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Analysis of International Great Lakes Shipping and Hinterland

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ANALYSIS OF INTERNATIONAL GREAT LAKES SHIPPING AND HINTERLAND

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TO THE READER:

The research results reported in this document are based on an analysis of a subset of the data contained on the Domestic and International Transportation of U.S. Foreign Trade: 1970 Public Use Tapes released by the Department of Commerce, Bureau of the Census in 1972. No remotely similar data source has existed since 1956. Supporters of this recent data collection effort foresaw a variety of uses including import market determination, domestic modal split analysis and specification of various hinterland characteristics. The uniqueness of this data source has already led to its use in the formulation of transportation related policies as well as in important decisions in both the public and private sectors such as investment in facilities. This widespread use has served to stimulate the effort that has been devoted to the preparation of this document. Unfortunately, our analysis of these important tapes indicates that their use for many of the most important applications, including that reported herein, is not completely valid.

In light of our findings, a word of caution must be raised before you begin to read this document. The specific commodity and port analyses appearing in Chapters II and III respectively are not to be interpreted as representative of the population of all shipments in these categories. Rather these analyses are simply descriptive of the contents of the sample used as the basis for this study. The sampling procedure employed to develop this data base was biased in a manner that prohibits valid inference from the sample to the population for any characteristic other than aggregate weight for ocean vessel shipments or aggregate value for air shipments. This procedure is described in Chapter I of this report.

We completed our research fully cognizant of the limitations imposed on our results by the biased sample. Despite these limitations, we feel the uniqueness of this important data source justifies our inclusion of these results.

Those interested primarily in specific analyses contained in Chapters II and/or III should not read these without taking the time to read Chapter I. This will fully inform you of the reasons that prohibit the sample on the Public Use Tapes from serving as the basis for inference to the population of shipments for any characteristic other than aggregate weight or value as stated above.

Sincerely,

Eric Schenker

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CHAPTER 1

INTRODUCTION

In September, 1972, the United States Department of Commerce, Bureau of the Census, released the results of a sampling survey of export and import traffic in a document entitled Domestic and International Transportation of U.S. Foreign Trade: 1970. The data collected were processed in accordance with nondisclosure policies and released for public use on magnetic (computer) tape. These tapes immediately became an invaluable information resource for transportation analysts. No similar survey had been conducted since 1956 and this 1970 survey was far more extensive.

It was known that a great many changes had taken place in the intervening years not the least of which was the opening of the St. Lawrence Seaway system. The primary intent of the survey was to obtain new data on the domestic leg of U.S. foreign trade and to link those with previously collected information on the international leg of "liner-type" commodity flows. Supporters of the survey foresaw uses of such data that included determination of the size, location and characteristics of various hinterlands; the differences between the hinterlands for some commodity groups as compared with others; the intermodal shares of traffic on the domestic leg of the international movement; and the volume of traffic moving on the domestic leg in international cargo containers.

The study reported herein is concerned with both a geographic and commodity-specific description of the hinterland of the fourth seacoast of the U.S., the Great Lakes. Clearly, this analysis falls within the intended use of the publicly available data. In fact, had the tapes not been available a study of such scope would not have been initiated. Before presenting the results of the study, a more complete description of the data base and some problems encountered in its use are provided.

Data collected in the sample are descriptive of "liner-type" commodities moving in foreign trade through ports within the 48 contiguous states and transported on the international leg by vessel or air during 1970. Note that this definition results in the exclusion of land transport between the United States and both Canada and Mexico.

The term "liner-type" is vague but the authors considered it superior to alternatives such as "non-bulk," "general cargo," or merchandise traffic. The scope of "liner-type" commodities includes all items in U.S. foreign trade, except specified commodities. The major exceptions are wheat, corn, other unmilled grains, cotton, oilseeds and oil nuts, iron ores, nonferrous metal scrap, stone, sand and gravel, coal, coke and petroleum, and items "not classified by kind."

The information contained on the tapes describes for each shipment the following: the commodity type, the weight and value of the shipment, the manner of shipping, the places

to which the shipment went or from which it came, the domestic and international means of transport (MOT), and the distances included in the U.S. portions of the movement (See Diagrams 1 and 2).

Places within the United States are described by a code which identifies state and usually some more specific place, data based on SMSA's (Standard Metropolitan Statistical Areas). In a few cases, a single SMSA can be identified, but more commonly, the most specific description includes several SMSA's or a "non-SMSA" designation. These codes and a full discussion of their contents are contained in Appendix B.

Foreign origins and destinations are given not by country name but by World Area. There are a dozen World Areas involved, each made up of one or more nations. A list of the World Areas and included nations is contained in Appendix I.

It is important to realize that the items appearing on the tapes are the result of a sampling process. In this process, the probability of selection of each item is known and was determined before the survey was taken. For vessel shipments, the probability of selection is proportional to the weight of the shipment. A vessel import shipment was accepted with certainty if its weight was greater than or equal to four million pounds. The certainty level for export shipments was six million pounds. The probability of the selection of a non-certainty vessel shipment is the ratio of

Diagram 1: Information on Movement of Exports

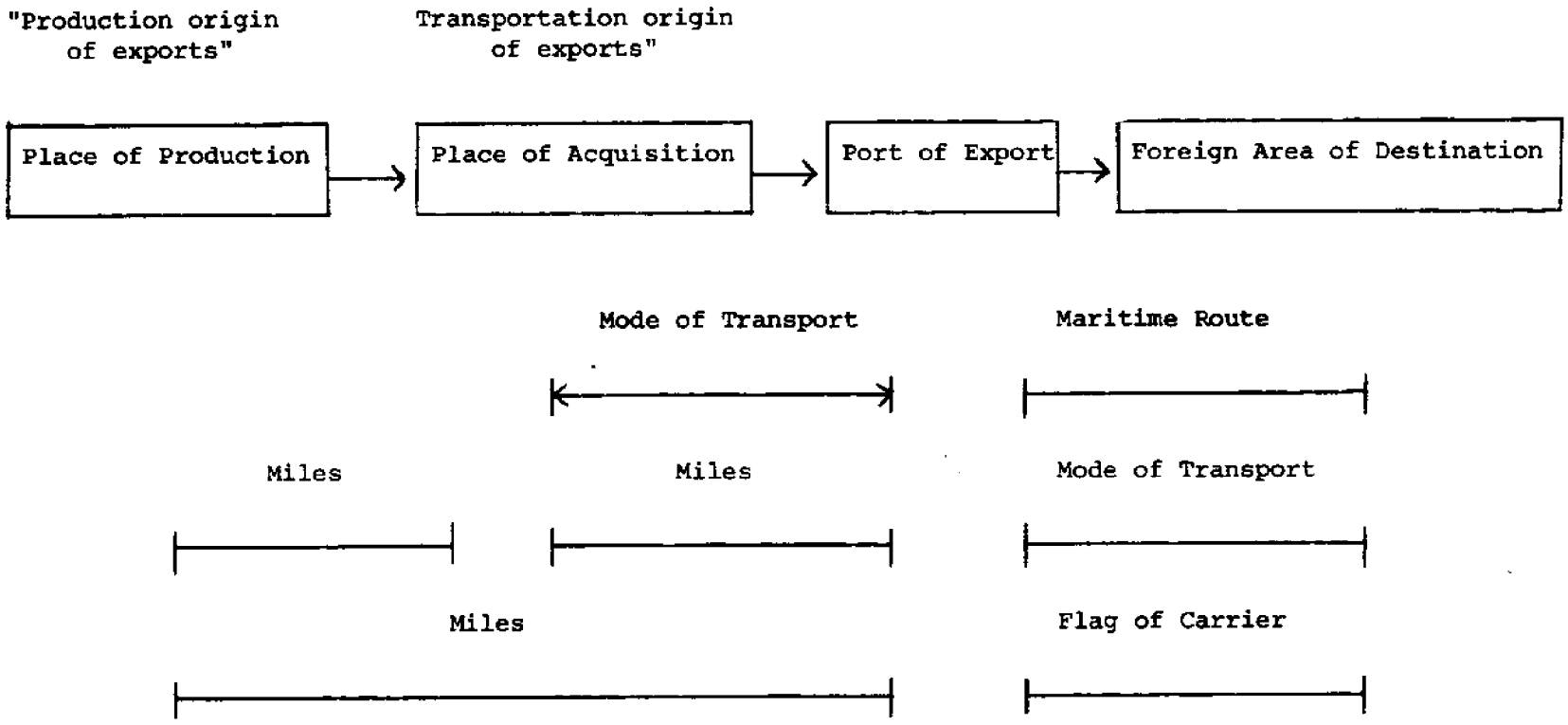
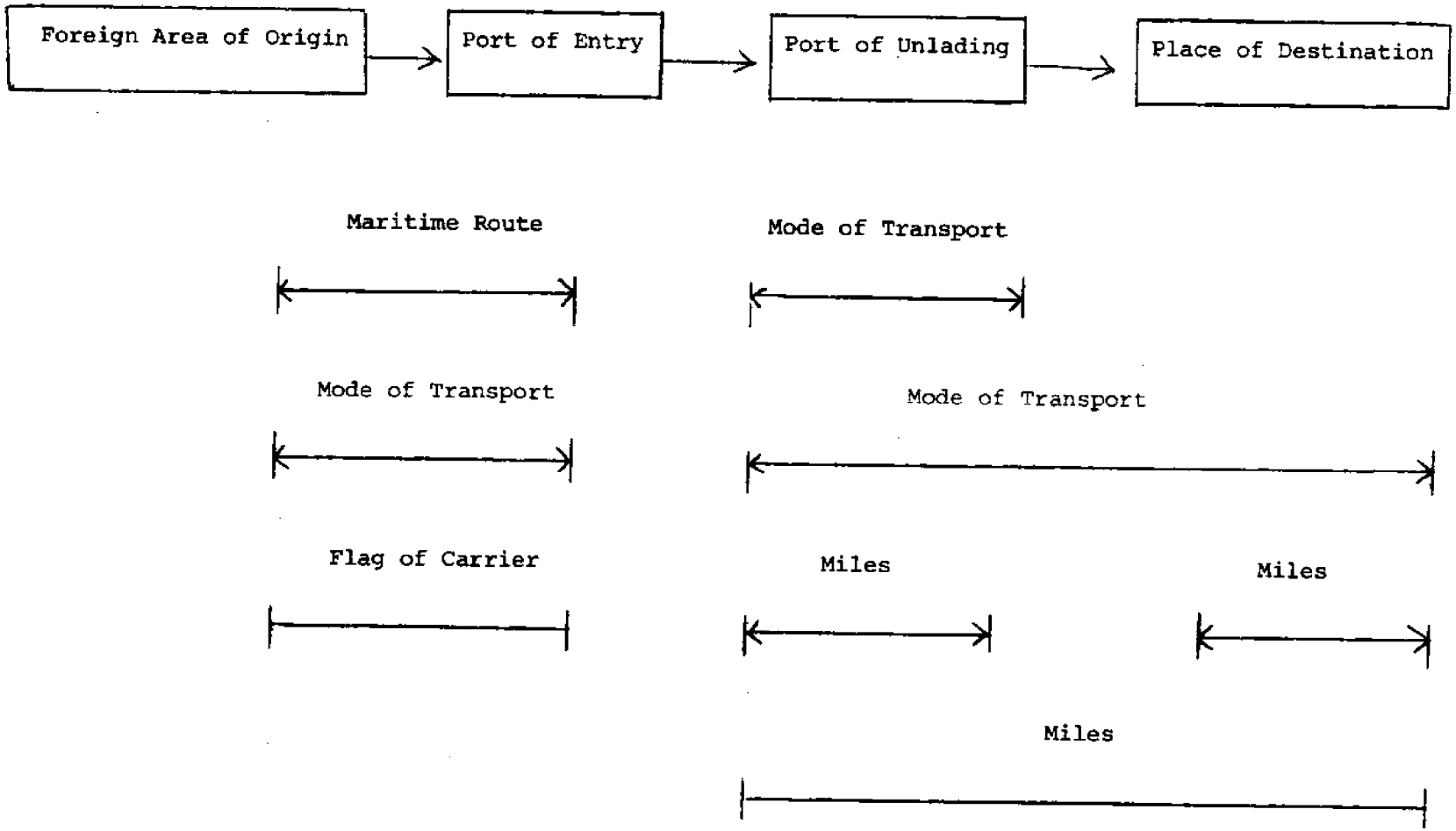


Diagram 2: Information on Movement of Imports



that shipment's weight to the sampling interval (eight million pounds for exports and six million pounds for imports). Thus, a four million pound vessel export shipment has a probability of 4/8 or .5 of being selected.

Though weight was considered the critical characteristic of vessel shipments, value was used for air shipments, and the strata were formed with value as a base. For both air exports and imports, the certainty level of selection was $250,000 in shipment value. However, the sampling intervals were different. For air export shipments, the sampling interval was $900,000; for air imports, it was $450,000. Thus, an air export shipment valued at $100,000 would have been selected with a probability of 1/9 or .11 while an air import shipment of the same value would have been selected with a probability of 1/4.5 or .22.

The effect of the sampling process used 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 a sample 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 traffic population is unknown, the sample 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 expected that the relationship between points receiving large shipments and those attracting primarily small shipments would be unreliable. Thus, any analysis based on these data for purposes other than estimating the universe vessel weight or universe air value must be restricted to describing the contents of the sample without generalization to the universe.

In addition to the limitations imposed by the sampling procedure there are many errors on the tapes resulting in the existence of "wild codes," i.e., codes not explained in the User's Manual. The most prevalent errors are in the universe equivalent value and weight given for each shipment. These figures are meant to indicate the portion of the population value and weight which each shipment represents; however, comparison with the individual shipment value and weight and the definitions of "universe equivalents" provided made it impossible to accept these figures with any degree of confidence.

For this reason and because the sample design made it impossible to infer anything from the sample to the population, it must be emphasized that this paper makes no attempt to do anything but describe the sample shipments contained on the tapes. This caution cannot be stated too strongly. To the extent that the sample is biased toward large shipments, so are the conclusions drawn. There is no way of knowing how

representative the information on any commodity, port, or geographic area is. All conclusions must be evaluated with this limitation in mind.

Despite these data limitations, analysis of the tapes is necessary. This data base is the only information source concerning domestic movements of exports and imports in over a decade which exists in such a detailed form. Though the information is incomplete, no other source describes individual shipments movements as well. This type of information is extremely important to every individual and agency engaged in international cargo movements. Shippers, port directors and commissioners, and government agencies will be involved.

Since this report is concerned with traffic attributable in some way to the Great Lakes, a set of "Great Lakes Tapes" was formed from the general tapes to use as a basis for this study. These tapes were compiled by choosing from master tapes those shipments which were, in any one of several ways, connected with the Great Lakes-St. Lawrence Seaway system. In all shipments chosen, one of the following occurred:

1. The shipping route was one of the Great Lakes Maritime Trade Routes. Maritime Trade Routes are established routes on which steamship lines serve specific ports in designated countries or sectors of the world. In 1970, sixty-five trade routes existed involving

the United States; seventeen involved the Great Lakes. A list of the trade routes appears in Appendix F.

2. The U.S. Customs District of Entry or U.S. Customs District of Unlading for imports was a customs district in the Great Lakes hinterland. An export shipment was chosen if the U.S. Customs District of Export was in the Great Lakes hinterland.
3. For imports, the port of entry, port of unlading or place of destination was in the Great Lakes hinterland. For exports, if the place of production, port of export, or place of acquisition was in the Great Lakes hinterland.

The definition of the Great Lakes Region (GLR) and its hinterland used is that of the United States Army Corps of Engineers found in Great Lakes-Overseas General Cargo Traffic Analysis, 1967. It consists of the eight border states of Illinois, Indiana, Michigan, Minnesota, western New York, Ohio, western Pennsylvania, and Wisconsin; plus the eleven contiguous states of Colorado, Iowa, Kansas, Kentucky, Missouri, Montana, Nebraska, North Dakota, South Dakota, West Virginia, and Wyoming. This definition was chosen from those considered because it was the most inclusive, thereby minimizing the probability of eliminating valuable information. A more detailed definition is contained in Appendix B.

Restricting the contents of these tapes in the manner described above resulted in a substantial reduction in the amount of data retained on the tapes. The number of export records was reduced from 25,452 on the master tape to 6,517 on the Great Lakes Tape. Similarly, the number of import records was reduced from 28,332 on the master tape to 7,217 on the Great Lakes Tape.

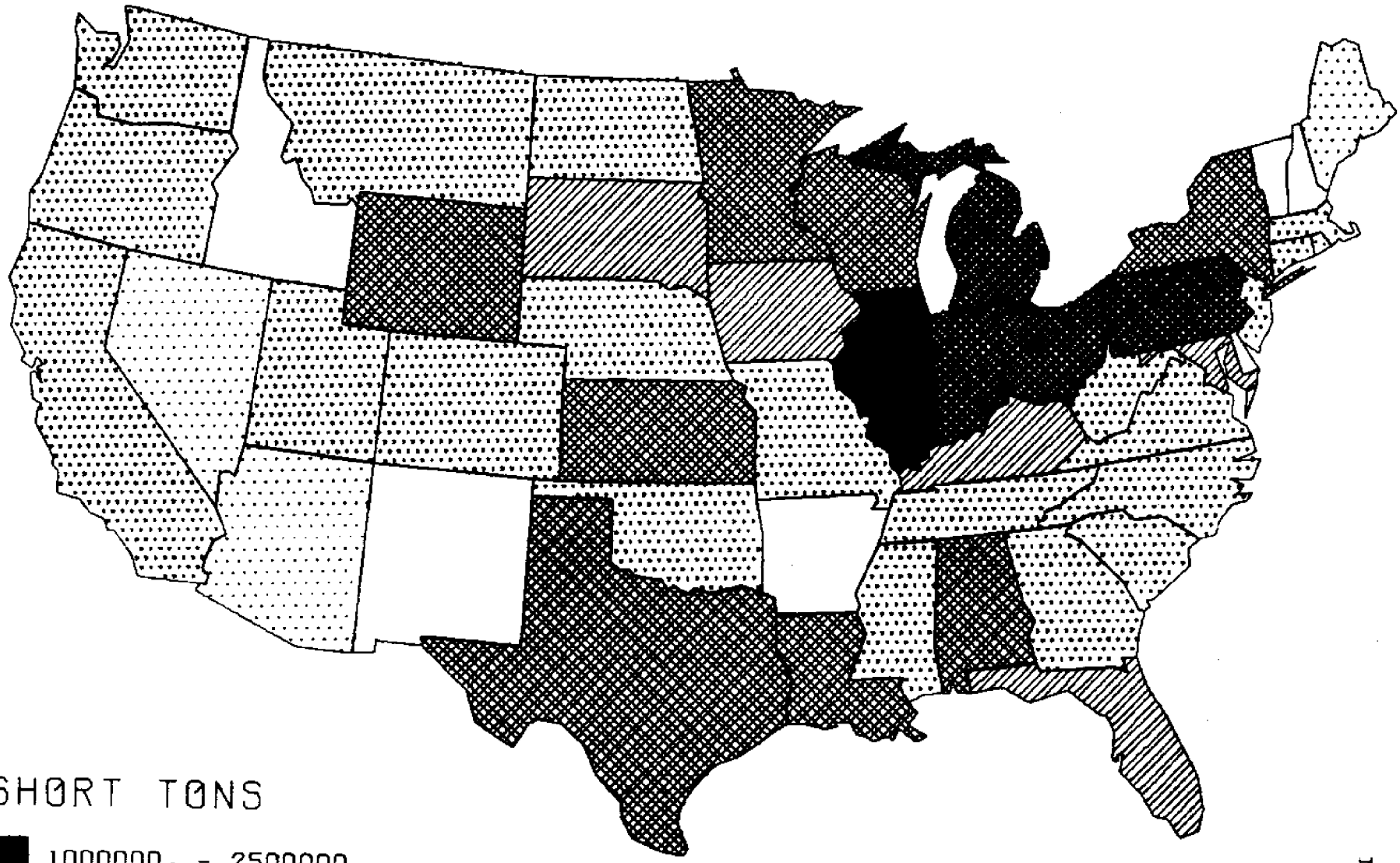
Maps 1 and 2 were generated based on these Great Lakes Tapes. Map 1 describes the place of acquisition of all export shipments on the Great Lakes Tapes. Map 2 shows place of destination of imports. Both maps include both air and vessel shipments. The background data for these maps and all other maps appearing in this report are in Appendix E.

Note that place of acquisition is used to be representative of the domestic hinterland for exports and place of destination is similarly used for imports. The latter is clearly appropriate whereas the former warrants further explanation.

Included on the export tapes is information as to both the place of production and the place of acquisition prior to shipment. Three basic reasons led to the choice of the place of acquisition as most representative of the hinterland for purposes of this study.

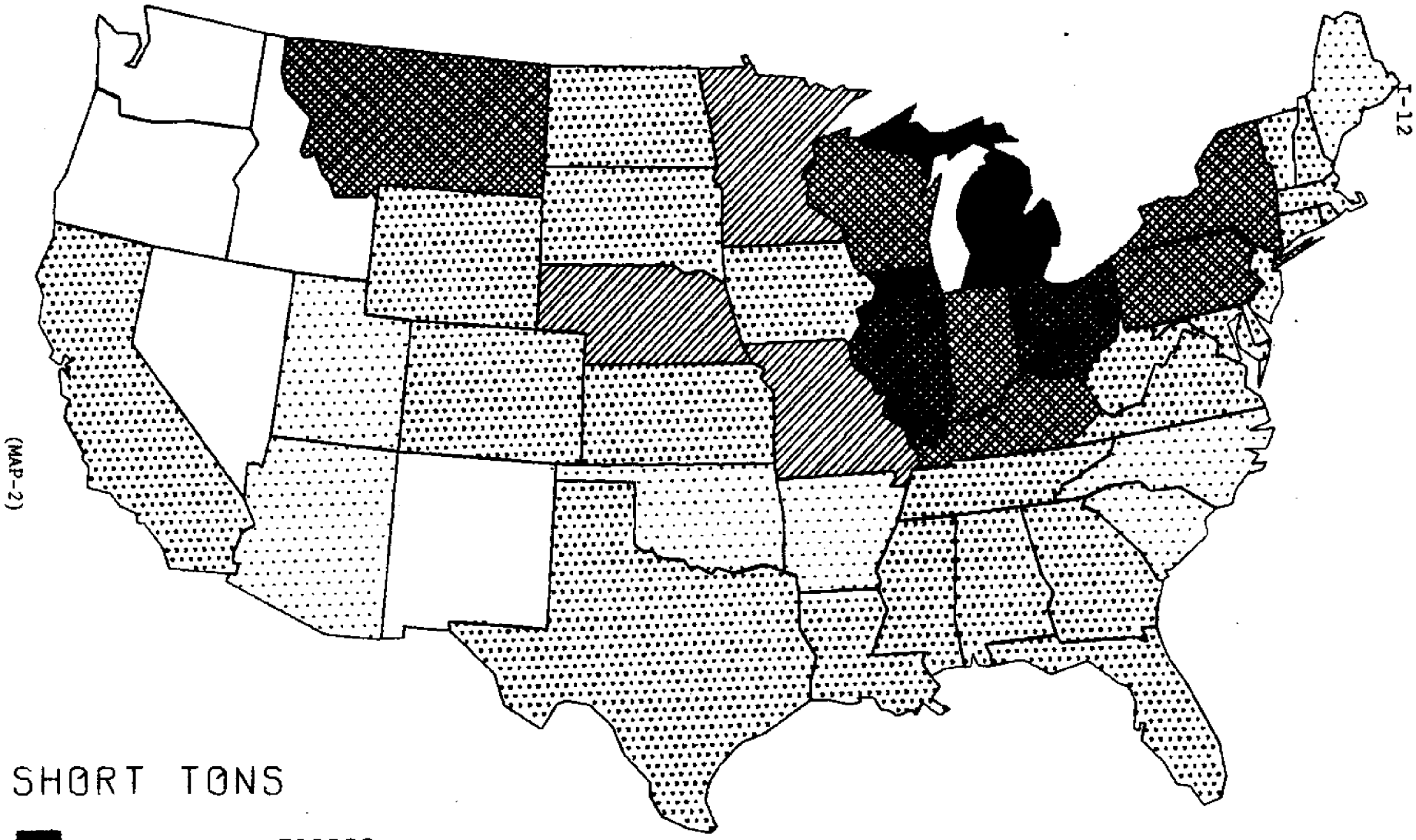
1. The survey questionnaire was answered by exporters, who were often unaware of the place of production. For example, the shipments may have been assembled elsewhere by

PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS



(MAP-1)

PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS



(MAP-2)

I-12

SHORT TONS

- 1000000. - 2500000.
- 500000. - 999999.
- 100000. - 499999.
- 50000. - 99999.
- 100. - 49999.
- 1. - 99.
- 0. - 0.

a freight forwarder. Consequently, more observations were available on the place of acquisition. This was deemed significant in that 475 additional observations were available out of the 6,517 possible on the Great Lakes Tape. And, this same relationship was maintained when considering the subset of vessel shipments on this tape in that 316 more observations were available out of the 3,816 possible. (See the statement on the Great Lakes Vessel Tape below.)

2. It was determined that, since the subtotaling is by state, only minor differences would exist between place of acquisition and place of production data because 64 per cent of all export shipments were acquired within 100 miles of the place of production.
3. Finally, given the intent of the study, the determination of the hinterland of the Great Lakes ports and the increasing importance of freight forwarders, it was felt that the place of acquisition provided a broader theoretical construct.

A similar situation existed with respect to choosing the appropriate definition of a port. Throughout this study port of export is used to represent the port through which

goods are exported and port of unlading is used to represent the port through which goods are imported. The former is clearly appropriate whereas the latter warrants further explanation.

Included on the import tapes is information as to both the port of entry and the port of unlading. A review of the definitions revealed that port of entry is an administrative term used primarily for customs purposes whereas port of unlading refers to where the shipment comes off the ship. Thus, port of unlading was chosen to describe the point of entry in this study.

A subset of the Great Lakes Tapes, the "Great Lakes Vessel Tapes," was formed by excluding all sample international air shipments. This partitioning resulted in a further significant reduction in the amount of data to be processed in subsequent analyses. The Great Lakes Vessel Tapes contain 3,816 export records and 5,029 import records. It is these tapes that serve as the basis for the remainder of this report.

Given the above definitions of hinterland and port, the samples contained on the Great Lakes Vessel Tapes were analyzed to determine an aggregate relationship between the traffic generating capability of the hinterland and the level of traffic handled by Great Lakes ports.

For exports, a shipment has the possibility of having been produced within and/or acquired within the hinterland, and/or exported through a port located within the hinterland.

The most interesting cases are those in which the place of production and/or the place of acquisition were within the hinterland, but port of export was not. These cases represent potential traffic which could have been served by a Great Lakes port but was not. On the Great Lakes Vessel Tape, 84 per cent of the sample weight was produced in the hinterland, 82 per cent was acquired there, but only 40 per cent was exported through a Great Lakes port.

For imports, the most interesting situation occurs when shipments destined for the Great Lakes area enter the United States through a non-Great Lakes port. Again, these shipments represent traffic that potentially could have been handled by a Great Lakes port. Of the total import sample weight on the Great Lakes Vessel Tapes, 93 per cent has a destination within the hinterland; and 74 per cent enter through a Great Lakes port. It should be noted that all traffic passing through a Great Lakes port is not necessarily destined for the hinterland.

Detailed analyses constitute the balance of this report. The next section contains specific analyses of 28 commodities. Following that is a section containing analyses of the major Great Lakes ports. A summary and conclusion section completes the body of the report.

Again the reader is reminded that, because of the limits of the sampling process, the only possibility is that of describing the sample given on the tape. No general conclusions can be drawn about all international movements. It must be

emphasized that such a description is the sole purpose of this study. The conclusions reached must not be taken as statements about all shipments.

CHAPTER II

COMMODITY ANALYSIS

Introduction

Twenty-eight commodities were chosen for individual analysis. A commodity was selected for individual analysis if it was ranked as one of the top ten according to any of the three criteria: shipments, value or weight, as recorded on the Great Lakes Vessel Tape. This method produced thirteen commodities on the export side and fifteen commodities on the import side for detailed study. Tables 2.1 and 2.2 list the selected commodities and their rankings by the three criteria.

To aid in the individual analysis of some of the commodities, a recently developed computer mapping technique was used. The mapping technique allowed the domestic movement of import and export shipments through the four coasts to be presented visually, in addition to the usual tabular form. The method of selection of the commodities that were mapped is provided in Appendix D and a further discussion of the mapping technique is presented in Appendix L.

In the analysis of these major commodities, it is important to remember several important facts which affected both the commodities which were selected and the movements of individual commodities and traffic as a whole.

The data described in the analysis were generated in 1970 during the Vietnam War. Because of this time frame and because many government impelled cargoes moved through Great

TABLE 2.1

RANKINGS OF EXPORT COMMODITY GROUPS

Commodity Group	Shipments	Value	Weight
Cereals and Cereal Preparations - SBR-04	4	5	6
Feeding-stuff for Animals - SBR-08	1	2	2
Miscellaneous Food Preparations - SBR-09	-	8	10
Crude Fertilizers and Minerals - SBR-27	7	9	5
Metalliferous Ores and Metal Scrap - SBR-28	3	3	3
Petroleum and Petroleum By-Products - SBR-33	6	7	4
Animal Oils and Fats - SBR-41	10	-	-
Fixed Vegetable Oils and Fats - SBR-42	-	4	7
Chemical Elements and Compounds - SBR-51	9	10	9
Manufactured Fertilizers and Fertilizer Materials - SBR-56	-	-	8
Iron and Steel - SBR-67	2	1	1
Non-Electric Machinery - SBR-71	5	6	-
Transport Equipment - SBR-73	8	-	-

TABLE 2.2

RANKINGS OF IMPORT COMMODITY GROUPS

Commodity Group	Shipments	Value	Weight
Fruits and Vegetables - SAR-05	7	-	-
Sugar, Sugar Preparations, and Honey - SAR-06	3	9	4
Coffee, Cocoa, Tea, Spices and Manufacturers Thereof - SAR-07	10	6	-
Crude Rubber - SAR-23	9	-	-
Wood, Lumber and Cork - SAR-24	-	-	9
Pulp and Waste Paper - SAR-25	-	8	8
Crude Fertilizers and Minerals - SAR-27	2	7	2
Chemical Elements and Compounds - SAR-51	-	3	3
Manufactured Fertilizers and Fertilizer Materials - SAR-56	-	-	7
Paper, Paperboard, and Manufactures Thereof - SAR-64	6	2	5
Non-Metallic Mineral Manufactures - SAR-66	5	-	6
Iron and Steel - SAR-67	1	1	1
Nonferrous Metals - SAR-68	-	5	-
Non-Electric Machinery - SAR-71	8	10	-
Transport Equipment - SAR-73	4	4	10

Lakes ports, several of the results of the following section must be generalized with extra care. Some specific ports may have had increases in trade which were only temporary in nature. Particular commodity movements may be inordinately high. Southeast Asia may figure more strongly as a destination for exports than it would in more normal times.

Similarly, related to government-impelled cargoes is the effect of the requirement that at least 50 per cent of such cargo be moved in U.S. flag vessels. Few such vessels served the Great Lakes in 1970. At the present time, 1975, there are no U.S. flag vessels serving the Great Lakes for overseas movements. This change must be considered in assessing the state of Great Lakes shipping.

Additionally, the effects of fewer over-all sailings and increasingly strong competition from capital intensive coastal ports must be recognized.

Most importantly, caution must be used in interpreting the results because of the unknown biases in the data itself. It is impossible to know whether the shipments described here are in any way representative of a specific commodity or coast or of any characteristic of a given international movement.

The initial paragraphs of each commodity description describe subcommodity breakdowns, packaging, domestic mode of transport, and foreign origin or destination for all of the shipments with that two-digit commodity code recorded

on the Great Lakes Vessel Tape. The second section is concerned with the coastal breakdown of shipments listed on the Great Lakes Vessel Tape through the major ports only. The major ports and the means by which they were selected are described in Appendix C.

In the coastal analysis, there is some bias toward the East Coast generated by the definition of a "Great Lakes related" shipment. A shipment was defined as Great Lakes related if any one of several characteristics as listed in the Introduction was appropriate. Some shipments moving through the East Coast were considered as Great Lakes only because their maritime trade route designation was classified as such. Still more bias originated in the impossibility of finely dividing New York and Pennsylvania. This inability dictated the inappropriate inclusion of some parts of these states in the Great Lakes hinterland (See Appendix B).

Exports

Cereals and Cereal Preparations, SBR-04

Commodity group SBR-04 is labeled cereals and cereal preparations, and includes preparations of flour, starch or malt extract at the two-digit level. Of the shipments of this commodity group, 63 per cent consisted of wheat flour, while other cereal flours accounted for approximately an additional 12 per cent. Prepared breakfast cereals accounted for nearly 12 per cent and malt, malt flour, and malt abstract accounted for the remaining 12 per cent.

This commodity group was one of the most important for the Great Lakes hinterland. It ranked fourth in the number of shipments in the sample with 283, fifth in value at $39,981,171, and sixth in weight at 470,725 tons.

In the international movement, seventeen shipments comprising 6 per cent of shipments, 9 per cent of value and 11 per cent of weight moved in reusable containers; while fifteen shipments on the domestic movement were made via container. The vast majority of sample shipments of SBR-04 (72 per cent of shipments, 72 per cent of value, and 72 per cent of weight) moved internationally in individual lots, cases, and barrels.

The primary mode of transport within the United States for exports of cereals and cereal preparations was rail as 264 of 283 shipments moved from place of acquisition to port

SBR-04 (Continued)

of export by rail. These shipments made up 93 per cent of the sample shipments, 91 per cent of value, and 91 per cent of weight.

The most important destinations for this commodity class were Southern Europe and the Mediterranean (World Area 8) and Southeast Asia and Australia (World Area 10). Southern Europe and the Mediterranean accounted for 52 shipments (18 per cent of shipments, 20 per cent of value, and 23 per cent of weight). Southeast Asia and Australia received 139 shipments (49 per cent of shipments, 63 per cent of value, and 61 per cent of weight).

Of the 283 shipments of SBR-04, 256, or 90 per cent, moved through major ports. Tables 2.3 and 2.4 provide the coastal analysis of shipments moving through major ports. Compared with the Gulf Coast which moved 77 per cent of the weight of these shipments, the Great Lakes Coast ranked a distant second among the coasts, accounting for only 15 per cent of the major port sample tonnage. The maps in Map 3 also clearly indicate the dominance of the Gulf Coast within the heavily shaded states of Kansas and Texas, each individually accounting for approximately twice the tonnage that moved through the entire Great Lakes Coast. The same maps show that the Great Lakes ports were dominant in the states of Minnesota, Wisconsin and Illinois. Supporting sample data shows that the states bordering the Great Lakes (Minnesota, Wisconsin, Illinois, Indiana, Michigan and

SBR-04 (Continued)

Ohio) exported nearly 53,000 tons via the Great Lakes versus less than 12,000 tons via the Gulf Coast.

The reason for the overall dominance of the Gulf Coast in the sample on cereal exports is not readily apparent from the statistics supporting the maps. For example, the World Areas of destination were concentrated. Southeast Asia, East Central Asia and Africa (except the Mediterranean) accounted for almost 72 per cent of the exported tonnage. Yet nearly all of the cargo shipped via the Great Lakes was destined for these World Areas; thus, the Great Lakes was a significant participant in serving the primary world market area. The Great Lakes may have been hurt by the requirement that 50 per cent of U.S. Government shipments be carried in U.S. flag vessels. The data shows that 48.93 per cent of the sample tonnage moved in U.S. flag vessels. However, one of the problems of the Great Lakes, even in 1970, was that few U.S. flag vessels were serving Great Lakes ports thereby forcing some shippers of government financed cargoes to divert cargoes to ports where U.S. flag vessels were available.

On the other hand, the weak showing of the Great Lakes Coast in cereal exports may reflect the sampling bias described above. Recall that the probability of selection of a shipment was a direct function of its weight. The average weight of a sample shipment of SBR-04 through the Gulf Coast was 2,053 tons whereas those shipped through

SBR-04 (Continued)

the Great Lakes averaged only 1,270 tons. Such a weight difference biases an intercoastal comparison because more large shipments are compared to fewer small shipments.

Map 3 describes the place of acquisition by coast of the shipments through major ports of cereals and cereal preparations. The figures illustrated on these maps can be found in Appendix E.

TABLE 2.3

COASTAL DISTRIBUTION OF SBR-04*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	51	(19.92)	6,494,077	(17.95)	64,756	(14.96)
East	33	(12.89)	2,444,651	(6.76)	22,351	(5.16)
Gulf	162	(63.28)	26,005,601	(71.88)	332,644	(76.85)
West	10	(3.91)	1,236,009	(3.42)	13,115	(3.03)
All Coasts	256	(100.00)	36,180,338	(100.00)	432,866	(100.00)

* Shipments through Major Ports Only.

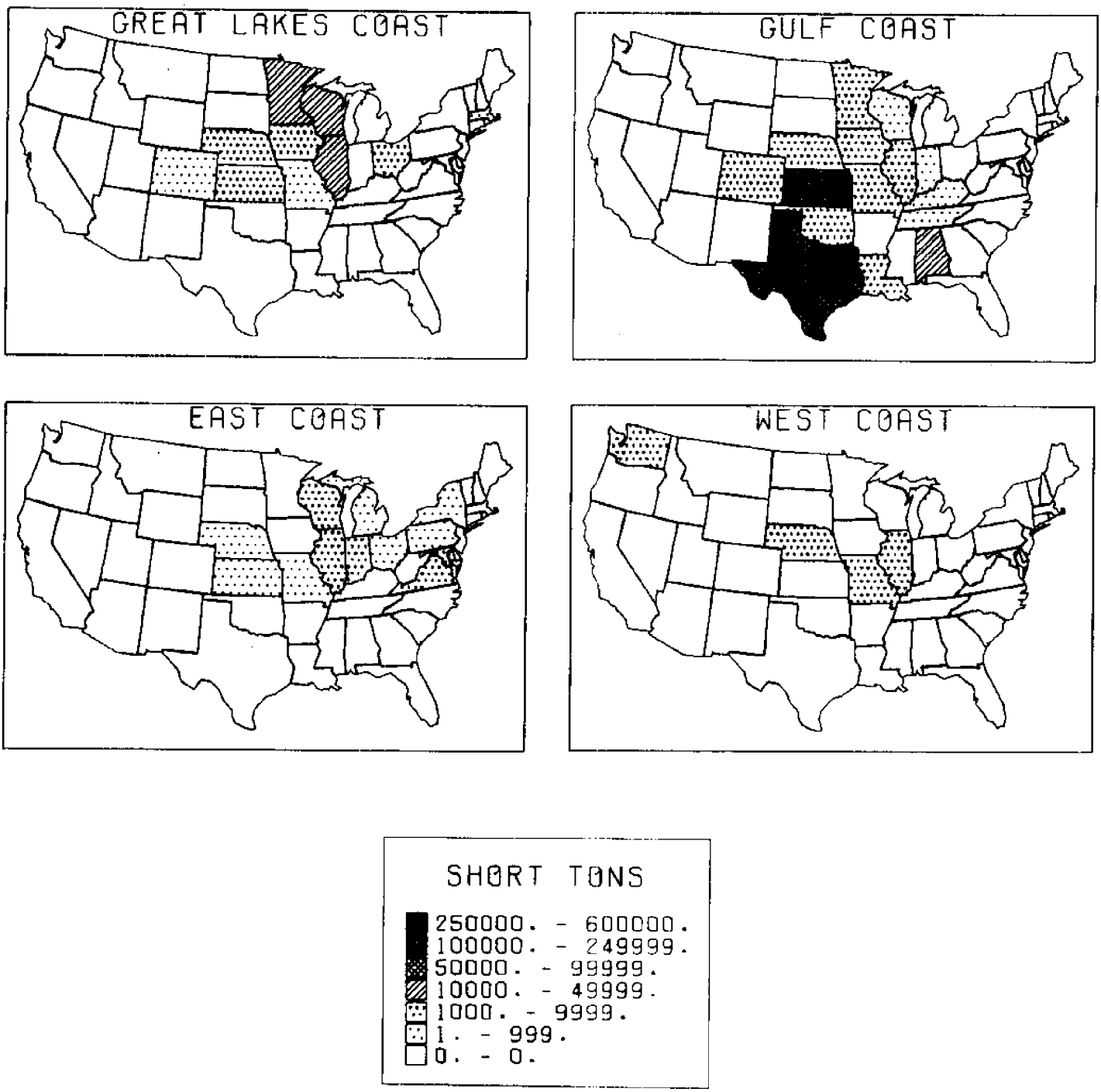
TABLE 2.4

SHIPMENT DESCRIPTION BY COAST - SBR-04*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	127,334.84	1,269.73	100.29
East	74,080.33	677.30	109.38
Gulf	160,528.40	2,053.36	78.18
West	123,600.90	1,311.50	94.24
All Coasts	141,329.45	1,690.88	83.58

* Shipments through Major Ports Only.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF CEREAL PREPARATIONS (SBR 4)



(MAP-3)

Feeding-stuff for Animals, SBR-08

Commodity group SBR-08 consists of feeding-stuff for animals, including unmilled cereals. Interestingly, only three significant sub-groups (at the four-digit SBR commodity code level) accounted for nearly all sample shipments. Oil-seed cake, meal and residues made up 77 per cent of the sample shipments; by-products of cereal grains and leguminous vegetables accounted for 14 per cent; and food waste and prepared animal feeds, N.E.C., added an additional 9 per cent.

