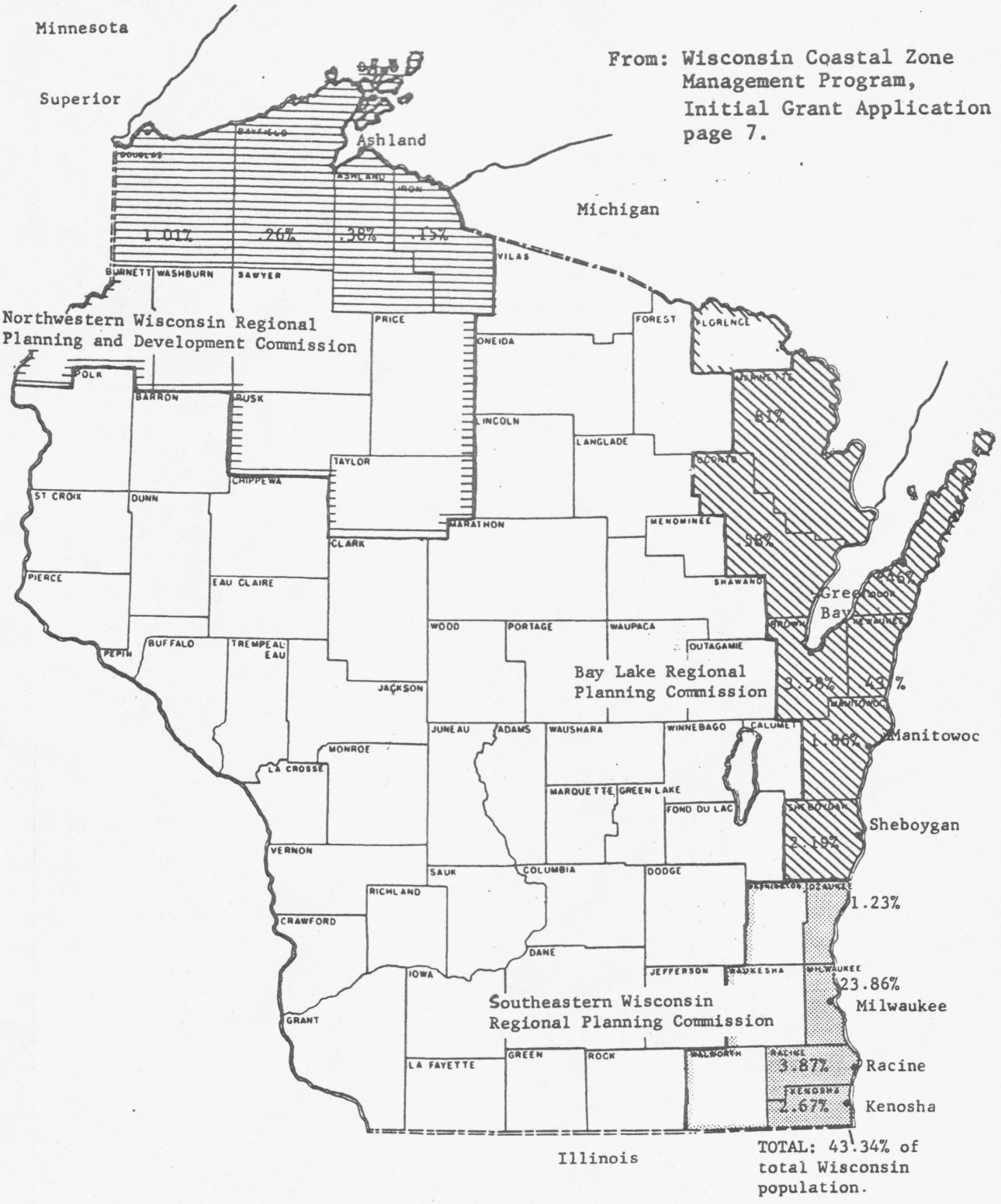
Defining a region with respect to port interests may be very difficult. For some purposes, an entire coastal range, such as the Atlantic Coast or the Great Lakes, may constitute a region.

For many other purposes, however, a region may be much smaller. In Wisconsin metropolitan areas (SMSA's) may be construed as regions. Thus, the Milwaukee metropolitan area would include the small port of Port Washington in addition to the Port of Milwaukee, but would exclude other nearby small ports, such as Racine and Kenosha.

A coastline or portion of a coastline may have many common conditions and problems affecting port planning, development and operations. At various areal scales there are informal organizations of ports to discuss and influence legislation on common problems. One such association covers all Great Lakes ports, and another covers Lake Michigan ports specifically. At the official level, port organizations covering entire coasts or major portions of coasts do not exist. However, coastal zone management programs may involve regional planning organization which, among other functions, coordinate plans for the many uses, conflicting or otherwise, in coastal area. In Wisconsin, there are three such regional planning organizations: (1) the Southeastern Wisconsin Regional Planning Commission (SEWRPC) covering the metropolitan areas of Milwaukee, Racine and Kenosha, (2) the Bay Lake Regional Planning Commission covering the coast of Lake Michigan from Sheboygan County north to the Michigan boundary including the shores of Green Bay, and (3) the Northwestern Wisconsin Regional Planning and Development Commission, covering the Lake Superior shoreline of Wisconsin. The respective regions of these three planning agencies are shown on Figure 3. If there were to be regional port organizations in Wisconsin, there are two options: (1) the three regions as currently delimited, or (2) combining the two regions along the Lake Michigan-Green Bay coast and keeping the Lake Superior coast region separately.