SBR-08 was the second most important export commodity group in the sample; it ranked first in number of shipments (918), second in value ($153,395,216), and second in weight (2,032,874 tons). Of the 918 shipments, 910 moved through major ports.

Only four shipments moved domestically in containers; however, 25 shipments (3 per cent of shipments, 4 per cent of value, and 5 per cent of weight) were placed in a container for the international voyage. Of the 918 shipments, 740 shipments (81 per cent) accounting for 70 per cent of value and 72 per cent of weight, were considered bulk packaged. The packaging item was left blank on 151 shipment records in this commodity classification.

Rail and inland water were the most important means of transporting shipments of feeding-stuff between place of acquisition and port of export. Rail served as the mode of

SBR-08 (Continued)

transport from place of acquisition to port of export for 710 shipments, representing 77 per cent of shipments, 55 per cent of value, and 57 per cent of weight. Inland water was used for 148 shipments. These 148 shipments constituted 16 per cent of shipments and held 32 per cent of the value and 30 per cent of the weight.

The 823 shipments to West-Central Europe (World Area 7) dominated all other World Areas as a final destination point for exports of SBR-08, accounting for 90 per cent of shipments, 84 per cent of value and 85 per cent of weight.

As shown in Table 2.5, the Gulf Coast dominated movements of this commodity, accounting for 49 per cent of the sample tonnage of these shipments. The Great Lakes Coast ranked second, accounting for 28 per cent of the sample tonnage. From the maps in Map 4, it can be seen that Illinois was the single most important exporting state with a sample tonnage of SBR-08 through major ports. Supporting data show that Illinois was the place of acquisition of 48 per cent of the total sample tonnage of SBR-08 through major ports. Although the shading of the maps indicates that both the Great Lakes Coast and the Gulf Coast were in the same category with respect to handling sample Illinois shipments, the data show that actually 62 per cent of the tonnage from Illinois was moved through the Gulf Coast as compared to only 30 per

cent for the Great Lakes. The supporting data for these maps are contained in Appendix E.

Table 2.5 reveals that the East Coast dominated in terms of number of shipments, accounting for 54 per cent, whereas it ranked third among the four coasts in terms of weight. This ranking indicates the importance of specifying the basis for any comparative evaluations. Table 2.6 is constructed from the figures in Table 2.5 and indicates why the difference in rankings exist. These data indicate that compared to the Great Lakes and Gulf Coasts, the East Coast handled more small shipments of higher unit value. The cause of this difference is not clear because over 97 per cent of SBR-08; measured by shipment number, value or weight; went to the same general World Area, Europe. However, these data also show that 16 per cent of the sample shipments and 30 per cent of the sample tonnage were shipped from the place of acquisition to the port of export via inland water. The facts thus may provide a partial explanation since barge shipments tend to be heavy and to service the hinterlands of the Great Lakes and Gulf Coasts.

TABLE 2.5

COASTAL DISTRIBUTION OF SBR-08*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	176	(19.34)	33,240,790	(21.84)	563,663	(28.02)
East	495	(54.40)	38,625,835	(25.37)	457,328	(22.73)
Gulf	237	(26.04)	80,306,326	(52.75)	986,188	(49.03)
West	2	(0.22)	58,044	(0.04)	1,381	(0.07)
All Coasts	910	(100.00)	152,230,995	(100.00)	2,011,560	(100.00)

* Shipments through Major Ports Only.

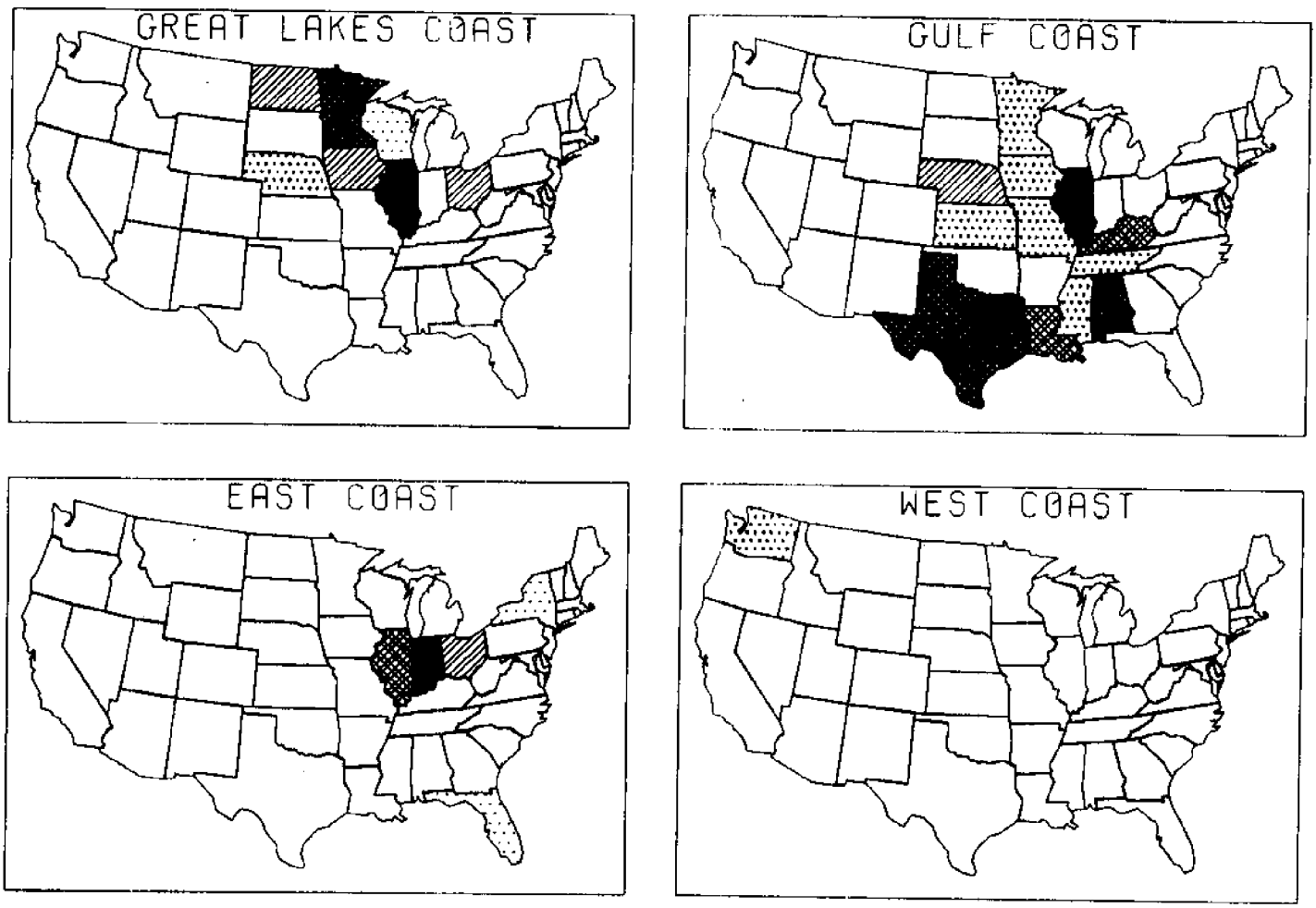
TABLE 2.6

SHIPMENT DESCRIPTION BY COAST - SBR-08*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	188,868.12	3,202.63	58.97
East	78,031.99	923.89	84.46
Gulf	338,845.26	4,161.13	81.43
West	29,022.00	690.50	42.03
All Coasts	167,286.81	2,210.51	75.68

* Shipments through Major Ports Only.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF FEEDING STUFF FOR ANIMALS (SBR 8)



(MAP-4)

Miscellaneous Food Preparations, SBR-09

SBR-09 consists of exports of miscellaneous food preparations. The sampled commodity shipments fall into two major headings: margarine and shortening (70 per cent) and food preparations, N.E.C. (30 per cent).

In the sample of vessel export shipments for the Great Lakes hinterland, miscellaneous food preparations ranked eleventh in number of shipments (97), eighth in value ($11,018,823), and tenth in weight (60,757 tons). Major ports handled 93 of the 97 sample shipments which were valued at $10,098,838 and weighed 54,419 tons.

Reusable containers were used for 4 per cent of shipments (4 per cent of value and 2 per cent of weight) in the international movement and 1 per cent of all sample shipments (3 per cent of value and 2 per cent of weight) remained in the same container for the domestic movement. When loaded aboard ship, 21 per cent of the shipments (23 per cent of value and 28 per cent of weight) were individual lots, cases or barrels; 48 per cent of shipments (43 per cent of value and 33 per cent of weight) were loaded into ships' tank; and 9 per cent of shipments (14 per cent of value and 11 per cent of weight) were bulk loaded.

Rail was the dominant mode of transport from the place of acquisition to the port of export, handling

SBR-09 (Continued)

79 per cent of shipments (76 per cent of the value and 77 per cent of the weight). The remaining sample shipments were divided between truck (8 per cent of shipments, 8 per cent of value, and 6 per cent of weight), and inland water (4 per cent of shipments, 6 per cent of value and 6 per cent of weight); with 8 per cent of shipments (10 per cent of value and 11 per cent of weight) labeled unknown with respect to mode.

The area represented by the United Kingdom and Ireland (World Area 5) was the major destination of miscellaneous food stuff exports, receiving 57 per cent of the sample shipments which represented 52 per cent of the sample value and 39 per cent of the sample weight. Other World Areas which were major destinations were Southeast Asia (World Area 10) (12 per cent of shipments, 20 per cent of value and 31 per cent of weight), West-Central Europe (World Area 7) (9 per cent of shipments, 8 per cent of value and 8 per cent of weight), and non-Mediterranean Africa (World Area 12) (5 per cent of shipments, 12 per cent of value and 15 per cent of weight).

The Great Lakes and the Gulf Coast were both competitive for Great Lakes related SBR-09 exports, as can be seen from Tables 2.7 and 2.8, which describe exports through major ports.

TABLE 2.7

COASTAL DISTRIBUTION OF SBR-09*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	46	(49.46)	4,759,942	(47.13)	24,297	(44.65)
East	5	(5.38)	566,125	(5.61)	3,492	(6.42)
Gulf	40	(43.01)	4,595,762	(45.51)	25,935	(47.66)
West	2	(2.15)	177,009	(1.75)	695	(1.28)
All Coasts	93	(100.00)	10,098,838	(100.00)	54,419	(100.00)

* Shipments through Major Ports Only.

TABLE 2.8

SHIPMENT DESCRIPTION BY COAST - SBR-09*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	103,477.00	528.20	195.91
East	113,225.00	698.40	162.12
Gulf	114,894.05	648.38	177.20
West	88,504.50	347.50	254.69
All Coasts	108,589.66	585.15	185.58

* Shipments through Major Ports Only.

Crude Fertilizers and Minerals, SBR-27

SBR-27 essentially consists of crude fertilizers and crude minerals, excluding coal, petroleum and precious stone. According to the Great Lakes Vessel Tapes, 60 per cent of the sample shipments in this category was clay and other refractory minerals, N.E.C.; 17 per cent was sodium chloride (salt); and 9 per cent was crude minerals, N.E.C. These commodities were basically unfinished intermediate goods used in the production of other final products.

Crude fertilizers and minerals ranked as one of the more important exported commodities, according to the sample contained on the Great Lakes Vessel Tapes, ranking seventh in sample shipments with 139 shipments, ninth by sample value with $10,463,634, and fifth by sample weight, 594,353 tons. Of the 139 sample shipments, 123 (88 per cent) were exported through the major ports.

Even though the sample was to include only liner type commodities, the commodities included in this two-digit classification are extremely bulk like. According to the classification, 45 per cent of all SBR-27 sample shipments were bulk packaged, while 28 per cent were packaged in individual lots, cases or barrels. The 45 per cent of the sample shipments bulk packaged represented 88 per cent of the sample value and 80 per cent of the sample weight of the exported fertilizers and minerals. Only three shipments with less than 1 per cent of class value and weight moved

SBR-27 (Continued)

within the United States in a reusable container. However, there were seventeen containerized shipments, involving 12 per cent of the sample, on the international portion of the movement. These seventeen shipments held 1 per cent of commodity value and 5 per cent of commodity weight.

For crude fertilizers and minerals, rail served as the prime mode of transport from place of acquisition to port of export for 63 per cent of the shipments (88 in number), 78 per cent of class value and 61 per cent of weight. Inland water handled 17 per cent of all shipments (24 in number), 20 per cent of all value and 30 per cent of weight. Truck moved 15 per cent of shipments (21 in number), 1 per cent of value and 5 per cent of weight.

According to the sample, the export of SBR-27 was mainly to three different World Areas: Canada (World Area 1), 30 per cent of sample shipments (32 per cent of value and 62 per cent of weight); West-Central Europe (World Area 7), 17 per cent of sample shipments (38 per cent of value and 18 per cent of weight); and Southeast Asia-Australia (World Area 10), 16 per cent of sample shipments (7 per cent of value and 7 per cent of weight). It is quite evident that according to the sample, the low value, bulk like items in SBR-27 are exported to Canada and that the high value items are exported to West-Central Europe.

Analysis of the movement of these shipments of SBR-27 by coast indicates that the Great Lakes Coast was by far

SBR-27 (Continued)

the dominant coast, especially when weight was used as the criterion, as indicated in Tables 2.9 and 2.10. The Gulf Coast ranked second to the Great Lakes Coast by all three criteria, moving 27 per cent of all sample shipments, 31 per cent of sample value, and 9 per cent of sample weight.

A further study of the data and some adjustments indicate that the Great Lakes Coast and Gulf Coast may have been handling different commodities. Although the value per shipment for both the Great Lakes Coast and the East Coast was reasonably similar, the weight per shipment through the East Coast was considerably less. The sample value per ton of goods shipped through the Great Lakes Coast was $11.92 while that going through the Gulf Coast was $60.01. This comparison would tend to indicate that different commodities within the same two-digit classification were going through the two coasts. This conclusion would tend to be supported by the fact that Canada (World Area 1) appears to be the destination for bulk like items, which it would be natural to move through the Great Lakes Coast.

The tonnage of SBR-27 moved through the major ports is described by coast and by place of acquisition in Appendix E. This information is illustrated in Map 5.

TABLE 2.9

COASTAL DISTRIBUTION OF SBR-27*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	58	(47.15)	5,328,015	(61.19)	446,861	(87.99)
East	19	(15.45)	325,820	(3.74)	10,615	(2.09)
Gulf	33	(26.83)	2,675,456	(30.73)	44,587	(8.78)
West	13	(10.57)	378,360	(4.35)	5,818	(1.15)
All Coasts	123	(100.00)	8,707,651	(100.00)	507,881	(100.00)

* Shipments through Major Ports Only.

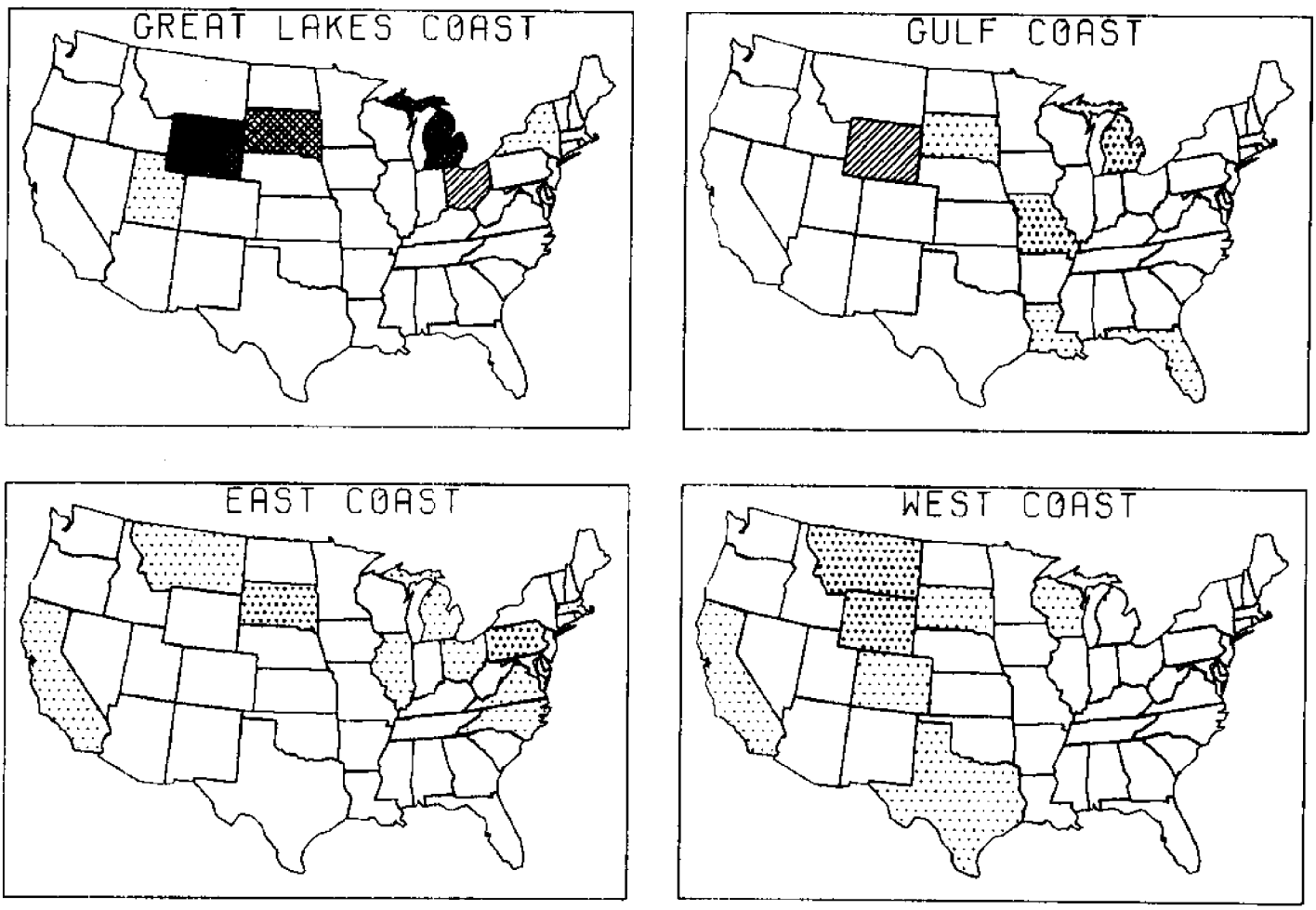
TABLE 2.10

SHIPMENT DESCRIPTION BY COAST - SBR-27*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	91,862.33	7,704.50	11.92
East	17,148.42	558.68	30.69
Gulf	81,074.42	1,351.12	60.01
West	29,104.62	447.54	65.03
All Coasts	70,793.91	4,129.11	17.15

* Shipments through Major Ports Only.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF FERTILIZERS AND MINERALS (SBR 27)



(MAP-5)

Metalliferous Ores and Metal Scrap, SBR-28

SBR-28 consists of exports of metalliferous ores and metal scrap. The sampled commodity shipments are primarily iron and steel scrap (93 per cent) and nonferrous metal ores and concentrates, N.E.C. (5 per cent).

In the sample of vessel export shipments for the Great Lakes hinterland, SBR-28 ranked third in number of shipments (289), third in value ($70,024,264), and third in weight (1,365,849 tons). The major ports, which have been previously identified, handled 279 of the 289 shipments. The value and weight of these shipments were $65,952,317 and 1,349,077 tons respectively.

SBR-28 is primarily a bulk commodity; 75 per cent of the shipments (78 per cent by value and 80 per cent by weight) were bulk loaded; 6 per cent of the shipments (5 per cent of value and 3 per cent of weight) were individual lots, cases or barrels. Less than 1 per cent of either value or weight, representing fourteen shipments, was packed in containers for the international movement; ten of these shipments were containerized domestically.

Trucks moved the greatest number of shipments from point of acquisition to port of export, transporting 51 per cent of the shipments, amounting to 30 per cent of sample value and 34 per cent of sample weight. Rail handled a smaller percentage of the shipments, 35 per cent, but these shipments accounted for 46 per cent of the value and 47 per cent of the weight.

SBR-28 (Continued)

Inland water transported 9 per cent of the shipments, representing 18 per cent of the value and 15 per cent of the weight. The mode of transport for the remaining shipments was unknown.

East-Central Asia (World Area 11) received 48 per cent of the shipments, 47 per cent of the value, and 53 per cent of the weight of SBR-28 exports. Southern Europe and the Mediterranean (World Area 8) was the destination for 29 per cent of the shipments having 30 per cent of the sample value and 30 per cent of the sample weight. West-Central Europe (World Area 7) was the other major recipient of the metalliferous ores and metal scrap exports, obtaining 10 per cent of the shipments, 6 per cent of the value and 3 per cent of tonnage.

The Great Lakes was the dominant coast for both value and weight and was competitive with the East Coast for number of shipments, as can be seen in Table 2.11. Table 2.12 indicates that the dominance of the Great Lakes Coast in these two categories is rooted in the significantly larger value per shipment and weight per shipment travelling through the Great Lakes Coast, relative to the East Coast. The seasonal nature of export shipments, probably due to the winter closing of the St. Lawrence Seaway is evidenced by the fact that 84 per cent of shipments comprising 88 per cent of value and 86 per cent of weight were exported from May through November.

As can be seen from the Great Lakes coastal map in Map 6, the actual competitive hinterland of the Great Lakes for this

SBR-28 (Continued)

commodity consisted of only the six western Great Lakes contiguous states. The East Coast map in Map 6 and Table 2.11 are biased because this study was unable to separate certain New York SMSA's and New York and Pennsylvania non-SMSA's into Great Lakes hinterland as previously described in this report. The overwhelming dominance of New York State for the East Coast (83 per cent of shipments, 83 per cent of value, and 92 per cent of weight) biases upward the importance of New York in the East Coast map in Map 6, and the East Coast's competitiveness in Tables 2.11 and 2.12. The figures illustrated in these maps can be located in Appendix E.

TABLE 2.11

COASTAL DISTRIBUTION OF SBR-28*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	123	(44.09)	38,239,027	(57.98)	802,321	(59.47)
East	137	(49.10)	17,238,985	(26.14)	395,185	(29.29)
Gulf	19	(6.81)	10,474,305	(15.88)	151,571	(11.24)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	279	(100.00)	65,952,317	(100.00)	1,349,077	(100.00)

* Shipments through Major Ports Only.

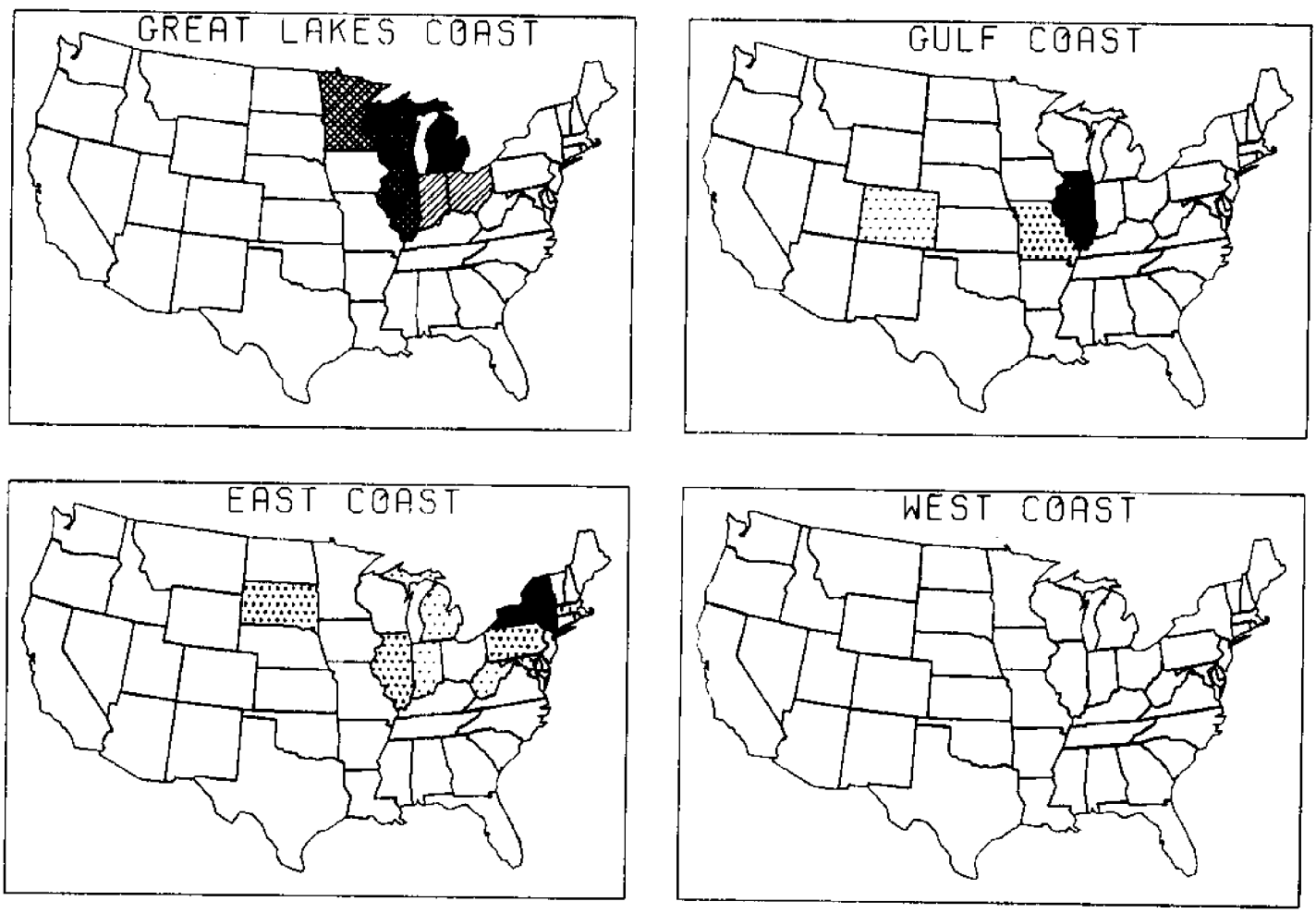
TABLE 2.12

SHIPMENT DESCRIPTION BY COAST - SBR-28*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	310,886.39	6,522.93	47.66
East	125,832.00	2,884.56	43.62
Gulf	551,279.21	7,977.42	69.10
West	-	-	-
All Coasts	236,388.23	4,835.40	48.89

* Shipments through Major Ports Only.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF METALLIFEROUS ORES AND SCRAP (SBR 28)



(MAP-6)

Petroleum and Petroleum By-Products, SBR-33

SBR-33 consists of exports of petroleum and petroleum by-products. The sampled commodity shipments are primarily pitch, asphalt, and other petroleum by-products, excluding chemicals (72 per cent) and lubricating oils and greases (28 per cent).

In the sample of vessel export shipments for the Great Lakes hinterland, SBR-33 ranked sixth in number of shipments at 188, seventh in value with $17,445,977, and fourth in weight with 611,354 tons. Major ports handled 187 shipments with a value of $17,209,865 and weight of 607,685 tons.

When loading on the ships, 70 per cent of the shipments (81 per cent by value and 79 per cent by weight) were bulk loaded; 12 per cent of the shipments (8 per cent by value and 12 per cent by weight) were loaded into the ships' tank; and 9 per cent of the shipments (5 per cent by value and 3 per cent by weight) were loaded as individual lots, cases or barrels. Only four shipments were containerized domestically and six shipments were packaged in reusable containers on the international voyage.

Rail transport moved 44 per cent of the sample shipments of petroleum and petroleum by-products from the place of acquisition to the port of export. The rail movement amounted to 40 per cent of the value and 32 per cent of the weight. Trucks carried 16 per cent of the shipments amounting to 13 per cent of value and 28 per cent of weight. Inland

water transported 28 per cent of shipments, having 31 per cent of value and 24 per cent of weight.

Canada (World Area 1) received the largest portion of exported petroleum and petroleum by-products with 36 per cent of shipments comprising 36 per cent of value and 55 per cent of weight. The remaining exports were quite evenly split between four other World Areas. Southern Europe and the Mediterranean (World Area 8) (15 per cent of shipments, 12 per cent of value, and 10 per cent of weight); West Central Europe (World Area 7) (13 per cent of shipments, 8 per cent of value and 6 per cent of weight); Northwest Europe (World Area 6) (12 per cent of the shipments, 19 per cent of value and 17 per cent of weight); and North and East South America (World Area 3) (9 per cent of shipments, 12 per cent of value and 6 per cent of weight) shared the remaining exports of SBR-33.

Comparisons between the coasts in Tables 2.13 and 2.14 suggest that of shipments through the major ports, primarily low valued products were being exported through the Great Lakes ports, with the higher valued products being shipped to Gulf and East Coast ports for export. Only Maryland ($11.90/ton) and New Jersey ($15.69/ton) for the East Coast had a comparably low value/ton ratio for Great Lakes related vessel export shipments.

On the East Coast in Map 7, 100 per cent of New Jersey's 34,180 tons (valued at $536,415) and 81 per cent

SBR-33 (Continued)

of Pennsylvania's 18,620 tons (valued at $621,436) were included as Great Lakes related shipments only because their destination is Canada via an East Coast to Canadian Great Lakes maritime trade route. April through November, the approximate Great Lakes shipping season, produced 74 per cent of shipments (79 per cent by value and 81 per cent by weight). Appendix E contains the supporting data for the maps in Map 7.

TABLE 2.13

COASTAL DISTRIBUTION OF SBR-33*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	50	(26.74)	4,957,634	(28.81)	296,327	(48.76)
East	54	(28.88)	3,159,428	(18.36)	84,820	(13.96)
Gulf	76	(40.64)	8,702,254	(50.57)	214,167	(35.24)
West	7	(3.74)	390,549	(2.27)	12,371	(2.04)
All Coasts	187	(100.00)	17,209,865	(100.00)	607,685	(100.00)

* Shipments through Major Ports Only.

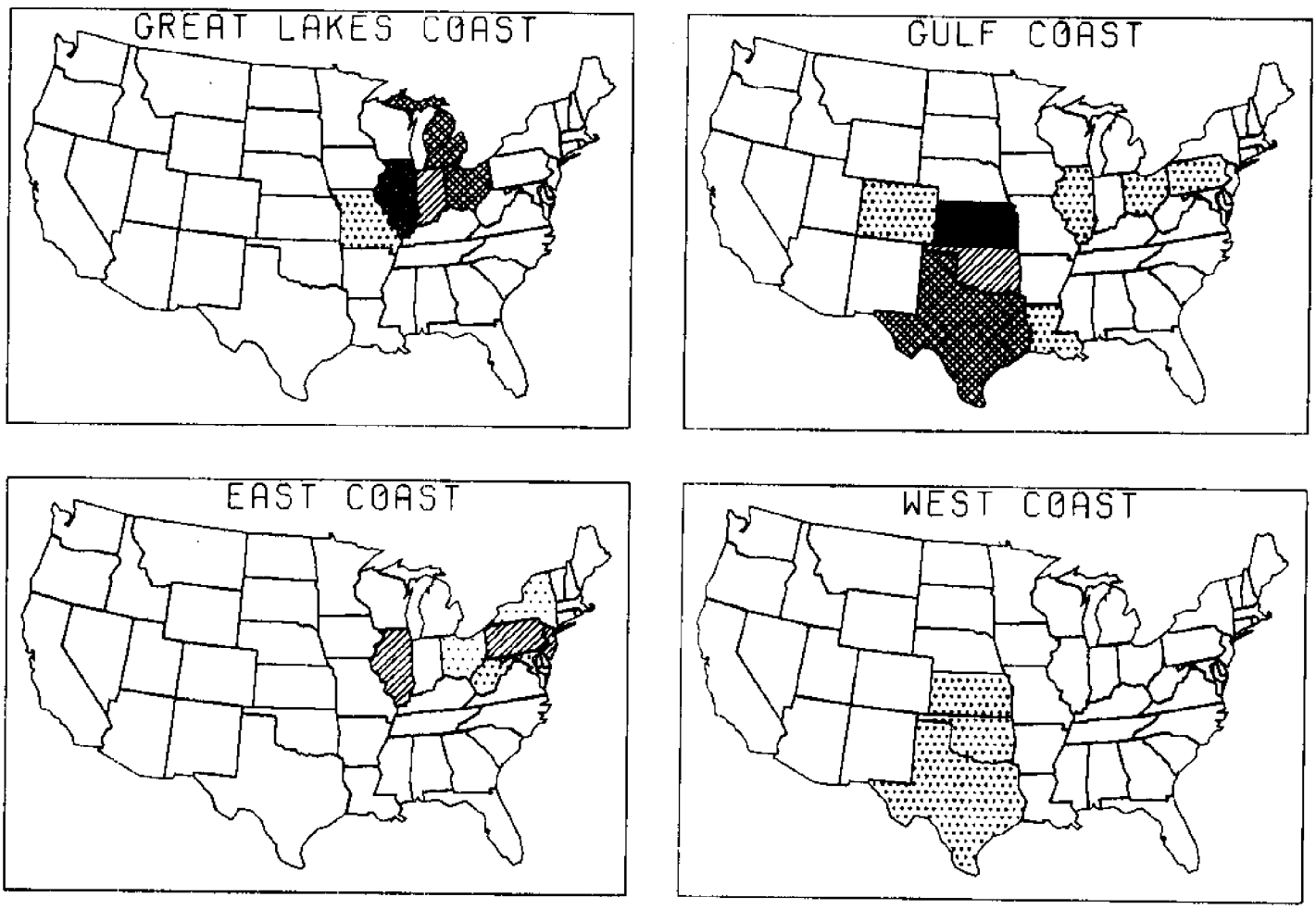
TABLE 2.14

SHIPMENT DESCRIPTION BY COAST - SBR-33*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	99,152.68	5,926.54	16.73
East	58,507.93	1,570.74	37.25
Gulf	114,503.34	2,817.99	40.63
West	55,792.71	1,767.29	31.57
All Coasts	92,031.36	3,249.65	28.32

* Shipments through Major Ports Only.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF PETROLEUM PRODUCTS (SBR 33)



(MAP-7)

Animal Oils and Fats, SBR-41

SBR-41 consists of exports of animal oils and fats. The 107 sampled commodity shipments were almost all shipments of animal oils and fats, N.E.C. (99 per cent).

Animal oils and fats ranked tenth in the sample for number of shipments (107), twelfth in value ($7,912,548), and eleventh in weight (47,284 tons). The major ports handled 106 shipments with a value of $7,818,719 and a weight of 46,634 tons.

As expected, SBR-41 is a bulk type commodity, with 72 per cent of the shipments (76 per cent of the value and 76 per cent of the weight) loaded into ships' tank; and 5 per cent of shipments (5 per cent of value and 5 per cent of weight) bulk loaded. On both international and domestic legs, 4 per cent of shipments (5 per cent of value and 5 per cent of weight) were shipped in a reusable container.

Rail, truck and inland water were the three main modes of transport from place of acquisition to port of export. Rail moved 53 per cent of the shipments, comprising 32 per cent of the value and 31 per cent of the weight. Truck handled 22 per cent of the shipments, representing 30 per cent of the value and 30 per cent of the weight, while inland water transported 14 per cent of the shipments, accounting for 25 per cent of the value and 27 per cent of the weight. Contrary to the expected distribution, the average sample weight of a shipment by truck was greater than the average sample weight of a shipment by rail.

SBR-41 (Continued)

West-Central Europe (World Area 7), Southeast Asia (World Area 10), and the United Kingdom and Ireland (World Area 5) were the three largest recipients of the animal oil and fat exports, using sample shipments as the criterion. Respectively, they accounted for 26 per cent of shipments (21 per cent of value and 22 per cent of weight); 20 per cent of shipments (16 per cent of value and 15 per cent of weight); and 19 per cent of shipments (6 per cent of value and 6 per cent of weight). Southern Europe and the Mediterranean (World Area 8) and East Central Asia (World Area 11) accounted for 14 per cent of shipments (17 per cent of value and 17 per cent of weight) and 11 per cent of shipments (14 per cent of value and 13 per cent of weight) respectively.

The Gulf Coast dominated in number of shipments but the Great Lakes processed larger shipments and was competitive for value and weight, as indicated in Table 2.15. The value per ton was similar for each coast, as can be seen by comparing value/ton for the four coasts in Table 2.16.

TABLE 2.15

COASTAL DISTRIBUTION OF SBR-41*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	30	(28.30)	3,209,539	(41.05)	19,807	(42.47)
East	18	(16.98)	1,017,932	(13.02)	5,645	(12.01)
Gulf	51	(48.11)	3,154,754	(40.35)	18,781	(40.27)
West	7	(6.60)	436,494	(5.58)	2,401	(5.15)
All Coasts	106	(100.00)	7,818,719	(100.00)	46,634	(100.00)

* Shipments through Major Ports Only.

TABLE 2.16

SHIPMENT DESCRIPTION BY COAST - SBR-41*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	106,984.63	660.23	162.04
East	56,551.78	313.61	180.32
Gulf	61,857.92	368.25	167.98
West	62,356.29	343.00	181.80
All Coasts	73,761.50	439.94	167.66

* Shipments through Major Ports Only.

Fixed Vegetable Oils and Fats, SBR-42

SBR-42 includes exports of fixed vegetable oils and fats, excluding hydrogenated types. The sampled commodity shipments are composed primarily of soybean oil (85 per cent), raw-linseed oil (10 per cent), cottonseed oil (3 per cent), and peanut oil (2 per cent).

In the sample of Great Lakes related vessels' export shipments, SBR-42 ranks fourteenth in number of shipments (59), fourth in value ($43,093,039), and seventh in weight (172,090 tons). The major ports handled 58 of these 59 shipments, valued at $42,350,539 and weighing 169,114 tons.

Fixed vegetable oils and fats is a bulk type commodity. It is known that 14 per cent of the shipments (10 per cent of value and 10 per cent of weight) were loaded as bulk. Another 15 per cent of shipments (6 per cent of value and 7 per cent of weight) were loaded into the ships' tank. Unfortunately the packaging of most of the shipments cannot be identified.

Inland water was by far the dominant mode of transport from place of acquisition to port of export, moving 95 per cent of the sample shipments which represented 99 per cent of the sample value and 99 per cent of the sample weight. Rail accounted for only 3 per cent of the shipments (.2 per cent of value and .2 per cent of weight).

Southeast Asia (World Area 10) was the place of destination for 47 per cent of the sample shipments of this

SBR-42 (Continued)

commodity, amounting to 49 per cent of value and 51 per cent of weight. Western South America (World Area 4) attracted 8 per cent of shipments (15 per cent of value and 14 per cent of weight), whereas Mexico and Central America (World Area 2) obtained 10 per cent of the shipments (5 per cent of value and 5 per cent of weight). Southern Europe and the Mediterranean (World Area 8) ranked second in this category, accounting for 15 per cent of shipments, representing 19 per cent of value and 18 per cent of weight.

As can be seen in Tables 2.17 and 2.18, the Gulf Coast overwhelmingly dominated exports of fixed vegetable oils and fats that were shipped through major ports.

Since the main inland waterway system for the Great Lakes hinterland is the Mississippi River and its tributaries, the expected coast of export for shipments moved by inland water would be the Gulf Coast. This movement did in fact occur. Another factor influencing the choice of the Gulf Coast for export is that 47 per cent of the shipments was destined for Southeast Asia, and 8 per cent for Western South America. Both of these destinations require passage through the Panama Canal when exports are not routed through the West Coast. In addition, 10 per cent of the shipments was destined for Mexico and Central America, for which the Gulf is the logical coast. An additional 15 per cent was destined for Southern Europe and the Mediterranean.

TABLE 2.17

COASTAL DISTRIBUTION OF SBR-42*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	2	(3.45)	361,978	(0.85)	1,490	(0.88)
East	1	(1.72)	35,758	(0.08)	155	(0.09)
Gulf	55	(94.83)	41,952,803	(99.06)	167,469	(99.03)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	58	(100.00)	42,350,539	(100.00)	169,114	(100.00)

* Shipments through Major Ports Only.

TABLE 2.18

SHIPMENT DESCRIPTION BY COAST - SBR-42

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	180,989.00	745.00	242.94
East	35,758.00	155.00	230.70
Gulf	762,778.24	3,044.89	250.51
West	-	-	-
All Coasts	730,181.71	2,915.76	250.43

* Shipments through Major Ports Only.

Chemical Elements and Compounds, SBR-51

SBR-51 categorizes chemical elements and compounds. The sampled commodities were primarily organic chemicals (45 per cent), inorganic chemicals, N.E.C., excluding medical chemicals (21 per cent), ammonia (12 per cent), sodium and potassium compounds, N.E.C. (10 per cent), chemical elements, N.E.C. (3 per cent), inorganic acids and oxygen compounds - non-metallic (3 per cent), and oxides - metallic (2 per cent).

SBR-51 ranked ninth in number of shipments (131), tenth in value ($9,404,713), and ninth in weight (92,431 tons) when compared to the other sampled Great Lakes related export commodities. Of these 131 shipments, 120 moved through the major ports.

A relatively large amount of exported chemical elements was containerized; 18 per cent of the shipments on the international leg, equalling 9 per cent of value and 2 per cent of the weight, were transported as such. On the domestic leg, 15 per cent of the shipments representing 9 per cent of value and 2 per cent of weight were containerized. As expected from the diverse nature of SBR-51, packaging varied with 8 per cent of the shipments comprising 10 per cent of value and 4 per cent of weight being palletized; 34 per cent of the shipments with 12 per cent of value and 18 per cent of weight were placed in individual lots, cases or barrels; 9 per cent of shipments accounting for 24 per

SBR-51 (Continued)

cent of value and 32 per cent of weight were loaded in ships' tank; and 13 per cent of shipments equalling 41 per cent of value and 37 per cent of weight were bulk packaged.

The mode of transport from place of acquisition to port of export was dominated by the rails as they moved 54 per cent of the shipments representing 70 per cent of the value and 47 per cent of the weight. Truck transport followed relatively close behind moving 39 per cent of shipments comprising 20 per cent of value and 19 per cent of weight.

West-Central Europe (World Area 7) was the destination of 25 per cent of the shipments (31 per cent of value and 13 per cent of weight). Southeast Asia (World Area 10) accounted for 16 per cent of shipments (7 per cent of value and 9 per cent of weight); 14 per cent of the shipments were destined for East Central Asia (World Area 11) (12 per cent of value and 5 per cent of weight). Another 15 per cent of shipments (10 per cent of value and 30 per cent of weight) were headed for North and East South America (World Area 3); and 7 per cent of the shipments (26 per cent of value and 38 per cent of weight) were exported to Canada (World Area 1). U.S. flagships carried 27 per cent of shipments traffic (14 per cent of value and 34 per cent of weight).

The 120 shipments moving through the major ports were divided coastally as described in Tables 2.19 and 2.20.

SBR-51 (Continued)

SBR-51 is a very diverse commodity classification, and it appears that different products were being exported through the different coasts as the commodity value per ton ranged from $70.28 through $671.56. The East Coast and West Coast obtained the smaller, higher valued shipments, the Gulf Coast handled the large bulk shipments of average value, and what remained for the Great Lakes ports was the low value, high weight shipments from Michigan and Illinois. The low valued, high weight shipments were probably exported to Canada. This conclusion is fostered by the fact that Canada (World Area 1) was the destination for only 7 per cent of the shipments, but this 7 per cent represented 38 per cent of the sample weight. Given the proximity of Canada to the Great Lakes, this would seem to be the logical movement.

TABLE 2.19

COASTAL DISTRIBUTION OF SBR-51*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	8	(6.67)	590,419	(7.22)	8,401	(20.63)
East	73	(60.83)	3,175,972	(38.86)	9,488	(23.30)
Gulf	33	(27.50)	4,353,349	(53.27)	22,749	(55.87)
West	6	(5.00)	53,053	(0.65)	79	(0.19)
All Coasts	120	(100.00)	8,172,793	(100.00)	40,717	(100.00)

* Shipments through Major Ports Only.

TABLE 2.20

SHIPMENT DESCRIPTION BY COAST - SBR-51*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	73,802.38	1,050.12	70.28
East	43,506.47	129.97	334.74
Gulf	131,919.67	689.36	191.36
West	8,842.17	13.17	671.56
All Coasts	68,106.61	339.31	200.72

* Shipments through Major Ports Only.

Manufactured Fertilizers and Fertilizer Materials, SBR-56

SBR-56 is composed of manufactured fertilizers and fertilizer materials. The sampled commodity shipments were fertilizers, N.E.C. (48 per cent), nitrogenous fertilizers except natural types (29 per cent), phosphatic fertilizers and materials (14 per cent), and potassic fertilizers except natural salts (9 per cent).

In the sample of Great Lakes related vessel exports, SBR-56 ranked twenty-first in number of shipments (35), fourteenth in value ($5,077,803), and eighth in weight (123,314 tons). Seven shipments (valued at $787,259 and weighing 23,109 tons) of these 35 shipments moved through major ports.

Of the commodity shipments, 3 per cent (0.1 per cent of value and 0.1 per cent of weight) were shipped in a reusable container for the domestic and international movements. As expected from the commodity descriptions, SBR-56 is primarily bulk loaded, with 66 per cent of the shipments (71 per cent of value and 73 per cent by weight) being bulk packaged. Palletized packaging was used for 6 per cent of the shipments (10 per cent of value and 9 per cent of weight); and 14 per cent of shipments (2 per cent of value and 2 per cent of weight) were loaded in individual lots, cases or barrels.

Of the total shipments, 74 per cent (59 per cent of value and 61 per cent of weight) moved by rail from place of

acquisition to port of export; 6 per cent of shipments (12 per cent by value and 11 per cent by weight) traveled by truck; and 9 per cent of shipments (12 per cent of value and 14 per cent of weight) moved by inland water.

Canada (World Area 1) was the destination of 40 per cent of the shipments (64 per cent of value and 65 per cent of weight); 29 per cent of shipments (13 per cent of value and 12 per cent of weight) were destined for North and East South America (World Area 3); and 11 per cent of shipments (3 per cent of value and 3 per cent of weight) were destined for West South America (World Area 4).

Of the seven shipments of SBR-56 exported through the major ports, only one went through the Great Lakes. The coastal analysis of shipments moving through major ports contained in Tables 2.21 and 2.22 is not very meaningful due to the limited observations. The limited observations do reveal the Gulf Coast to be the dominant coast, using weight as the criteria, but the value per ton of shipments moving through the Great Lakes is almost identical.

The most unusual feature about SBR-56 is that only seven of the thirty-five sample shipments moved through major ports, as these ports are defined in Appendix C. A frequency count of shipments through individual ports reveals that eighteen of the thirty-five shipments moved through the Tampa-St. Petersburg port and four other shipments in the sample went through other ports in Florida.

SBR-56 (Continued)

In addition, the Great Lakes Vessel Tapes reveal that thirteen of the shipments were produced in Illinois and twelve of these thirteen shipments had their port of export in Florida. The extremely unusual feature is that two of these thirteen shipments had Canada (World Area 1) as their destination. This would seem to imply that some specialized facilities in the final production of SBR-56 are located in Florida, causing the unusual transportation chain.

SBR-56, although composed of similar type commodities, is of widely varying value per ton by state of acquisition, ranging from $14.15 per ton from Texas through the Gulf to $186.18 per ton from Missouri through the Gulf.

TABLE 2.21

COASTAL DISTRIBUTION OF SBR-56*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	1	(14.29)	163,111	(20.72)	4,660	(20.17)
East	3	(42.86)	31,126	(3.95)	1,794	(7.76)
Gulf	3	(42.86)	593,022	(75.33)	16,655	(72.07)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	7	(100.00)	787,259	(100.00)	23,109	(100.00)

* Shipments through Major Ports Only.

TABLE 2.22

SHIPMENT DESCRIPTION BY COAST - SBR-56*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	163,111.00	4,660.00	35.00
East	10,375.33	598.00	17.35
Gulf	197,674.00	5,551.67	35.61
West	-	-	-
All Coasts	112,465.57	3,301.29	34.07

* Shipments through Major Ports Only.

Iron and Steel, SBR-67

SBR-67 consists of export shipments of iron and steel. Shipments within this category which are Great Lakes related fall into the following sub-classifications: pig iron, sponge iron, iron or steel powder and shot, and ferro alloys (6 per cent), iron or steel primary forms (40 per cent), iron or steel bars, rods, angles, shapes, sections, and sheet piling (6 per cent), iron or steel plates or sheets (32 per cent), iron or steel hoop and strip (5 per cent), iron or steel rails and railway track construction material (1 per cent), iron or steel wire (0.4 per cent), iron or steel tubes, pipes and fittings (8 per cent), and rough iron or steel castings and forgings (2 per cent).

Iron and steel ranked second on the Great Lakes Vessel Tapes with respect to number of shipments, 517 or 14 per cent. It ranked first in value having $236,216,865 or 35 per cent of the tape total, and was first with respect to weight, 2,469,974 tons or 30 per cent. The major ports handled 511 of the export shipments of iron and steel.

Only four of the shipments traveled within the United States in a reusable container while only ten shipments (2 per cent of shipments, 0.2 per cent of value and 0.04 per cent of weight) were containerized internationally. A total of 263 of the sample shipments were packaged in individual lots, cases or barrels; these included 51 per cent of the class shipments, 58 per cent of the value and 56 per cent

SBR-67 (Continued)

of the weight. Another 27 per cent of the shipments, 141, with 31 per cent of value and 34 per cent of weight were classified as bulk packaged.

The most important World Areas for destinations of exports of iron and steel were the United Kingdom and Ireland (World Area 5), West-Central Europe (World Area 7), and Southern Europe and the Mediterranean (World Area 8). The United Kingdom and Ireland were destinations for 12 per cent of the shipments (22 per cent of the sample value and 24 per cent of the weight). West-Central Europe received 26 per cent of the shipments (32 per cent of value and 35 per cent of weight), while Southern Europe and the Mediterranean accounted for 22 per cent of shipments (27 per cent of value and 24 per cent of weight).

The Gulf Coast handled the largest number of shipments of iron and steel, but these shipments were smaller on the average than those moved through the Great Lakes, as indicated in Tables 2.23 and 2.24. The shipments through the East Coast were relatively small but had the highest value density of any of the coasts.

Map 8, describing the place of acquisition by coast of export for exports of iron and steel through major ports, shows that the Gulf Coast drew most strongly from states actually bordering on the Great Lakes. The data described in these maps are in Appendix E.

TABLE 2.23

COASTAL DISTRIBUTION OF SBR-67*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	104	(20.35)	68,594,496	(29.25)	785,546	(31.95)
East	159	(31.12)	27,984,538	(11.93)	225,401	(9.17)
Gulf	248	(48.53)	137,924,026	(58.82)	1,447,385	(58.88)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	511	(100.00)	234,503,060	(100.00)	2,458,332	(100.00)

* Shipments through Major Ports Only.

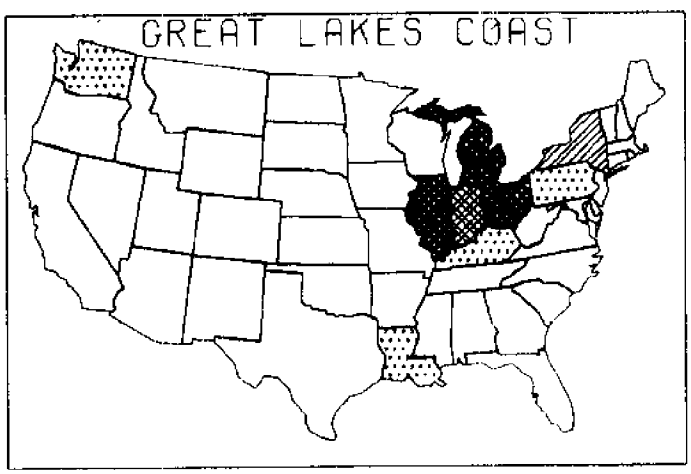
TABLE 2.24

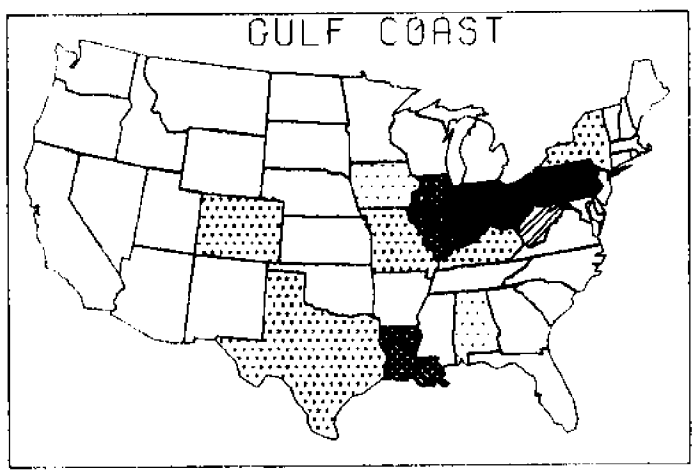
SHIPMENT DESCRIPTION BY COAST - SBR-67*

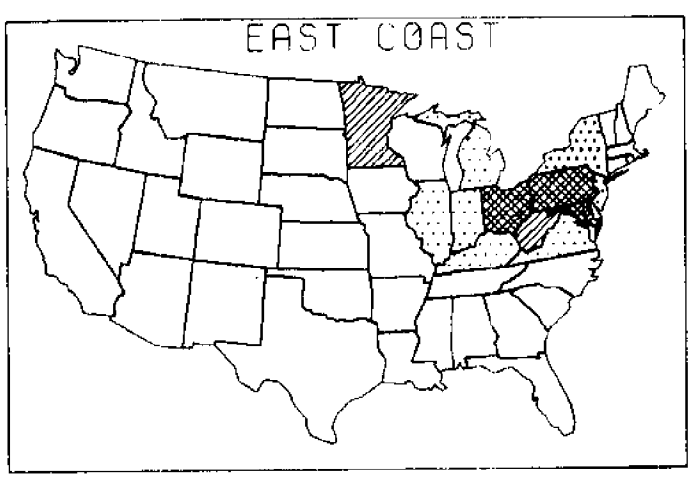
Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	659,562.46	7,553.33	87.32
East	176,003.38	1,417.62	124.15
Gulf	556,145.27	5,836.23	95.29
West	-	-	-
All Coasts	458,910.10	4,810.83	95.39

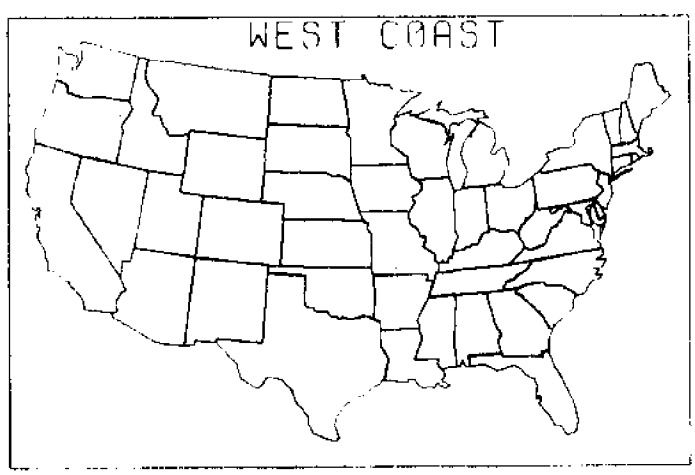
* Shipments through Major Ports Only.

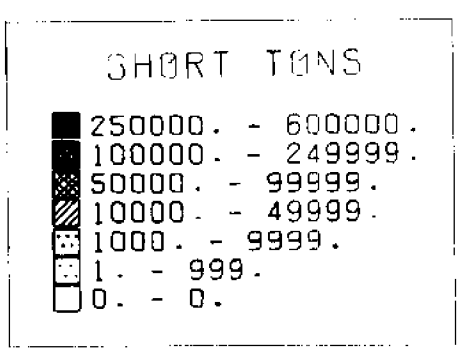
PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF IRON AND STEEL (SBR 67)











(MAP-8)

Non-Electric Machinery, SBR-71

SBR-71 is classified as non-electric machinery. The sampled commodities in this classification include machinery and appliances and machinery parts (37 per cent), machines for special industries and parts (25 per cent), agricultural machinery and parts (18 per cent), power generating machinery and parts, except electrical (8 per cent), metalworking machinery (8 per cent), office machines and parts (3 per cent), and textile machinery (0.4 per cent).

SBR-71 is an important export commodity for the Great Lakes hinterland, ranking fifth in number of sample shipments with 251, sixth in sample value ($22,201,511), and fourteenth in sample weight (15,643 tons). Major ports moved 239 of the 251 sample shipments.

Containers were used for 17 per cent of the sample shipments for the domestic movement, accounting for 8 per cent of the value and 3 per cent of the weight. On the international leg, containers were used for 20 per cent of the shipments, equalling 10 per cent of the value and 4 per cent of the sample weight. Individual lots, cases and barrels were used for 59 per cent of the sample shipments comprising 72 per cent of the value and 79 per cent of weight, whereas the significant portion of the remaining shipments were bulk loaded (6 per cent of shipments, 5 per cent of value, and 5 per cent of weight); and palletized (4 per cent of shipments, 1 per cent of value, and 1 per cent of weight).

U.S. flag ships were able to attract 28 per cent of the traffic (33 per cent of value and 49 per cent of weight).

Rail and truck moved 96 per cent of all sample shipments from place of acquisition to port of export. Rail accounted for 57 per cent of the sample shipments, which represented 65 per cent of value and 59 per cent of sample weight. Trucks moved 39 per cent of the shipments, accounting for 29 per cent of the value and 40 per cent of weight. The statistics point to a somewhat curious development in that the rails, according to the sample, are carrying higher value goods than the trucks, somewhat contradictory to established theory.

Southeast Asia (World Area 10) with 19 per cent of the sample shipments (19 per cent of value and 18 per cent of weight), West-Central Europe (World Area 7) with 16 per cent of shipments (11 per cent of value and 6 per cent of weight), and North and East South America (World Area 3) with 16 per cent of shipments (14 per cent of value and 10 per cent of weight) were the World Area destinations for just over half of the exports of non-electric machinery. An additional 12 per cent of shipments (19 per cent of value and 15 per cent of weight) were attracted by Southern Europe and the Mediterranean (World Area 8).

The coastwise breakdown of movements through the major ports (Tables 2.25 and 2.26) seem to indicate that the coast nearest to the final destination is a determining factor in

SBR-71 (Continued)

coast of export, as would be expected in a high value-low weight commodity where direct transport cost is subordinate to speed of shipping. The relatively long time required for a ship to exit the Great Lakes and to reach the port of destination, as well as less frequent sailings from Great Lakes ports to many destinations, results in the major Great Lakes ports being unable to effectively compete for non-electric machinery acquired in the Great Lakes region.

TABLE 2.25

COASTAL DISTRIBUTION OF SBR-71*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	13	(5.44)	2,190,639	(10.67)	987	(6.66)
East	158	(66.11)	12,000,869	(58.43)	9,864	(66.60)
Gulf	43	(17.99)	3,785,974	(18.43)	2,293	(15.48)
West	25	(10.46)	2,561,924	(12.47)	1,667	(11.26)
All Coasts	239	(100.00)	20,539,406	(100.00)	14,811	(100.00)

* Shipments through Major Ports Only.

TABLE 2.26

SHIPMENT DESCRIPTION BY COAST - SBR-71*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	168,510.69	75.92	2,219.49
East	75,954.87	62.43	1,216.63
Gulf	88,045.91	53.33	1,651.10
West	102,476.96	66.68	1,536.85
All Coasts	85,938.94	61.97	1,386.77

* Shipments through Major Ports Only.

Transport Equipment, SBR-73

SBR-73, transport equipment, consists of finished products or accessories ranging from railway vehicles to motor vehicles and ships, boats, and floating structures. According to Great Lakes Vessel Tapes, 52 per cent of the sample shipments consisted of passenger cars, trucks, buses and special purpose vehicles. Motor vehicle and tractor parts and accessories, N.E.C., comprised 39 per cent of the sample export shipments.

With 132 shipments, transport equipment ranked eighth on the export side in the number of sample shipments among all commodities. It did not rank in the top ten in either sample value or sample weight.

There were 29 shipments of SBR-73 which were containerized on the domestic leg of the journey. On the international movement, containerized shipments totaled 34 (26 per cent of shipments, 11 per cent of value, and 13 per cent of weight). A total of 48 per cent of the shipments were packaged in individual lots, cases or barrels. These represented 44 per cent of the sample value and 49 per cent of sample weight.

Most of the shipments of transport equipment (69 per cent of the shipments, 82 per cent of value and 78 per cent of weight) moved by rail from place of acquisition to port of export. Another 23 per cent of the shipments (13 per cent of value and 14 per cent of weight) were transported by truck.

SBR-73 (Continued)

Transport equipment was exported mainly to four World Areas, according to the Great Lakes Vessel Tapes. North and East South America (World Area 3) received 24 per cent of sample shipments (13 per cent of value and 21 per cent of weight); Southeast Asia (World Area 10) received 18 per cent of sample shipments (26 per cent of value and 20 per cent of weight); West-Central Europe (World Area 7) received 12 per cent of sample shipments (3 per cent of value and 3 per cent of weight); and Africa, except the Mediterranean (World Area 12) received 11 per cent of the sample shipments (18 per cent of value and 16 per cent of weight).

Given that the sample was taken in 1970, the high percentage of exports to Southeast Asia may have been due to the Vietnam War.

In terms of coastal analysis, the East Coast was by far the dominant coast, accounting for 79 per cent of the 131 sample shipments moving through the major ports, representing 55 per cent of the sample value and 61 per cent of the sample weight of Great Lakes related exports. The most startling statistic is the fact that only 5 per cent of the sample shipments, representing only 2 per cent of the sample value and 4 per cent of the weight, went through the Great Lakes Coast, given that a significant amount of the production of transport equipment takes place in Michigan and Illinois. Tables 2.27 and 2.28 contain additional information of the composition of SBR-73 moving through the coasts.

SBR-73 (Continued)

A more recent example of this type of situation occurred in April 1974, when ten 12-1/2 ton mixer trucks, produced in Milwaukee, were driven to New York for export to Iran rather than sailing out of a Great Lakes port.

The poor position can be explained by looking at the high volume of transport equipment produced and the relatively infrequent sailings offered out of Great Lakes ports. To use the Great Lakes ports, firms would many times incur substantial inventory costs, more important on high value goods, waiting for a sailing for the appropriate destination from a Great Lakes port. Consequently, the goods were transported to the three other coasts which provide more frequent service.

TABLE 2.27

COASTAL DISTRIBUTION OF SBR-73*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	6	(4.58)	188,405	(2.23)	214	(4.08)
East	103	(78.63)	4,657,827	(55.11)	3,207	(61.11)
Gulf	9	(6.87)	1,695,957	(20.07)	1,065	(20.29)
West	13	(9.92)	1,909,191	(22.59)	762	(14.52)
All Coasts	131	(100.00)	8,451,380	(100.00)	5,248	(100.00)

* Shipments through Major Ports Only.

TABLE 2.28

SHIPMENT DESCRIPTION BY COAST - SBR-73*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	31,400.83	35.67	880.40
East	45,221.62	31.14	1,452.39
Gulf	188,439.67	118.33	1,592.45
West	146,860.85	58.62	2,505.50
All Coasts	64,514.35	40.06	1,610.40

* Shipments through Major Ports Only.

Imports

Fruits and Vegetables, SAR-05

The commodities classified under SAR-05 include fruits, vegetables, and nuts: fresh, preserved, and dried; as well as various fruit and vegetables preparations such as jellies and juices. Of the Great Lakes related shipments classified as SAR-05, 26 per cent were edible nuts, not for oil; 29 per cent represented fruits and nuts, prepared or preserved; and 21 per cent were prepared or preserved vegetables. Thus, the major proportion of fruits and vegetables with which the Great Lakes might have been concerned was not highly perishable. A maximum of less than 15 per cent of the Great Lakes related fruits and vegetable shipments were fresh. This percentage is most likely high since several subclassifications include both fresh fruits or vegetables and those which have been treated in some way.

Among Great Lakes related imports, fruits, vegetables, and nuts ranked high only with respect to total number of shipments. There were 163 such shipments, a little more than 3 per cent of the total shipments on the Great Lakes Vessel Tapes. SAR-05 ranked seventh by this criterion. It was not significant with respect to weight (10,090 tons) and value ($2,722,587). Major ports handled 149 of the 163 sample shipments.

Only 13 per cent of the shipments of SAR-05 traveled in a reusable container on the international leg of the

journey. These twenty-one shipments contained only 13 per cent of the weight in this category, but over 31 per cent of the value. Eight of the shipments remained in the same containers on the domestic journeys. Individual lots, cases or barrels were the form of packaging used for 41 per cent of the sample shipments (47 per cent of value and 63 per cent of weight) while 33 per cent of the shipments (16 per cent of value and 19 per cent of weight) were palletized. It is interesting to note that only the containerized shipments carried a greater percentage of value than of weight.

Within the United States, most of the traffic in SAR-05 (56 per cent of shipments, 61 per cent of value, and 61 per cent of weight) moved by truck from the port of entry to place of destination. Rail was the mode of transport for 36 per cent of the shipments (30 per cent of value and 31 per cent of weight).

In the Great Lakes sample, imports of fruits and vegetables were generated primarily from three World Areas. The southern part of North America (World Area 2) contributed 15 per cent of SAR-05 shipments, but only 2 per cent of value and 6 per cent of weight; whereas Southern Europe and the Mediterranean (World Area 8) provided 23 per cent of sample shipments, 41 per cent of value, and 49 per cent of weight; and 47 per cent of shipments, 29 per cent of value, and 30 per cent of weight originated in Asia and Australia (World Areas 10 and 11).

SAR-05 (Continued)

Table 2.29 indicates that the East Coast dominated in the movement of these shipments of Great Lakes related fruits and vegetables. The West Coast was second by reason of number of shipments and third by value and weight. The Great Lakes Coast was third by number of shipments and second by value and weight. The Gulf Coast was fourth by all criteria.

The shipments through the Gulf Coast were, however, very large (Table 2.30) as compared to those through the other coasts. The value per tons figure fails to indicate any significant difference in commodity mix through the coasts, though such differences may have, in fact, existed.

TABLE 2.29

COASTAL DISTRIBUTION OF SAR-05*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	14	(9.40)	381,657	(14.72)	1,300	(13.43)
East	101	(67.79)	1,612,665	(62.18)	6,181	(63.87)
Gulf	3	(2.01)	250,239	(9.65)	1,012	(10.46)
West	31	(20.81)	349,023	(13.46)	1,185	(12.24)
All Coasts	149	(100.00)	2,593,584	(100.00)	9,678	(100.00)

* Shipments through Major Ports Only.

TABLE 2.30

SHIPMENT DESCRIPTION BY COAST - SAR-05*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	27,261.21	92.86	293.58
East	15,966.98	61.20	260.91
Gulf	83,413.00	337.33	247.27
West	11,258.81	38.23	294.53
All Coasts	17,406.60	64.95	267.99

* Shipments through Major Ports Only.

Sugar, Sugar Preparations, and Honey, SAR-06

Imports of sugar, sugar preparation, and honey are classified under SAR-06. Almost all of the shipments on the Great Lakes Vessel Tapes consist of shipments of molasses. This commodity ranked third in relative importance in Great Lakes related imports by reason of number of shipments (249), fourth by reason of weight (404,102 tons), and ninth by reason of value ($7,482,359). All of the 249 shipments moved through major ports.

"Bulk" packaging was used for 58 per cent of the 249 sample shipments, accounting for 50 per cent of the value and 51 per cent of the weight. Over 35 per cent by all three criteria came in ships' tanks. Containerization was insignificant.

From the port of entry to the place of destination, 55 per cent of the shipments (39 per cent of value and 44 per cent of weight) were transported via inland water. Truck and rail moved 24 per cent of the shipments (40 per cent of value and 36 per cent of weight) and 18 per cent of shipments (11 per cent of value and 11 per cent of weight) respectively.

The southern part of North America (World Area 2) provided 47 per cent of these commodities shipments, representing 42 per cent of the value and 42 per cent of the weight. Over 25 per cent of the shipments originated in South America (World Areas 3 and 4) while an additional 12 per cent came

SAR-06 (Continued)

from Southeast Asia and Australia (World Area 10) and another 10 per cent of the sample shipments arrived from non-Mediterranean Africa (World Area 12).

The West Coast did not attract any of the sample shipments of SAR-06. As Table 2.31 shows, the East and the Gulf Coast divided most of the traffic. Both of these coasts were responsible for about half of the imported value and weight. The Gulf Coast had a much larger number of shipments.

East Coast shipments were larger in tonnage than those through the Gulf Coast, by more than a 2:1 ratio, as shown in Table 2.32. The value ratio was even higher. However, the value per ton through each coast was quite similar; this is to be expected since the traffic was primarily one commodity, molasses. The extremely high value per shipment and weight per shipment for the Great Lakes Coast cannot be considered significant since only one shipment was involved.

The place of destination for imports of SAR-06 is illustrated by coast of entry in Map 9. Supporting data are in Appendix E.

TABLE 2.31

COASTAL DISTRIBUTION OF SAR-06*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	1	(0.40)	181,376	(2.42)	9,234	(2.29)
East	71	(28.51)	3,604,719	(48.18)	177,137	(43.83)
Gulf	177	(71.08)	3,696,264	(49.40)	217,731	(53.88)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	249	(100.00)	7,482,359	(100.00)	404,102	(100.00)

* Shipments through Major Ports Only.

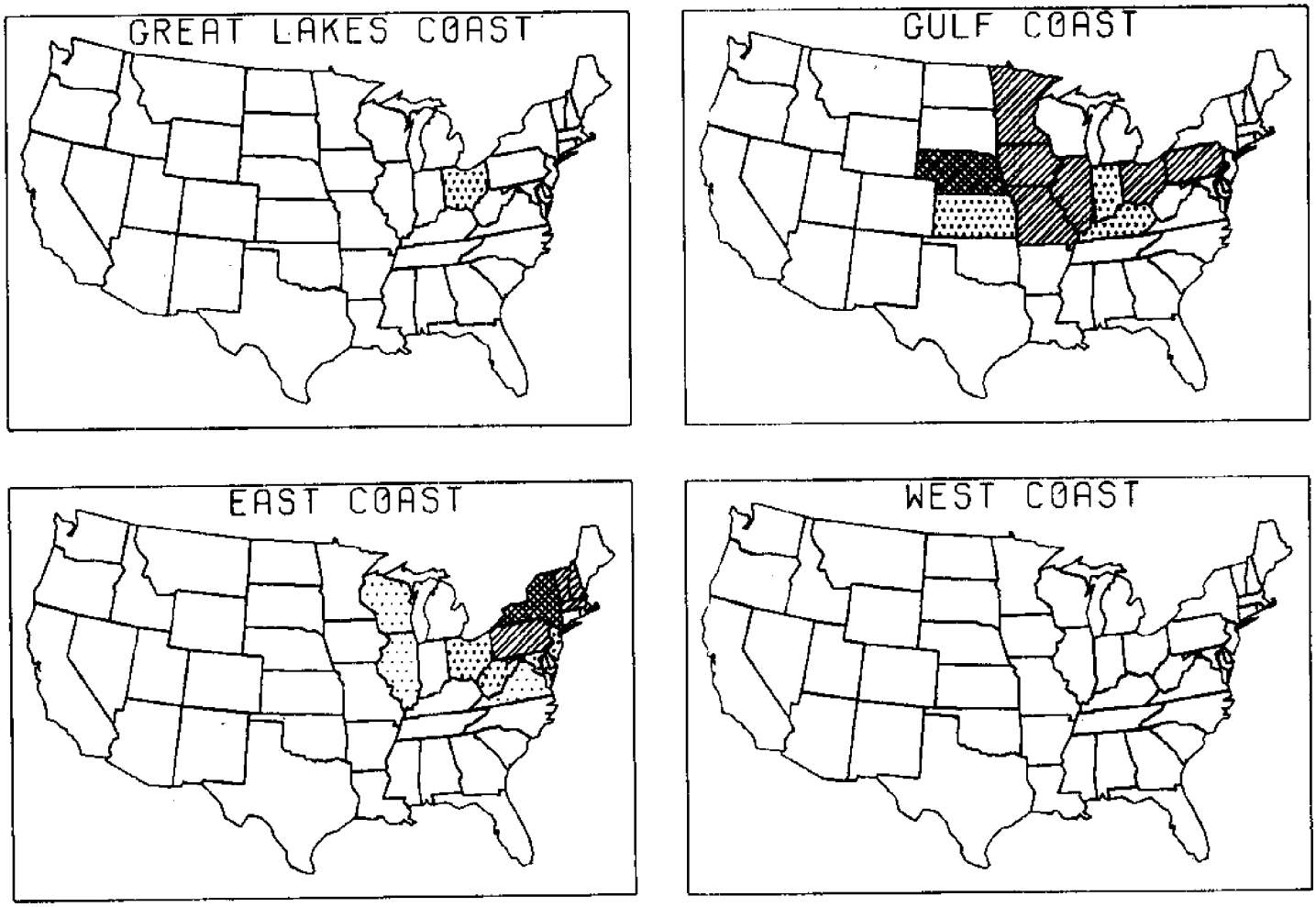
TABLE 2.32

SHIPMENT DESCRIPTION BY COAST - SAR-06*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	181,376.00	9,234.00	19.64
East	50,770.69	2,494.89	20.35
Gulf	20,882.85	1,230.12	16.98
West	-	-	-
All Coasts	30,049.63	1,622.90	18.52

* Shipments through Major Ports Only.

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF SUGAR DERIVATIVES (SAR 6)



(MAP-9)

Coffee, Cocoa, Tea, Spices, and Manufactures Thereof, SAR-07

The category SAR-07 is made up of coffee, cocoa, tea, spices, and manufactures thereof. Coffee, coffee substitutes and mixtures accounted for 53 per cent of the Great Lakes related shipments of this commodity, and cocoa beans represented 29 per cent of the sample shipments. The remaining shipments included cocoa powder, cocoa butter, and cocoa paste; chocolate and other food preparations containing cocoa and chocolate, N.E.C.; tea; pepper, pimento, and other spices.

SAR-07, having about 3 per cent of the shipments on the Great Lakes Vessel Tapes, with 130 shipments ranked tenth among all commodities classified by number of shipments. It ranked sixth by value with $17,699,519 and fifteenth by weight with 24,769 tons.

For 29 per cent of the shipments, the type of packaging is unknown. Of the sample shipments, 46 per cent, representing 48 per cent of value and 44 per cent of weight, were packaged in individual lots, cases and barrels; and 15 per cent of the sample shipments (16 per cent of value and 17 per cent of weight) were classified as palletized. On the international movement, reusable containers were used on 17 per cent of the sample shipments, but these shipments accounted for only 8 per cent of the value and 8 per cent of the weight. All of these shipments, except one, remained in the same container for the domestic movement.

SAR-07 (Continued)

Domestic transportation of SAR-07 took place primarily by rail. Trains carried 90 of the 130 sample shipments (69 per cent). These 90 shipments represented 74 per cent of the commodity value and 73 per cent of the weight. Another 36 shipments (28 per cent), involving 24 per cent of value and 25 per cent of weight, traveled by truck.

Non-Mediterranean Africa (World Area 12) was the primary source of this commodity shipment, originating 44 per cent of the shipments, which represented 82 per cent of the value and 85 per cent of the weight in the sample. The other important origins were Southern North America (World Area 2) (15 per cent of shipments, 6 per cent of value, and 5 per cent of weight), and North and East South America (World Area 3) (18 per cent of shipments, 8 per cent of value and 7 per cent of weight).

All of the 130 shipments moved through the major ports. Table 2.33 shows that of Great Lakes related shipments moving through the major ports, the largest part of imports of coffee, cocoa, tea, spices, and manufactures thereof came into the United States through the East Coast. The Gulf Coast ranked second. The Great Lakes Coast, though it handled relatively few shipments, captured an unexpectedly high percentage of both value and weight.

This is shown more strongly in Table 2.34 in which it is apparent that both value per shipment and weight per shipment were comparatively high for those sample shipments

SAR-07 (Continued)

imported through the Great Lakes Coast. Since there is no strong discontinuity in value per ton, it is impossible to speculate on possible commodity mix differences.

TABLE 2.33

COASTAL DISTRIBUTION OF SAR-07*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	3	(2.31)	2,365,216	(13.36)	3,589	(14.49)
East	74	(56.92)	11,718,229	(66.21)	16,612	(67.07)
Gulf	52	(40.00)	3,295,574	(18.62)	3,998	(16.14)
West	1	(0.77)	320,500	(1.81)	570	(2.30)
All Coasts	130	(100.00)	17,699,519	(100.00)	24,769	(100.00)

* Shipments through Major Ports Only.

TABLE 2.34

SHIPMENT DESCRIPTION BY COAST - SAR-07*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	788,405.33	1,196.33	659.02
East	158,354.45	224.49	705.41
Gulf	63,376.42	76.88	824.31
West	320,500.00	570.00	562.28
All Coasts	136,150.15	190.53	714.58

* Shipments through Major Ports Only.

Crude Rubber, SAR-23

SAR-23 consists of crude rubber. This classification appears on the Great Lakes Vessel Tapes primarily in the form of natural rubber and similar natural gums. This one sub-category accounts for over 95 per cent of the 134 shipments involved.

Crude rubber ranks ninth on the Great Lakes Vessel Tapes by number of shipments with 134 shipments, 3 per cent of the total. With $4,150,490, a little over 1 per cent of the total, it ranks thirteenth by reason of value. It encompasses 11,382 tons, less than 1 per cent of total tonnage, and ranks eighteenth by this criterion.

Only two shipments with insignificant value and weight moved by container on the international leg of the journey. One of these continued in the same container for the domestic movement. The methods of packaging SAR-23 varied. While 22 per cent of the shipments (18 per cent of value and 20 per cent of weight) was palletized; 34 per cent of the shipments (35 per cent of value and 25 per cent of weight) were shipped in individual lots, cases or barrels; 14 per cent of the shipments (22 per cent of value and 31 per cent of weight) were loaded in ships' tanks; and 16 per cent of the shipments (15 per cent of value and 14 per cent of weight) were bulk loaded.

Within the United States, the primary mode of transport from port of entry to place of destination was rail, accounting for 60 per cent of the shipments with 77 per cent of

SAR-23 (Continued)

total value and 74 per cent of total weight. Truck accounted for 32 per cent of the shipments with 17 per cent of value and 20 per cent of weight.

Most of the shipments classified as SAR-23 (70 per cent) originated in East Central Asia (World Area 11), but this World Area accounted for only 50 per cent of commodity value and 51 per cent of weight. Another 24 per cent of shipments, 34 per cent of value and 41 per cent of weight, originated in Non-Mediterranean Africa (World Area 12). Interestingly, only one shipment came from Southern North America (World Area 2) but this shipment represented 12 per cent of class value though only about 2 per cent of class weight.