In some instances, a given port, or two or more nearby or contiguous ports, may be within more than one state. They may be on opposite sides of a river as, for example, Philadelphia and Camden or St. Louis and East St. Louis, or they may share a common harbor or harbors, as in the port district of the Port Authority of New York and New Jersey, where the agency was established by interstate compact and ratified by the U.S. Congress. In Wisconsin, there are two situations in which adjacent ports are in different states, but share a common harbor: Duluth-Superior and Menomonee-Marinette. Superior, in traffic tonnage, is Wisconsin's largest port. It is under a municipal port authority, but cooperation with the Port of Duluth is very close, and the two port agencies combine in their promotional and other operations. Whether an interstate agency would be more effective is an open question.

The areal extent of jurisdiction of a port agency is partly contingent upon the geographic pattern of general governmental units, and partly upon the nature of individual ports or groups of ports. It is not easily possible to generalize regarding either the governmental form of the port agency which is most desirable, nor its areal extent.



MAP 1 - Wisconsin's Coastal Zone

Regional Planning Commissions participating in Wisconsin's Coastal Zone Management Development Program - outlined in black with coastal counties shaded.

Distribution of Wisconsin's total population in the coastal counties - percentages noted. (source: "Wisconsin Profile Series--Population" Department of Administration, April 1971.)

FIGURE 3
The Three Regional Planning Areas of Wisconsin's Coastal Zone

If a single port or group of ports lies entirely within the area of a local government, municipal or county, it will be practicable to continue, as at present in Wisconin, the port agency as a unit or dependency of such local government.

There are several advantages in continuation of the status quo, in which the port is a direct function of the local or county government, or the port agency is a Board of Harbor Commissioners directly responsible to such government. The general obligation bonds by which the port can be financed would, in such instance, be backed by the faith and credit of the municipal or county government. Thereby they could be issued with lower rates of interest and possibly longer amortization periods, than if the port were under a separate local port or transportation agency. General tax revenues could be used to pay off such bonds, as well as to finance any deficits from the port operations. Also, it should be easier to relate the planning of port extensions or improvements, or, if need be, cutbacks or elimination of the port, to the other requirements and demands of the local area.

There are, however, several disadvantages to having the port function under the local or county government. Such government may have no special interest or concern for port matters, and may be under considerable pressure to use its financial and manpower resources to meet the numerous other needs of the area. Also, it would be easier for the port to be influenced by ephemeral or special-interest political pressures, than if it were more autonomous. If the port is under a general local or county government, for example, it may be more difficult for the public to understand the necessity for the public employees to travel extensively in the process of developing the traffic and services of the port. Any prudent private corporation would not be inhibited in such necessary expenditures of time and money, but the legislative bodies and the general public may not understand the necessity for such activities and expenditures.

In recent years there has been a proliferation of special-purpose and multi-purpose governments in the United States. One of the earliest, and most known, is the Sanitary District of Chicago created in 1889. The Port Authority of New York and New Jersey, created in 1921, although interstate and, therefore, somewhat of a special case, nevertheless is in many ways a prototype for numerous specialized port and general metropolitan and regional transportation authorities and districts which were subsequently created. By 1972 there were, in the United States, about 24 thousand special districts, other than school districts, and their numbers were rapidly increasing. Such specialized authorities and districts have the obvious advantage of being primarily or exclusively concerned with their particular functions, but have the disadvantage of constituting additonal layers of government in an already complex matrix of governments. Furthermore, some such multi-purpose and special purpose authorities and district governments have been subject to the criticism that they are less responsive to the general public and their constituancies than are the general-purpose local and county governments, or the states.

A major reason for the popularity and proliferation of special district and authority governments is that they may obtain financing independent of and beyond the amount which the local and county governments can raise within the debt limits imposed by the respective states.

Special purpose and multi-purpose authorities or districts concerned with ports may take the form of general transportation authorities or districts concerned with several modes, or they may be specifically port districts or authorities. In many instances, as previously pointed out, it may be difficult to determine whether certain activities and facilities under such agencies are specifically port functions and activities, or whether they are subsumed under general transportation. Nevertheless, the advantages and disadvantages of both types of special-purpose government are evident.

The general or multi-purpose transportation authority or district is becoming increasingly common, and has a number of advantages.

The several modes of transportation interface with each other and should be mutually complementary. It may be easier to plan, develop, operate, and finance port installations and activities as part of a general transportation complex than as a separate function. The revenues of various activities can, in many instances, be pooled, so that deficit operations - which are characteristic of many port functions - may be partly or completely financed by the revenues from other activities which produce surpluses. This type of cross subsidization may make it easier to finance the development of a port. With a number of operations and activities, the financial risks are spread, and it may often be easier to obtain financing on favorable terms.

With its larger financial base, as compared with a specialized port authority, the general regional or metropolitan transportation authority may be financially able to draw upon more highly qualified management and technical personnel.

On the other hand, the resources and efforts of a general transportation authority may be directed more heavily to projects, and operations which may have only peripheral or no relationship to the port as, for example, airports and local transit systems. These activities and operations may be more visible and understandable to the general public than are port operations.

Some transportation authorities, as well as port authorities, develop and operate facilities which compete directly with private enterprise, and which may or may not be relevant to the port, such as office buildings and industrial parks.

The more specialized port authorities and district organizations also have a number of advantages and disadvantages as contrasted with transportation authorities.

The sole or primary function of such a specialized organization is the port. It, therefore, devotes most or all of its attention to the port. Like the general transportation authority, but perhaps even to greater degree, the specialized port authority or agency is not subject to intensive public criticism when it devotes time and money to such necessary port development activities as traffic solicitation, and rate protection activities, which may involve extensive travel and time consuming activities away from the home base. The specialized port authority does not have the competition for funding for other enterprises which are characteristic of both general governments and general transportation authorities. Since the specialized port authority cannot

benefit from cross subsidization from non-port activities, except through external subsidies, there is less tendency to over invest in the port; therefore, each prospective bond issue or other financial transaction tends to be subject to more intensive and critical benefit-cost analyses.