Major U.S. ports handled 129 of the 134 import shipments in this class. Tables 2.35 and 2.36 describe these movements. Table 2.35 indicates that the East Coast was dominant in the moving of these Great Lakes related import shipments of crude rubber. The Great Lakes Coast captured shipments which were smaller, both in value and weight, than those moving through the East Coast. The value per ton for all but the Gulf Coast was quite similar.

The Gulf Coast handled only half as many shipments as the Great Lakes Coast, but these shipments were relatively small in weight and quite high in value. Thus, the value per ton for the Gulf Coast was twice that of the other coasts. This might indicate a difference in commodity mix within the general classification.

TABLE 2.35

COASTAL DISTRIBUTION OF SAR-23*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	35	(27.13)	712,606	(17.48)	1,865	(16.76)
East	67	(51.94)	2,025,534	(49.69)	6,669	(59.92)
Gulf	17	(13.18)	842,001	(20.66)	1,108	(9.96)
West	10	(7.75)	496,117	(12.17)	1,487	(13.36)
All Coasts	129	(100.00)	4,076,258	(100.00)	11,129	(100.00)

* Shipments through Major Ports Only.

TABLE 2.36

SHIPMENT DESCRIPTION BY COAST - SAR-23*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	20,360.17	53.29	382.09
East	30,231.85	99.54	303.72
Gulf	49,529.47	65.18	759.93
West	49,611.70	148.70	333.64
All Coasts	31,598.90	86.27	366.27

* Shipments through Major Ports Only.

Wood, Lumber and Cork, SAR-24

SAR-24, wood, lumber and cork, consists basically of rough unfinished wood products ranging from fuel wood and railroad ties to cork. According to the Great Lakes Vessel Tapes, 82 per cent of the 109 sample import shipments were lumber--softwood, rough-sawed or surface worked, and 12 per cent of the sample import shipments were lumber--hardwood, rough-sawed or surface worked.

Wood, lumber, and cork was a relatively important commodity import according to the Great Lakes Vessel Tapes. It ranked ninth in tonnage among all Great Lakes related imports, with 56,137 tons. However, it did not rank in the top ten according to sample shipments (109) or sample value ($2,916,315).

Despite what appears to be the bulk like nature of the commodity, 51 per cent of the sample shipments were containerized on both the international and domestic legs of the journey, but these shipments represented only about 5 per cent of the sample value and 4 per cent of the sample weight. Thus, the containerized shipments are relatively small, but though small they have a value per ton of $66.39 as compared to $51.93 for the class as a whole. In the movement from port of entry to place of destination, rail accounted for 64 per cent of the sample shipments, but only 9 per cent of value and 7 per cent of weight. Trucks carried 25 per cent of the shipments, with 35 per cent of

SAR-24 (Continued)

value and 41 per cent of weight. Inland water carried only 4 per cent of the shipments but 23 per cent of value and 22 per cent of weight.

Canada (World Area 1) dominated as the origin of Great Lakes related imports of SAR-24 with more than 80 per cent of the shipments, or 89 shipments, originating there. These shipments represented 94 per cent of the class value and 96 per cent of the weight.

Of the 109 SAR-24 shipments on the Great Lakes Vessel Tapes, 108 were through the major ports. Tables 2.37 and 2.38 describe these movements. The dominant coast of import of wood, lumber, and cork imports is open to contention. In the sample, the Great Lakes reported no traffic in this commodity group. This occurred in spite of the fact that 82 per cent of the sample shipments were from Canada (World Area 1). The Great Lakes maritime trade routes were unimportant, registering only one shipment. Part of the dominance of the East Coast can be explained by a lack of delineation in the data. It is impossible to completely separate non-Great Lakes related New York and Pennsylvania from Great Lakes related territories in those two states. These two states accounted for 30 of the 41 shipments that were Great Lakes related but passed through the East Coast.

The figures in Table 2.38 partially explain the large number of sample shipments through the West Coast. The value per ton of good passing through the West Coast is

SAR-24 (Continued)

$80.28. These shipments are relatively small, averaging less than 46 tons per shipment. Thus, it may be less expensive, in terms of inventory and time costs, for these goods to pass through the West Coast and then to be shipped by rail to the Great Lakes region.

TABLE 2.37

COASTAL DISTRIBUTION OF SAR-24*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	-	(0.00)	-	(0.00)	-	(0.00)
East	41	(37.96)	2,638,989	(90.58)	52,474	(93.54)
Gulf	3	(2.78)	40,240	(1.38)	707	(1.26)
West	64	(59.26)	234,107	(8.04)	2,916	(5.20)
All Coasts	108	(100.00)	2,913,336	(100.00)	56,097	(100.00)

* Shipments through Major Ports Only.

TABLE 2.38

SHIPMENT DESCRIPTION BY COAST - SAR-24*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	-	-	-
East	64,365.59	1,279.85	50.29
Gulf	13,413.33	235.67	56.92
West	3,657.92	45.56	80.28
All Coasts	26,975.33	519.42	51.93

* Shipments through Major Ports Only.

Pulp and Waste Paper, SAR-25

SAR-25, pulp and waste paper, is a relatively narrow commodity definition. Practically all commodities that fall into the two-digit classification, including specialized chemicals, are intermediate products in the paper manufacturing process. Of the imports, 87 per cent of the sample shipments were wood pulp--sulphate and 12 per cent were wood pulp--sulphite.

Pulp and waste paper was a relatively important import. It ranked eighth among all Great Lakes related imports in both value, $10,017,064, and weight, 72,798 tons. The 111 shipments represented 2 per cent of Great Lakes related import shipments. SAR-25 did not rank among the top ten commodities by this criterion.

SAR-25 is non-bulk like and very conducive to packaging in individual lots, cases or barrels, and 83 per cent of all sample shipments, 89 per cent of value, and 89 per cent of all sample weight were packaged as such. No shipments were containerized.

Canada (World Area 1) and Northwest Europe (World Area 6) were the two main suppliers of imports of wood pulp. Canada was the source of 69 per cent of all sample shipments, 90 per cent of sample value, and 89 per cent of sample weight. Northwest Europe provided 31 per cent of all sample shipments, 10 per cent of value, and 11 per cent of weight.

SAR-25 (Continued)

Major ports moved only 74 per cent of the shipments, 82 of 111 sample shipments, a proportion somewhat smaller than recorded in other commodities. The coastwise breakdown of these movements is described below.

The Great Lakes Coast was by far the dominant coast, especially in terms of weight. This coast handled 83 per cent of the sample weight. The East Coast was the only other coast that served this import. Tables 2.39 and 2.40 provide the coastal comparison for the other criteria. But a special circumstance exists for this commodity as 26 per cent of all shipments of SAR-25 were handled by non-major ports, such as Green Bay, Wisconsin; Providence, Rhode Island; and Bridgeport, Connecticut, which are not included in this coastwise analysis.

Additionally, limitations on the separability of data in New York and Pennsylvania appears to have increased the share of Great Lakes related imports passing through the East Coast. Some movements of shipments, such as those into Massachusetts, which have their port of entry in New York were entered in as Great Lakes related. Given the statistical quirk, it appears that the Great Lakes is competitive in the import of SAR-25

TABLE 2.39

COASTAL DISTRIBUTION OF SAR-25*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	50	(60.98)	5,956,264	(81.17)	43,655	(82.51)
East	32	(39.02)	1,382,088	(18.83)	9,256	(17.49)
Gulf	-	(0.00)	-	(0.00)	-	(0.00)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	82	(100.00)	7,338,352	(100.00)	52,911	(100.00)

* Shipments through Major Ports Only.

TABLE 2.40

SHIPMENT DESCRIPTION BY COAST - SAR-25*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	119,125.28	873.10	136.44
East	43,190.25	289.25	149.32
Gulf	-	-	-
West	-	-	-
All Coasts	89,492.10	645.26	138.69

* Shipments through Major Ports Only.

Crude Fertilizers and Minerals, SAR-27

Classification SAR-27 encompasses shipments of crude fertilizers and minerals. The Great Lakes related shipments in this category fall mainly into four sub-classifications. These are sodium nitrate (13 per cent of 337 shipments), clay and other refractory materials, N.E.C. (21 per cent), sodium chloride (42 per cent), and mica, fluorspar, nepheline syenite, cryolite, and natural mineral fluxes, N.E.C. (13 per cent).

Crude fertilizers and minerals ranked second among Great Lakes related imports in terms of both number of shipments, 337, and value imported, $12,128,298. The class ranked seventh by virtue of total weight imported with 1,221,791 tons.

Bulk packaging was the classification used for 85 per cent of the shipments, comprising 85 per cent of the sample value and 93 per cent of the sample weight. Containerization was insignificant.

Canada (World Area 1) was the origin of 44 per cent of the shipments. These shipments involved 81 per cent of the weight but only 37 per cent of the value in this classification. Other origins were important if only one or two of the three characteristics; number of shipments, value or weight, is being considered. The strong differences in value to weight ratios would seem to imply that different commodities were being moved. These other World Areas are listed in Table 2.41.

SAR-27 (Continued)

Of the 337 class shipments, 286 (or 85 per cent) moved through major ports. Table 2.42 shows that the Great Lakes Coast was actually handling most of the imports of Great Lakes related crude fertilizers and minerals. The East and Gulf Coast competed for some of the traffic. The Gulf handled fewer shipments than the East, but more total value and weight. The West Coast was insignificant in this case.

Table 2.43 illustrates that though the shipments through the Great Lakes ports were large in terms of weight, they had a very low value per ton when compared to those handled by the East and Gulf Coasts. Given the difference in value per ton, it might be inferred that the coasts were actually handling different commodity mixes.

The distribution of place of destination by coast of entry for imports of crude fertilizers and minerals are illustrated in Map 10, the supporting data are in Appendix E.

TABLE 2.41

ORIGINS OF IMPORTS - SAR-27

WORLD AREA	% OF SHIPMENTS	% OF WEIGHT	% OF VALUE
Southern North America	9.79	7.07	24.79
Western South America	14.54	1.96	6.39
U. K. and Ireland	18.69	3.47	6.82
Southern Europe and the Mediterranean	2.67	3.52	13.29
Non-Mediterranean Africa	5.64	1.15	6.28

TABLE 2.42

COASTAL DISTRIBUTION OF SAR-27*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	191	(66.78)	6,803,363	(65.78)	789,808	(85.63)
East	65	(22.73)	1,307,673	(12.64)	62,609	(6.79)
Gulf	29	(10.14)	2,219,858	(21.46)	69,878	(7.58)
West	1	(0.35)	11,931	(0.12)	30	(0.00)
All Coasts	286	(100.00)	10,342,825	(100.00)	922,325	(100.00)

* Shipments through Major Ports Only.

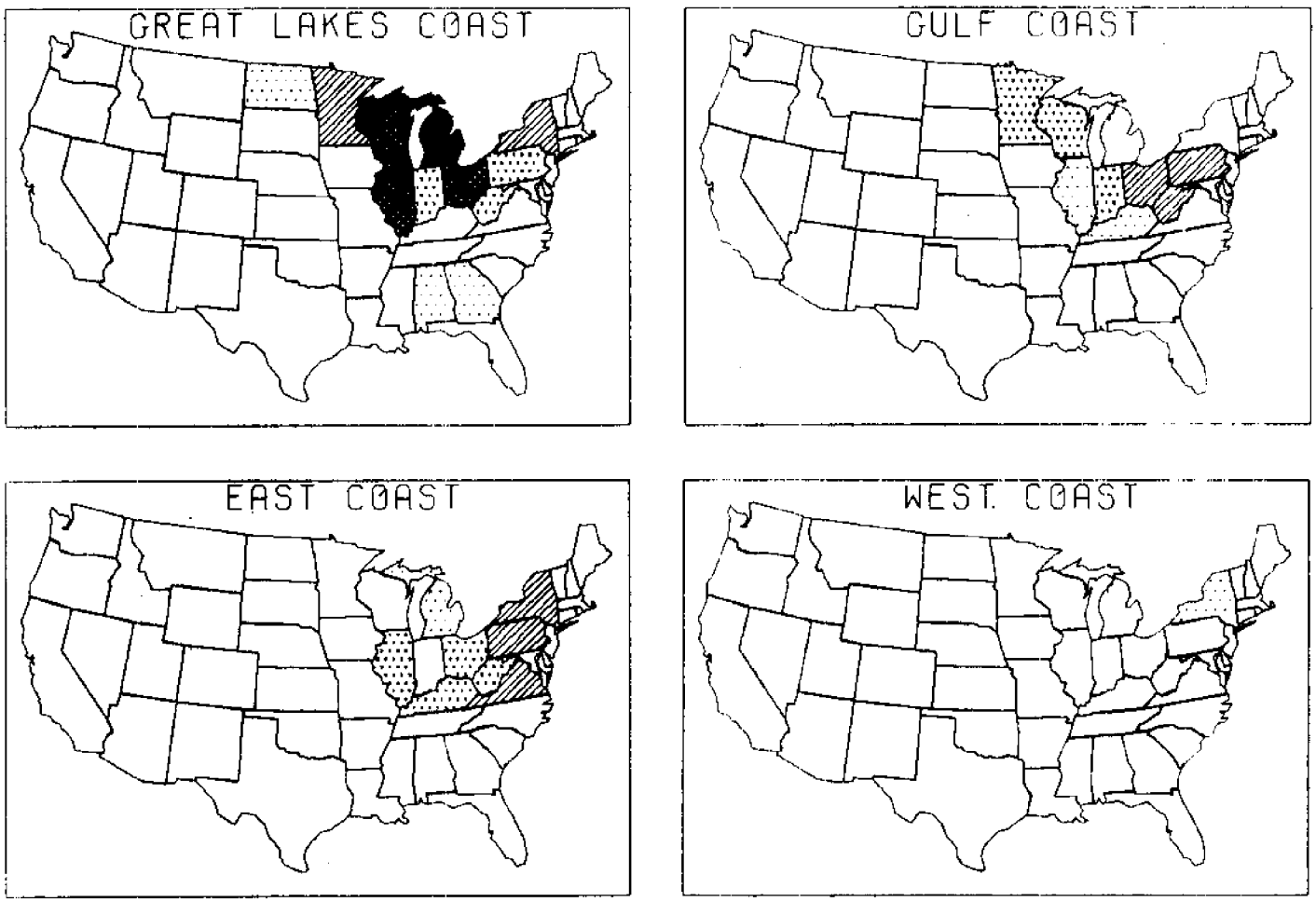
TABLE 2.43

SHIPMENT DESCRIPTION BY COAST - SAR-27*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	35,619.70	4,135.12	8.61
East	20,118.05	963.22	20.89
Gulf	76,546.83	2,409.59	31.77
West	11,931.00	30.00	397.70
All Coasts	36,163.72	3,224.91	11.21

* Shipments through Major Ports Only.

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF FERTILIZERS AND MINERALS (SAR 27)



(MAP-10)

Chemical Elements and Compounds, SAR-51

The commodity classification SAR-51 is made up of chemical elements and compounds. Organic chemicals composed 70 per cent of the Great Lakes related shipments in this category. Ammonia, sodium hydroxide, potassium hydroxide and related matter accounted for 12 per cent, while another 10 per cent contained inorganic chemicals; except elements, oxides, hydroxides, peroxides, and halogen salts.

With only ninety shipments, chemical elements and compounds ranked eighteenth on the Great Lakes Vessel Tapes by virtue of number of shipments. However, the commodity ranked third by value, $31,313,029, and third by weight, 453,377 tons.

Packaging of this commodity class was quite diversified when number of shipments is considered, but much less when the criteria are value and weight. While 39 per cent of the shipments were classified as bulk, these shipments comprised 77 per cent of the weight in the classification and 67 per cent of the value. Another 28 per cent of the shipments contained 21 per cent of the weight and 27 per cent of the value and were shipped in ships' tanks. Containers were used for 14 per cent of the shipments during the international movement. However, these shipments were less than 1 per cent of the class weight or value. Little more than half of the containerized shipments remained in containers for the domestic movement.

SAR-51 (Continued)

From port of entry to place of destination, 31 shipments traveled by rail, 25 by truck, and 26 by inland water. However, those which moved by rail comprised 82 per cent of class value and 79 per cent of weight as compared to truck with 2 per cent of value and 1 per cent of weight, and inland water with 10 per cent of value and 14 per cent of weight.

The principle World Areas of origin for chemical elements and compounds were Southern North America (World Area 2) and East Central Asia (World Area 11). The former was the origin of 28 per cent of SAR-51 shipments, 60 per cent of value, and 69 per cent of weight. The latter accounted for 27 per cent of shipments, 25 per cent of value, and 15 per cent of weight. Other major origins were Canada (World Area 1) and West-Central Europe (World Area 7).

Shipments of SAR-51 were almost exclusively handled by major ports which served 87 of the 90 shipments. As shown in Table 2.44, relatively little of this limited sample of the traffic in chemical elements and compounds came into the United States by way of the Great Lakes ports. The Gulf Coast handled the largest number of shipments and a significant portion of value and weight. The West Coast, with few shipments, received the largest percentage of both value and weight. The East Coast, though second in number of shipments, was insignificant with respect to the other two criteria.

Table 2.45 points out two interesting facts. The Great Lakes and West Coasts seem to have handled very similar

SAR-51 (Continued)

commodity mixes with respect to the value per ton measure, yet the shipments through the West Coast were about ten times larger. The East Coast, though it handled relatively small shipments, captured shipments with a very high value density.

Map 11 describes the statewide distribution of destination of SAR-51 by coast of entry. There were two shipments to the Great Lakes hinterland through Texas. It would seem likely that these shipments were among those originating in Southern North America.

TABLE 2.44

COASTAL DISTRIBUTION OF SAR-51*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	16	(18.39)	2,959,810	(9.56)	48,220	(10.72)
East	23	(26.44)	501,642	(1.62)	3,113	(0.69)
Gulf	39	(44.83)	10,185,236	(32.91)	121,241	(26.96)
West	9	(10.34)	17,299,549	(55.90)	277,165	(61.63)
All Coasts	87	(100.00)	30,946,237	(100.00)	449,739	(100.00)

* Shipments through Major Ports Only.

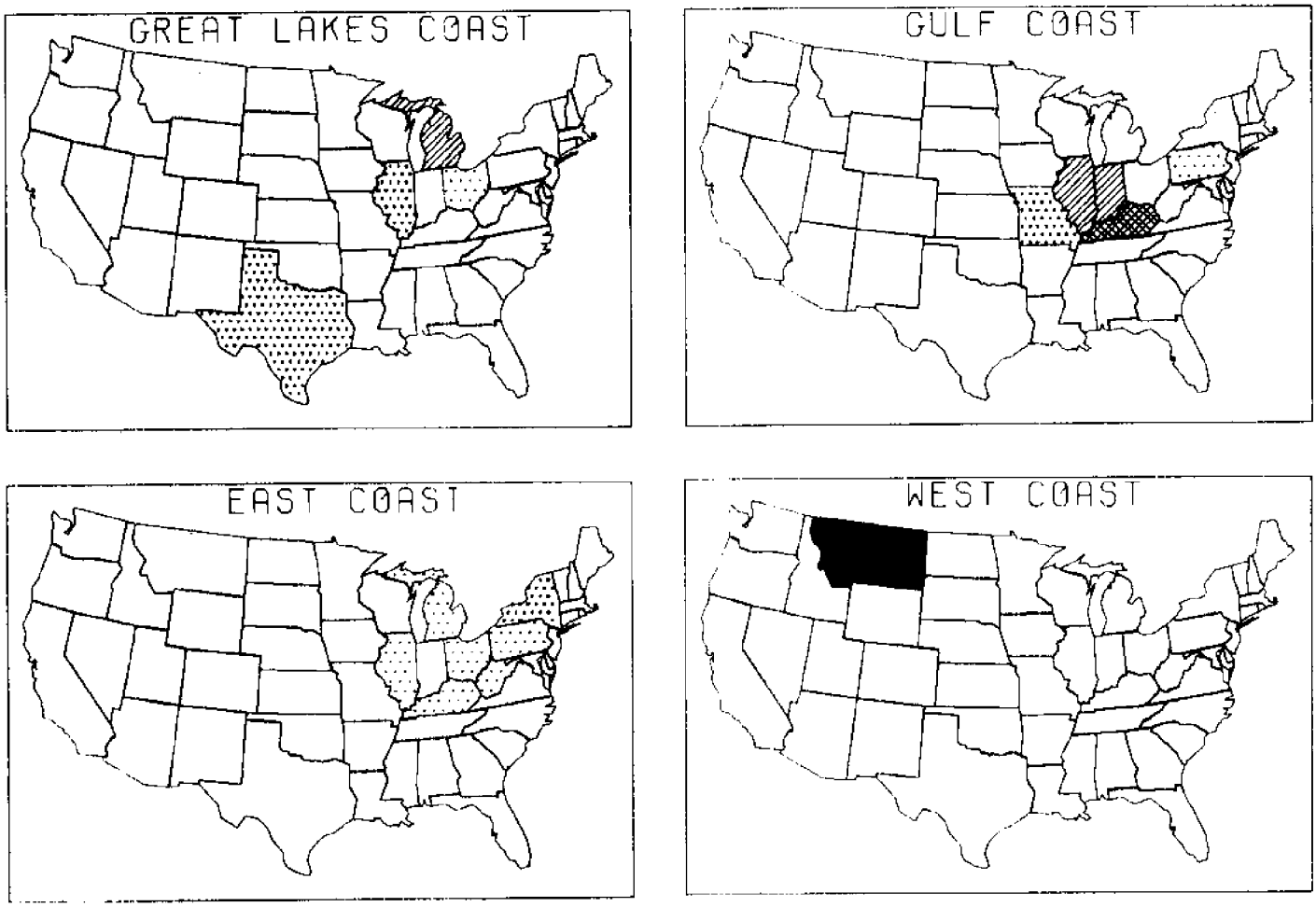
TABLE 2.45

SHIPMENT DESCRIPTION BY COAST - SAR-51*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	184,988.13	3,013.75	61.38
East	21,810.52	135.35	161.14
Gulf	261,159.90	3,108.74	84.01
West	1,922,172.11	30,796.11	62.42
All Coasts	355,703.87	5,169.41	68.81

* Shipments through Major Ports Only.

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF CHEMICALS (SAR 51)



(MAP-11)

Manufactured Fertilizers and Fertilizer Materials, SAR-56

Commodity classification SAR-56 includes manufactured fertilizer and fertilizer materials, N.E.C. Of the 34 shipments in this category on the Great Lakes Vessel Tapes, 26 per cent were potassic fertilizers and fertilizer materials; 21 per cent were nitrogenous fertilizers and fertilizer materials; and 47 per cent were other fertilizers and fertilizer materials, N.E.C.

SAR-56 ranked seventh by weight among Great Lakes related imports with 77,957 tons. Its portion of total shipments, 34, and total value ($3,068,788) were insignificant.

Two shipments of SAR-56 of the 34 on the Great Lakes Vessel Tapes traveled in reusable containers for the international movement; one of these remained in the same container for the domestic journey. These two containerized shipments had a relatively low value to weight ratio. The data shows that they held 14 per cent of the class weight but only 8 per cent of the value. Of the remaining 32 shipments, 24 (71 per cent of all shipments) were described as bulk packaged. These shipments held 85 per cent of the class weight and 91 per cent of the value.

Rail was used to move 20 of the 34 shipments (59 per cent), which accounted for only 14 per cent of the value and 18 per cent of the weight. Trucks handled 8 shipments (24 per cent) but these few shipments were surprisingly large, amounting to 62 per cent of value and 55 per cent of

SAR-56 (Continued)

weight. Only four shipments (12 per cent) moved by inland water, but these four held 21 per cent of the class value and 21 per cent of the weight.

Import shipments of manufactured fertilizers and fertilizer materials came primarily from five World Areas. No World Area completely dominated another. These five are listed in Table 2.46.

Major ports handled 30 of the total 34 shipments. Tables 2.47 and 2.48 show the movements of Great Lakes related imports through major ports by coast. The Great Lakes Coast was the entry point for very few shipments, but the shipments were very large. Both the value per shipment and weight per shipment for this coast were much higher than for the East or Gulf Coasts. The East Coast handled the majority of shipments; the shipments were relatively small and had a low value per ton.

TABLE 2.46

ORIGIN OF IMPORTS - SAR-56

Area	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Northern North America	4	(11.76)	1,548,855	(50.47)	33,382	(42.82)
Southern North America	3	(8.82)	458,988	(14.96)	11,439	(14.67)
Western South America	13	(38.24)	72,419	(2.36)	1,790	(2.30)
West Central Europe	5	(14.71)	650,335	(21.19)	18,939	(24.29)
Southern Europe & Mediterranean	7	(20.59)	327,914	(10.69)	12,196	(15.64)

TABLE 2.47

COASTAL DISTRIBUTION OF SAR-56*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	4	(13.33)	1,714,160	(55.98)	35,360	(45.46)
East	19	(63.33)	466,746	(15.24)	19,717	(25.35)
Gulf	7	(23.33)	881,129	(28.78)	22,702	(29.19)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	30	(100.00)	3,062,035	(100.00)	77,779	(100.00)

* Shipments through Major Ports Only.

TABLE 2.48

SHIPMENT DESCRIPTION BY COAST - SAR-56 *

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	428,540.00	8,840.00	48.48
East	24,565.58	1,037.74	23.67
Gulf	125,875.57	3,243.14	38.81
West	-	-	-
All Coasts	102,067.83	2,592.63	39.37

* Shipments through Major Ports Only.

Paper, Paperboard, and Manufactures Thereof, SAR-64

SAR-64, the paper, paperboard and manufactures thereof category, was one of the most important of all Great Lakes related commodity groups; ranking sixth in sample shipments, 169 shipments; second in sample value, $45,822,915; and fifth in sample weight, 331,906 tons. Within the broad two-digit classification, by far the most important sub-category was standard newsprint, accounting for over 90 per cent of all sample shipments.

The nature of newsprint makes it very conducive for bulk carriage, and 62 per cent of all sample shipments in this category were classified as bulk. These 62 per cent of shipments comprised 79 per cent of value and 80 per cent of weight. Individual lots, cases or barrels was the form of packaging of 12 per cent of the sample shipments but accounted for only 8 per cent of value and 7 per cent of weight.

From the port of entry to the place of destination, the means of transport was known for less than 65 per cent of the shipments. Truck was the predominant mode, moving 44 per cent (75 shipments) of the sample shipments, equalling 29 per cent of value and 27 per cent of weight. Rail and inland water, respectively, handled 13 per cent (22 shipments) and 5 per cent (9 shipments) of all sample shipments. Rail accounted for 4 per cent of value and 3 per cent of weight and inland water for 5 per cent of value and 5 per cent of weight.

SAR-64 (Continued)

Canada (World Area 1) was the primary source of SAR-64 imports, providing 91 per cent of sample shipments, 98 per cent of sample value and 99 per cent of sample weight.

Of 169 shipments, 150 or 89 per cent entered through major ports. The Great Lakes was by far the dominant coast in terms of paper and paperboard imports, importing 84 per cent of Great Lakes related sample shipments and almost 97 per cent of sample value and weight. Tables 2.49 and 2.50 provide a coastal analysis of this commodity movement through the major ports.

Map 12 illustrates the distribution of points of destination for imports of SAR-64. There is one map for each coast of entry. The shipments destined for Florida on the East Coast Map are some of those which were Great Lakes related only because of a maritime trade route. There was only one shipment involved in the movement through the Great Lakes into Georgia.

TABLE 2.49

COASTAL DISTRIBUTION OF SAR-64*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	126	(84.00)	41,957,492	(96.77)	304,910	(96.80)
East	9	(6.00)	639,156	(1.47)	4,000	(1.27)
Gulf	5	(3.33)	453,793	(1.05)	3,699	(1.17)
West	10	(6.67)	309,684	(0.71)	2,365	(0.75)
All Coasts	150	(100.00)	43,360,125	(100.00)	314,974	(100.00)

* Shipments through Major Ports Only.

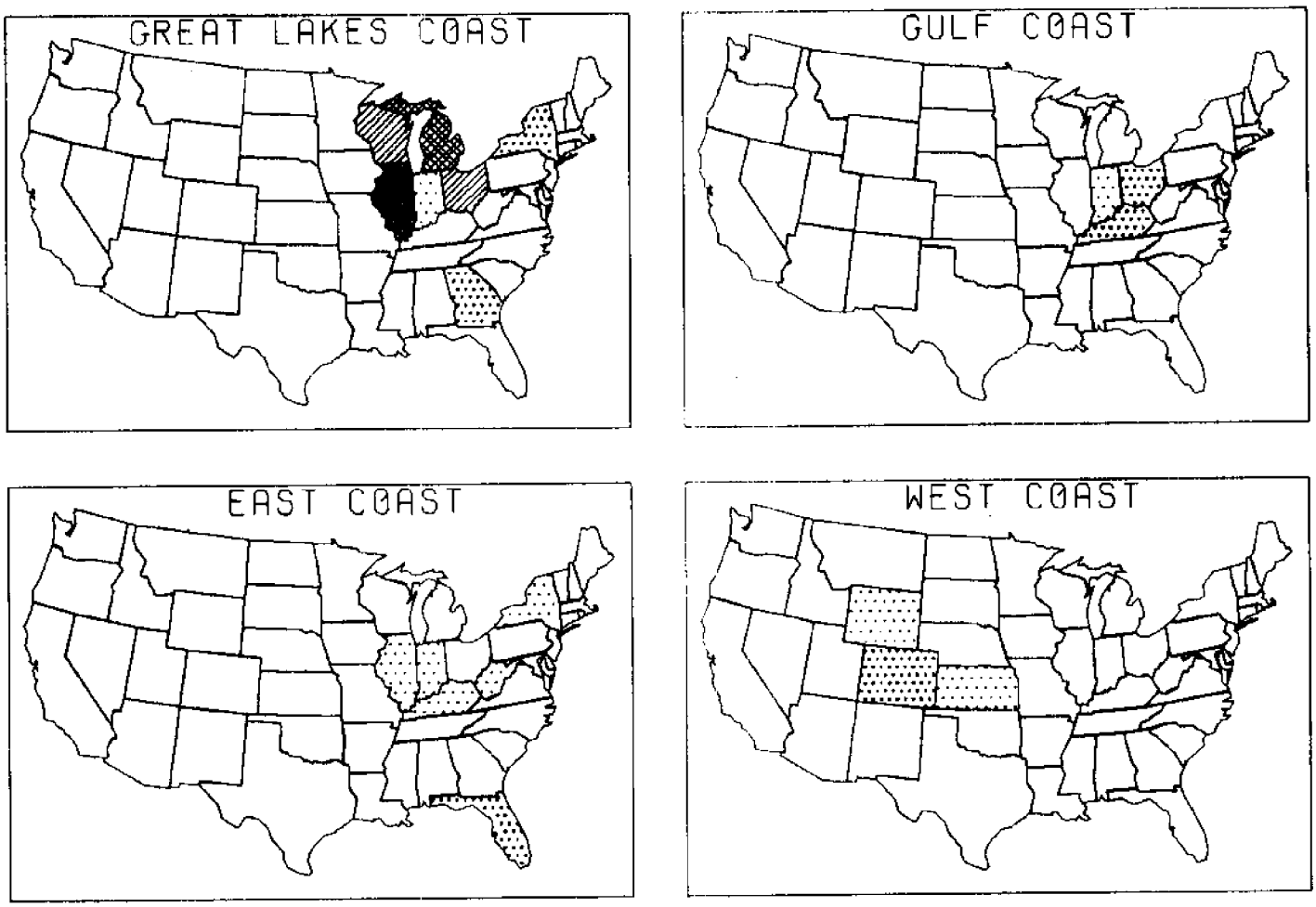
TABLE 2.50

SHIPMENT DESCRIPTION BY COAST - SAR-64*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	332,995.97	2,419.92	137.61
East	71,017.33	444.44	159.79
Gulf	90,758.60	739.80	122.68
West	30,968.40	235.50	130.94
All Coasts	289,067.50	2,099.83	137.66

* Shipments through Major Ports Only

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF PAPER AND PAPER PRODUCTS (SAR 64)



(MAP-12)

Non-Metallic Mineral Manufactures, SAR-66

Imports of non-metallic mineral manufactures are classified as SAR-66. There are 211 shipments in this category on the Great Lakes Vessel Tapes. Cement and other concrete mixes accounted for 56 per cent or 119 of these shipments. The remainder fall into several different categories. There are seventeen shipments (8 per cent) of ceramic tile and other non-refractory ceramic construction materials; nineteen shipments (9 per cent) of unworked drawn blown glass; and nineteen shipments (9 per cent) of porcelain or household chinaware.

With 211 shipments which are Great Lakes related, non-metallic mineral manufactures ranked fifth by the number of shipments. It ranked sixth by weight with 326,254 tons; however, it was only fourteenth by value, $4,148,269.

Reusable containers were used for 24 shipments (11 per cent) for the international movement. These shipments contained only 4 per cent of the class value and less than 1 per cent of the class weight. Of the containerized shipments, 13 remained in the same container for the domestic movement. Over one-half, 51 per cent of the shipments with 81 per cent of the value and 92 per cent of the weight, were classified as bulk packaged.

SAR-66 (Continued)

Air transport figured strongly as a mode of transport for moving imports of SAR-66 between port of entry and place of destination; 51 shipments (24 per cent) moved by air. These shipments held 34 per cent of value and 41 per cent of weight. Truck was still the dominant mode with respect to number of shipments moving 29 per cent (62 shipments) of the sample shipments accounting for 9 per cent of value and 1 per cent of weight. Rail moved 9 per cent (20 shipments) holding 3 per cent of value and less than 1 per cent of weight.

Imports of non-metallic mineral manufactures came primarily from Canada (World Area 1), the origin for 51 per cent of the shipments, 82 per cent of the value and 96 per cent of weight. Other major origins included West Central Europe (World Area 7), Southern Europe and the Mediterranean (World Area 8), and East Central Asia (World Area 11).

The subset of the sample entering through major ports, 207 shipments, is described by coast in Tables 2.51 and 2.52. The Great Lakes Coast ranked first by all criteria, but it handled cargo with the lowest value per ton. The East Coast was unequivocally second, managed about the same value per ton as the Great Lakes, but had much smaller shipments, both by weight and by value. The West and Gulf Coasts handled almost insignificant portions of the traffic, but had a high value per ton (especially the West Coast). The shipments through both of these coasts were relatively small.

TABLE 2.51

COASTAL DISTRIBUTION OF SAR-66*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	102	(49.28)	3,263,090	(79.44)	261,742	(81.29)
East	82	(39.61)	777,974	(18.94)	59,722	(18.55)
Gulf	6	(2.90)	20,196	(0.49)	418	(0.13)
West	17	(8.21)	46,216	(1.13)	119	(0.04)
All Coasts	207	(100.00)	4,107,476	(100.00)	322,001	(100.00)

* Shipments through Major Ports Only.

TABLE 2.52

SHIPMENT DESCRIPTION BY COAST - SAR-66*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	31,991.08	2,566.10	12.47
East	9,487.49	728.32	13.03
Gulf	3,366.00	69.67	48.32
West	2,718.59	7.00	388.37
All Coasts	19,842.88	1,555.56	12.76

* Shipments through Major Ports Only.

Iron and Steel, SAR-67

SAR-67 includes shipments of iron and steel. There were 1,717 shipments in this category which are Great Lakes related. Of these, 851 or 50 per cent were shipments of uncoated iron or steel sheets. No other sub-category made up 10 per cent or more of the sample shipments.

The 1,717 shipments of iron and steel completely dominated Great Lakes related imports. They made up 34 per cent of import shipments. The value was $165,270,188, 42 per cent of the total, and weight was 1,483,872 tons, 31 per cent of the import weight.

Containerization of SAR-67 was insignificant. Less than 1 per cent of shipments, value, or weight was containerized. Individual lots, cases or barrels was the form of packaging for 52 per cent or 899 shipments (44 per cent of value and 43 per cent of weight). In addition, 31 per cent, 529 shipments, was classified as bulk (36 per cent of value and 39 per cent of weight).

Truck was by far the dominant mode of transport from port of entry to place of destination, moving 68 per cent of shipments (1,175 shipments) representing 65 per cent of value and 65 per cent of weight. Another 239 shipments, 14 per cent, making up 17 per cent of value and 17 per cent of weight, moved by inland waters.

The origins of shipments of iron and steel were varied. West-Central Europe (World Area 7) and East Central Asia

SAR-67 (Continued)

(World Area 11) dominated. Canada (World Area 1), Southern Europe and the Mediterranean (World Area 8), United Kingdom and Ireland (World Area 5), and Non-Mediterranean Africa (World Area 12) also originated sizeable tonnages. This can be seen in Table 2.53.

Virtually all of the shipments of iron and steel moved through major ports. The coastwise breakdown is described in Tables 2.54 and 2.55, where it is shown that the Great Lakes Coast handled the greatest part of imports of iron and steel. The greatest competition came from the Gulf with the East Coast a low third. The West Coast was insignificant.

The distribution of places of destination of imports of iron and steel by coast of entry is shown in Map 13. These points were unusually dispersed in every case. The shipment coming through the West Coast to New York originated in East Central Asia, as did the shipment coming through the Gulf Coast to New York. Most of the East Coast shipments to New York and Pennsylvania are among those which are Great Lakes related only because parts of New York and Pennsylvania are defined as being in the Great Lakes hinterland.

TABLE 2.53

ORIGINS OF IMPORTS - SAR-67

World Area	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Canada	51	(2.97)	8,212,656	(4.97)	141,794	(9.56)
U.K. & Ireland	123	(7.16)	8,916,085	(5.39)	77,371	(5.21)
West Central Europe & Mediterranean	893	(52.01)	74,573,366	(45.12)	637,302	(42.95)
Southern Europe & Mediterranean	51	(2.97)	13,747,995	(8.32)	106,576	(7.18)
East Central Asia	479	(27.90)	46,181,748	(27.94)	397,283	(26.77)
Non-Mediterranean Africa	69	(4.02)	8,703,155	(5.27)	76,952	(5.19)

TABLE 2.54

COASTAL DISTRIBUTION OF SAR-67*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	1,335	(78.81)	133,271,068	(82.34)	1,198,574	(82.88)
East	83	(4.90)	3,457,976	(2.14)	18,836	(1.30)
Gulf	262	(15.47)	24,440,137	(15.10)	223,485	(15.45)
West	14	(0.83)	685,787	(0.42)	5,325	(0.37)
All Coasts	1,694	(100.00)	161,854,968	(100.00)	1,446,220	(100.00)

* Shipments thorugh Major Ports Only.

TABLE 2.55

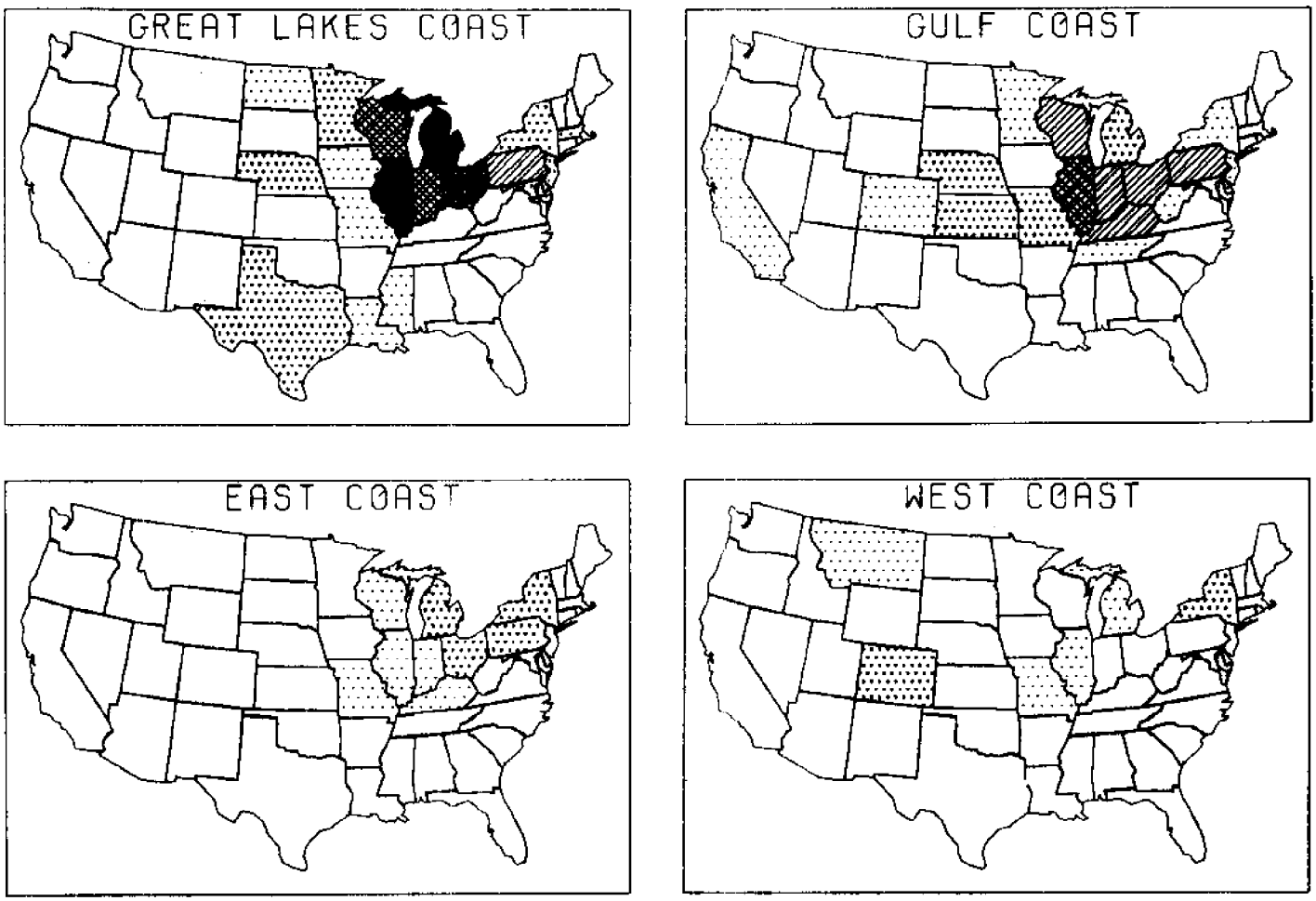
SHIPMENT DESCRIPTION BY COAST - SAR-67*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	99,828.52	897.81	111.19
East	41,662.36	226.94	183.58
Gulf	93,282.97	853.00	109.36
West	48,984.79	380.36	128.79
All Coasts	95,546.03	853.73	111.92

* Shipments through Major Ports Only.

PLACE 0F DESTINATI0N 0F GREAT LAKES RELATED IMP0RTS 0F IR0N AND STEEL (SAR 67)

II-134



(MAP-13)

Nonferrous Metals, SAR-68

SAR-68 includes imports of nonferrous metals. The sampled commodities were primarily zinc and zinc alloys (57 per cent), base metals and alloys (13 per cent), and copper and copper alloys (13 per cent).

In the sample of Great Lakes related vessel import shipments, nonferrous metals ranked twelfth in number of shipments with 126, fifth in value at $23,025,135, and twelfth in weight with 34,749 tons. Of the 126 shipments, 122 shipments valued at $22,703,170 and weighing 33,575 tons moved through the major ports.

The shipment packaging of SAR-68 varied, with 30 per cent of the shipments (17 per cent of the value and 23 per cent of the weight) being palletized; 36 per cent (41 per cent of the value and 34 per cent of the weight) in individual lots, cases or barrels; and 26 per cent (39 per cent of the value and 39 per cent of the weight) bulk loaded. Only three shipments were containerized on the international movement, while two remained containerized domestically.

Rail served as the mode of transport from port of entry to the place of destination for 57 of the sampled shipments. These 57 shipments, 45 per cent of the total, held 25 per cent of value and 46 per cent of weight. Another 52 shipments, 41 per cent of the total, moved by truck, these shipments involved 22 per cent of value and 17 per cent of weight. While only 15 shipments, 12 per cent of the

SAR-68 (Continued)

total, moved on inland water; these 15 shipments involved 52 per cent of the commodity value and 36 per cent of the weight.

Western South America (World Area 4) was the World Area of origin for 19 per cent of the shipments of SAR-68. These 24 shipments contained 58 per cent of the commodity value and 42 per cent of the weight. Another 37 shipments (29 per cent) came from West-Central Europe (World Area 7). These 37 shipments held only 11 per cent of value but 24 per cent of weight. Southeast Asia and Australia (World Area 10) accounted for 30 shipments (24 per cent), 13 per cent of value and 10 per cent of weight.

A coastal breakdown of the 122 shipments that moved through major ports, contained in Tables 2.56 and 2.57, shows that the Great Lakes Coast was competitive with the East and Gulf Coasts for handling nonferrous metals. Imports of nonferrous metals destined for the Great Lakes were of average weight per shipment, but of relatively low value per ton. Heavier and higher valued shipments moved through the Gulf Coast.

TABLE 2.56

COASTAL DISTRIBUTION OF SAR-68*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	49	(40.16)	4,966,081	(21.87)	12,208	(36.36)
East	55	(45.08)	5,657,636	(24.92)	8,814	(26.25)
Gulf	18	(14.75)	12,079,453	(53.21)	12,553	(37.39)
West	-	(0.00)	-	(0.00)	-	(0.00)
All Coasts	122	(100.00)	22,703,170	(100.00)	33,575	(100.00)

* Shipments through Major Ports Only.

TABLE 2.57

SHIPMENT DESCRIPTION BY COAST - SAR-68*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	101,348.59	249.14	406.79
East	102,866.11	160.25	641.89
Gulf	671,080.72	697.39	962.28
West	-	-	-
All Coasts	185,091.56	275.21	672.10

* Shipments through Major Ports Only.

Non-Electric Machinery, SAR-71

SAR-71 classifies imports of non-electric machinery. The sampled commodity shipments were primarily power generating machinery, except electrical (15 per cent of the shipments), machinery and appliances and machine parts, N.E.C. (48 per cent), and metalworking machinery (11 per cent).

SAR-71 ranked eighth in number of shipments (139), eleventh in value ($7,298,836), and tenth in weight (38,860 tons) when compared with the other import commodity classifications. Of the 139 shipments, 137 shipments valued at $6,296,411 and weighing 38,036 tons moved through the major ports.

SAR-71 was highly containerized, as 41 per cent of the total shipments (34 per cent of value and 49 per cent of weight) moved in a reusable container in the international movement. Of the total shipments, 27 per cent (27 per cent of the value and 48 per cent of the weight) moved in the same container for U.S. domestic movement. Of the shipments in this class, 42 per cent (58 per cent of the value and 45 per cent of the weight) were loaded as individual lots, cases or barrels. The packaging item for over 50 per cent of the shipments was blank.

From port of entry to place of destination, rail moved 30 per cent of the shipments (38 per cent of the value and 50 per cent of the weight); 61 per cent of the shipments (38 per cent of the value and 45 per cent of the weight)

SAR-71 (Continued)

traveled by truck; 4 per cent of the shipments (20 per cent of the value and 4 per cent of the weight) moved by inland waters.

Much of SAR-71 was imported from Europe. The United Kingdom and Ireland (World Area 5) was the World Area of origin for 20 per cent of the shipments (16 per cent of the value and 4 per cent of the weight); 27 per cent of the shipments (42 per cent of the value and 8 per cent of the weight) came from West-Central Europe (World Area 7); and 11 per cent of the shipments (6 per cent of the value and 57 per cent of the weight) originated in Southern Europe and the Mediterranean (World Area 8). In addition, 31 per cent of the shipments (25 per cent of the value and 28 per cent of the weight) came from East Central Asia (World Area 11). The disparities in the percentages of values and weight originating in the various World Areas would seem to indicate the different sub-classifications that were originating in each area. U.S. flag ships accounted for 97 per cent of the shipments (96 per cent of the value and 99 per cent of the weight).

As can be seen in Tables 2.58 and 2.59, which describe the 137 shipments through the major ports, the East Coast clearly dominated for imports of non-electrical machinery. This is to be expected, both because of the large degree of containerization and the predominance of European origins. The Great Lakes Coast attracted shipments of

SAR-71 (Continued)

high value density, which is contradictive to the experience of many other commodity groups that have been analyzed in this section.

TABLE 2.58

COASTAL DISTRIBUTION OF SAR-71*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	25	(18.25)	1,591,649	(25.28)	5,661	(14.88)
East	88	(64.23)	3,817,287	(60.63)	24,406	(64.17)
Gulf	7	(5.11)	431,025	(6.85)	3,238	(8.51)
West	17	(12.41	456,450	(7.25)	4,731	(12.44)
All Coasts	137	(100.00)	6,296,411	(100.00)	38,036	(100.00)

* Shipments through Major Ports Only.

TABLE 2.59

SHIPMENT DESCRIPTION BY COAST - SAR-71*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	63,665.96	226.44	281.16
East	43,378.26	277.34	156.41
Gulf	61,575.00	462.57	133.11
West	26,850.00	278.29	96.48
All Coasts	45,959.20	277.64	165.54

* Shipments through Major Ports Only.

Transport Equipment, SAR-73

SAR-73 represents imports of transport equipment. According to the Great Lakes Vessel Tapes, 59 per cent of all sample shipments were passenger motor vehicles, 20 per cent of the sample shipments were motor vehicles and tractor parts and accessories, and 11 per cent of the sample shipments were pleasure boats, floating structures and parts. Transport equipment is generally a finished product, ready for use or assembly on arrival.

SAR-73, transport equipment, represented one of the largest commodity group movements, ranking fourth in sample shipments (215), fourth in sample value ($29,218,398), and tenth in sample weight (43,803 tons).

For the international movement, reusable containers were used for 44 shipments (20 per cent of the total). Of these, only 21 remained containerized domestically. Over half of the shipments of SAR-73, 127 shipments or 59 per cent (89 per cent of value and 51 per cent of weight) moved in individual lots, cases or barrels. Bulk was the classification for 11 per cent of shipments (4 per cent of value and 5 per cent of weight).

Truck moved 129 shipments (60 per cent of shipments, 73 per cent of value and 48 per cent of weight), and rail moved 72 shipments (33 per cent of shipments, 25 per cent of value and 14 per cent of weight) from port of entry to place of destination.

SAR-73 (Continued)

Most of the transport equipment was imported from two major World Areas. West-Central Europe (World Area 7) provided 40 per cent of sample shipments (78 per cent of the sample value and 41 per cent of the sample weight), and East Central Asia (Japan) (World Area 11) provided 48 per cent of the sample shipments (20 per cent of the sample value and 57 per cent of the sample weight).

Major ports handled 210 of the 215 shipments of SAR-73. Tables 2.60 and 2.61 describe these imports by coast. No coast clearly dominated in the importation of transport equipment that is Great Lakes related. In fact, the most surprising feature is that the Great Lakes Coast was as competitive as it was, given the sources of the imports--West-Central Europe and Japan. The Great Lakes was not handling only the low value cargo in the transport equipment two-digit category.

The average value per ton through the Great Lakes Coast was very similar to the values per ton of the East and Gulf Coasts, as indicated in Table 2.61. But a curious situation exists with respect to the West Coast. The value per ton on import SAR-73 through the West Coast was $35.08. This is approximately 30 times less than the average value per ton through the other coasts. The cause of this dilemma is 14 shipments passing through the West Coast to Illinois with a value of $183,912 and weighing 13,198 tons. This movement averages to approximately $14.00 per ton. One would expect that such a low value shipment would come in directly through

SAR-73 (Continued)

the Great Lakes Coast since, because of the low value, inventory cost would be minimal and the time factor not very important. But all 14 shipments may have come from East Central Asia, in which case entrance through the West Coast would be considered natural.

Map 14 shows the large dispersion of points of destination for imports of SAR-73 for each coast. This mapping technique portrays well the large amount of competition between coasts for Great Lakes related transport equipment imports.

TABLE 2.60

COASTAL DISTRIBUTION OF SAR-73*

Coast	No. of Sample Shipments	(%)	Sample Value (Dollars)	(%)	Sample Weight (Tons)	(%)
Great Lakes	44	(20.95)	11,596,526	(39.84)	10,500	(26.06)
East	86	(40.95)	10,901,551	(37.45)	9,087	(22.55)
Gulf	43	(20.48)	6,078,599	(20.88)	5,464	(13.56)
West	37	(17.62)	534,571	(1.84)	15,238	(37.82)
All Coasts	210	(100.00)	29,111,247	(100.00)	40,289	(100.00)

* Shipments through Major Ports Only.

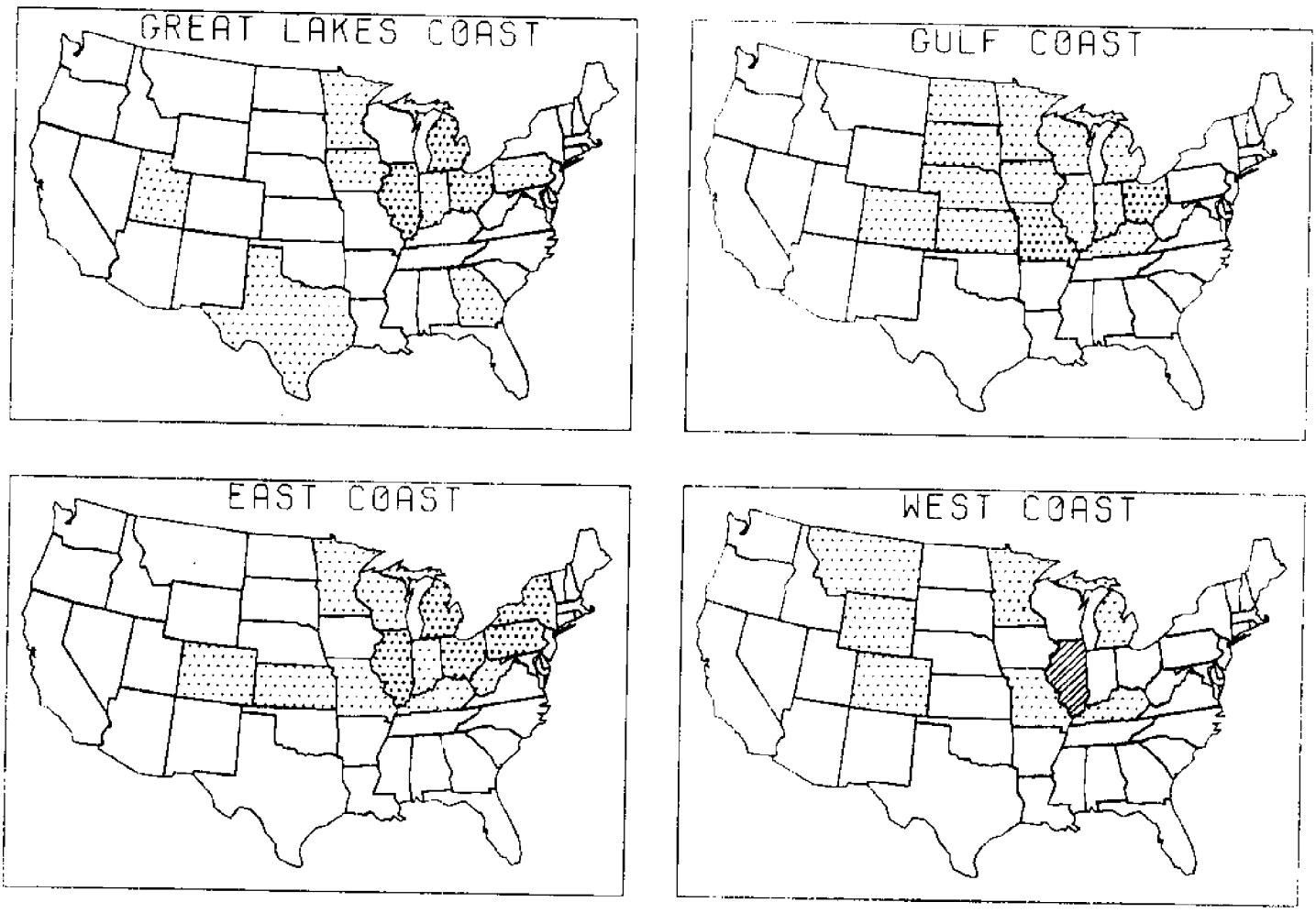
TABLE 2.61

SHIPMENT DESCRIPTION BY COAST - SAR-73*

Coast	Value/Shipment ($)	Weight/Shipment (Tons)	Value/Ton ($/Ton)
Great Lakes	263,557.41	238.64	1,104.43
East	126,762.22	105.66	1,199.69
Gulf	141,362.77	127.07	1,112.48
West	14,447.86	411.84	35.08
All Coasts	138,624.98	191.85	722.56

* Shipments through Major Ports Only.

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF TRANSPORT EQUIPMENT (SAR 73)



(MAP-14)

Summary and Conclusions

Tables 2.62 and 2.63 summarize the coastal destinations of Great Lakes related shipments for the thirteen export commodities and the fifteen import commodities previously treated.

For exports, the Great Lakes Coast was truly dominant only in the cases of Crude Fertilizers and Minerals (SBR-27) and Metalliferous Ores and Metal Scrap (SBR-28). For SBR-27, Canada (World Area 1) attracted over 60 per cent of the exported weight. However, the Great Lakes did not do so well with respect to the other commodities for which Canada was the major destination. These were Petroleum and Petroleum Products (SBR-33) and Manufactured Fertilizers and Fertilizer Materials (SBR-56).

The shipments of SBR-28 were generated very close to the major Great Lakes ports as shown in Map 6. If this was the reason for the use of the Great Lakes Coast, we would have expected SBR-67, Iron and Steel, to be more strongly held to that coast. That it was rather the Gulf Coast through which our sample shipments of this commodity moved is beyond the explanatory power of this data.

For imports, the Great Lakes overwhelmingly dominated in serving five of the fifteen commodities. These five are Pulp and Waste Paper (SAR-25), Crude Fertilizers and Minerals (SAR-27), Paper, Paperboard and Manufactures Thereof (SAR-64), Non-Metallic Mineral Manufactures (SAR-66), and Iron and Steel (SAR-67).

Canada (World Area 1) was the dominant World Area of origin for all of these except Iron and Steel. Canada also figured very strongly as an origin for Manufactured Fertilizers and Fertilizer Materials (SAR-56), though not so overwhelming. This was the other commodity for which the Great Lakes Coast had a strong attraction.

The commodities mentioned above were the only ones for which Canada was the primary origin with the exception of Wood, Lumber, and Cork (SAR-24). This is a very interesting commodity. Many of the shipments of SAR-24 (51 per cent) were containerized, but these shipments represented only 5 per cent of the sample value and 3 per cent of the sample weight. Also, it is questionable whether all of the shipments of SAR-24 listed are really Great Lakes related since 30 of 41 shipments passing through the East Coast are destined for New York or Pennsylvania (See Appendix B).

Iron and Steel (SAR-67) imports seem to have been drawn to the Great Lakes Coast not by its origin so much as by destination. Map 13 shows that the destination of iron and steel fell most heavily in Illinois and Michigan.

TABLE 2.62

WEIGHT AND PER CENT OF TOTAL WEIGHT OF GREAT LAKES RELATED EXPORTS THROUGH INDIVIDUAL COASTS

(In Thousands of Tons)

COMMODITY (SBR)	Great Lakes		East		Gulf		West	
	Weight	%	Weight	%	Weight	%	Weight	%
Cereals & Cereal Preparations (04)	65	14.96	22	5.16	333	76.85	13	3.03
Feeding-Stuff for Animals (08)	564	28.02	457	22.73	986	49.03	1	0.07
Miscellaneous Food Preparations (09)	24	44.65	3	6.42	26	47.66	1	1.28
Crude Fertilizers & Minerals (27)	447	87.99	11	2.09	45	8.78	6	1.15
Metalliferous Ores & Metal Scrap (28)	802	59.47	395	29.29	152	11.24	-	0.00
Petroleum & Petroleum Products (33)	296	48.76	85	13.96	214	35.24	12	2.04
Animal Oils & Fats (41)	20	42.47	6	12.01	19	40.27	2	5.15
Fixed Vegetable Oils & Fats (42)	1	0.88	*	0.09	167	99.03	-	0.00
Chemical Elements & Compounds (51)	8	20.63	9	23.30	23	55.87	*	0.19
Manufactured Fertilizers & Fertilizer Materials (56)	5	20.17	2	7.76	17	72.07	-	0.00

TABLE 2.62 (Continued)

WEIGHT AND PER CENT OF TOTAL WEIGHT OF GREAT LAKES

RELATED EXPORTS THROUGH INDIVIDUAL COASTS

(In Thousands of Tons)

COMMODITY (SBR)	Great Lakes		East		Gulf		West	
	Weight	%	Weight	%	Weight	%	Weight	%
Iron and Steel (67)	786	31.95	225	9.17	1,447	58.88	-	0.00
Non-Electric Machinery (71)	1	6.66	10	66.60	2	15.48	2	11.26
Transport Equipment (73)	*	4.08	3	61.11	1	20.29	1	14.52

* Significantly less than one thousand tons, but non-zero

TABLE 3.63

WEIGHT AND PER CENT OF TOTAL WEIGHT OF GREAT LAKES

RELATED IMPORTS THROUGH INDIVIDUAL COASTS

(In Thousands of Tons)

COMMODITY (SAR)	Great Lakes		East		Gulf		West	
	Weight	%	Weight	%	Weight	%	Weight	%
Fruits and Vegetables (05)	1	13.43	6	63.87	1	10.46	1	12.24
Sugar, Sugar Preparations and Honey (06)	9	2.29	177	43.83	218	53.88	-	0.00
Coffee, Cocoa, Tea, Spices and Manufactures Thereof (07)	4	14.49	17	67.07	4	16.14	1	2.30
Crude Rubber (23)	2	16.76	7	59.92	1	9.96	1	13.36
Wood, Lumber and Cork (24)	-	0.00	52	93.54	1	1.26	3	5.20
Pulp and Waste Paper (25)	44	82.51	9	17.49	-	0.00	-	0.00
Crude Fertilizer & Minerals (27)	790	85.63	63	6.79	70	7.58	*	0.00
Chemical Elements and Compounds (51)	48	10.72	3	0.69	121	26.96	277	61.63
Manufactured Ferlizers and Fertilizer Material (56)	35	45.46	20	25.35	23	29.19	-	0.00
Paper, Paperboard and Manufactures Thereof (64)	305	96.80	4	1.27	4	1.17	2	0.75
Non-Metallic Mineral Manufactures (66)	282	81.29	60	18.55	*	0.13	*	0.04

TABLE 2.63 (Continued)

WEIGHT AND PER CENT OF TOTAL WEIGHT OF GREAT LAKES

RELATED IMPORTS THROUGH INDIVIDUAL COASTS

(In Thousands of Tons)

COMMODITY (SAR)	Great Lakes		East		Gulf		West	
	Weight	%	Weight	%	Weight	%	Weight	%
Iron and Steel (67)	1,199	82.88	19	1.30	223	15.45	5	0.37
Nonferrous Metals (68)	12	36.36	9	26.25	13	37.39	-	0.00
Non-Electric Machinery (71)	6	14.88	24	64.17	3	8.51	5	12.44
Transport Equipment (73)	10	26.06	9	22.55	5	13.56	15	37.82

* Significantly less than one thousand tons, but non-zero

CHAPTER III

PORT ANALYSIS

Introduction

Data from the public use tapes entitled Domestic and International Transportation of U.S. Foreign Trade: 1970 were used to analyze traffic flows through individual Great Lakes ports in order to determine the specific hinterlands served by each port. In addition, these analyses provide insight into the extent of interport competition among Great Lakes ports as well as the extent of the effective hinterland served by the ports collectively. Recall that the sample contained on these tapes was designed in a manner that biased its contents in favor of large shipments. The nature of this bias prohibits statistical inference to the population of all shipments. Therefore, the reader is reminded that all analyses are applicable only to the sample and that conclusions based upon these analyses are commensurately restricted. Also, note that all percentages in the text are rounded off and that additional detail is found in the various referenced tables and appendices.

The decision was made to study only the major Great Lakes ports because to include all of the ports of the Great Lakes would be a lengthy undertaking, and the additional knowledge gained would not warrant the extra

expenditure. Also, smaller ports are not uniquely identifiable on the tapes. A port was selected if the number of its export plus import sample shipments totalled at least 100. These ports were considered major ports. This criterion resulted in the selection of six ports: Chicago, Cleveland, Detroit, Duluth, Milwaukee and Toledo. The balance of this chapter is limited to a discussion of these selected ports.

For these six ports, a detailed analysis of both exports and imports was conducted. Topics discussed include major commodities of individual ports by the three criteria: number of shipments, value, and weight. Appendix K contains twelve tables that summarize these data, one for exports and one for imports for each of the six selected ports. Each contains a tabulation of the number, weight, and value of sampled shipments with corresponding percentages by commodity moving through the port during 1970.

Maps were generated for each port to depict its hinterland. The supporting data for the maps were then further analyzed to determine which states were actually served to an extent that justifies their inclusion in a port's effective hinterland. Consideration of World Area, i.e., the source of imports and destination of exports, completes the analysis of interport competition and the effective Great Lakes Coast hinterland. This hinterland

description hopefully provides information about the potential sources of growth for Great Lakes ports, information which is essential if they are to collectively improve their competitive position with respect to the other three major coasts.

Exports

General Observations

Table 3.1 below shows that the six Great Lakes ports can be placed into two very general categories by the key measure, weight -- with Chicago and Detroit classified as large, while the rest are classified as small. Chicago and Detroit jointly accounted for nearly 75 per cent of the sample weight exported. Duluth, the third ranked port, was a distant third accounting for only 8 per cent of the sample weight. Although the absolute size of the gap between the first and second ranked ports was essentially the same as that between the second and third ranked ports, the magnitude of the relative weights warrants the two-category classification.

TABLE 3.1

MAJOR GREAT LAKES PORTS RANKED BY EXPORT TONNAGE

Rank	Port	Weight (Short Tons)	Per cent of Sample
1	Chicago	1,392,242	47.45
2	Detroit	794,049	27.06
3	Duluth	239,407	8.16
4	Cleveland	201,106	6.85
5	Milwaukee	182,082	6.21
6	Toledo	125,443	4.28
	TOTAL	2,934,329	100.00

It was determined from the six export tables in Appendix K that 29 commodity groups were exported through these six Great Lakes ports during 1970. However, it is of interest to note that only five of these commodities accounted for over 95 per cent of the total sample weight exported through those six ports as detailed in Table 3.2.

TABLE 3.2

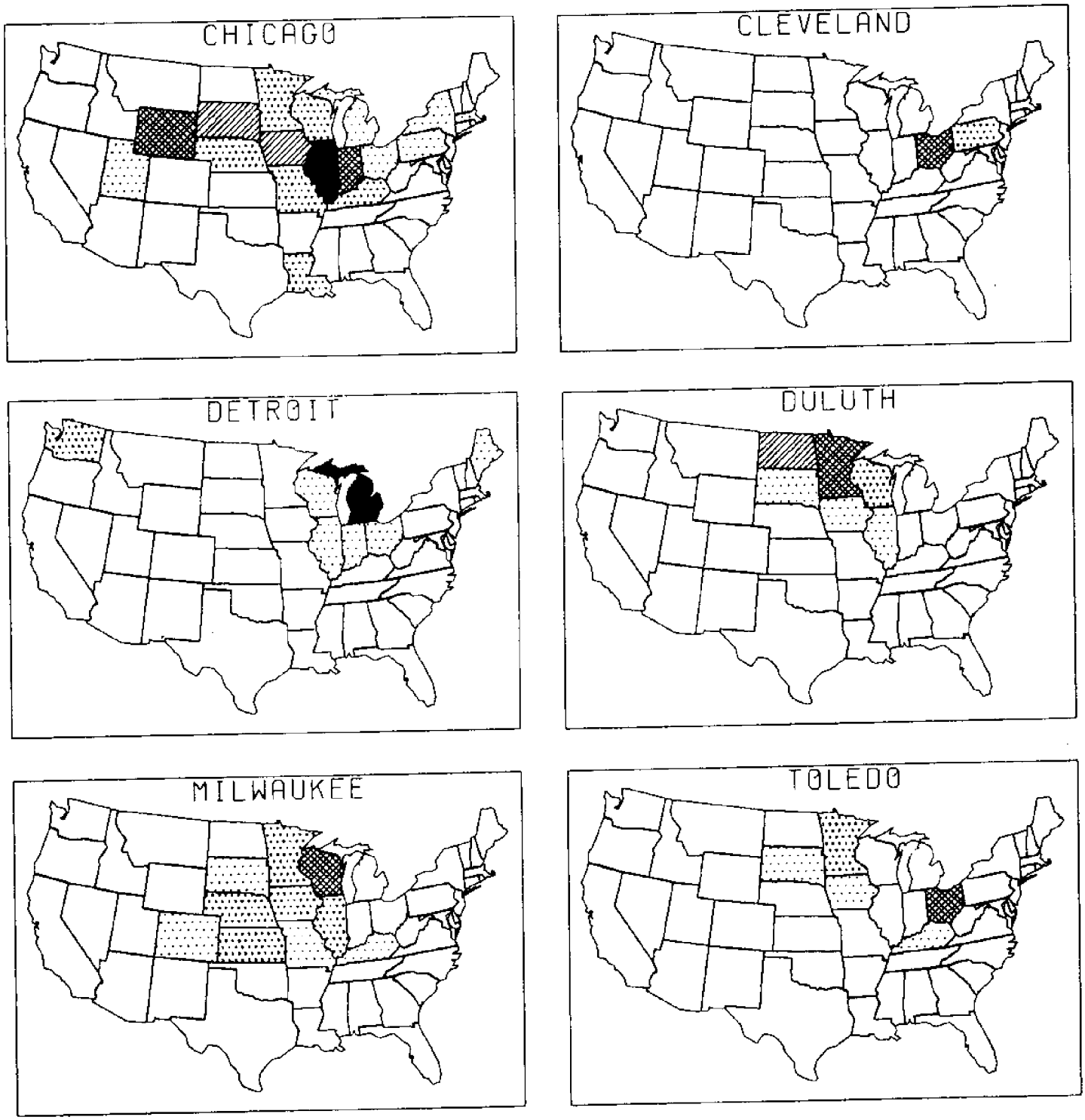
IMPORTANT GREAT LAKES EXPORT COMMODITIES BY WEIGHT

SBR	Description	Percentage of Sample Weight
28	Metalliferous ores & metal scrap	26.09%
67	Iron & steel	24.83
8	Feeding-Stuff for animals	19.21%
27	Crude fertilizers & minerals	15.22%
33	Petroleum & petroleum products	9.94%
	TOTAL	95.29%

The individual port analyses below indicate that the degree of commodity dominance was significantly more pronounced at each port with the exception of Chicago.

The six maps in Map 15 depict the export hinterlands served by the six major Great Lakes ports as described by the limited sample available. Recall that place of acquisition has been selected as the means of defining the hinterland for export movement. These maps are based on the total sample tonnage exported through a given port, i.e., they depict the aggregate hinterland of all commodities for that port. Taken together, the hinterlands for the six major ports generated over 97 per cent of the sample tonnage exported through the Great Lakes Coast as defined in Appendix C.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS THROUGH GREAT LAKES PORTS



(MAP-15)

One measure of the hinterland served by a given port is simply the number of states served, i.e., the shaded states on each map. Applying this criterion results in the following ranking.

TABLE 3.3

MAJOR GREAT LAKES PORTS RANKED BY NUMBER OF STATES SERVED - EXPORTS

Rank	Port	Number of States Served
1	Chicago	17
2	Milwaukee	10
3	Detroit	7
4	Duluth	6
5	Toledo	5
6	Cleveland	2

This ranking is in contrast to that obtained when ranking by the key factor of weight since only Chicago retains the same position.

A review of the maps indicates that each hinterland was dominated by the state in which the port is located. The extent of this dominance is quantified by determining the percentage of the sample weight exported through each port that had the same state as the place of acquisition. These percentages are presented in Table 3.4. It can be seen that only Chicago and Milwaukee obtained less than 90 per cent of the sample export tonnage from their respective

TABLE 3.4

MEASURE OF HOME STATE DOMINANCE - EXPORTS

Port	Home State	Percentage of Port's Sample Export Tonnage From Home State	Percentage From All Other States Excluding Foreign Country
Chicago	Illinois	59.64	31.57
Cleveland	Ohio	93.05	3.11
Detroit	Michigan	93.48	0.18
Duluth	Minnesota	90.16	9.76
Milwaukee	Wisconsin	83.17	10.60
Toledo	Ohio	98.79	1.15

home states. This large degree of dominance raises the question of the significance of the hinterlands depicted in the maps. Table 3.5 contains summary information on those states in the hinterland that individually accounted for less than 1 per cent of the port's sample tonnage. From this table, it is clear that the majority of states in the various ports' hinterlands were insignificant.

TABLE 3.5

EXPORT HINTERLAND PARTICIPATION

Port	Number of States in Hinterland	Number of States Contributing Less Than 1%	Aggregate Contribution of These States
Chicago	17	12	1.37%
Cleveland	2	0	-
Detroit	7	6	.17%
Duluth	6	3	.44%
Milwaukee	10	5	1.33%
Toledo	5	3	.11%

Chicago

Among the six Great Lakes ports, Chicago ranked first regardless of which of the three measures is employed: number of shipments, value, or weight. Along with Detroit, it had the greatest variety of commodities (17). Most of the commodities being exported through Chicago were insignificant with respect to weight. The aggregate weight of ten of the seventeen commodities accounted for less than 1 per cent of the sample weight. There was not a single clearly dominant commodity contrary to the pattern which existed at the five other ports. As seen in Table 3.6, five commodities are required to account for at least 90 per cent of the total sample weight.

Table 3.24 shows that West-Central Europe (World Area 7) was the most common destination of Chicago's sample export tonnage, receiving 42 per cent. Canada (World Area 1) received almost 22 per cent of Chicago's sample export tonnage and the United Kingdom and Ireland (World Area 5) received less than 18 per cent. Chicago's top ranking is emphasized in Table 3.25 where it is shown that Chicago dominated the sample tonnage to World Area 5 and World Area 7. This port also ranked first in sample tonnage to World Area 1.

Map 15 indicates that three states - Louisiana, Massachusetts and Utah - which appeared in Chicago's hinterland fall outside the Corps definition used as a benchmark throughout this study. The three "outside"

TABLE 3.6

PORT OF CHICAGO

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
8	Feeding-stuff for animals	36.45 (1)	28.19 (2)	28.16 (1)
67	Iron & steel	13.71 (2)	42.24 (1)	27.11 (2)
27	Crude fertilizers & minerals	9.70 (4)	5.01 (4)	17.88 (3)
28	Metalliferous ores & metal scrap	11.04 (3)	14.41 (3)	13.94 (4)
33	Petroleum & petroleum products	5.35 (7)	2.34 (6)	9.97 (5)
	TOTAL	76.25	92.19	97.06

states jointly accounted for well under 1 per cent of the port's sample export tonnage.

The World Area of destination for these shipments can be determined from the World Area matrix for Chicago that appears in Appendix J. A review of the World Area matrix indicates that a single shipment exported through Chicago had Louisiana as its place of acquisition and was destined for Southeast Asia (World Area 10). No explanation is immediately obvious for such a pattern of movement. Similarly, no explanation can be given for the single shipment exported through Chicago which was acquired in Massachusetts and destined for the Southern Europe and Mediterranean area (World Area 8). There were three shipments exported through Chicago that had Utah as a place of acquisition, but two of these were destined for West-Central Europe (World Area 7) and one for the United Kingdom and Ireland (World Area 5). This pattern of movement is clearly reasonable as one alternative to those World Areas.

Cleveland

Although Cleveland did not handle the most iron and steel (SBR-67) of the six Great Lakes ports, it was the most dominated by that commodity group. Iron and steel ranked first by all three measures with its weight accounting for 70 per cent. This is more than three

times the weight of the second ranked commodity, fertilizers and minerals (SBR-27). As seen in Table 3.7, it takes only three of the eight commodities to account for nearly 97 per cent of the sample weight.

Table 3.24 reveals that West-Central Europe (World Area 7) was the destination of 37 per cent of Cleveland's sample export tonnage. Canada (World Area 1) ranked second and the United Kingdom and Ireland (World Area 5) ranked third with over 26 per cent and 22 per cent respectively. A fourth significant World Area, Southern Europe and the Mediterranean (World Area 8) accounted for less than 14 per cent. Thus, virtually all of Cleveland's sample export tonnage went to those four World Areas.

Detroit

Detroit ranked second among the six Great Lakes ports in terms of weight of shipments and first along with Chicago in variety of commodities (17). Again, a few commodities completely dominated by all three measures with metalliferous ores and metal scrap (SBR-28) consistently ranked first. In a situation similar to that of the port of Chicago, eleven of the seventeen commodities had an aggregate weight of less than 1 per cent of the sample weight. In this case, the four dominant commodities accounted for over 97 per cent of the sample weight, as shown in Table 3.8.

TABLE 3.7

PORT OF CLEVELAND

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
67	Iron & steel	61.11 (1)	95.56 (1)	70.22 (1)
27	Crude fertilizers & minerals	11.11 (2)	1.55 (2)	20.68 (2)
33	Petroleum & petroleum products	5.56 (4)	0.63 (4)	5.70 (3)
	TOTAL	77.78	97.74	96.60

TABLE 3.8

PORT OF DETROIT

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
28	Metalliferous ores & metal scrap	32.48 (1)	44.16 (1)	43.14 (1)
67	Iron & steel	16.56 (2)	41.41 (2)	26.45 (2)
27	Crude fertilizers & minerals	13.38 (3)	2.47 (4)	19.61 (3)
33	Petroleum & petroleum products	7.64 (4)	4.78 (3)	8.41 (4)
	TOTAL	70.06	92.82	97.61

Each of five World Areas was the destination for over 10 per cent of the sample export tonnage from Detroit. Table 3.24 reveals that these five destinations jointly accounted for nearly 95 per cent of Detroit's sample export tonnage. Canada (World Area 1) was the most common destination with almost 30 per cent, and Southern Europe and the Mediterranean (World Area 8) countries accounted for over 20 per cent.

From Map 15, it can be seen that Maine and Washington appear in Detroit's hinterland. However, these two "outside" states jointly accounted for only slightly more than 0.1 per cent of the port's sample export tonnage. From the World Area matrix for Detroit in Appendix J, it can be seen that a single shipment exported through Detroit had Maine as a place of acquisition and was destined for the United Kingdom and Ireland (World Area 5). Again, no explanation is immediately obvious. The World Area of destination for the shipment acquired in Washington and exported through Detroit was Southeast Asia (World Area 10). Although aberrations from the normal patterns of movement are to be expected in a sample size as large as that dealt with in this study, a movement as indirect as the latter one above raises the question of the accuracy of the recorded data. Given the incidence of errors known to exist in other specific items of information on the tapes (as mentioned elsewhere in this study), the possibility cannot be dismissed in this instance.

Duluth

Duluth ranked third among the six Great Lakes ports in terms of weight, but it was a distant third to the ports of Chicago and Detroit. Feeding-stuff for animals (SBR-8) was the dominant commodity in all three measures. Three of eight of the exported commodities accounted over over 94 per cent of the total weight as shown in Table 3.9.

West-Central Europe (World Area 7) dominated the destinations of Duluth's sample export tonnage. According to Table 3.24, over 58 per cent of the sample tonnage was destined there. East-Central Asia (World Area 11) ranked a distant second accounting for about 20 per cent.