A major disadvantage of the specialized port organization is that it is not inherently capable of viewing all of the multitude of relationships with the local area and region. It must, therefore, coordinate closely with the local, metropolitan, regional and other planning agencies, in order to insure that its facilities and operations are in conformance with the maximum benefits to the area.

The more specialized the agency, the narrower its financial base and its ability to get credit on favorable terms.

Since the present enabling legislation in Wisconsin relative to ports is limited in scope to municipal and county development and operation either directly or through boards of harbor commissioners, any initiation of port organization in any other form would require additional enabling legislation.

State Assistance to Local and Regional Ports

Assuming that the ports of Wisconsin will be administered by local, county, and/or regional bodies, probably including existing port organizations, it is necessary to consider the possible forms, if any, of state assistance to the ports.

State assistance to individual ports may be rationalized or justified by the benefits to the economy of the state as a whole.

The Panel on Future Port Requirements of the United States has indicated rather strongly as a result of its investigations and deliberations that it is in the national interest for the federal government to provide technical and financial assistance to the ports of the nation. Based upon the precedent and analogy of the federal assistance programs for airports and highways, it is presumed that federal assistance to the ports would be channeled through the several states. As in the case of the airport and highways programs, federal assistance to ports would require contributions by the states. Even if the federal assistance were not to be available, it is in the interest of the several states to assure that ports are developed and operated with sufficient capacity effectively to meet the needs of the state's industry and commerce, and to be instruments in the further development of the state's economy. An objective of programs of state assistance to its ports is the maintenance of competition and of options to shippers and carriers which would result in flexibility and, presumably, lower transportation costs.

A central issue becomes a comparison between local financial autonomy with respect to ports and a program of some combination of federal and state financial assistance to ports. In the former situation, the tendency of local ports to engage in some marginal development may be counterbalanced by their restricted ability to raise capital. In the latter situation, there may be a tendency to spread financial assistance, for political or other considerations, too thinly amoung both viable and submarginal ports.

CHAPTER IV

SOME SPECIAL ISSUES AND FUTURE INVESTIGATIONS

There are four important special problems affecting the future of Wisconsin's Great Lakes ports in which it is imperative that the State's roles, if any, be defined. They are (1) continuation and improvement of the shipping services across Lake Michigan, (2) extending the season of operation of interlake and overseas services to and from Wisconsin's lake ports, (3) disposal of dredged materials in relation to coastal zone management, and (4) rate protection and traffic solicitation.

Shipping Services Across Lake Michigan

For many years there has been a number of steamship and ferry services across Lake Michigan, linking eastern Wisconsin and western Michigan. The last of the regular steamship services terminated in 1973, due to obsolescence of the vessels, and the high cost of modifying them to meet environmental requirements. Three railroads - the Chessie System, the Grand Trunk Western, and the Ann Arbor - have been operating car ferry services since the late nineteenth century, using a technology which was the prototype for similar services in many parts of the world (Figure 4). All three of these services are now in prospect of imminent termination; each of the railroads has applied for abandonment.1/

In recent years there has been a precipitous decline in the amount of service provided by the ferries, and several of the routes have already been abandoned, while operators of the remaining routes have all applied for abandonment. There are several reasons for this decline. The changing technology of railroad transportation together with the recent and prospective changes in the geographic patterns of railroad traffic flow to the east of Lake Michigan have shifted the east-west traffic predominantly through the Chicago gateway, around the southern end of Lake Michigan. The vessels are inefficient: they are labor-intensive, slow, some lack the needed sewage holding or treatment facilities on board, and the newest of them are coal-burners, with environmental problems. The latter are, in fact, already a quarter-century old, and their replacement is economically impossible on a profit-making basis for the railroads. Most importantly, they are not equipped for, nor are the railroads interested in, the handling of heavy highway trucking. In other words, the present ferry services across Lake Michigan are highly specialized, and they do not meet the contemporary and prospective requirements for cross-lake service.

Abandonment of the present cross-lake service would leave Lake Michigan as an impenetrable barrier over 300 miles in length across the main east-west axis of transportation in the United States forcing all movement, except by air,

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1/ George W. Hilton, "Great Lakes Car Ferries: An Endangered Species", Trains, Vol. 35, No. 3 (January, 1975), pp. 42-51.