Milwaukee

Although Milwaukee was a relatively small port in terms of sample weight, ranking fifth among the six Great Lakes ports considered, it handled a variety (14) of commodities nearly rivaling that of the larger ports of Chicago and Detroit. Nevertheless, one commodity group, metalliferous ores and metal scrap (SBR-28), overwhelmingly dominated Milwaukee's exports. This commodity accounted for almost 74 per cent of the sample weight but for less than 20 per cent of the sample shipments. This distribution represents the most evident single commodity dominance among the Great Lakes ports. Not surprisingly, as shown in Table 3.10, the three key commodities accounted for over 97 per

TABLE 3.9

PORT OF DULUTH

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
8	Feeding-stuff for animals	59.79 (1)	51.88 (1)	58.30 (1)
28	Metalliferous ores & metal scrap	8.25 (3)	18.73 (2)	32.33 (2)
4	Cereals & cereal preparations	4.12 (5)	7.20 (4)	3.65 (3)
	TOTAL	72.16	77.81	94.28

TABLE 3.10

PORT OF MILWAUKEE

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
28	Metalliferous ores & metal scrap	19.39 (2)	38.35 (1)	73.72 (1)
4	Cereals & cereal preparations	24.49 (1)	26.95 (2)	17.97 (2)
9	Miscellaneous food preparations	12.24 (3)	14.18 (3)	5.68 (3)
	TOTAL	56.12	79.48	97.37

cent of the sample weight, whereas the eight least important commodities by weight had an aggregate weight of less than 1 per cent of the sample weight.

Milwaukee was unique in that, according to Table 3.24, East-Central Asia (World Area 11) was the most common destination accounting for roughly 45 per cent of Milwaukee's sample export tonnage. Southern Europe and the Mediterranean (World Area 8) countries ranked second accounting for 34 per cent. Milwaukee was also unique in that no sample shipments were destined for Canada (World Area 1).

Toledo

The Toledo port was similar to the other Great Lakes ports in that a few commodities dominated. It was different in that the most important commodity by weight was petroleum and petroleum products (SBR-33) which accounted for nearly 60 per cent of the weight, yet this commodity was not very important to any other port. In contrast to petroleum's ranking at Toledo, iron and steel (SBR-67), which was an important commodity at the other ports that handled it, was of minimal importance here ranking last. Similar to the other ports, the three key commodities accounted for over 97 per cent of the sample weight as shown in Table 3.11.

Canada (World Area 1) dominated the destinations of Toledo's sample export tonnage accounting for nearly 60 per cent as seen in Table 3.24. Note that this percentage is

TABLE 3.11

PORT OF TOLEDO

IMPORTANT EXPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SBR	Description	No. Shipments	Value	Weight
33	Petroleum & petroleum products	50.00 (1)	29.57 (2)	59.63 (1)
8	Feeding-stuff for animals	15.79 (2)	37.15 (1)	25.36 (2)
28	Metalliferous ores & metal scrap	7.89 (3)	13.87 (3)	12.24 (3)
	TOTAL	73.68	80.59	97.22

identical to that for SBR-33 in Table 3.11, i.e., a single commodity seems to have accounted for all of the sample traffic to Canada (World Area 1). The second ranked World Area was West-Central Europe (World Area 7) with over 25 per cent while East-Central Asia (World Area 11) ranked third. Again, a comparison of percentages in Tables 3.11 and 3.24 reveals that all tonnage exported to the latter World Area seems to have been metalliferous ores and metal scrap (SBR-28).

In Map 15, it is interesting to compare the hinterlands of Cleveland and Toledo which share the same home state. Although Cleveland exported a greater sample weight, it had the smaller hinterland and was unable to attract any traffic from west of Ohio. However, all of the traffic that Toledo did attract from outside Ohio could be considered insignificant in that it was the most home state dominated port with nearly 99 per cent of the sample weight acquired in Ohio. A review of the World Area matrix for Toledo in Appendix J revealed that only one sample shipment was acquired in each of the other four states in the hinterland.

Imports

General Observations

From Table 3.12 below, it can be seen that, as was the case for exports, Detroit and Chicago clearly dominated the other four ports in terms of weight accounted for in the

sample of import shipments. However, their ranking reversed. Detroit was first with just over 37 per cent of the sample weight and Chicago ranked a close second with under 37 per cent. The third ranked port, Cleveland, was a distant third accounting for less than 9 per cent. Thus, the pattern is quite similar to that for exports.

In Chicago, Cleveland, Detroit, and Toledo, commodity SAR-67 - iron and steel - was ranked first in number of shipments, weight, and value. This one commodity accounted for more than 50 per cent of the sample weight in Cleveland, Detroit, and Toledo and for more than 40 per cent in Chicago. Even in Duluth and Milwaukee, where the ranking differed among the three criteria, iron and steel ranked first by value and number of shipments. In all, commodity SAR-67 accounted for nearly 50 per cent of the sample weight for the combined imports for all six ports.

TABLE 3.12

MAJOR GREAT LAKES PORTS RANKED BY IMPORT TONNAGE

Rank	Port	Weight (Short Tons)	Per cent of Sample
1	Detroit	854,063	37.33
2	Chicago	835,680	36.35
3	Cleveland	201,631	8.81
4	Toledo	185,208	8.10
5	Milwaukee	183,945	8.04
6	Duluth	27,098	1.18
	TOTAL	2,287,625	100.00

When iron and steel (SAR-67) is removed, the port rankings change. Chicago shipped the largest percentage of sample import weight, 40 per cent. It was followed by Detroit (33 per cent), Milwaukee (9 per cent), Cleveland (8 per cent), Toledo (8 per cent), and Duluth (2 per cent).

The sample shows that a total of thirty commodities were imported through the six Great Lakes ports during 1970. Due to the great influence of iron and steel imports, nearly 90 per cent of the total sample weight imported through those six ports was accounted for by only three commodities as detailed in Table 3.13.

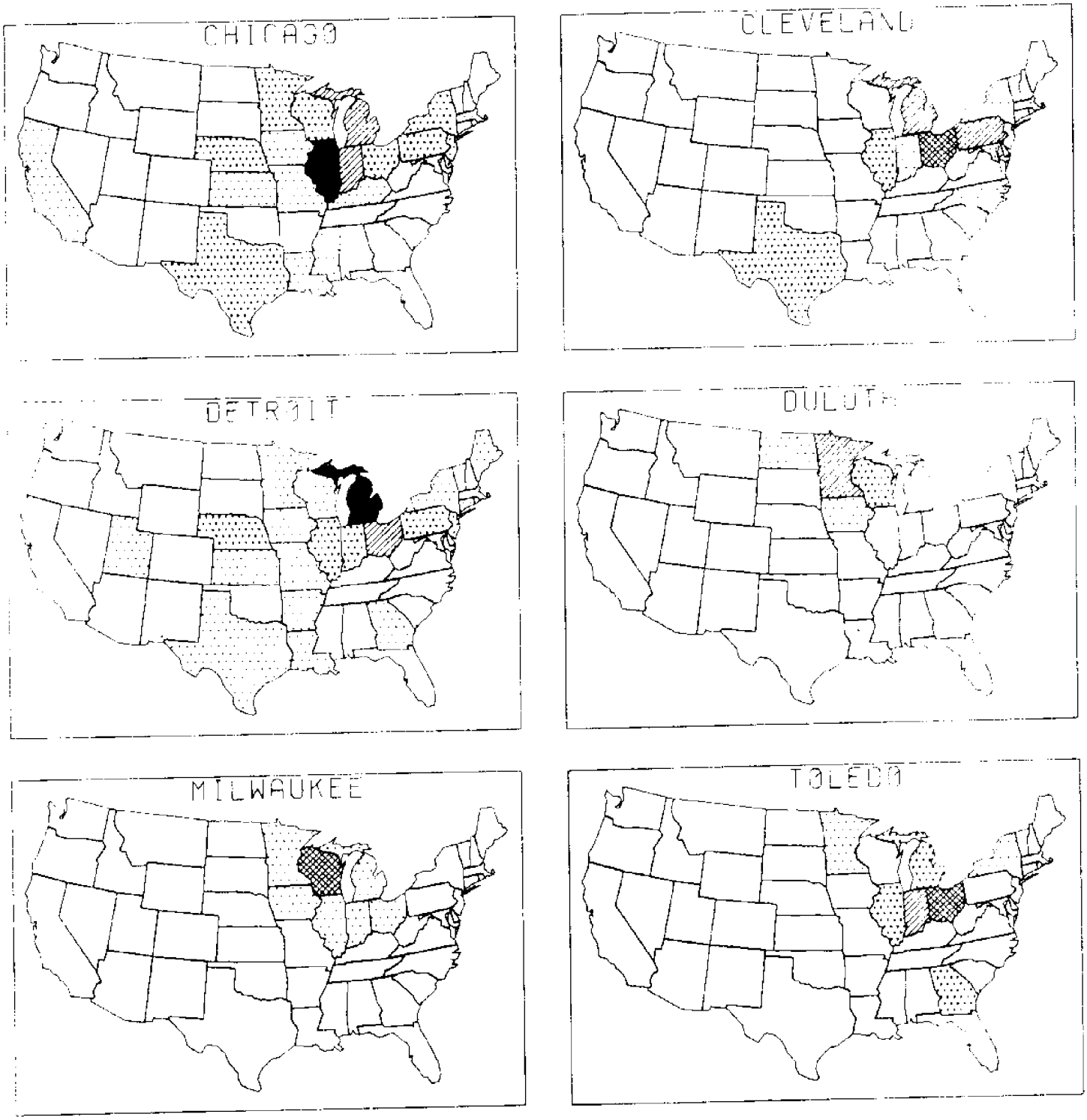
TABLE 3.13

IMPORTANT GREAT LAKES IMPORT COMMODITIES BY WEIGHT

SAR	Description	Percentage of Sample Weight
67	Iron and steel	49.70%
27	Crude fertilizers and minerals	27.20%
64	Paper, paperboard and manufactures thereof	12.56%
	TOTAL	89.46%

The import hinterlands served by the six major Great Lakes ports are shown in Map 16. It is evident from a casual observation of the shading that Detroit and Chicago were dominant. One means of quantifying a relative measure of the hinterland served is to count the number of states

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS THROUGH GREAT LAKES PORTS



(MAP-16)

served by a port. The application of this criterion results in the following ranking.

TABLE 3.14

MAJOR GREAT LAKES PORTS RANKED BY NUMBER OF STATES SERVED - IMPORTS

Rank	Port		Number of States Served
1	Detroit	) Tie	20
2	Chicago	)	20
3	Cleveland		10
4	Milwaukee		7
5	Toledo		6
6	Duluth		4

In contrast to exports, this ranking nearly duplicates that obtained via the ranking by weight above.

The hinterland area of the Detroit and Chicago ports was extensive, extending beyond the Army Corps of Engineers' Great Lakes hinterland definition. However Table 3.15 may cast some doubt upon considering all twenty states or even the Corps of Engineers' nineteen state definition as proper in defining a port's hinterland. The major destination of imports through the various Great Lakes ports was the home state of a port for well over 75 per cent of the sample import shipments. The port of Detroit led the list with nearly 89 per cent of imports destined for

TABLE 3.15

MEASURE OF HOME STATE DOMINANCE - IMPORTS

Port	Home State	Percentage of Port's Sample Import Tonnage To Home State	Percentage to All Other States Excluding Foreign Country
Chicago	Illinois	83.88%	11.34%
Cleveland	Ohio	79.02%	14.17%
Detroit	Michigan	88.66%	2.94%
Duluth	Minnesota	87.52%	12.25%
Milwaukee	Wisconsin	86.33%	1.03%
Toledo	Ohio	83.33%	13.23%

Michigan while less than 3 per cent of all sample weight was destined for the other nineteen states. The area served by Chicago was somewhat more representative of a hinterland in that less than 84 per cent of all sample weight was destined for Illinois while over 11 per cent of all sample weight was destined for the other nineteen states. The degree of dominance is further emphasized by Table 3.16 which contains summary information on those states in the hinterland that individually accounted for less than 1 per cent of the port's sample tonnage. As was the case for exports, it can be seen that the majority of states in the various port's hinterlands were insignificant.

TABLE 3.16

IMPORT HINTERLAND PARTICIPATION

Port	Number of States in Hinterland	Number of States Contributing Less Than 1%	Aggregate Contribution of These States
Chicago	20	17	2.45%
Cleveland	10	5	1.36%
Detroit	20	18	1.42%
Duluth	4	0	-
Milwaukee	7	6	1.03%
Toledo	7	3	1.27%

Chicago

Although Chicago showed imports in twenty-one commodity categories, three commodity groups accounted for 96 per cent of the sample import weight as shown in Table 3.17. The other eighteen commodities can be considered insignificant in the light of their contribution to the total weight passing through the port. These eighteen together accounted for a little over 4 per cent of the weight of the Chicago import sample.

The most important import commodity for Chicago by all three criteria--number of shipments, weight, and value--was iron and steel (SAR-67). This finding is not in the least surprising since shipments of iron and steel heavily dominated traffic incoming through the Great Lakes system. Iron and steel accounted for 70 per cent of the sample import shipments through Chicago, 45 per cent of the weight and 52 per cent of the value.

Commodities SAR-27 and SAR-64 accounted for over 92 per cent of the total sample weight excluding iron and steel.

From Table 3.27, it is seen that over 58 per cent of Chicago's sample import tonnage was from Canada (World Area 1) while 23 per cent originated in West-Central Europe (World Area 7). East-Central Asia (World Area 11) was the origin of over 14 per cent of the sample tonnage. Together these three World Areas accounted for over 95 per cent of Chicago's sample import tonnage. Although World Area 1 was the dominant origin overall, it ranked only

TABLE 3.17

PORT OF CHICAGO

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
67	Iron & steel	70.25 (1)	51.87 (1)	44.61 (1)
27	Crude fertilizers & minerals	3.59 (3)	1.35 (5)	28.15 (2)
64	Paper, paperboard, & manufactures thereof	7.62 (2)	32.15 (2)	22.97 (3)
	TOTAL	81.46	85.37	95.73

third as the source of imports of iron and steel with World Area 7 and World Area 11 ranked one and two respectively.

The only real anomaly to consider was four sample shipments through Chicago into Texas. The World Area matrix for Chicago in Appendix J revealed that two of the four shipments came from Canada (World Area 1) and two shipments came from Africa (World Area 12). It is reasonable to consider Texas part of the Great Lakes hinterland, and specifically the port of Chicago hinterland, for imports from World Area 1; but it is much harder to rationalize the depiction of the maps when the commodities were imported from Africa.

Cleveland

Of the fourteen commodities indicated as imports through the Port of Cleveland, three clearly dominated the other eleven. Together these three accounted for almost 99 per cent of the sample weight, as shown in Table 3.18. As in Chicago, Cleveland had iron and steel (SAR-67) the most important by all three criteria, and in fact it figured even more strongly in Cleveland's traffic. Commodities SAR-27 and SAR-64 made up over 97 per cent of the sample import weight excluding iron and steel.

Three World Areas of origin accounted for over 78 per cent of Cleveland's import tonnage according to Table 3.27. They were West-Central Europe (World Area 7) with 48 per

TABLE 3.18

PORT OF CLEVELAND

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
67	Iron & steel	80.27 (1)	74.21 (1)	56.35 (1)
64	Paper, paperboard, & manufactures thereof	4.04 (3)	10.20 (3)	33.98 (2)
27	Crude fertilizers & minerals	4.93 (2)	13.45 (2)	8.54 (3)
	TOTAL	89.24	97.86	98.87

cent, Canada (World Area 1) with over 20 per cent, and Southern North America (World Area 2) with less than 11 per cent. Cleveland was unique in that it was the only port for which World Area 1 was not the most common origin of sample imports. Also, Cleveland was the dominant port in the sample for imports from Southern North America (World Area 2) accounting for over 63 per cent according to Table 3.28.

Map 16 reveals that the destination of imports through Cleveland were to the east of Ohio, probably due to the strong influence of Chicago and Detroit to the west. A curious anomaly exists in that Texas was the destination of 2,202 tons of goods (one shipment) imported through Cleveland. According to the World Area matrix for Cleveland in Appendix J, the shipment came from West-Central Europe. One could conceivably include Texas in Cleveland's hinterland for goods imported from eastern Canada, but such an inclusion for goods coming from West-Central Europe is more difficult.

Detroit

Detroit, with seventeen commodities enumerated, ranked first of the six ports in weight sampled. Commodity SAR-67, iron and steel, ranked unambiguously as it was a strong first by all three criteria. Four commodities accounted for over 98 per cent of the sample weight as shown in

Table 3.19, with the remaining thirteen making up only less than 2 per cent. Commodities SAR-27, SAR-64 and SAR-66 accounted for over 96 per cent of sample import weight for Detroit excluding SAR-67.

Canada (World Area 1) ranked first with 41 per cent of the sample import tonnage through Detroit according to Table 3.27. West-Central Europe (World Area 7) was the second most important World Area of origin accounting for over 32 per cent followed by East-Central Asia (World Area 11) which accounted for nearly 11 per cent.

According to Map 16, it would appear that Connecticut, New Jersey, and Texas were part of Detroit's hinterland. According to the World Area matrix for Detroit in Appendix J, the four shipments to Connecticut, the three shipments to New Jersey and one of the four shipments to Texas came from World Area 7. The sample shipment to Texas is understandable, but it is hard to rationalize the sample shipments from World Area 7 to Connecticut and New Jersey. In addition, one of the sample shipments to Texas entering the United States through Detroit originated in East-Central Asia. This pattern is extremely difficult to rationalize. The anomalies in the Port of Detroit case point out one of the problems with samples on the tape.

TABLE 3.19

PORT OF DETROIT

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
67	Iron & steel	74.87 (1)	77.54 (1)	55.85 (1)
27	Crude fertilizers & minerals	8.99 (2)	3.13 (3)	22.91 (2)
66	Nonmetallic mineral manufactures	3.44 (4)	1.82 (6)	13.83 (3)
64	Paper, paperboard, & manufactures thereof	3.57 (3)	10.60 (2)	5.92 (4)
	TOTAL	90.87	93.09	98.51

Duluth

Only seven commodities were in the sample of Duluth's imports. No commodity unambiguously dominated all others although SAR-27 was clearly dominant by weight. Three of the commodities were consistently in the top three ranking, and together accounted for over 98 per cent of the sample weight as shown in Table 3.20. Though SAR-67 (iron and steel) was not dominant by any criterion, it was among the top three. The remaining two, SAR-27 and SAR-65, continued to account for over 98 per cent of the sample weight when iron and steel was excluded.

As can be seen from Table 3.27, Canada (World Area 1) totally dominated as the World Area of origin for imports coming through Duluth, accounting for 80 per cent of the sample import tonnage. No other World Area accounted for as much as 10 per cent of import tonnage.

Milwaukee

Although Milwaukee was fifth in total weight in its import sample, it had a relatively large variety of commodities - sixteen. No commodity had an unambiguous dominance, but a total of four commodity classes accounted for almost 96 per cent of sample weight as shown in Table 3.21. Excluding the weight of iron and steel (SAR-67), the remaining three commodities accounted for more than 96 per cent of sample import weight.

TABLE 3.20

PORT OF DULUTH

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
27	Crude fertilizers & minerals	25.93 (2)	9.19 (3)	80.07 (1)
67	Iron & steel	33.33 (1)	36.85 (1)	11.32 (2)
65	Textile yarn, fabrics, made up articles, & related products	22.22 (3)	34.83 (2)	7.17 (3)
	TOTAL	81.48	80.87	98.56

TABLE 3.21

PORT OF MILWAUKEE

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
27	Crude fertilizers & minerals	7.83 (4)	2.50 (6)	42.30 (1)
67	Iron & steel	28.70 (1)	48.95 (1)	39.32 (2)
64	Paper, paperboard, & manufactures thereof	10.43 (3)	19.50 (2)	9.32 (3)
63	Wood & cork manufactures	18.26 (2)	8.90 (4)	4.88 (4)
	TOTAL	65.22	79.85	95.82

Milwaukee's imports were dominated by those from Canada (World Area 1), according to Table 3.27, accounting for over 55 per cent of the imported sample tonnage. The second ranked World Area of origin was East-Central Asia (World Area 11) accounting for less than 29 per cent. As seen in Tables 3.26 and 3.28, Milwaukee was the top ranked port in sample import tonnage from Africa (World Area 12).

According to Map 16, Wisconsin was the only state which can be considered part of the hinterland of the Port of Milwaukee. A curious statistic though is that foreign countries (probably Canada) were the destinations of more than 12 per cent of the sample weight imported through Milwaukee. Given the information available, this occurrence cannot be explained with certainty but it may have been simply a result of the inadequately designed sample.

Toledo

Iron and steel (SAR-67) comprised the bulk of Toledo's sample import traffic. However, the importance of this commodity was not quite so overwhelming as it was in the cases of Chicago and Duluth. The sample for Toledo shows sixteen commodities imported of which four accounted for over 90 per cent of the sample weight, as shown in Table 3.22. The three other than iron and steel accounted for 80 per cent of the sample weight exclusive of SAR-67.

TABLE 3.22

PORT OF TOLEDO

IMPORTANT IMPORT COMMODITIES BY WEIGHT

Commodity		Percentage (Rank)		
SAR	Description	No. Shipments	Value	Weight
67	Iron & steel	46.76 (1)	52.23 (1)	52.97 (1)
56	Manufactured fertilizers	2.16 (8)	8.25 (3)	19.06 (2)
27	Crude fertilizers & minerals	3.60 (5)	0.71 (11)	12.53 (3)
64	Paper, paperboard, & manufactures thereof	10.79 (3)	8.20 (4)	6.09 (4)
	TOTAL	63.31	69.39	90.65

Toledo's sample import tonnage came mostly from Canada (World Area 1) which accounted for 41 per cent as seen in Table 3.27. Southern Europe and the Mediterranean (World Area 8) ranked second accounting for over 22 per cent of the sample tonnage, and West-Central Europe (World Area 7) was a close third at just over 21 per cent. Tables 3.26 and 3.28 reveal that Toledo ranked second to Detroit in sample tonnage from World Area 8.

Map 16 does display one anomaly, that of Georgia being the destination for an import through Toledo. However, the World Area matrix for Toledo in Appendix J shows that the import originated from World Area 1, and for such imports it may be quite consistent to consider Georgia as part of the Great Lakes hinterland.

World Area Overview

Exports

The World Area matrices for the various ports which are found in Appendix J illustrate sources of competition between ports and coasts. For exports, this tabulation contains the state of acquisition and the World Area of destination for movements by the six major ports. For imports, the tabulation lists the World Area of origin and the place of destination for shipments by the six major ports. Hence, the movement of goods can be followed from the state of acquisition through the specific Great Lakes port on to the World Area of destination for exports, or conversely for imports.

Table 3.23 shows that West-Central Europe (World Area 7) and Canada (World Area 1) were the recipients of the two largest amounts of sample tonnage passing through the Great Lakes ports. Three other World Areas, the United Kingdom and Ireland (World Area 5), Southern Europe and the Mediterranean (World Area 8) and East Central Asia (World Area 11) each received over 10 per cent of the sample export weight from the six major Great Lakes ports.

The matrices in Appendix J indicate that almost no competition existed between the ports for the export of goods to West-Central Europe (World Area 7). Each port was state specific for place of acquisition, with only occasional shipments drawn from other states passing through the port.

TABLE 3.23

EXPORT TONNAGE

No.	World Area	Port						
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee	World Area Total*
1.	Northern North America	304,701	237,276	4,660	53,584	74,796	0	675,017
2.	Southern North America	1,340	0	231	0	0	331	1,902
3.	North & East South America	77	216	1,020	0	0	0	1,313
4.	West South America	0	0	857	0	0	0	857
5.	United Kingdom & Ireland	246,123	90,547	17,527	43,544	360	12,828	410,929
6.	Northwest Europe	6,841	27,420	0	0	0	393	34,654
7.	West-Central Europe	592,338	130,800	140,262	74,070	32,017	3,167	972,654
8.	Southern Europe & Mediterranean	118,653	163,076	17,910	28,012	2,918	62,234	392,803
9.	Eastern Europe	6,547	13,228	0	0	0	1,332	21,107
10.	Southeast Asia & Australia	16,244	1,694	8,101	1,896	0	15,720	43,655
11.	East-Central Asia	96,631	129,775	48,605	0	15,353	82,139	372,503
12.	Africa, except Mediterranean	2,752	21	231	0	0	3,937	6,941
	Port Total*	1,392,247	794,053	239,404	201,106	125,444	182,081	2,934,335

* Totals may not add due to rounding.

The shipments were generally drawn from states that do not have ports, such as Iowa, Wyoming, and Nebraska. For example, the port of Chicago served as port of export for 592,338 tons to World Area 7; but only 4,528 tons were acquired in a state other than Illinois with a major Great Lakes port. Excluding the 350,561 tons acquired in Illinois, most of the remaining domestically acquired tonnage came from states not served by ports.

Detroit served as a similar example in that of the 130,800 tons exported to World Area 7, 125,023 tons were acquired in Michigan and only 213 tons were acquired in states with Great Lakes ports. Duluth, the second largest exporter to World Area 7 with 140,262 tons, acquired commodities from only two states, Minnesota and North Dakota.

Exports to Canada (World Area 1) were even more port-state specific. Only through the port of Duluth did traffic from a state with its own Great Lakes port (Wisconsin) travel to World Area 1. In all other cases, the imported materials were acquired in the state of the port or a state with no Great Lakes port.

Essentially, the same pattern of export movement by state of acquisition held for exports through the six major Great Lakes ports for the remaining three major World Areas, the United Kingdom and Ireland (World Area 5),

Southern Europe and the Mediterranean (World Area 8), and Southeast Asia (World Area 10).

Table 3.23 does indicate a rather curious development with respect to the port of Milwaukee. No commodities were exported through the port of Milwaukee with World Area 1 as the destination. In addition, Milwaukee specialized in export traffic to East-Central Asia (World Area 11) with 82,139 tons representing nearly 45 per cent of its sample export tonnage, and to World Area 8 with 62,234 tons representing 40 per cent of the sample export tonnage. For the other major Great Lakes ports, the primary World Area of destination for export tonnage was either World Area 1 or World Area 7. Only in the case of the ports of Detroit and Duluth was a World Area other than the two primary ones just listed ranked second as a destination.

The World Area matrices point out that individual ports specialized in trading relations with certain World Areas and, thus, were not really competing with each other for traffic. This lack of competition is brought out further by analyzing the domestic hinterland of each port for exports. Each port, except Chicago and to some extent Milwaukee, was home state intensive in terms of acquisition of commodities. Thus, the hinterland of the port was merely the home state. But for the port of Chicago, the hinterland probably included the states of Indiana, Iowa, Nebraska, and South Dakota, with the port of Milwaukee competing for traffic originating in Iowa, Nebraska and South Dakota.

World Area Matrix Summary, Exports

Tables 3.23, 3.24, and 3.25 referenced repeatedly above show the effect of World Area of destination upon export shipments through the previously defined major Great Lakes ports. All tonnages and percentages refer only to the export shipments passing through the major Great Lakes ports. The dominance of Chicago and Detroit is shown in Table 3.23; Chicago and Detroit each exported more tonnage than the other four ports combined. The major areas of export in order of tonnage were West-Central Europe (World Area 7), Canada (World Area 1), the United Kingdom and Ireland (World Area 5), Southern Europe and the Mediterranean (World Area 8), and East-Central Asia (World Area 11). As seen in Table 3.24, with the exception of Milwaukee with less than 2 per cent, each port had over 45 per cent of its tonnage destined for either West-Central Europe or Canada. Milwaukee had nearly 79 per cent of its tonnage destined for East Central Asia or Southern Europe and the Mediterranean.

TABLE 3.24

PERCENTAGE OF MAJOR GREAT LAKES PORT'S TONNAGE
EXPORTED TO SPECIFIC WORLD AREAS

No.	World Area	Port					
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee
1.	Northern North America	21.89	29.88	1.95	26.64	59.63	0.00
2.	Southern North America	0.10	0.00	0.10	0.00	0.00	0.18
3.	North & East South America	0.01	0.03	0.43	0.00	0.00	0.00
4.	West South America	0.00	0.00	0.36	0.00	0.00	0.00
5.	United Kingdom & Ireland	17.68	11.40	7.32	21.65	0.29	7.01
6.	Northwest Europe	0.49	3.45	0.00	0.00	0.00	0.21
7.	West-Central Europe	42.55	16.47	58.59	36.83	25.52	1.73
8.	Southern Europe & Mediterranean	8.52	20.54	7.48	13.93	2.33	33.99
9.	Eastern Europe	0.47	1.67	0.00	0.00	0.00	0.73
10.	Southeast Asia & Australia	1.17	0.21	3.38	0.94	0.00	8.59
11.	East-Central Asia	6.94	16.34	20.30	0.00	12.24	44.86
12.	Africa, except Mediterranean	0.20	0.00*	0.10	0.00	0.00	2.15
	Port Total**	100.00	100.00	100.00	100.00	100.00	100.00

* Less than 0.005%.

** Total may not add to 100.00% due to rounding.

TABLE 3.25

PERCENTAGE OF WORLD AREA TONNAGE EXPORTED FROM SPECIFIC PORT

No.	World Area	Port						
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee	World Area Total*
1.	Northern North America	45.14	35.15	0.69	7.94	11.08	0.00	100.00
2.	Southern North America	70.45	0.00	12.15	0.00	0.00	17.40	100.00
3.	North & East South America	5.86	16.45	77.68	0.00	0.00	0.00	100.00
4.	West South America	0.00	0.00	100.00	0.00	0.00	0.00	100.00
5.	United Kingdom & Ireland	59.89	22.03	4.27	10.60	0.09	3.12	100.00
6.	Northwest Europe	19.74	79.13	0.00	0.00	0.00	1.13	100.00
7.	West-Central Europe	60.90	13.45	14.42	7.62	3.29	0.33	100.00
8.	Southern Europe & Mediterranean	30.21	41.52	4.56	7.13	0.74	15.84	100.00
9.	Eastern Europe	31.02	62.67	0.00	0.00	0.00	6.31	100.00
10.	Southeast Asia & Australia	37.21	3.88	18.56	4.34	0.00	36.01	100.00
11.	East-Central Asia	25.94	34.84	13.05	0.00	4.12	22.05	100.00
12.	Africa, except Mediterranean	39.65	0.30	3.33	0.00	0.00	56.72	100.00

* Total may not add to 100.00% due to rounding.

Imports

Inspection of Tables 3.26 and 3.27 reveal that Canada (World Area 1) and West-Central Europe (World Area 7) were the two primary origins of imports through the six major Great Lakes ports. Only for the port of Cleveland was Canada not the primary source of imports. In this instance, World Area 7 provided the most imports with World Area 1 ranking second. Only two other significant deviations existed from the predominant pattern. For the port of Milwaukee, nearly 29 per cent of the sample import tonnage originated in East-Central Asia (World Area 11), making it the second most important source of imports. For the port of Toledo, Southern Europe and the Mediterranean (World Area 8) served as the source of over 22 per cent of the sample imported weight, thereby making it the second most important source of imports.

The only other World Area that provided a considerable amount of the import traffic was East-Central Asia. Whereas Canada (World Area 1) provided 1,078,415 tons of the total 2,287,640 sample import tons, and West-Central Europe provided 608,638 tons, East-Central Asia provided slightly over 10 per cent of the sample tonnage, 294,509 tons.

Examination of the World Area matrices in Appendix J reveals that, except for the ports of Chicago and Toledo, the destination of imports from East-Central Asia were state-port specific. Illinois received only 70,750 tons

TABLE 3.26

IMPORT TONNAGE

No.	World Area	Port						
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee	World Area Total*
1.	Northern North America	486,033	351,748	21,696	41,228	76,030	101,680	1,078,415
2.	Southern North Americ	0	3,000	0	21,167	9,234	0	33,401
3.	North & East South America	2,063	2,170	0	0	254	0	4,487
4.	West South America	2,406	0	0	0	1,060	0	3,466
5.	United Kingdom & Ireland	11,581	44,113	2,028	8,948	6,032	15,581	88,283
6.	Northwest Europe	816	39	0	155	0	658	1,668
7.	West-Central Europe	193,621	276,086	2,483	95,727	39,122	1,599	608,638
8.	Southern Europe & Mediterranean	16,128	70,817	0	15,637	40,989	142	143,713
9.	Eastern Europe	1,125	635	0	570	0	0	2,330
10.	Southeast Asia & Australia	117	7,669	119	613	154	5,516	14,188
11.	East-Central Asia	119,161	92,365	173	17,578	12,337	52,895	294,509
12.	Africa, except Mediterranean	2,638	5,429	600	0	0	5,875	14,542
	Port Total*	835,689	854,071	27,099	201,623	185,212	183,946	2,287,640

* Totals may not add due to rounding.

TABLE 3.27

PERCENTAGE OF MAJOR GREAT LAKES PORT'S TONNAGE
IMPORTED FROM SPECIFIC WORLD AREAS

No.	World Area	Port					
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee
1.	Northern North America	58.16	41.18	80.06	20.45	41.05	55.28
2.	Southern North America	0.00	0.35	0.00	10.50	4.99	0.00
3.	North & East South America	0.25	0.25	0.00	0.00	0.14	0.00
4.	West South America	0.29	0.00	0.00	0.00	0.57	0.00
5.	United Kingdom & Ireland	1.39	5.17	7.48	4.44	3.26	8.47
6.	Northwest Europe	0.10	0.00*	0.00	0.08	0.00	0.36
7.	West-Central Europe	23.17	32.33	9.16	47.48	21.12	0.87
8.	Southern Europe & Mediterranean	1.93	8.29	0.00	7.76	22.13	0.08
9.	Eastern Europe	0.13	0.07	0.00	0.28	0.00	0.00
10.	Southeast Asia & Australia	0.01	0.90	0.44	0.30	0.08	3.00
11.	East-Central Asia	14.26	10.81	0.64	8.72	6.66	28.76
12.	Africa, except Mediterranean	0.32	0.64	2.21	0.00	0.00	3.19
	Port Total**	100.00	100.00	100.00	100.00	100.00	100.00

* Less than 0.005%.

** Total may not add to 100.00% due to rounding.

of the 119,161 tons imported through Chicago while Indiana received 27,890 tons and Michigan obtained 7,197 tons. Through the port of Toledo, Indiana received 7,778 tons of the 12,337 tons imported.

Two conclusions can be quickly reached with respect to the state of destination of import shipments in this sample. First, almost all imports that originated in Canada (World Area 1) were destined for the state in which the specific port of import was located. Very few shipments were even destined for states with no major port as defined herein, as only Indiana and North Dakota, two states included in the Army Corps of Engineers' definition of Great Lakes hinterland, receiving any import shipments from World Area 1. The second conclusion stems from imports coming from West-Central Europe in that considerable competition appears to have existed between the six major ports for these imports.

It appears that for this sample, anyway, only when dealing with imports from West-Central Europe, did the Great Lakes ports (Coast) approximate the hinterlands defined by the Army Corps of Engineers. However, West-Central Europe accounted for less than 27 per cent of the sample import tonnage.

In referring back to the discussion of exports, notice was taken of the port of Milwaukee's position as an exporter to the Southern Europe and the Mediterranean area (World

Area 8). Looking at the import side, we see that well under 1 per cent of the imports through the port of Milwaukee come from this area. This was a curious imbalance, as was the imbalance in the trade with Canada (World Area 1). The port of Milwaukee exported no tonnage to Canada, yet the port received over 100,000 tons.

In contrast to the analysis of exports, more competition seemed to exist among the ports for import traffic. The port of Chicago handled considerable traffic destined for Michigan, Minnesota, Ohio and Wisconsin. The port of Detroit moved numerous shipments destined for Illinois and Ohio. The port of Cleveland handled a substantial portion of the traffic destined for Michigan, along with moving some cargo into Illinois. Competition existed among the ports of Chicago, Detroit, and Cleveland for the traffic in Indiana; and the ports of Chicago and Detroit were both moving traffic into Nebraska. In addition, New York State and Pennsylvania were served to a substantial degree by the ports of Cleveland, Detroit, and Chicago.

World Area Matrix Summary, Imports

Tables 3.26, 3.27, and 3.28 show the effect of World Area of origin upon import shipments through the previously defined major Great Lakes ports. All tonnages and percentages refer only to the sample import shipments passing

TABLE 3.28

PERCENTAGE OF WORLD AREA TONNAGE IMPORTED THROUGH SPECIFIC PORT

No.	World Area	Port						
		Chicago	Detroit	Duluth	Cleveland	Toledo	Milwaukee	World Area Total*
1.	Northern North America	45.07	32.62	2.01	3.82	7.05	9.43	100.00
2.	Southern North America	0.00	8.98	0.00	63.37	27.65	0.00	100.00
3.	North & East South America	45.98	48.36	0.00	0.00	5.66	0.00	100.00
4.	West South America	69.42	0.00	0.00	0.00	30.58	0.00	100.00
5.	United Kingdom & Ireland	13.12	49.97	2.30	10.14	6.83	17.65	100.00
6.	Northwest Europe	48.92	2.34	0.00	9.29	0.00	39.45	100.00
7.	West-Central Europe	31.81	45.36	0.41	15.73	6.43	0.26	100.00
8.	Southern Europe & Mediterranean	11.22	49.28	0.00	10.88	28.52	0.10	100.00
9.	Eastern Europe	48.28	27.25	0.00	24.46	0.00	0.00	100.00
10.	Southeast Asia & Australia	0.82	54.05	0.84	4.32	1.09	38.88	100.00
11.	East-Central Asia	40.46	31.36	0.06	5.97	4.19	17.96	100.00
12.	Africa, except Mediterranean	18.14	37.33	4.13	0.00	0.00	40.40	100.00

* Total may not add to 100.00% due to rounding

through the major Great Lakes ports. Chicago and Detroit dominated the Great Lakes ports, with each importing more tonnage than the other four ports combined, as seen in Table 3.26. The major World Areas of origin were Canada (World Area 1) and West-Central Europe (World Area 7), followed by East-Central Asia (World Area 11), Southern Europe and the Mediterranean (World Area 8), and the United Kingdom and Ireland (World Area 5). World Areas 1 and 7 jointly accounted for at least 55 per cent of the sample tonnage at each of the six ports, as seen in Table 3.27. Every port except Cleveland had over 40 per cent of its total import tonnage originating in Canada, showing the role of Great Lakes as an inland regional waterway. Table 3.28 shows the relative importance of each port to the import shipments from each World Area. Chicago and Detroit together accounted for more than 70 per cent of the import tonnage from each of the three most important World Areas.

Port Analysis Summary and Conclusion

In this section of the report, emphasis has been given to the six major Great Lakes ports and their respective hinterlands. Again the reader is reminded that the conclusions that follow are only descriptive of the sample. Generalization to all Great Lakes general cargo traffic is not statistically valid. Also, it must be remembered that the data base is descriptive of 1970 traffic and that substantial technological and economic changes have occurred in the interim.

General conclusions arrived at were that metalliferous ores and metal scrap (SBR-28), iron and steel (SBR-67), feeding-stuff for animals (SBR-08), crude fertilizers and minerals (SBR-27), and petroleum and petroleum products (SBR-33) were the dominant commodities exported through the Great Lakes Coast. On the import side of the ledger, the dominant commodities were iron and steel (SAR-67), crude fertilizers and minerals (SAR-27), and paper, paperboard and manufactures thereof (SAR-64).

It was shown that using sample weight as the criterion, Chicago and Detroit clearly dominated the other four major ports, on both the import and export side of the movement of Great Lakes related goods in international traffic. The ranking also held for sample shipments and for sample value. The ports of Chicago and Detroit accounted for

nearly 75 per cent of the sample weight exported, Chicago handling over 47 per cent and Detroit moving just over 27 per cent of the sample weight exported. These two ports also handled just under 74 per cent of all sample import weight, Detroit and Chicago each handling about 37 per cent of the sample import weight.

A further discovery in the commodity analysis was the extent to which iron and steel (SAR-67) dominated the import weight, representing almost 50 per cent of the sample weight. This dominance extended to individual ports as it was the dominant commodity, by sample weight, at four of the major ports. Only at the port of Duluth and the port of Milwaukee was the dominance of iron and steel broken. At these two ports, crude fertilizers and minerals (SAR-27) accounted for the largest portion of the sample weight. Although at the port of Milwaukee, SAR-27 dominated SAR-67 by only 3 per cent of the sample weight.

For export movements through individual ports, feeding-stuff for animals (SBR-08) and metalliferous ores and metal scrap (SBR-28) each dominated sample weight moving out for two ports. But no one commodity exhibited the dominance of Great Lakes port exports as iron and steel did on the import side.

Further analysis of the six individual ports dealt with the determination of individual port hinterlands. General conclusions reached were that each of the ports was state specific, except for the port of Chicago, when discussing exports. For exports, the home state was the state of acquisition for at least 83 per cent of sample weight, except for the port of Chicago for which Illinois was the site of acquisition for less than 60 per cent of sample weight.

The limited hinterland was even more apparent in the discussion of imports. The state in which the port was located was the place of destination for at least 80 per cent of the imported sample weight. Analysis of movements of major commodities through individual coasts forced the conclusion that the Great Lakes Coast hinterland was the six states contiguous to the Great Lakes, except New York and Pennsylvania.

The World Area overview re-emphasized the restricted nature of the domestic hinterlands for both sample exports and imports. The analysis was extended to consider inter-port competition. It was concluded that in general this was not extensive, but appeared that it was more intensive with respect to imports relative to exports.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The initial purpose of this study was to investigate the competitive hinterland of the Great Lakes System. The data source utilized is the public use tapes available from the U.S. Department of Commerce, Bureau of the Census, entitled Domestic and International Transportation of U.S. Foreign Trade: 1970. The information from the Department of Commerce is unique. It provides a depth and breadth of information not available elsewhere; there are thousands of individual shipment records included on the tapes, and each record describes almost every characteristic of the shipment and its movement. Because of the unique character of the material, it remains necessary to study this information despite its many limitations.

The strongest conclusions reached are with respect to the inadequacy of the sampling procedure. A sampling procedure that is biased toward a particular characteristic as this is permits very accurate estimates of that characteristic for the population or universe. In this study, the sample on the public use tapes is biased toward shipment weight for vessel movements. However, since the relationship between the distribution of weight and other characteristics of the population is unknown, one cannot use this sample to describe these characteristics with confidence. For example, it is possible that one would wish to estimate the distribution

of destinations within the U.S. for a particular import. In this case, since the sample is biased toward large shipments, it is to be expected that the relationship between ports serving primarily large shipments and those serving mostly small shipments will be unreliable. This is especially true when the distribution of shipments by weight between ports is unknown.

Another possibility is that one would want to analyze the flows of container movements within the United States or the amount of containerization in movements of a particular commodity or along a single route. However, since the relationship between weight and a given commodity, route, or destination is unknown for containerized shipments, any conclusions drawn from this sample could be misleading.

In addition to the problems with the basic sample, the data included on the tapes contains many errors and inconsistencies. In some cases, especially the universe equivalent value and weight measurements, the errors render the item useless.

Despite these limitations, the survey is the best available and has already been widely used as a data source by many private and public agencies. For this reason, it is necessary to be aware of the contents of the tapes. The following pages summarize the movements of Great Lakes related shipments; however, these conclusions must be evaluated with care in view of the drawbacks in the sampling process.

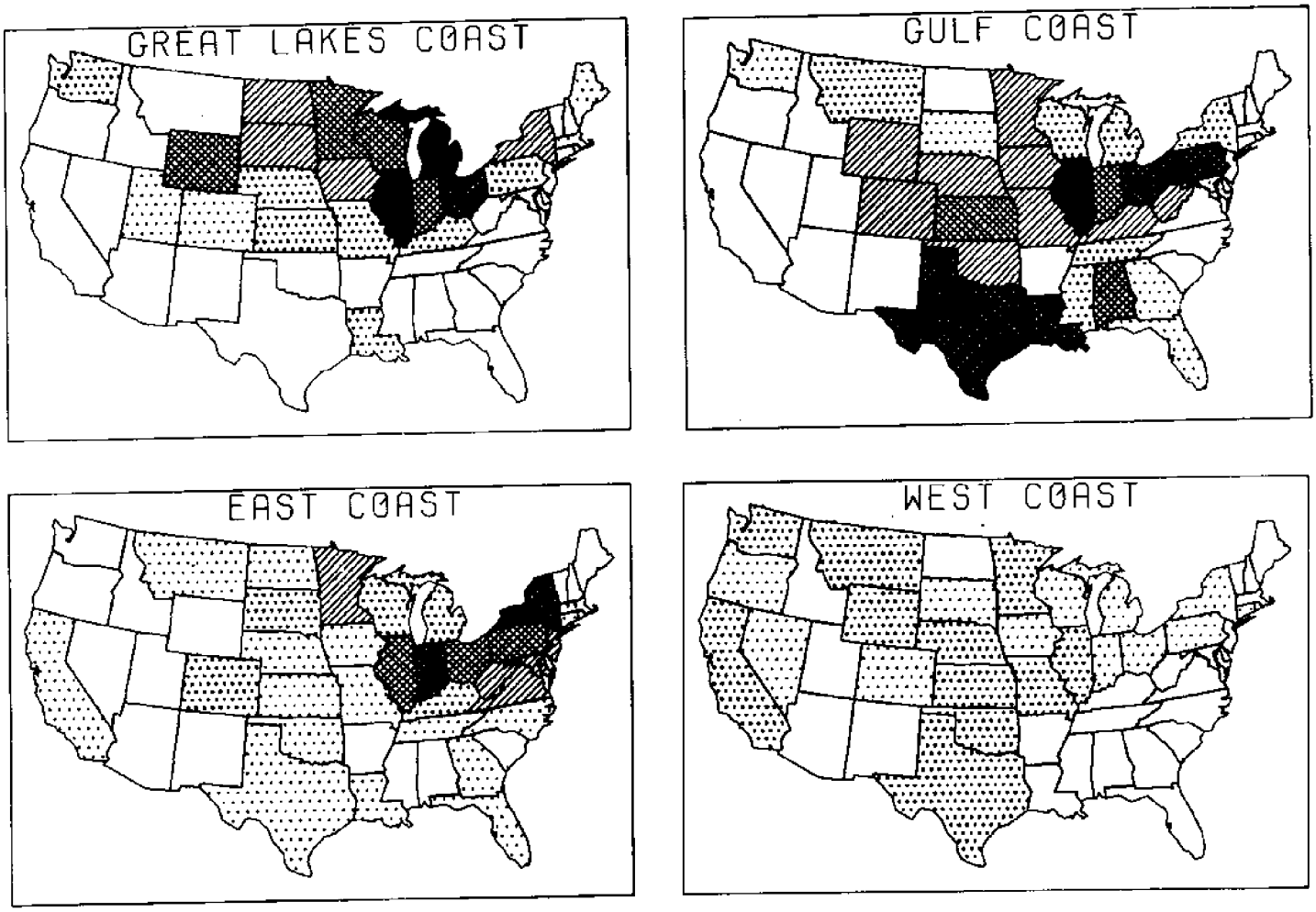
With respect to imports, the Great Lakes Coast seems to dominate in the movements of bulk-like commodities originating in Canada. Iron and steel (SAR-67) movements are the major exception to this observation, and the domestic destinations of this commodity are highly concentrated within the Great Lakes border states.

For exports, the existence of Canada as a destination is an important element, but it by no means insures use of the Great Lakes Coast. Another strong incentive to use of this coast is the acquisition of shipments near a major Great Lakes port. However, this factor is not overwhelming either. In order to more fully analyze these movements, it would be necessary to include other factors beyond the scope of this study. Primarily, these would include sailing schedules and rates by competing domestic and international modes.

Maps 17 and 18 show the coastwise breakdowns for all commodity movements which are Great Lakes related. These maps describe the Great Lakes hinterland primarily as those states which border the Lakes. This is at least the case for the shipments contained on the tapes. It need not be true for all shipments.

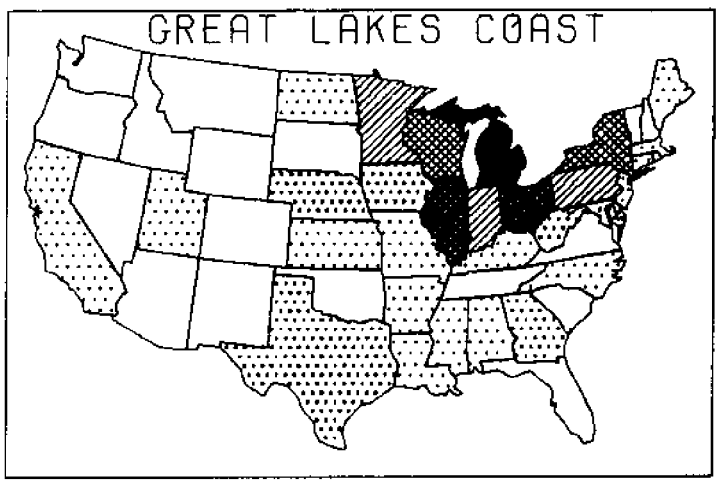
With respect to the six major Great Lakes ports, in using sample weight as the criterion, Chicago and Detroit clearly dominated the other four major ports on both the import and export side of the movement of Great Lakes related

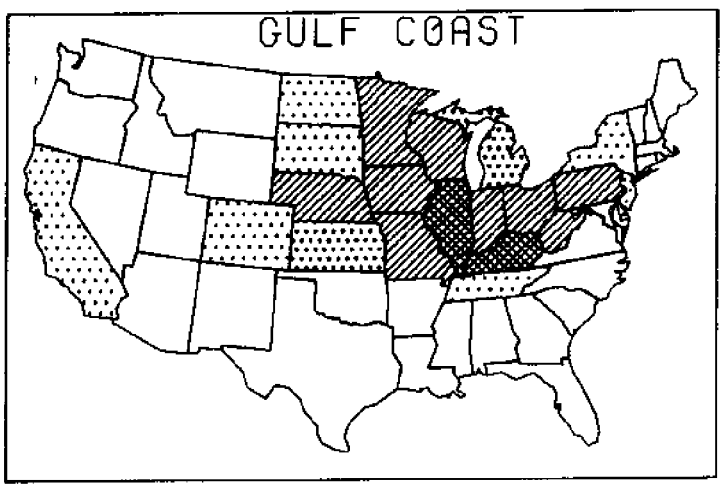
PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS THROUGH MAJOR COASTS

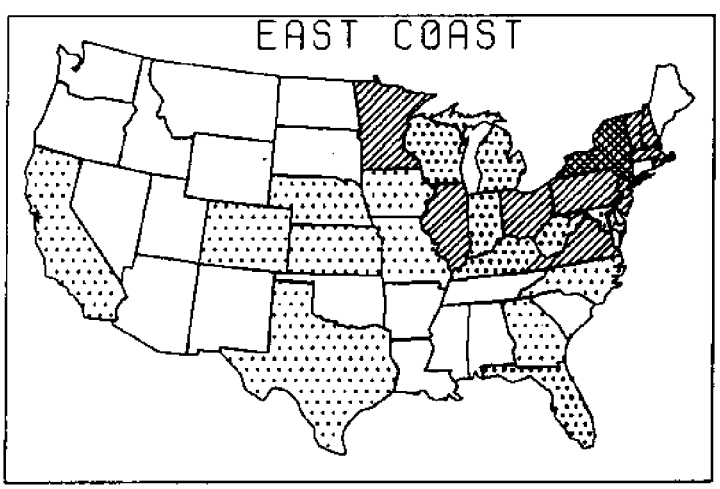


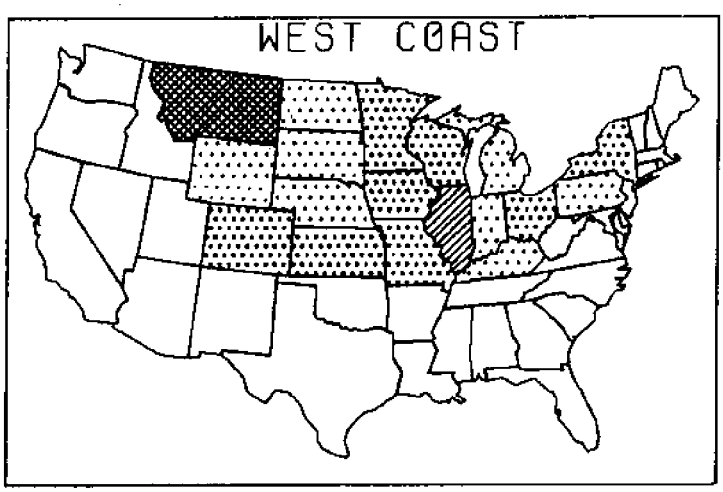
(MAP-17)

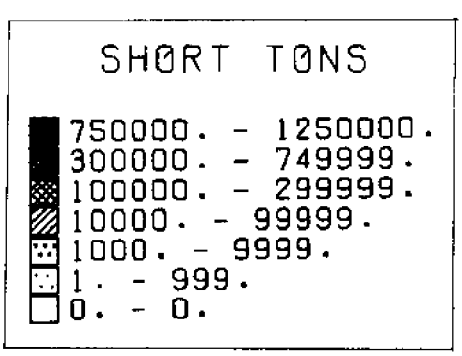
PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS THROUGH MAJOR COASTS











(MAP-18)

goods in international traffic. This ranking also held for number of sample shipments and for sample value. The ports of Chicago and Detroit jointly accounted for nearly 75 per cent of the sample weight exported, Chicago handling 47 per cent and Detroit moving 27 per cent of the sample weight exported. These two ports also handled 74 per cent of all sample import weight, with each handling about 37 per cent.

General conclusions are that metalliferous ores and metal scrap (SBR-28), iron and steel (SBR-67), feeding-stuff for animals (SBR-08), crude fertilizers and minerals (SBR-27), and petroleum and petroleum products (SBR-33) were the dominant commodities exported through the Great Lakes Coast. On the import side of the ledger, the dominant commodities were iron and steel (SAR-67), crude fertilizers and minerals (SAR-27), and paper, paperboard and manufactures thereof (SAR-64).

Iron and steel (SAR-67), representing nearly 50 per cent of the sample weight through the six Great Lakes ports, dominated the import side. This dominance extended to individual ports as it was the major commodity, by sample weight, at four of the major ports. Only at the port of Duluth and the port of Milwaukee was the dominance of iron and steel broken. At these two ports, crude fertilizers and minerals (SAR-27) accounted for the largest portion of the sample weight. Although at the port of Milwaukee, SAR-27 dominated SAR-67 by only 3 per cent of sample weight.

For export movements through individual ports, feeding-stuff for animals (SBR-08) and metalliferous ores and metal scrap (SBR-28) each dominated sample weight moving out for two ports. But no one commodity exhibited the dominance of Great Lakes port exports as iron and steel did on the import side.

It is interesting to note that even though a single commodity, iron and steel, dominated the import Great Lakes traffic, export traffic was more heavily concentrated at the six major ports than was import traffic. In particular, the six major ports accounted for 97 per cent of the sample export tonnage through the Great Lakes Coast as compared with 84 per cent of the sample import tonnage.

Further analysis of the six individual ports dealt with the determination of individual port hinterlands. The general conclusions are that each of the ports was state specific, except for the port of Chicago, with respect to exports. For exports, the home state was the state of acquisition for at least 83 per cent of sample weight, except for the port of Chicago for which Illinois was the site of acquisition for under 60 per cent of sample weight. The limited hinterland was even more apparent in the discussion of imports. The state in which the port was located was the place of destination for at least 79 per cent of the imported sample weight.

Table 4.1 contains a summary of the hinterland analysis of the six major ports. For exports, it contains the sample

TABLE 4.1

PERCENTAGE OF SAMPLE TONNAGE MOVING THROUGH 6 MAJOR GREAT LAKES PORTS AND THE GREAT LAKES COAST GENERATED BY 5-STATE AND 6-STATE HINTERLAND

	E X P O R T S		I M P O R T S	
Hinterland	Major Ports	G.L. Coast	Major Ports	G.L. Coast
5 state*	77.62%	75.44%	88.23%	74.03%
6 state**	82.21%	79.90%	91.41%	76.69%

*5 states: Minnesota, Wisconsin, Illinois, Michigan and Ohio.

**6 states: Same plus Indiana.

tonnage that was acquired in the five home states of the six major ports stated as a percentage of the entire sample tonnage exported through those six ports as well as the same percentage for the Great Lakes Coast. For imports, it contains the sample tonnage that was destined for the five home states of the six major ports stated as a percentage of the entire sample tonnage imported through those six ports as well as the same percentage for the Great Lakes Coast. For both exports and imports, the percentages are repeated considering the addition of Indiana to the five-home-state hinterland. The magnitude of the percentages clearly indicates that the available data shows that the effective hinterland of the major Great Lakes ports, and thus of the Great Lakes Coast, can be considered to be the six contiguous states that border the Lakes: Minnesota, Wisconsin, Illinois, Indiana, Michigan, and Ohio. It must be remembered that there are biases in the data and that some commodities of particular interest to the Great Lakes have been excluded from the sample completely. These commodities are listed in the introduction. Nevertheless, the results point strongly to the need for further research and additional information.

CHAPTER V

RECOMMENDATIONS

During the preparation of this study, it became apparent that if data of the sort found in Domestic and International Transportation of U.S. Foreign Trade: 1970 are provided on a continuing basis at regular intervals, several shortcomings in the present data must not be duplicated. These shortcomings dictate that the 1970 study not be the initial point in the formulation of a time series. In addition, if it is legally and financially possible, a few other pieces of information might be provided for each shipment.

Most importantly, the sampling technique used in 1970 must not be repeated. Rather, the sample should be reconstructed to be perfectly random with each shipment having the same probability of selection. This probability should equal the inverse of the number of shipments in the population. This change is essential to eliminate the serious limitations resulting from the present biased sampling procedure that is described in Chapter IV of this study.

If additional precision is desired, as might be the case in estimating universe weight for vessel shipments or universe value for air shipments, a separate sample might be taken on a probability proportional to size basis in which, for example, any air shipment will have a probability of selection equal to the ratio of its value to total airborne value. This procedure can be merged with the purely random sampling procedure recommended above through use of an identification

digit appended to each selected shipment record. Such an identifier would permit users to sort shipment records on the basis of a specific selection criterion thereby allowing users to generate files best suited to their intended use of the sample data. This procedure would permit, if desired, the inclusion of any shipment exceeding a critical level (e.g., critical weight for vessel or critical value for air) which was not chosen in one of the samples. Inclusion of such a shipment would only require the use of an additional identifier digit.

The extra cost of the recommended multiple sampling procedure would be easily justifiable in terms of the greater usability of the resulting samples and the benefit derived therefrom. This extra cost could be minimized by selecting samples somewhat smaller than the present biased sample, such that the total number of shipment records selected would not be much greater than the over fifty thousand records comprising the present sample. Yet, each sample would still have large sample properties.

Another important shortcoming which became evident as we analyzed the Public Use Tapes concerns the procedure for creating the tapes. The number of errors on the Public Use Tapes implies that an inadequate file editing procedure was used. There are numerous instances of codes which do not correspond to those allowed. Also there are enough inconsistencies in the information provided for expanding the

sample weight and sample value to estimated universe values to render these items untrustworthy. It would have been a simple matter to check the data for erroneous codes and to compare actual shipment value and weight with their respective critical values, i.e., "certainty levels," as defined in the sampling procedure employed. This obviously was not done. No future study should neglect this important step.

Another general problem concerns port and commodity code compatibility with related data sources. In particular, the Corps of Engineers publishes an annual report, Waterborne Commerce of the United States, which contains detailed information on ports and commodity movements through ports. But presently the port codes and commodity codes used in that report are not directly comparable to those used in the survey. A conversion of the Bureau of the Census codes employed in this survey into those employed by the Corps necessarily results in some arbitrary assignments for specific commodity subgroups. Similarly, the grouping of ports in the survey rather than the specific identification of ports as in the Corps report poses further compatibility problems. If the Bureau of the Census disclosure rules will permit, a uniform method of coding should be developed so that consistency exists between the two reports. Additionally, future surveys might allow the further division

of identifiable geographical areas so that each SMSA and regional group of non-SMSA counties can be identified for analysis.

Rapidly changing technology in transportation, both in the transport equipment itself and in the movement of goods, requires that current data be available to assess changing conditions. Thus, it is recommended that the survey be conducted at regular intervals, such as every five years. In addition, the processing of the survey data should be done as quickly as possible. Rapid dissemination of the data obtained from such surveys is required to respond to changing conditions with formative policies.

Although data on shipments moving in containers were collected, other technological changes have taken place in the transportation industry which were not addressed. Future surveys might consider these changes. Specialized cargo movement facilities have been introduced. These include Roll on/Roll off vessels and "Kangaroo" vessels. Future questionnaires might also generate information about the movement of the goods within the port itself. And, if possible, future questionnaires could request information on international shipments moving on through rates to provide a measure of the use of intermodalism.

It is recognized that these latter recommendations are idealistic. Nevertheless, every consideration should be

given to improving this potentially valuable informational resource.

Undertaken at regular intervals, a properly constructed survey of domestic and international transportation of U.S. foreign trade will result in sample data which provide valuable and reliable current information. Once this data source is established, regulatory agencies, courts, corporations, and transportation specialists will be able to develop more informed policy decisions that could lead to a more efficient use of limited resources.

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APPENDIX A

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE

Item Order on Record Layout[1]	Item Description	Number of Characters	Key to Codes or Reference to Key
1	Statistical month and computer control number	6 2	1st two digits are Foreign Trade Div. statistical month of shipment.
2a	Origin (exports only)	1	D = Domestic F = Foreign
2b	Serial (VGN) number in order of sample selection. Shipments are stratified and serialized within 1st digit identifying groups. By systematic assignment of records in groups 2, 4, 6, and 8 to variance groups (VGNs) a basis would exist for estimating sampling variability.	7	1st Digit: Code Item (TE) 1 VEX Certainty 2 VEX Non-Cert. 3 AREX Certainty 4 AREX Non-Cert. 5 VIM Certainty 6 VIM Non-Cert. 7 ARIM Certainty 8 ARIM Non-Cert. 2nd Digit: (STRATA) Stratum (weight for vessel and value for air) in which item was selected. See STM 2.1 p. 10-13 for breaks. 3rd, 7th Digits: Order of selection in sample within the 8 1st digit groups. Serial Number
3	SIC Foreign Trade Division recode from schedules A and B revised.	4	See Sections 3 and 8 of "U.S. Foreign Trade Statistics, Classifications and Cross-Classifications: 1970," Foreign Trade Division, Bureau of the Census.

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

Item Order on Record Layout[1]	Item Description	Number of Characters	Key to Codes or Reference to Key
4	I-O Sector, Office of Business Economics. Input-output commodities recoded from SIC in previous item.	2	
5	Maritime Trade Route, Maritime Administration. Recode based upon foreign port and U.S. coastal district.	2	
6	MOT P/E to P/D. Means of transport from port of entry to place of destination. Imports only coded from questionnaire. MOT point acquired to port of export for exports.	1	Code Transport. 1 Rail 2 Truck 3 Air 4 Inland Water 5 Other 6 Unknown 0 P/E and P/D same
7	TCC Approximate transportation. Commodity code (same as STCC to 5 digits) Recoded from SAR and SBR (see item 9 following)	6	A sixth digit (*) indicates a "cluster." Cluster "bridge" available from Trans. Div., Bureau of Census

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

Item Order on Record Layout[1]	Item Description	Number of Characters	Key to Codes or Reference to Key
8	MOT P/E to P/U Means of Transport from Port of Entry to Port of Unloading. Imports only--coded from declaration.	1	Code Transport. 1 Rail 2 Truck 3 Air 4 Inland Water 5 Other 6 Unknown 0 P/E and P/U same
9a	WORLD AREA: Recode of foreign country of origin (imports) and exports (exports).	2	See Appendix C for codes.
9b	Commodity SAR-SBR 5-digit Schedule A Revised (imports) or Schedule B Revised (exports)	4	See "U.S. Foreign Trade Statistics, Classifications and Cross-Classifications: 1970"
10	MOT International Means of Transport of International Movement	1	Code Transport. 1 Vessel 4 Vessel 3 Air
11	U.S. or other. Flag of International Carrier	1	Code Transport. 0 U.S. 5 Other
12	Estimated Universe Value.[2] This will be the sampling interval for air shipments and the reciprocal of the sampling rate times actual value for vessel. Same as actual value for certainty shipments. In whole dollars.	12	

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

Item Order on Record Layout[1]	Item Description	Number of Characters	Key to Codes or Reference to Key
13	Estimated Universe SWT.[2] This will be the sampling interval for sampled vessel shipments and the reciprocal of the sampling rate times actual weight for sampled air. Same as actual weight for certainty shipments. In whole pounds.	12	
14	Unweighted Value.[2] Actual value in whole dollars of sampled shipment.	12	
15	Unweighted SWT.[2] Actual weight in whole pounds of sampled shipment.	12	
16	International container: Did shipment move in a reusable container in the international movement? From questionnaire.	1	Code Response 1 Yes 2 No 3 Don't Know
17	Domestic container: Did shipment move in same container (if previous item answered yes) for U.S. domestic movement?	1	Code Response 1 Yes 2 No 3 Don't Know

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

Item Order on Record Layout[1]	Description	Number of Characters	Key to Codes or Reference to Key
18	Packaging. Vessel only. For shipments not moving in reusable containers, how was the shipment packaged?	1	Code Response 1 Palletized 2 Individual lots, cases, or barrels 3 Ships tank 4 Bulk 5 Don't Know
19	Entry D/P. U.S. Customs District of entry (imports only) No comparable code for exports	2	See Schedule D, "U.S. Foreign Trade Statistics, Classification and Cross-Classifications: 1970"
20	Unloading D/P U.S. Customs District of unlading (imports), Customs District of lading (exports)	2	See Schedule D, "U.S. Foreign Trade Statistics, Classification and Cross-Classifications: 1970"
21	PE-STATE, PA, MA Port of entry (Census Division and State, production area, and market area codes); place of production for exports	6	Place of production (exports); entry (imports)
22	PU-STATE, PA, MA Same as previous items for U.S. port of unlading (imports) and port of lading (exports)	6	

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

Item Order on Record Layout[1]	Item Description	Number of Characters	Key to Codes or Reference to Key
23	PD--STATE, PA, MA Same as previous items for U.S. place of destination (imports) or place acquired (exports)	6	
24	Miles PE/PU Miles[3] between the port of entry and port of unlading (imports)	6	Actual miles *fill if State code is 01, 02, 03
25	Miles PU/PD Miles[3] between port of unlading and the place of destination (imports)	6	Actual miles *fill if State code is 01, 02, 03
26	Miles PE/PD Miles[3] between the port of entry and the place of destination (imports)	6	Actual miles *fill if State code is 01, 02, 03

[1]Import record layout. Almost identical for exports except that fields pertaining to imports only are blank in export record and vice versa.

[2]Where there was more than one U.S. destination (imports) or U.S. origin (exports), the sampled international shipment was split into that number of U.S. movements. The total international weights and values were divided among these U.S. movements based upon the "percent of total value on the questionnaire."

CONTENT OF "SHIPMENT" RECORD IN PUBLIC USE TAPE, cont.

[3] Straight-line miles computed using the PICADAD system. Actual miles may be approximated by applying circuitry factors to the straight-line miles based upon means of transport. If origin or destination is unknown, then miles field is blank.

GENERAL NOTES

1. The "shipment" is a "line item" on an export declaration (or corresponding import document) when only one U.S. domestic origin or destination is reported on the questionnaire. If two or more domestic origins or destinations are involved, the line item is subdivided into as many parts (called "shipments") as needed, and the weight and value shown in items 14 and 15 relate to the appropriate part or shipment.

2. U.S. Interior Geographic Areas.--These are identified in items 21 to 23 as States, and also "Production Areas." The latter consist of 25 major industrial Standard Metropolitan Statistical Areas (or clusters of SMSA's) used for measuring origin/destination commodity flows in the census of transportation.

3. The computed distances in items 24 to 26 are based on a computer system (PICADAD) for measuring straight-line distances between pairs of cities or areas in the United States.

4. The "universe equivalents" are the weight and value of the "shipment" shown in items 12 and 13 expanded by the sampling rate used to select the import or export document. The universe equivalents should be used for all tabulations involving aggregation of shipments. The weight and value shown in items 14 and 15 should be used for classifying transactions by size.

Source: U.S. Bureau of the Census, Domestic and International Transportation of U.S. Foreign Trade: 1970, U.S. Government Printing Office, Washington, D.C., 1972.

APPENDIX B

SPECIFICATION OF THE GREAT LAKES REGION USED TO SEGREGATE THE DATA BASE

The basic geographic units employed on the Domestic and International Transportation of U.S. Foreign Trade: 1970 public use tapes are each labeled with a unique 6-digit numerical code that identifies the (1) state, (2) the production area and (3) the market area. This coding is used for Items 21, 22 and 23 on the public use tapes. However, this level of detail was not required for the analyses conducted for this study. Therefore, the same geographical units were assigned a 4-digit recode that contained information specific to this study in a more compact form.

The fifty states, plus the Virgin Islands and Puerto Rico, were segregated into the Great Lakes Region (GLR) and non-Great Lakes Region, given the definition developed by the United States Corps of Engineers in their study, Great Lakes-Overseas General Cargo Traffic Analysis, 1967. Each group was ordered alphabetically.

All identifiable areas were then sequentially recoded beginning with 001 for the Denver, Colorado SMSA in the Great Lakes Region and ending with 188 for the non-SMSA area in Puerto Rico and the Virgin Islands. There are 183 identifiable SMSA or non-SMSA areas in the original code and the recode numbers 067-071 were not used. In addition, a recode of 195 means that the code was "blank," 196 is "no answer," 197 is

"foreign country," and 198 is "production unknown," for a total of 187 possible recodes.

All identifiable areas which contained a Great Lakes port, which are listed in U.S. Great Lakes Ports' Monthly Statistics for Overseas and Canadian Waterborne Traffic 1970 by the Chicago Association of Commerce and Industry, Research and Statistics Division, were further identified by a "1" after the three-digit recode (for example, the Port of Chicago, Illinois is 0041). All other areas were assigned zero as a fourth digit.

It will be noted that the states of New York and Pennsylvania presented unique problems in this recoding process. These states are unique in that they have both Great Lakes and ocean ports. The Corps of Engineers GLR definition splits both states. Unfortunately, the split did not correspond to the geographical units defined on the public use tapes. Therefore, 4 geographical units are listed in both the GLR and the non-GLR. These areas are listed below.

State	Recode	Code	SMSA's Included
New York	0401	210998	Albany, Schenectady-Troy, Syracuse, Utica-Rome
New York	0420	213098	SMSA
New York	0431	215000	non-SMSA
Pennsylvania	0561	235000	non-SMSA

The make-up of each area was reviewed to determine the best means of treating it with respect to the various analyses to be conducted during this study. It was decided to treat all

areas except 401 as part of the GLR in all analyses. This is deemed consistent with the use of the very broad Corps definition of the hinterland.

Within the area recoded 0401 we are unable to separate the Albany-Schenectady-Troy SMSA (which is not in the GLR) from the Syracuse SMSA and the Utica-Rome SMSA (both of which are in the GLR). Thus, this single area has both Great Lakes ports, Rochester and Oswego, as well as an inland coastal port, Albany. An analysis of the relative volume and make-up of the traffic passing through these ports during 1970 justified treating the area as falling within the GLR with respect to hinterland analyses but as part of the East Coast with respect to port-dependent export and import coastal analyses. The primary reason for the latter assignment is the fact that the 1970 tonnage for Albany's port nearly quadrupled that of either Rochester or Oswego.

GREAT LAKES REGION

State	Recode	Code	SMSA's Included
Colorado	0010	842298	Denver
Colorado	0020	843098	Colorado Springs, Pueblo
Colorado	0030	845000	non-SMSA
Illinois	0041	331598	Chicago
Illinois	0050	331898	St. Louis SMSA
Illinois	0060	333098	Bloomington, Champaign, Decatur, Peoria, Rockford, Rock Island, Springfield
Illinois	0070	335000	non-SMSA
Indiana	0080	321498	Cincinnati SMSA
Indiana	0091	321598	Gary-Hammond-East Chicago
Indiana	0100	323036	Indianapolis, Muncie, Terre Haute
Indiana	0110	323037	Louisville SMSA
Indiana	0120	323098	Andersonville, Evansville, Fort Wayne, Lafayette, South Bend
Indiana	0130	325000	non-SMSA
Iowa	0140	423046	Omaha SMSA
Iowa	0150	423098	Cedar Rapids, Davenport, Des Moines, Dubuque, Sioux Falls, Waterloo, Sioux City
Iowa	0160	425000	non-SMSA
Kansas	0170	473047	Topeka, Kansas City
Kansas	0180	473098	Wichita
Kansas	0190	475000	non-SMSA
Kentucky	0200	611498	Cincinnati SMSA
Kentucky	0210	613037	Louisville
Kentucky	0220	613098	Lexington, Owensboro, Evansville, Huntington-Ashland
Kentucky	0230	615000	non-SMSA
Michigan	0241	341398	Ann Arbor, Detroit, Flint, Toledo
Michigan	0251	343035	Grand Rapids, Muskegon
Michigan	0261	343098	Bay City, Jackson, Kalamazoo, Lansing, Monroe, Saginaw
Michigan	0271	345000	non-SMSA
Minnesota	0280	411798	Minneapolis-St. Paul
Minnesota	0291	413098	Duluth, Rochester, Fargo-Moorhead
Minnesota	0301	415000	non-SMSA
Missouri	0310	431898	St. Louis
Missouri	0320	433047	Kansas City, St. Joseph

Great Lakes Region, cont.

State	Recode	Code	SMSA's Included
Missouri	0330	433098	Columbia, Springfield
Missouri	0340	435000	non-SMSA
Montana	0350	813098	Billings, Great Falls
Montana	0360	815000	non-SMSA
Nebraska	0370	463046	Lincoln, Omaha
Nebraska	0380	463098	SMSA, Sioux City
Nebraska	0390	465000	non-SMSA
New York	0401	210998	Albany, Schenectady-Troy, Syracuse, Utica-Rome
New York	0411	211098	Buffalo, Rochester
New York	0420	213098	SMSA
New York	0431	215000	non-SMSA
North Dakota	0440	443098	Fargo-Moorhead
North Dakota	0450	445000	non-SMSA
Ohio	0461	311198	Akron, Canton, Cleveland, Lorain-Elyria, Youngstown-Warren
Ohio	0470	311298	Steubenville-Weirton, Wheeling
Ohio	0481	311398	Toledo
Ohio	0490	311498	Cincinnati, Hamilton-Middletown, Dayton, Springfield
Ohio	0500	313034	Columbus
Ohio	0510	313098	Lima, Marshfield, Huntington-Ashland
Ohio	0521	315000	non-SMSA
Pennsylvania	0531	231198	Erie
Pennsylvania	0540	231298	Pittsburgh
Pennsylvania	0550	233098	Altoona, Johnstown
Pennsylvania	0561	235000	non-SMSA
South Dakota	0570	453098	Sioux Falls
South Dakota	0580	455000	non-SMSA
West Virginia	0590	551298	Wheeling, Steubenville-Weirton
West Virginia	0600	553098	Charleston, Huntington-Ashland
West Virginia	0610	555000	non-SMSA
Wisconsin	0621	351698	Kenosha, Milwaukee, Racine
Wisconsin	0631	353098	Appleton, Green Bay, LaCrosse, Madison, Superior
Wisconsin	0641	355000	non-SMSA
Wyoming	0650	833098	SMSA
Wyoming	0660	835000	non-SMSA

NON-GREAT LAKES REGION

State	Recode	Code	SMSA's Included
Alabama	0720	633042	Birmingham, Tuscaloosa
Alabama	0730	633044	Mobile
Alabama	0740	633098	Columbus, Ga., Gadsden, Huntsville, Montgomery
Alabama	0750	635000	non-SMSA
Alaska	0760	943098	SMSA
Alaska	0770	945000	non-SMSA
Alaska	0780	945099	non-SMSA
Arizona	0790	863051	Phoenix, Tucson
Arizona	0800	863098	SMSA
Arizona	0810	865000	non-SMSA
Arkansas	0820	713039	Memphis
Arkansas	0830	713098	Fort Smith, Little Rock, Pine Bluff, Texarkana
Arkansas	0840	715000	non-SMSA
California	0850	932498	San Francisco-Oakland, San Jose, Vallejo-Fairfield-Napa
California	0860	932598	Anaheim-Santa Ana-Garden Grove, Los Angeles-Long Beach, Riverside-San Bernardino-Ontario
California	0870	933053	Sacramento, Stockton
California	0880	933054	Bakersfield, Fresno
California	0890	933055	San Diego
California	0900	933098	Modesto, Santa Rosa, Oxnard-Sima Valley-Ventura, Salinas-Seaside-Monterey, Santa Barbara-Santa Maria-Lompoc
California	0910	935000	non-SMSA
Connecticut	0920	160298	Bridgeport, Hartford, Meriden, New Britain, New Haven, Norwalk, Stamford, Waterbury, Springfield-Chicopee-Holyoke
Connecticut	0930	163098	Danbury, New London
Connecticut	0940	165000	non-SMSA
Delaware	0950	510598	Wilmington
Delaware	0960	513098	SMSA
Delaware	0970	515000	non-SMSA
District of Columbia	0980	533032	Washington
District of Columbia	0990	533098	SMSA

Non-Great Lakes Region, cont.

State	Recode	Code	SMSA's Included
District of Columbia	1000	535000	non-SMSA
Florida	1010	593041	Fort Lauderdale-Hollywood, Miami, West Palm Beach
Florida	1020	593043	Tampa-St. Petersburg
Florida	1030	593044	Pensacola
Florida	1040	593098	Gainsville, Jacksonville, Orlando, Tallahassee
Florida	1050	595000	non-SMSA
Georgia	1060	581998	Atlanta
Georgia	1070	583040	Augusta
Georgia	1080	583098	Albany, Chattanooga, Columbus, Macon, Savannah
Georgia	1090	585000	non-SMSA
Hawaii	1100	953098	Honolulu
Hawaii	1110	955000	non-SMSA
Hawaii	1120	955099	non-SMSA
Idaho	1130	823098	Boise
Idaho	1140	825000	non-SMSA
Louisiana	1150	723045	New Orleans
Louisiana	1160	723098	Alexandria, Baton Rouge, Lafayette, Lake Charles, Monroe, Shreveport
Louisiana	1170	725000	non-SMSA
Maine	1180	113098	Portland, Lewiston
Maine	1190	115000	non-SMSA
Maryland	1200	520598	Wilmington, Del.
Maryland	1210	520698	Baltimore
Maryland	1220	523032	Washington, D.C.
Maryland	1230	523098	SMSA
Maryland	1240	525000	non-SMSA
Massachusetts	1250	140198	Boston, Brockton, Laurence-Haverhill, Lowell, Worchester
Massachusetts	1260	140298	Springfield-Chicopee-Holyoke
Massachusetts	1270	143098	Fall River, Fitchburg-Leominster, New Bedford, Pittsfield
Massachusetts	1280	145000	non-SMSA
Mississippi	1290	643098	Gulf Port, Jackson
Mississippi	1300	645000	non-SMSA
Nevada	1310	883098	Las Vegas, Reno
Nevada	1320	885000	non-SMSA
New Hampshire	1330	120198	Laurence-Haverhill

Non-Great Lakes Region, cont.

State	Recode	Code	SMSA's Included
New Hampshire	1340	123098	Manchester, Nashua
New Hampshire	1350	125000	non-SMSA
New Jersey	1360	220498	Jersey City, Middlesex County, Newark, Patterson-Clifton-Passaic, Somerset County
New Jersey	1370	220598	Trenton, Wilmington, Philadelphia
New Jersey	1380	220798	Allentown-Bethlehem-Easton SMSA
New Jersey	1390	223098	Atlantic City, Vineland-Millville-Bridgeton
New Jersey	1400	225000	non-SMSA
New Mexico	1410	853098	Albuquerque
New Mexico	1420	855000	non-SMSA
New York	1430	210398	New York
New York	1440	210598	Philadelphia SMSA
New York	0401	210998	Albany-Schenectady-Troy, Syracuse, Utica-Rome
New York	1450	213031	Binghamton
New York	0420	213098	SMSA
New York	0431	215000	non-SMSA
North Carolina	1460	563098	Ashville, Charlotte, Durham, Fayetteville, Greensboro-Winston Salem-Highpoint, Raleigh, Wilmington
North Carolina	1470	565000	non-SMSA
Oklahoma	1480	733048	Oklahoma City, Tulsa
Oklahoma	1490	733098	Fort Smith, Lawton
Oklahoma	1500	735000	non-SMSA
Oregon	1510	923052	Portland
Oregon	1520	923098	Eugene, Salem
Oregon	1530	925000	non-SMSA
Pennsylvania	1540	230598	Philadelphia
Pennsylvania	1550	230798	Allentown-Bethlehem-Easton, Reading
Pennsylvania	1560	230898	Harrisburg, Lancaster, York
Pennsylvania	1570	233031	Scranton, Wilkes-Barre-Hazleton, Binghamton, N.Y.
Pennsylvania	0561	235000	non-SMSA
Rhode Island	1580	150198	Providence-Pawtucket, Warwick
Rhode Island	1590	153098	Fall River
Rhode Island	1600	155000	non-SMSA
South Carolina	1610	573040	Augusta, Ga., Columbia
South Carolina	1620	573098	Charleston, Greenville

Non-Great Lakes Region, cont.