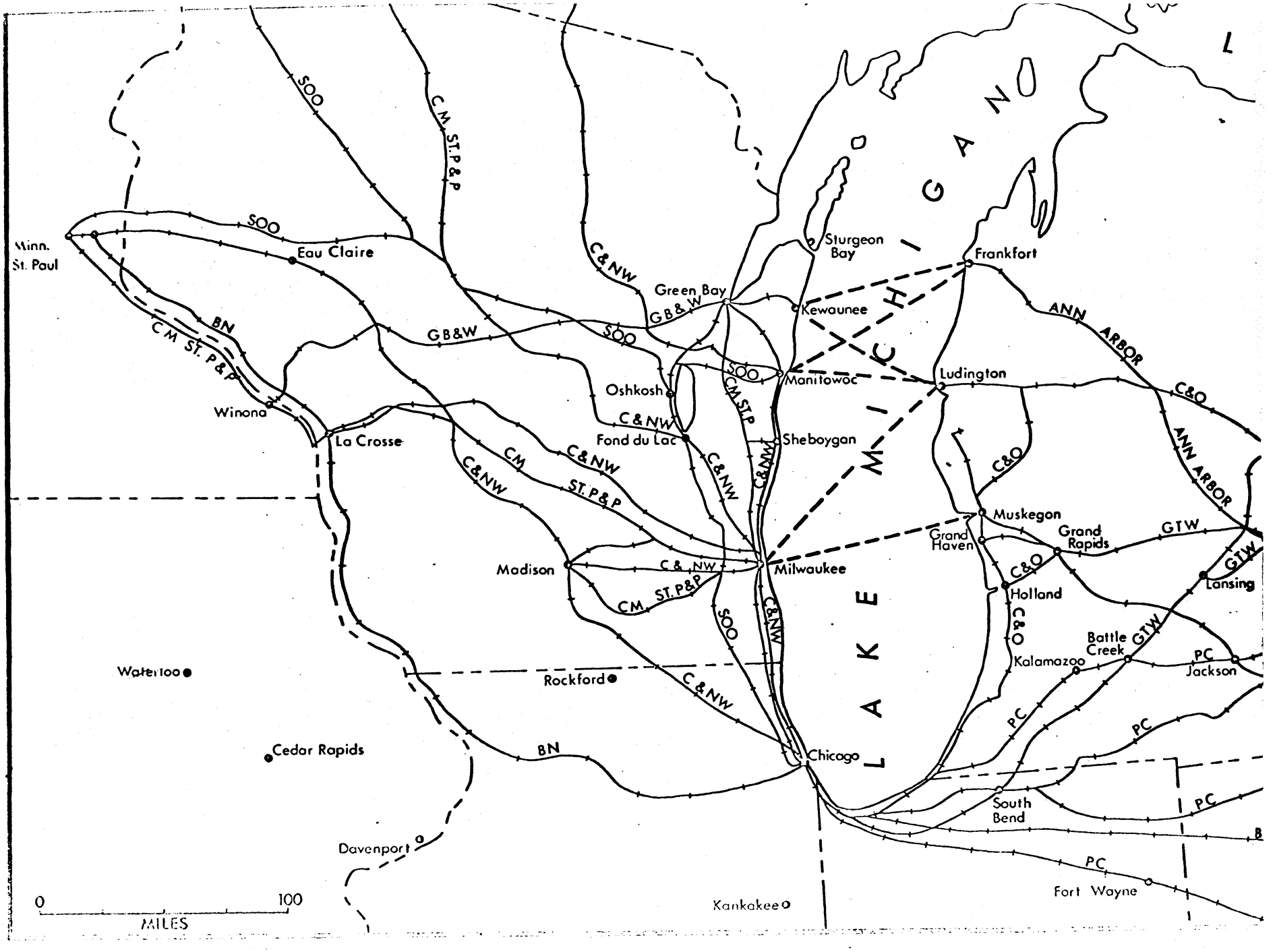

Figure 4

Existing Lake Michigan Car Ferry Services

around the end of the lake, mainly through the Chicago gateway, thus producing substantial added mileage, congestion delays, additional air pollution, and additional fuel consumption. Wisconsin, west of the lake, will be particularly adversely affected, because most of the state, and especially the industrialized urban southeastern portion, will be vulnerable to transit conditions through the Chicago gateway. Of particular significance is the fact that the availability of the cross-lake routes for freight, as an alternative and by-pass avoiding Chicago, has placed the western shoreline cities and portions of their hinterlands, including Milwaukee, on a freight rate parity with Chicago; in other words, the ferries have in effect removed the handicap of the 85 additional miles between Chicago and Milwaukee, and placed the area west of the lake into the eastern railroad network, thus facilitating access to the major industrial areas on the opposite side of the lake and beyond. Were the ferries to terminate, the Milwaukee area would lose its easterly railroad connections and would cease to function as a gateway. While there may be some continuation of the existing rate structure, it is very problematical how long that would last in view of the fact that the geographic pattern of routes and movements would be altered in a major respect. Many important industries in Milwaukee and eastern Wisconsin would be seriously handicapped in their ability to compete in eastern markets, or to receive inputs from east of Lake Michigan, were such alterations to occur. Eastern railroads are indifferent to this condition, for they would not wish to continue to short-haul themselves on such traffic, and southeastern Wisconsin would then be served only by three western railroads; presently single-line movements to and from the east would become interline movements, with additional vulnerability to delays, loss and damage, and additional out-of-pocket costs to the carriers.

Even more significant is the long-term shift of much of the high-grade freight, including predominantly merchandise, from railroad to highway transportation. The relation of Milwaukee and southeastern Wisconsin to Chicago is similar for trucks as for rail; the rate situation is analogous. The present ferry services are not geared to handle heavy trucking.

Additionally, the steamship services of the past and the ferry services, have handled substantial seasonal tourist traffic between Wisconsin and Michigan, to the benefit of both states; the trip across the lake has been in itself a tourist feature. Some of the present ferry services carry tourist automobiles, but the most direct service (Milwaukee-Muskegon) does not and never has; a conventional steamer did until recently (Figure 5).

There has been much interest in cross-lake services on both sides of the lake. Western Michigan interests have pursued this matter[1/] and considerable background information has been obtained. Other studies, prompted by the issue of cessation of service through the abandonment process, (including those done by consultants such as A. T. Kearney, Banks and Associates, and Harbridge House) have addressed in detail service, economic, environment, and social issues as well, in some instances, funding mechanisms. Because the Ann Arbor has declared bankruptcy and is eligible for inclusion in the system being prepared by the United States Railway Association (USRA) under the provisions of the 1973 Rail-

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1/ Leo Jakobson et. al, Muskegon Lake: A Study of Opportunities (Muskegon: West Michigan Shoreline Regional Development Commission, June 1974), expecially Appendix A, "An Assessment of the Prospects for Commercial Shipping at the Port of Muskegon" by Harold M. Mayer, pp. A-1 - A-29.

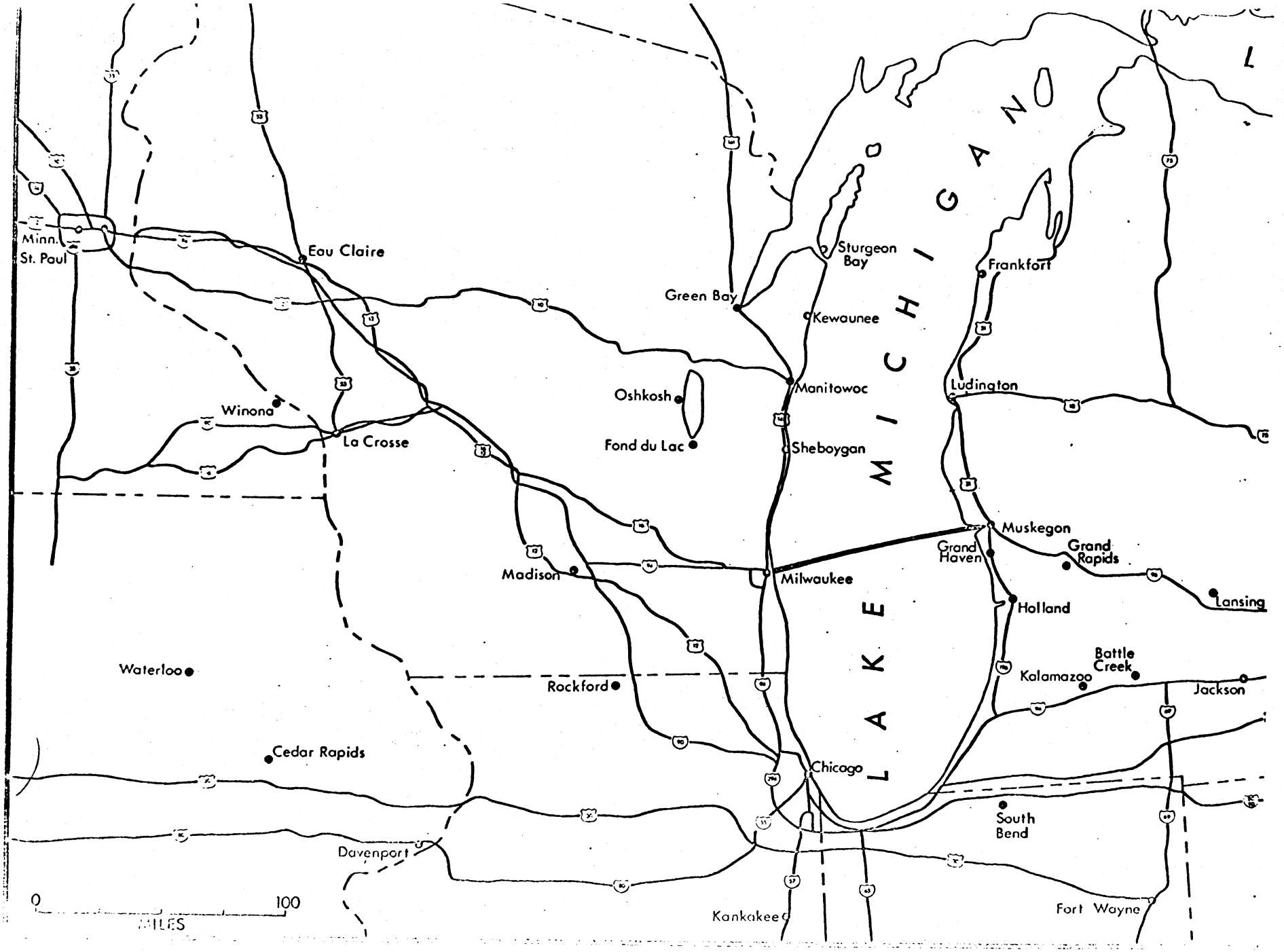

Figure 5

Milwaukee-Muskegon Ferry Route

road Reorganization Act, additional attention has been devoted to this operation. In various combinations, these studies have given consideration to rail, truck, and passenger1/ (auto) needs and potentials.

The State of Wisconsin has actively participated in abandonment cases heard before the Interstate Commerce Commission (particularly the Ann Arbor) and has taken a position in opposition to the cessation of service.

There are several ways in which the states of Wisconsin and Michigan could assist in the initiation and operation of a modern service across Lake Michigan. One way would be if the service is to involve, in whole or part, a railroad operation, a direct state subsidy to the railroad or railroads that would be responsible for the operation. At present this may not be possible for Wisconsin, since state financial assistance to railroads is not specified in the constitution, as it is for ports, airports, and highways. A referendum to amend the state constitution to permit subsidies for any or all modes of transportation was narrowly defeated, after a recount, by the state's electorate early in 1975.

Another possibility for state participation in a cross-lake service would be through a subsidy to a private operator. The contractual arrangement would provide subsidy from the two states to underwrite annual deficits and would be on a sufficiently long term basis to justify operation by a private contractor.

An interstate ad hoc steamship or ferry authority could be created to provide the service. There are presently several State ferry operations: Wisconsin has a free ferry across the Wisconsin River for highway traffic, while the departments of highway or transportation, as the case may be, of the states of Louisiana and Washington, among others, operate a number of ferry services. The State of Alaska has an extensive system of long-haul ferries, including a route from the State of Washington. Massachusetts has a state steamship authority connecting the mainland with the offshore islands of Martha's Vineyard and Nantucket. Finally, and more relevant to the Wisconsin-Michigan situation, an interstate ferry authority has an intensive operation across Delaware Bay between New Jersey and Delaware. Again, if Wisconsin were to participate, either directly or through an interstate organization, constitutional authority would be required through an amendment.

In any event, it is clear that a subsidy would be required. Should the operation be performed by a railroad or railroads, by a private contractor or by a public agency, highway traffic would presumably be carried, and in that case the State could possibly furnish the terminal facilities, including approach roads, staging areas, and terminal buildings as part of the state highway system.

There are several possible forms of available federal assistance, which could possibly be channeled through the state or states. The ferry could be considered as a link in the national highway system. The Highway Act of 1956 specifically excludes ferries from the 42,500 mile Interstate system, and thus from the 90 percent federal construction subsidy. On the other hand, ferries are specifically included as eligible for aid as part of the 50-50 system of federal aid highways. Under this formula, financial assistance for construction of vessels and terminals should be investigated. Also, there is a possibility that a

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1/ The Center for Great Lakes Studies, University of Wisconsin-Milwaukee has proposed a further investigation to additionally consider highway vehicles only and passenger only type service. This investigation is proposed as a project to be funded by Sea Grant.

ferry route could be construed as part of the system of reorganized bankrupt eastern railroads; the Ann Arbor is one of the bankrupts. Finally, there are several provisions of the Shipping Act of 1970 which amended the Merchant Marine Acts of 1916 and 1936 that could be investigated: mortgage guarantees, construction subsidies, and operating subsidies are now all possible for domestic shipping. The extent, if any, to which these various forms of federal aid could be pyramided should be carefully investigated.

The cost of a modern ferry service across Lake Michigan would probably be less, per mile of route, than even a simple highway of comparable distance. The benefits to the two states in overcoming the lake barrier should be evaluated against such cost.

The benefits to the public indicate that, sooner or later, a modern cross-lake service will be instituted. It is important that provision for terminals at one or more appropriate Wisconsin ports be made in order that the required waterfront land as well as land for backup and landward approaches be designated in advance of incompatible developments. Such provision should be included as integral parts of local and regional plans, as well as in coastal zone management planning.

Extension of the Navigation Season

Shipping services on the Great Lakes, except for intralake services, are seasonal, with closure of the interlake passages by ice during the winters. For the most part, the Lake Michigan ferries and such intralake operations as tankers between Indiana Harbor and other Lake Michigan ports, have operated during the entire year. The average number of days of interruption by weather conditions of the car ferries in Lake Michigan in recent years has been about five annually. Ice conditions in the harbors may be a problem at the beginning and end of the normal navigation season.

The interlake services, which generally terminate in December and reopen in early spring, involve stockpiling of the bulk commodities over the off-season, or diversion of some movements, such as that of iron ore from the upper lakes, to rail movement.

A demonstration program to extend the navigation season in the Great Lakes, authorized by the River and Harbor Act of 1970 and amended by the Water Resources Development Act of 1974, is continuing until the end of 1976. The program undertakes to demonstrate the practicability of extending the navigation season on the Great Lakes-St. Lawrence System.[1/]

For the first time interlake operation of shipping service was carried on during the winter of 1974-75. This was accomplished by a combination of many

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1/ Great Lakes-St. Lawrence Seaway Winter Navigation Board, Third Annual Report. Washington: U.S. Government Printing Office, 1975.

techniques, including icebreaking by Coast Guard vessels especially assigned to the operation, bubblers on the bottoms of critical connecting channels and harbors to create turbulance and thus inhibit ice formation, improved surveillance and reporting of ice conditions, and the use of ice strengthened hulls and more powerful engines than those typical of lake vessels in the past. During the winter of 1974-75, several ore carriers of one company, the United States Steel Corporation, were kept in service until the beginning of the 1975 navigation season; thus the two seasons overlapped. One of the locks at Sault Ste. Marie was kept available at all times through the winter; this was possible, even though anyone of the locks was closed, because of parallel locks at that location.

It is not possible, in the forseeable future, to keep the St. Lawrence Seaway or the Welland Ship Canal open for more than about eleven months per year, because all of the St. Lawrence locks, and all but three of the Welland locks are single, and closure of any one of them for needed maintenance and repairs, results in closure of the entire system except for local movements. Thus, connection between the Upper Lakes (Superior, Michigan, Huron and Erie, on the one hand, and Lake Ontario, the lower St. Lawrence, and overseas), is broken each winter. However, there may be substantial benefits to the Great Lakes region in extending the open season between the upper lakes and Lake Ontario, and between the Great Lakes and tidewater, later in the winter and earlier in the spring, than has, heretofore, been the practice.

Following their use in late winter - March, 1975 - the vessels which operated in the previous weeks were taken out of service for varying lengths of time for normal maintenance and servicing, which, had they not operated early in the calendar year, would have been accomplished during the winter. One can legitimately raise the question whether there was any advantage, therefore, in maintaining operations of these vessels through the most difficult weeks when they could have been serviced during the normal winter layup. The question is further underscored by the fact that many fewer, but larger, vessels are now in service in internal Great Lakes trade than ever before, and thus there is, in the normal course of events, other ways of realizing the economies of scale than extension of the season, with all of the costs, difficulties and hazards involved.

Other issues relative to all-year or extended-season navigation within the Great Lakes are also unresolved. During the past winter (1974-75) vessels of only one company operated through the winter and overlapped the spring season normal opening. At most, only a few operators would keep their vessels in service during the winter. One may raise the question of whether the public interest would be adequately served by public costs in maintaining operation of the channels, ice-breaking and other aids to navigation during the few weeks of maximum severe winter conditions, or whether the same results can be, and are being, achieved by more operation during the "shoulder" periods before and after deep winter conditions, together with larger vessels, faster speeds, and more efficient port turn-around.

From the viewpoint of the states, including Wisconsin, full advantage of the possibility of extending the navigation season betwen the lakes - whether or not

all-year navigation becomes practicable - will depend upon keeping at least some of the major harbors open. The relations between the federal, state, and local governments, including the port agencies, needs to be worked out in detail. However, it is the responsibility of the terminal operators, whether public or private, to prevent ice formation alongside their wharves sufficiently to permit vessel access and to keep the terminals themselves in condition to be operable in the severe winter weather.

In one sense, either operation within the respective harbors is a general function and responsibility of the local port agency. Financial assistance (if any) from the State to meet the additional costs would be presumably subsumed in the general costs of port operation, and could be handled in much the same way as any other form of state assistance to the individual ports. Consideration must be given, however, to the possibility of over-extension of such winter port operations, if an excessive number of ports are to be involved. Benefit-cost investigations should be made separately for each of the possible winter ports, as well as for the Great Lakes system as a whole.

Disposal of Dredged Material

Dredging is required in order to remove sediments which accumulate in the channels and harbors of the Great Lakes. It is important to maintain project depths, since every inch of additional vessel draft means that a vessel can load scores or hundreds of additional tons of cargo. The level of the lakes fluctuates through an amplitude of several feet from year to year, in a cyclical pattern which is not yet well understood, and there is little that man can do to control the lake levels except for a few inches. Dredging operations are divided into three catagories: (1) new work involving deepening and/or widening of a pre-existing project or the initiation of a new harbor or waterway. (2) maintenance, involving the removal of unconsolidated sediments which have been deposited in a navigation project since the last dredging operation, and (3) dredging privately or under permit by private contractors in private harbors and approach channels and alongside wharves adjacent to federally-maintained channels. Both new work and maintenance dredging in federal harbors and waterways are regulated by the U.S. Army Corps of Engineers, under congressionally authorized projects and through annual appropriations.

With the current emphasis upon the quality of the environment, it is no longer possible indiscriminately to transport dredged material to disposal areas in the lakes or elsewhere.1/

Each dredging project has unique characteristics, and all federal projects are subject to variations in lake levels and the extent of federal funding. Private dredging in the navigable waters of the Great Lakes requires both approval of the Corps of Engineers and an environmental permit issued by the

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1/ Much of the material in this section of the report is based upon a manuscript prepared by L. Andre' Roy, Wisconsin Department of Transportation, Division of Planning.

Wisconsin Department of Natural Resources. Although the Corps of Engineers does not dredge private navigation projects, the sloughing of sediments, as a derived benefit, from privately maintained channels into public channels slightly reduces the quantity of private dredging required in public harbors.

Although the principal channels in each of the harbors where federal projects exist are dredged by the Corps of Engineers, either directly or by private contractors, the maintenance of depths alongside the wharves and terminals are local or private responsibilities. If, therefore, the State of Wisconsin were to own and operate port terminal facilities, there would of necessity be State involvement in providing and maintaining the channel depths, and the State would be responsible for the preparation of environmental impact statements and the securing of the necessary permits for disposal of the dredged materials.

Rate Protection and Traffic Solicitation

Most of the tonnage handled at Great Lakes ports consists of bulk commodities, a large proportion of which is transported on the lakes by private and contract carriers exempt from rate regulation. Some of the Wisconsin ports handle a relatively large volume of movement by common carriers, such as the ferries, which are subject to rate and service regulation. All of the rail and much of the highway transportation landward is regulated. The ports of Wisconsin, the Great Lakes, the coastal ranges, and even of Canada, compete with each other for the traffic originating and terminating in Wisconsin, both domestically and internationally. This competition can be intense because much of the traffic is sensitive to variations in rate levels and to quality and frequency of service.

If the maximum benefits to the State's economy are to be realized from the availability of its ports and the transportation services which do or can use them, it is important that some qualified agencies engage continuously in monitoring the nature, quality and frequency of both land and water transportation services and, perhaps even more important, protect the interests of the ports by carefully investigating the ever changing rate structures, and by presenting evidence in support of the state and local interests in cases before the regulatory bodies, including the Interstate Commerce Commission, the Federal Maritime Board, the various energy agencies, and the state agencies. Practitioners before these bodies constitute a special profession, and it is important that such qualified professional talent be continuously available to the State.

Also, in interport and interregional competition for traffic - and, in the case of the major Wisconsin Great Lakes ports, for especially direct overseas traffic - solicitation of traffic, as well as of prospective ship operators, for movement through the ports, must be vigorous and dynamic. Many of the world ports maintain traffic solicitation offices, not only in their home countries, but also in overseas areas which generate, or could generate, traffic through the respective ports. These offices may be maintained directly by the ports, or they may be agents who perform the service for several ports which are either grouped or are non-competitive, as the case may be.

Some of the states which operate ports have their own traffic offices; others, which do not operate ports maintain relationships with the traffic solicitation function through their department of business or economic development. In any event, traffic solicitation and development is a function which cannot be left to chance. In Wisconsin, intensification of these activities could possibly generate significant additional overseas traffic for the state's major ports. Further exploration of this possibility may produce significant results.

Free Ports and Foreign Trade Zones

With the opening of the St. Lawrence Seaway, there was some interest in the possibility of establishing free ports or foreign trade zones at some of the Great Lakes ports.

A free port, or a "foreign trade zone" as it is called within the United States, is a port, or an area within a port or airport, or elsewhere, within which goods may be landed, handled, manufactured, repackaged, and reshipped without the payment of customs duties to the host country.[1/] Only when goods pass through the free port boundary into the host country are they subject to customs inspection and tariff. The primary purpose of a free port or foreign trade zone is to remove from a port those hindrances to trade which may be imposed by customs regulations. Thus, industries that package, process, or store goods from various countries of origin, may be attracted to sites within the free port zone, where processing or assembly can take place prior to further shipment to the host country or other countries.

A number of such foreign trade zones have been established within the United States. Some have been moderately successful, but some have not, and have been discontinued. Within the Great Lakes region, a foreign trade zone is operated within the port of Toledo, Ohio.

A comprehensive study of free ports and foreign trade zones two decades ago reached essentially negative conclusions with reference to the advantages for the United States:

> "Free ports and foreign trade zones of highly industrialized, tariff-enclosed nations must demonstrate that they can compete successfully with bonded warehouses or other alternative systems if they are to perservere. So far, they have not evidenced an ability to do this when: (1) they have been placed in small seaports or airports, (2) they have been introduced as very small units in active seaports, or (3) they have been inserted into seaports, large or small, of which the commerce is not conducive to free port operations. The only free ports of highly industrialized, tariff-enclosed nations that are yet strongly defended with justifiable reason are the large, dynamic units located in equally large, dynamic seaports such as Hamburg and Bremen. Even under similar conditions, however, bonded warehouses appear to be functioning successfully in such leading European seaports as Rotterdam, Amsterdam, Antwerp

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1/ "Free Port", Encyclopaedia Britannica, by Mayer, Harold M., 1972 & 1973 ed.

and London. In addition, bonded warehouse systems can and do operate prosperously in smaller places."[1]

The principal foreign trade zones are located in nations that conduct considerable "third nation" or intermediate trade, transshipping goods that neither originates nor terminates in the host country. On the other hand, there may be some possibility for assembly of repackaging of goods originating in several foreign countries which, in turn, may be components assembled into finished products within a free port for ultimate consumption or sale in the host country.

The author of the above-noted definitive and comprehensive study of free ports that was made in 1956 before the opening of the enlarged St. Lawrence Seaway, suggested that:

> "....the results of the research for this book have indicated that the United States should not consider the establishment of any additional foreign-trade zones until the Great Lakes-St. Lawrence Seaway has become a reality and its traffic has stabilized. At that time, studies should be conducted concerning the overall efficiency of the foreign trade zone, as compared with our bonded warehouse system, in facilitating such commerce as would normally benefit by a free port in the one or two really major seaports then active. Such studies should be based on the assumption that the greater part of foreign merchandise stored in either the foreign-trade zone or the bonded warehouse system would be eventually imported into this country, and that only a small percentage of such merchandise-probably not more than 15%- would be re-exported. If the results of these studies favor continuation of the foreign-trade zone, such a zone should be planned on a scale sufficiently large that it has a valid chance for success. If the results are negative, steps should be taken towards repeal of our foreign-trade zones legislation."[2]

Now, a decade and a half after the opening of the Seaway, the decline of general cargo in direct Great Lakes-overseas movement from the levels achieved a few years after the Seaway opening indicate that the need for a foreign-trade zone in any Wisconsin port is doubtful. However, although a detailed investigation of the subject is beyond the scope of the present report, it is suggested that a study of foreign-trade zones by the Department of Business Development or some other appropriate Wisconsin state agency may be useful.

The Future of the Smaller Ports

With the concentration of commercial shipping traffic at fewer but larger or more specialized ports, the smaller ports face prospects of a changed future. Some of them may not survive as ports, but many can adapt themselves to new or expanded roles for other than large-scale commercial shipping.

1/ Thoman, Richard S., Free Ports and Foreign Trade Zones. Cambridge, Md.: Cornell Maritime Press, 1956, p. 163.

2/ Ibid., p. 164.

There are several possibilities for such smaller ports. Among them are (1) recreational boating, (2) sport fishing, and (3) commercial fishing.

There is a growing demand for facilities for small craft, including both sail and power boats, on the Great Lakes. Berthage and launching facilities are in short supply, and their provision could be a major public concern for a number of Wisconsin's ports, small as well as large. In the larger harbors and entrance channels there may be navigational conflicts between commercial ships and small craft, conflicts which may not exist at ports which have little if any commercial shipping.

Thus, some of the smaller ports may advantageously provide extensive facilities for recreational boating. Such facilities may include marinas, with berthage, moorings, and launching ramps, as well as associated services and facilities including fueling, repair yards, communication services, yacht clubs and waterfront "boatels" and restaurants. In some instances, these facilities would be privately developed and operated, but, in many instances, they would be appropriate public functions.[1/]

Commercial and sport fishing, subject to management of the biotic resources of the lakes, could also be expanded at some of the smaller ports.

The thousands of small recreational and fishing vessels on lakes Michigan and Superior require harbors of refuge along the respective coasts. Each of the smaller harbors, as well as the larger ones, are essential for this purpose.

Recreational boating, sport fishing, and commercial fishing vessels do not require deep channels. Therefore, some of the harbors at the smaller ports need not be provided with continued maintenance of present project depths, but, rather, should have provision, whether federal, state, or local, of channels with depths suitable for medium-sized or smaller craft. Continued maintenance and operation of aids to navigation, such as lighthouses, buoys, emergency communications, and rescue services, are essential. This could be, as now, a federal function, although, in some instances, local interests could provide some of these facilities and services.

1/ Recreational boating is excluded from the scope of this study, and is the subject of a separate report.

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