State	Recode	Code	SMSA's Included
South Carolina	1630	575000	non-SMSA
Tennessee	1640	623038	Nashville
Tennessee	1650	623039	Memphis
Tennessee	1660	623098	Chattanooga, Knoxville
Tennessee	1670	625000	non-SMSA
Texas	1680	742098	Dallas, Fort Worth
Texas	1690	742198	Beaumont-Port Arthur, Galveston-Texas City, Houston
Texas	1700	743049	Austin, San Antonio
Texas	1710	743098	Abilene, Amarillo, Brownsville-Harlingen-San Benito, Bryan-College Station, Corpus Christi, El Paso, Laredo Lubbock, McAllen-Pharr-Edinburg, Midland, Odessa, San Angelo, Sherman-Denison, Texarkana, Tyler, Waco, Wichita Falls
Texas	1720	745000	non-SMSA
Utah	1730	873050	Ogden, Provo-Orem, Salt Lake City
Utah	1740	873098	SMSA
Utah	1750	875000	non-SMSA
Vermont	1760	133098	SMSA
Vermont	1770	135000	non-SMSA
Virginia	1780	543032	Washington, D.C.
Virginia	1790	543033	Newport News-Hampton, Norfolk-Virginia Beach-Portsmouth
Virginia	1800	543098	Lynchburg, Roanoke
Virginia	1810	545000	non-SMSA
Washington	1820	912398	Seattle-Everett, Tacoma
Washington	1830	913052	Portland
Washington	1840	913098	Spokane
Washington	1850	915000	non-SMSA
Virgin Islands-Puerto Rico	1860	503098	SMSA
Virgin Islands-Puerto Rico	1870	505000	non-SMSA
Virgin Islands-Puerto Rico	1880	505099	non-SMSA
Blank	1950	000000	
No Answer	1960	010000	
Foreign Country	1970	020000	
Production Unknown (Exports)	1980	030000	

APPENDIX C

DEFINITION OF MAJOR PORTS AND COASTS

Throughout this report, analysis has been restricted to those data deemed most significant with respect to orientation of this study. The selection criterion for major ports was that only those ports having a total of 49 or more Great Lakes related shipments, i.e., exports plus imports, would be considered in the analysis. This particular cutoff number was chosen because it accounted for over 95 per cent of all the sample shipments on the tapes. Twenty-seven ports met this criterion.

These major ports, as identified by Item 22 on the tapes, i.e., the 4-digit recode of the state, production area, market area code, were grouped geographically with each group identified as a coast. Coastal groupings were employed as specified on the following table.

SIX COAST GROUPING OF MAJOR PORTS*

Coast	Item 22	Interpretation
Great Lakes		
	0041	Chicago
	0241	Detroit
	0261	Lansing
	0291	Duluth
	0411	Buffalo
	0461	Cleveland
	0481	Toledo
	0521	Ohio (non-SMSA)
	0621	Milwaukee
	0641	Wisconsin (non-SMSA)
Northeast		
	0401	Albany
	1210	Baltimore
	1250	Boston
	1370	Philadelphia (NJ)
	1430	New York City
	1540	Philadelphia (Pa.)
Southeast		
	1010	Miami
	1790	Norfolk
Gulf		
	0730	Mobile
	1150	New Orleans
	1160	Lake Charles
	1170	Louisiana (non-SMSA)
	1690	Houston/Galveston
West Central		
	0850	S.F./Oakland
	0860	L.A./Long Beach
Northwest		
	1820	Seattle
	1850	Washington (non-SMSA)

*A second 4 coast grouping was formed by consolidating Northeast and Southeast into the East Coast and West Central and Northwest into the West Coast.

APPENDIX D

METHOD OF SELECTING COMMODITIES TO BE MAPPED BY COAST

Throughout the hinterland study, the weight of the commodity shipments has been taken as the most representative measure of activity through ports. Both import and export commodities selected to be mapped were chosen as follows. First, the top five commodities ranked by total shipment weight were automatically selected. Then, an analysis was made of the top five commodities ranked by both value and the number of shipments. If a commodity fell into the top five in both of these second categories it too was added as a commodity to be analyzed along with the top five commodities selected by weight. As it turned out, only one commodity was added to exports--SBR-4, and one to imports--SAR-73. The six commodities meeting the selection criteria for exports and imports are listed on the following table.

COMMODITIES EVALUATED BY MAPPING

EXPORTS

SBR Code	Commodity Description
4	Cereal and Cereal Preparations
8	Feeding-Stuff for Animals, Excluding Unmilled Cereals
27	Fertilizers and Minerals
28	Metalliferous Ores and Metal Scrap
33	Petroleum and Petroleum Products
67	Iron and Steel

IMPORTS

SAR Code	Commodity Description
6	Sugar, Sugar Preparation and Honey
27	Fertilizers and Minerals
51	Chemical Elements and Compounds
64	Paper, Paperboard and Manufactures Thereof
67	Iron and Steel
73	Transport Equipment

APPENDIX E

SUPPORTING DATA FOR MAPS 1 THROUGH 18

Each of the following tables relates directly to one of the pages of maps appearing in the main body of the report. Contents of the tables consist of input data used in the generation of the maps. This procedure is described in Appendix L. State totals were derived by summing Item 23 for both exports and imports from the Domestic and International Transportation of U.S. Foreign Trade: 1970 public use tapes over specified ranges of the 4-digit recode of state, production area and market area. This specification appears in Appendix A. It should be noted that the data is subject to the rounding errors inherent in the conversion of the source data from pounds to tons and the subsequent summation to state totals. Any blank space indicates zero shipments.

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS
THROUGH GREAT LAKES PORTS

State	Short Tons					
	Chicago	Cleveland	Detroit	Duluth	Milwaukee	Toledo
Alabama						
Arizona						
Arkansas						
California						
Colorado					553	
Connecticut						
Delaware						
Florida						
Georgia						
Idaho						
Illinois	830,313		38	306	9,799	
Indiana	134,746		16			
Iowa	36,841			461	1,223	10
Kansas					2,718	
Kentucky	1,816				13	99
Louisiana	2,784					
Maine			20			
Maryland						
Massachusetts	898					
Michigan	620		742,307			
Minnesota	4,528			215,841	2,538	1,308
Mississippi						
Missouri	1,256				586	
Montana						

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS
THROUGH GREAT LAKES PORTS (CONTINUED)

State	Short Tons					
	Chicago	Cleveland	Detroit	Duluth	Milwaukee	Toledo
Nebraska	3,933				1,826	
Nevada						
New Hampshire						
New Jersey						
New Mexico						
New York	403					
North Carolina						
North Dakota				17,520		
Ohio	310	187,128	152			123,928
Oklahoma						
Oregon						
Pennsylvania	348	6,262				
Rhode Island						
South Carolina						
South Dakota	76,075			291	51	24
Tennessee						
Texas						
Utah	119					
Vermont						
Virginia						
Washington			1,051			
West Virginia						
Wisconsin	2,214		155	4,789	151,429	
Wyoming	172,692					

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS
THROUGH GREAT LAKES PORTS

State	Short Tons					
	Chicago	Cleveland	Detroit	Duluth	Milwaukee	Toledo
Alabama						
Arizona						
Arkansas			66			
California	12					
Colorado						
Connecticut			574			
Delaware	1,077					
Florida						
Georgia			9			1,187
Idaho						
Illinois	700,958	1,154	2,584		480	2,569
Indiana	57,091	328	2,570		150	12,531
Iowa	435		81	357	274	
Kansas	1		1			
Kentucky	51					
Louisiana	151		1			
Maine			44			
Maryland		2,216				
Massachusetts	10	403				
Michigan	17,255	10,267	757,280		21	7,051
Minnesota	2,404		29	23,715	938	234
Mississippi	641					
Missouri	602		2			
Montana						

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS
THROUGH GREAT LAKES PORTS (CONTINUED)

State	Short Tons					
	Chicago	Cleveland	Detroit	Duluth	Milwaukee	Toledo
Nebraska	1,329		1,386			
Nevada						
New Hampshire						
New Jersey	50		287			
New Mexico						
New York	1,365	860	579			935
North Carolina		6				
North Dakota				711		
Ohio	3,424	159,321	12,998		32	154,333
Oklahoma						
Oregon						
Pennsylvania	1,064	11,141	3,633			
Rhode Island						
South Carolina						
South Dakota						
Tennessee						
Texas	5,425	2,202	93			
Utah			6			
Vermont						
Virginia						
Washington						
West Virginia						
Wisconsin	2,354		187	1,631	158,806	
Wyoming						

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF CEREAL PREPARATIONS (SBR 4)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama			18,899	
Arizona				
Arkansas				
California				
Colorado	553		1,403	
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois	13,406	8,888	8,088	2,388
Indiana		2,568	279	
Iowa	1,151		1,029	
Kansas	2,717	110	122,606	
Kentucky			49	
Louisiana			8,946	
Maine				
Maryland		1,018		
Massachusetts	897			
Michigan		41		
Minnesota	15,584		2,747	
Mississippi				
Missouri	516	5	8,956	3,282
Montana				
Nebraska	1,798	229	5,952	3,089
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York		797		
North Carolina				
North Dakota				
Ohio	1,515	100		
Oklahoma			4,301	
Oregon				
Pennsylvania		488		

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS

OF CEREAL PREPARATIONS (SBR 4) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee			50	
Texas			148,838	
Utah				
Vermont				
Virginia		3,600		
Washington				5,212
West Virginia				
Wisconsin	22,381	4,496	491	
Wyoming				

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF FEEDING STUFF FOR ANIMALS (SBR 8)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama			103,742	
Arizona				
Arkansas				
California				
Colorado				
Connecticut				
Delaware				
Florida		19		
Georgia				
Idaho				
Illinois	295,830	87,288	589,530	
Indiana		335,390		
Iowa	34,554		2,901	
Kansas			7,861	
Kentucky			50,520	
Louisiana			82,964	
Maine				
Maryland				
Massachusetts				
Michigan				
Minnesota	126,582		7,233	
Mississippi			3,055	
Missouri			3,048	
Montana				
Nebraska	3,655		15,507	
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York		189		
North Carolina				
North Dakota	17,519			
Ohio	31,810	34,435		
Oklahoma				
Oregon				
Pennsylvania				

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF FEEDING STUFF FOR ANIMALS (SBR 8) (CONTINUED)

State	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee			1,528	
Texas			118,288	
Utah				
Vermont				
Virginia				
Washington				1,381
West Virginia				
Wisconsin	160			
Wyoming				

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF FERTILIZERS AND MINERALS (SBR 27)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California		9		2
Colorado				1
Connecticut				
Delaware				
Florida			225	
Georgia				
Idaho				
Illinois		69		
Indiana				
Iowa				
Kansas				
Kentucky				
Louisiana			469	
Maine				
Maryland				
Massachusetts		3		
Michigan	134,534	10	3,513	
Minnesota				
Mississippi				
Missouri			4,661	
Montana		10		3,082
Nebraska				
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York	338			
North Carolina		27		
North Dakota				
Ohio	41,748	24		
Oklahoma				
Oregon				
Pennsylvania		9,281		

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS

OF FERTILIZERS AND MINERALS (SBR 27) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota	76,105	1,179	565	60
Tennessee				
Texas				131
Utah	119			
Vermont				
Virginia		3		
Washington				
West Virginia				
Wisconsin				166
Wyoming	172,692		35,150	2,372

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF METALLIFEROUS ORES AND SCRAP (SBR 28)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado			701	
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois	164,284	1,940	149,675	
Indiana	22,696	303		
Iowa				
Kansas				
Kentucky				
Louisiana				
Maine				
Maryland		5,507		
Massachusetts		3,174		
Michigan	364,179	597		
Minnesota	77,395			
Mississippi				
Missouri			1,194	
Montana				
Nebraska				
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York		362,488		
North Carolina				
North Dakota				
Ohio	17,269			
Oklahoma				
Oregon				
Pennsylvania		3,660		

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS

OF METALLIFEROUS ORES AND SCRAP (SBR 28) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota		4,041		
Tennessee				
Texas				
Utah				
Vermont				
Virginia				
Washington				
West Virginia		1		
Wisconsin	125,272			
Wyoming				

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF PETROLEUM PRODUCTS (SBR 33)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado			4,618	
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois	101,273	24,261	7,115	
Indiana	19,622			
Iowa				
Kansas			105,752	4,695
Kentucky				
Louisiana			6,251	
Maine				
Maryland		1,650		
Massachusetts				
Michigan	61,247			
Minnesota				
Mississippi				
Missouri	1,255			
Montana				
Nebraska				
Nevada				
New Hampshire				
New Jersey		34,180		
New Mexico				
New York		80		
North Carolina				
North Dakota				
Ohio	90,776	14	2,484	
Oklahoma			17,023	3,780
Oregon				
Pennsylvania		18,619	1,064	

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS

OF PETROLEUM PRODUCTS (SBR 33) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas			69,856	3,895
Utah				
Vermont				
Virginia				
Washington				
West Virginia		6,011		
Wisconsin				
Wyoming				

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS OF IRON AND STEEL (SBR 67)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama			103	
Arizona				
Arkansas				
California				
Colorado			3,093	
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois	247,138	381	199,334	
Indiana	92,085	298	269,678	
Iowa			351	
Kansas				
Kentucky	1,815	156	4,922	
Louisiana	2,783		229,382	
Maine				
Maryland		58,431		
Massachusetts				
Michigan	195,340	881		
Minnesota		11,022		
Mississippi				
Missouri			1,020	
Montana				
Nebraska				
Nevada				
New Hampshire				
New Jersey		110		
New Mexico				
New York	19,090	3,526	4,480	
North Carolina				
North Dakota				
Ohio	153,639	68,963	325,532	
Oklahoma				
Oregon				
Pennsylvania	6,608	70,568	390,340	

PLACE OF ACQUISITION OF GREAT LAKES RELATED EXPORTS

OF IRON AND STEEL (SBR 67) (CONTINUED)

State	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas			1,327	
Utah				
Vermont				
Virginia		769		
Washington	1,051			
West Virginia		10,284	12,811	
Wisconsin				
Wyoming				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS
OF SUGAR DERIVATIVES (SAR 6)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado				
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois		70	31,994	
Indiana			3,543	
Iowa			17,910	
Kansas			6,821	
Kentucky			7,954	
Louisiana				
Maine				
Maryland		515		
Massachusetts		15,702		
Michigan				
Minnesota			18,613	
Mississippi				
Missouri				
Montana			38,446	
Nebraska			67,985	
Nevada				
New Hampshire		15,702		
New Jersey		4,636		
New Mexico				
New York		93,092		
North Carolina				
North Dakota				
Ohio	9,234	6,872	13,982	
Oklahoma				
Oregon				
Pennsylvania		21,016	10,474	

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF SUGAR DERIVATIVES (SAR 6) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas				
Utah				
Vermont		14,946		
Virginia		756		
Washington				
West Virginia		3,809		
Wisconsin		15		
Wyoming				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS
FERTILIZERS AND MINERALS (SAR 27)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama	306			
Arizona				
Arkansas				
California				
Colorado				
Connecticut				
Delaware				
Florida				
Georgia	11			
Idaho				
Illinois	235,257	2,838	885	
Indiana	4,697		1,122	
Iowa				
Kansas				
Kentucky		2,937	756	
Louisiana				
Maine				
Maryland				
Massachusetts				
Michigan	253,887	50		
Minnesota	19,757		1,520	
Mississippi				
Missouri				
Montana				
Nebraska				
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York	12,132	10,477		30
North Carolina				
North Dakota	700			
Ohio	129,747	5,608	10,638	
Oklahoma				
Oregon				
Pennsylvania	6,419	10,052	18,733	

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS

FERTILIZERS AND MINERALS (SAR 27) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas				
Utah				
Vermont				
Virginia		29,250		
Washington				
West Virginia	1,955	1,388	35,141	
Wisconsin	107,855		1,078	
Wyoming				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF CHEMICALS (SAR 51)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado				
Connecticut				
Delaware				
Florida				
Georgia				
Idaho				
Illinois	5,024	10	35,421	
Indiana			11,988	
Iowa				
Kansas				
Kentucky		152	70,205	
Louisiana				
Maine				
Maryland				
Massachusetts				
Michigan	33,194	116		
Minnesota				
Mississippi				
Missouri			3,127	
Montana				277,165
Nebraska				
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York		2,262		
North Carolina				
North Dakota				
Ohio	17	187		
Oklahoma				
Oregon				
Pennsylvania		99	497	

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF CHEMICALS (SAR 51) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas	5,408			
Utah				
Vermont				
Virginia				
Washington				
West Virginia		280		
Wisconsin				
Wyoming				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS

OF PAPER AND PAPER PRODUCTS (SAR 64)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado				1,362
Connecticut				
Delaware				
Florida		3,559		
Georgia	1,187			
Idaho				
Illinois	183,791	27		
Indiana	50	45	54	
Iowa				
Kansas				419
Kentucky		309	1,133	
Louisiana				
Maine				
Maryland				
Massachusetts				
Michigan	53,638			
Minnesota				
Mississippi				
Missouri				
Montana				
Nebraska				
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York	9,981	23		
North Carolina				
North Dakota				
Ohio	27,535		2,510	
Oklahoma				
Oregon				
Pennsylvania				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF PAPER AND PAPER PRODUCTS (SAR 64) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee				
Texas				
Utah				
Vermont				
Virginia				
Washington				
West Virginia		34		
Wisconsin	17,139			
Wyoming				583

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF IRON AND STEEL (SAR 67)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California			99	
Colorado				
Connecticut			87	
Delaware	1,076		151	
Florida				
Georgia				
Idaho				
Illinois	261,441	133	65,410	
Indiana	63,183	340	28,116	
Iowa	500			
Kansas			1,663	
Kentucky		224	21,038	
Louisiana	151			
Maine				
Maryland	2,215			
Massachusetts	9			
Michigan	464,312	1,707	7,989	
Minnesota	5,411		790	
Mississippi	641			
Missouri	581	1	5,818	
Montana				
Nebraska	2,700		2,863	
Nevada				
New Hampshire				
New Jersey	286		139	
New Mexico				
New York	3,152	2,760	89	
North Carolina				
North Dakota	11			
Ohio	174,041	7,283	49,640	
Oklahoma				
Oregon				
Pennsylvania	15,814	6,199	20,664	

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF IRON AND STEEL (SAR 67) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota				
Tennessee			317	
Texas	2,201			
Utah				
Vermont				
Virginia				
Washington				
West Virginia			212	
Wisconsin	84,455	21	18,219	
Wyoming				

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS OF TRANSPORTATION EQUIPMENT (SAR 73)

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama				
Arizona				
Arkansas				
California				
Colorado		19	3	827
Connecticut				
Delaware				
Florida				
Georgia	9			
Idaho				
Illinois	3,798	1,497	386	13,197
Indiana	499	72	651	
Iowa	15		229	
Kansas		8	40	
Kentucky		58	49	38
Louisiana				
Maine				
Maryland				
Massachusetts				
Michigan	2,307	2,059	317	79
Minnesota	233	17	262	629
Mississippi				
Missouri		37	2,318	395
Montana				53
Nebraska			19	
Nevada				
New Hampshire				
New Jersey				
New Mexico				
New York		1,886		
North Carolina				
North Dakota			7	
Ohio	3,439	1,395	1,114	
Oklahoma				
Oregon				
Pennsylvania	9	1,732		

PLACE OF DESTINATION OF GREAT LAKES RELATED IMPORTS

OF TRANSPORTATION EQUIPMENT (SAR 73) (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota			7	
Tennessee				
Texas	90			
Utah	5			
Vermont				
Virginia				
Washington				
West Virginia		234		
Wisconsin		40	53	
Wyoming				14

PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS

State	Short Tons
Alabama	134,443
Arizona	1
Arkansas	
California	6,712
Colorado	19,831
Connecticut	211
Delaware	
Florida	80,046
Georgia	6,380
Idaho	
Illinois	2,105,736
Indiana	776,125
Iowa	56,003
Kansas	249,570
Kentucky	65,997
Louisiana	356,910
Maine	21
Maryland	69,931
Massachusetts	4,105
Michigan	833,883
Minnesota	273,019
Mississippi	4,708
Missouri	30,785
Montana	26,505
Nebraska	34,225
Nevada	68
New Hampshire	
New Jersey	35,867
New Mexico	
New York	411,508
North Carolina	185
North Dakota	18,712
Ohio	789,628
Oklahoma	25,269
Oregon	4,301
Pennsylvania	541,938

PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS
(CONTINUED)

State	Short Tons
Rhode Island	2
South Carolina	1,219
South Dakota	82,486
Tennessee	1,878
Texas	391,623
Utah	120
Vermont	
Virginia	10,515
Washington	9,556
West Virginia	34,665
Wisconsin	191,291
Wyoming	277,661

PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS

State	Short Tons
Alabama	307
Arizona	1
Arkansas	67
California	168
Colorado	5,370
Connecticut	575
Delaware	1,228
Florida	3,576
Georgia	1,597
Idaho	
Illinois	962,482
Indiana	145,317
Iowa	26,504
Kansas	11,310
Kentucky	111,728
Louisiana	164
Maine	44
Maryland	2,731
Massachusetts	29,000
Michigan	1,089,232
Minnesota	68,962
Mississippi	644
Missouri	65,244
Montana	281,914
Nebraska	76,122
Nevada	
New Hampshire	15,702
New Jersey	33,843
New Mexico	
New York	431,762
North Carolina	65
North Dakota	769
Ohio	526,447
Oklahoma	1
Oregon	
Pennsylvania	228,704

PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS (CONTINUED)

State	Short Tons
Rhode Island	2,837
South Carolina	30
South Dakota	3,471
Tennessee	326
Texas	7,908
Utah	6
Vermont	17,614
Virginia	30,038
Washington	
West Virginia	44,952
Wisconsin	326,982
Wyoming	617

PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS

THROUGH MAJOR COASTS

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama			134,443	
Arizona				
Arkansas				
California		53		3,856
Colorado	553	3,604	11,754	480
Connecticut		3		196
Delaware				
Florida		249	225	
Georgia		13	13	
Idaho				
Illinois	840,454	127,735	1,124,001	4,285
Indiana	134,762	343,290	270,276	351
Iowa	38,535	781	15,579	609
Kansas	2,718	215	236,399	5,242
Kentucky	1,928	3,467	58,099	
Louisiana	2,784	99	354,020	
Maine	20			
Maryland		69,930	1	
Massachusetts	898	3,177		
Michigan	775,159	6,850	3,522	159
Minnesota	227,465	11,176	23,985	1,722
Mississippi			3,056	
Missouri	1,842	397	24,566	3,665
Montana		11	1,772	3,192
Nebraska	5,759	455	24,804	3,198
Nevada				68
New Hampshire				
New Jersey		35,816		
New Mexico				
New York	23,186	382,598	4,481	3
North Carolina		181		
North Dakota	17,520	2		
Ohio	345,155	107,162	329,248	156
Oklahoma		1	21,437	3,826
Oregon				18
Pennsylvania	6,610	106,277	391,564	414

PLACE OF ACQUISITION OF ALL GREAT LAKES RELATED EXPORTS

THROUGH MAJOR COASTS (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island				
South Carolina				
South Dakota	76,442	5,222	645	177
Tennessee		18	1,752	
Texas		62	355,274	4,082
Utah	119			
Vermont		10,334		
Virginia				
Washington	1,051		19	6,818
West Virginia		19,779	14,739	
Wisconsin	158,586	5,189	1,097	504
Wyoming	172,692		47,501	2,373

PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS

THROUGH MAJOR COASTS

State	Short Tons			
	Great Lakes	East	Gulf	West
Alabama	306			
Arizona				
Arkansas	66			
California	12	37	100	
Colorado		286	504	4,535
Connecticut	574			
Delaware	1,077		151	
Florida		3,559		
Georgia	1,559	12		
Idaho				
Illinois	707,746	16,952	157,378	20,954
Indiana	72,876	8,387	46,527	430
Iowa	1,147	739	22,565	1,828
Kansas	2	89	9,735	1,467
Kentucky	51	4,955	101,793	273
Louisiana	153			
Maine	44			
Maryland	2,216	515		
Massachusetts	413	28,576		
Michigan	916,607	9,928	9,851	869
Minnesota	27,318	15,235	21,598	3,135
Mississippi	641			
Missouri	604	588	61,208	1,869
Montana				280,849
Nebraska	2,715	56	73,138	176
Nevada				
New Hampshire		15,702		
New Jersey	337	33,243	140	
New Mexico				
New York	164,393	252,921	221	2,890
North Carolina	6	55		
North Dakota	711		58	1
Ohio	390,658	39,285	92,877	2,427
Oklahoma				
Oregon				
Pennsylvania	22,259	65,356	50,653	24

PLACE OF DESTINATION OF ALL GREAT LAKES RELATED IMPORTS

THROUGH MAJOR COASTS (CONTINUED)

State	Short Tons			
	Great Lakes	East	Gulf	West
Rhode Island		58		
South Carolina				
South Dakota			58	386
Tennessee			318	
Texas	7,720	29		
Utah	6			
Vermont		17,614		
Virginia		30,038		
Washington				
West Virginia	1,956	7,109	35,362	
Wisconsin	262,954	3,447	19,776	1,247
Wyoming				599

APPENDIX F

MARITIME TRADE ROUTES

The Maritime Trade Routes are established shipping routes on which steamship lines serve specific ports in designated countries or sectors of the world. The attached listing describes the countries included in each Maritime Trade Route.

This listing contains only those Maritime Trade Routes that serve ports or regions in the United States. In 1970, 65 trade routes existed involving the United States; but only 17 of these trade routes involved the Great Lakes region.

The Maritime Trade Route was one of the methods in which a shipment became Great Lakes related as all shipments that involved one of the 17 Great Lakes Maritime Trade Routes immediately were classified as Great Lakes related. This process led to several curious patterns of cargo movement, called anomalies, which were analyzed in several sections of the main body of the report.

MARITIME TRADE ROUTES
1970

Trade Route Number	Description
1	Atlantic/East Coast South America
2	Atlantic/West Coast South America
4	Atlantic/Caribbean (Incl. Cristobal), East Coast Mexico
5) 7) 8) 9)	North Atlantic/United Kingdom and Ireland, Germany (North Sea), Belgium, Netherlands, Atlantic France and Spain (North of Portugal)
6	North Atlantic/Scandinavian and Baltic Ports (including Newfoundland)
10	North Atlantic/Mediterranean, Black Sea, Portugal, Spain (South of Portugal), Morocco and Azores
11	South Atlantic/United Kingdom, Continental Europe North of Portugal
12	Atlantic/Far East
13	South Atlantic and Gulf/Mediterranean, Black Sea, Portugal, Spain (South of Portugal), Morocco and Azores
(41)14-1	Atlantic (Service 1)/West Africa, Canary Is., Cape Verde Is. & Madeira Is.
(42)14-2	Gulf (Service 2)/West Africa, Canary Is., Cape Verde Is. and Madeira Is.
(43)14-3	Pacific/West Africa, Canary Is., Cape Verde Is. and Madeira Is.
(51)15-A	Atlantic/South & East Africa, Malagasy Rep., British West Africa, St. Helena, Ascension Is.
(52)15-B	Gulf/South & East Africa, Malagasy Republic, British West Africa, St. Helena, Ascension Is.
(53)15-C	Pacific/South & East Africa, Malagasy Republic, British West Africa, St. Helena, Ascension Is.
16	Atlantic, Gulf/Australasia
17	Atlantic, Gulf, Pacific/Indonesia, Malay, Singapore
18	Atlantic, Gulf/India, Persian Gulf, Red Sea, Pakistan, Ceylon, Burma
19	Gulf, Caribbean (Incl. Cristobal), East Coast of Mexico
20	Gulf/East Coast South America
21	Gulf/United Kingdom and Ireland, Continental Europe North of Portugal
22	Gulf/Far East
23	Pacific/Caribbean (Incl. Cristobal), East Coast Mexico
24	Pacific/East Coast South America
25	Pacific/West Coast South America, Central America and Mexico, Balboa
26	Pacific, Hawaii, Alaska/United Kingdom and Ireland, Continental Europe North of Portugal

Maritime Trade Routes, 1970, cont.

Trade Route Number	
(65)26-C	Pacific/Mediterranean
27	Pacific, Hawaii/Australasia
28	Pacific/Burma, Ceylon, India, Pakistan, Persian Gulf, Gulf of Aden, Red Sea
29	Pacific, Hawaii, Alaska/Far East
31	Gulf/West Coast South America
32	Great Lakes/United Kingdom and Ireland, Continental Europe North of Portugal
33	Great Lakes/Caribbean (Incl. Cristobal), East Coast Mexico
34	Great Lakes/Mediterranean, Black Sea, Portugal, Spain (South of Portugal), Morocco
35	Atlantic, Canadian Great Lakes
36	Gulf/Canadian Great Lakes
37	California/Canadian Great Lakes
38	Washington, Oregon/Canadian Great Lakes
54	Great Lakes/West Africa
55	Great Lakes/South and East Africa
56	Great Lakes/Red Sea, India, P.G., Indonesia, Malaya, Singapore
57	Round-the-World
58	Great Lakes/Pacific Canada
59	Great Lakes/Far East
60	Great Lakes/Australasia
71	Atlantic/West Coast Central America and Mexico
72	Gulf/West Coast Central America and Mexico
77	Atlantic/Pacific Canal Zone
78	Gulf/Pacific Canal Zone
80	Great Lakes/W.C. South America, Central America and Mexico
81	Atlantic/Atlantic Canada
82	Gulf/Atlantic Canada
83	Pacific/Atlantic Canada
84	Great Lakes/East Coast South America
85	Atlantic/Pacific Canada
86	Gulf/Pacific Canada
87	Pacific/Pacific Canada
89	Great Lakes/Atlantic Canada
91	Puerto Rico/Foreign
92	Hawaii/Foreign (Except T.R. - 26, 27 and 29)
93	Alaska/Foreign (Except T.R. - 26 and 29)
61	Great Lakes/Great Lakes (used in Census cards)

Source: U.S. Bureau of the Census, Domestic and International Transportation of U.S. Foreign Trade: 1970 (Public Use Tape Users Manual, Interim Document, Attachment 6), 1972.

APPENDIX G

EXPORT COMMODITIES IN U.S. FOREIGN TRADE - SCHEDULE B SUBGROUPS (SBR)*

Code	Description
	Section 0 - Food and Live Animals
00	Animals - Live
01	Meat and Meat Preparations
02	Dairy Products and Eggs
03	Fish and Fish Preparations
04	Cereals and Cereal Preparations; and Preparations of Flour, Starch, or Malt Extract
05	Fruits and Vegetables
06	Sugar, Sugar Preparations, and Honey
07	Coffee, Cocoa, Tea, Spices, and Manufactures Thereof
08	Feeding-Stuff for Animals, Excluding Unmilled Cereals
09	Miscellaneous Food Preparations
	Section 1 - Beverages and Tobacco
11	Beverages
12	Tobacco and Tobacco Manufactures
	Section 2 - Crude Materials - Inedible, Except Fuels
21	Hides, Skins, and Furskins - Undressed, Raw or Cured
22	Oilseeds, Oil Nuts, and Oil Kernels, and Flour and Meal of Oilseeds, Nuts, and Kernels
23	Rubber - Crude, Including Synthetic and Reclaimed, and Similar Natural Gums, Excluding Compounded, Semiprocessed, and Manufactures
24	Wood, Lumber, and Cork
25	Pulps, and Waste Paper
26	Textile Fibers (Not Manufactured into Yarn, Thread or Fabrics) and Their Waste
27	Fertilizers and Minerals - Crude, Excluding Coal, Petroleum and Precious Stones
28	Metalliferous Ores and Metal Scrap
29	Animal and Vegetable Materials, N.E.C. - Crude

Export Commodities in U.S. Foreign Trade, cont.

Code	Description
	Section 3 - Mineral Fuels, Lubricants, and Related Materials
32	Coal, Coke, and Briquets
33	Petroleum and Petroleum Products
34	Gas - Natural and Manufactured
	Section 4 - Oils and Fats - Animal and Vegetable
41	Animal Oils and Fats, N.E.C.
42	Vegetable Oils and Fats - Fixed, Except Hydrogenated
43	Fatty Acids, Waxes, and Specially Treated Fats and Oils, Excluding Petroleum Products
	Section 5 - Chemicals
51	Chemical Elements and Compounds
52	Mineral Tar, Tar Oils, and Crude Chemicals From Coal, Petroleum, and Natural Gas
53	Dyeing, Tanning, and Coloring Materials - Natural and Synthetic
54	Medicinal and Pharmaceutical Products
55	Essential Oils and Perfume Materials; Toilet, Polishing, and Cleansing Preparations
56	Fertilizers, Manufactured
57	Explosives and Pyrotechnic Products (Including Hunting and Sporting Ammunition)
58	Synthetic Resins, Regenerated Cellulose, and Plastic Materials
59	Chemical Products and Materials, N.E.C.
	Section 6 - Manufactured Goods Classified Chiefly by Material
61	Leather, Leather Manufactured, N.E.C., and Dressed Furskins
62	Rubber Manufactures - Semifinished and Finished, N.E.C.
63	Wood and Cork Manufactures, N.E.C.
64	Paper, Paperboard, and Manufactures Thereof
65	Textile Yarn, Fabrics, Made-Up Articles and Related Products
66	Nonmetallic Mineral Manufactures, N.E.C.

Export Commodities in U.S. Foreign Trade, cont.

Code	Description
	Section 6 - Manufactured Goods Classified Chiefly by Material, cont.
67	Iron and Steel
68	Nonferrous Metals
69	Manufactures of Metal, N.E.C.
	Section 7 - Machinery and Transport Equipment
71	Machinery, Other Than Electric
72	Electrical Machinery, Apparatus, and Appliances
73	Transport Equipment
	Section 8 - Miscellaneous Manufactured Articles, N.E.C.
81	Sanitary, Plumbing, Heating and Lighting Fixtures, Fittings, Lamps, and Parts Thereof
82	Furniture
83	Travel Goods, Handbags, and Other Personal Goods
84	Clothing and Accessories; Elastic or Rubberized Knit Fabric; Knit Housefurnishings and Articles; and Articles Made of Fur
85	Footwear - New, Except Military and Orthopedic
86	Professional, Scientific and Controlling Instruments; Photographic and Optical Goods; Watches and Clocks
89	Miscellaneous Manufactured Articles, N.E.C.
	Section 9 - Commodities and Transactions Not Classified According to Kind
93	Special Transactions Not Classified According to Kind
94	Animals, N.E.C. - Live, Including Zoo Animals, Dogs, Cats, Insects, and Birds
95	Arms of War and Ammunition Therefor, Armored Fighting Vehicles, Military Equipment Not Identified by Kind, and Military Apparel
96	Coin, Other Than Gold, Not Being Legal Tender

*For a more complete listing see U.S. Department of Commerce, Bureau of the Census, U.S. Foreign Trade Statistics: Classifications and Cross-Classifications: 1970, U.S. Government Printing Office, Washington, D.C., 1971.

APPENDIX H

IMPORT COMMODITIES IN U.S. FOREIGN TRADE - SCHEDULE A SUBGROUPS (SAR)*

Code	Description
	Section 0 - Food and Live Animals
00	Animals - Live
01	Meat and Meat Preparations
02	Dairy Products and Eggs
03	Fish and Fish Preparations
04	Cereals and Cereal Preparations; and Preparations of Flour, Starch, or Malt Extract
05	Fruits and Vegetables
06	Sugar, Sugar Preparations, and Honey
07	Coffee, Cocoa, Tea, Spices, and Manufactures Thereof
08	Feeding-Stuff for Animals, Excluding Unmilled Cereals
09	Miscellaneous Food Preparations
	Section 1 - Beverages and Tobacco
11	Beverages
12	Tobacco and Tobacco Manufactures
	Section 2 - Crude Materials - Inedible, Except Fuels
21	Hides, Skins, and Furskins - Undressed, Raw or Cured
22	Oilseeds, Oil Nuts, and Kernels
23	Rubber - Crude, Including Synthetic and Reclaimed, and Similar Natural Gums
24	Wood, Lumber, and Cork
25	Pulps and Waste Paper
26	Textile Fibers (Not Manufactured into Yarn, Thread or Fabrics) and Their Waste
27	Crude Fertilizers and Crude Minerals, Excluding Coal, Petroleum, and Precious Stone
28	Metalliferous Ores and Metal Scrap
29	Animal and Vegetable Materials, N.E.S. - Crude
	Section 3 - Mineral Fuels, Lubricants, and Related Materials
32	Coal, Coke, and Briquets
33	Petroleum and Petroleum Products
34	Gas - Natural and Manufactured

Import Commodities in U.S. Foreign Trade, cont.

Code	Description
	Section 4 - Oils and Fats - Animal and Vegetable
41	Animal Oils and Fats, N.E.S.
42	Vegetable Oils, and Fats - Fixed, Except Hydrogenated
43	Fatty Acids, Waxes, and Specially Treated Fats and Oils, Excluding Petroleum Products
	Section 5 - Chemicals
51	Chemical Elements and Compounds
52	Mineral Tar, Tar Oils, and Crude Chemicals from Coal, Petroleum and Natural Gas
53	Dyeing, Tanning, and Coloring Materials - Natural and Synthetic
54	Medicinal and Pharmaceutical Products
55	Essential Oils and Perfume Materials; Toilet, Polishing, and Cleansing Preparations
56	Fertilizers, Manufactured, and Fertilizer Materials, N.E.S.
57	Explosives and Pyrotechnic Products (Including Small Arms Ammunition)
58	Synthetic Resins, Regenerated Cellulose and Plastic Materials
59	Chemical Products and Materials, N.E.S.
	Section 6 - Manufactured Goods Classified Chiefly by Material
61	Leather, Leather Manufactures, N.E.S., and Dressed Furskins
62	Rubber Manufactures - Finished, N.E.S., Excluding Hygienic and Pharmaceutical Products
63	Wood and Cork Manufactures, N.E.S.
64	Paper, Paperboard, and Manufactures Thereof
65	Textile Yarn, Fabrics, Made-Up Articles and Related Products
66	Nonmetallic Mineral Manufactures, N.E.S.
67	Iron and Steel
68	Nonferrous Metals
69	Manufactures of Metal, N.E.S.

Import Commodities in U.S. Foreign Trade, cont.

Code	Description
	Section 7 - Machinery and Transport Equipment
71	Machinery, Other Than Electric
72	Electrical Machinery, Apparatus, and Appliances
73	Transport Equipment
	Section 8 - Miscellaneous Manufactured Articles, N.E.S.
81	Sanitary, Plumbing, Hearing, and Lighting Fixtures, Fittings, Lamps and Parts, N.E.S.
82	Furniture
83	Travel Goods, Handbags, and Other Personal Goods
84	Clothing and Accessories; Elastic or Rubberized Knit Fabric; Knit House Furnishings and Articles; and Articles Made of Fur
85	Footwear - New, Except Orthopedic
86	Professional, Scientific and Controlling Instruments; Photographic and Optical Goods, N.E.S.; Watches and Clocks
89	Miscellaneous Manufactured Articles, N.E.S.
	Section 9 - Commodities and Transactions Not Classified According to Kind
93	Special Transactions Not Classified According to Kind
94	Animals - Live, N.E.S., Including Zoo Animals, Dogs, Cats, Insects and Birds
95	Arms of War, Ammunition and Armored Fighting Vehicles
99	Estimated Value of Under $251 Formal and Informal Entries

*For a more complete listing see U.S. Department of Commerce, Bureau of the Census, U.S. Foreign Trade Statistics: Classifications and Cross-Classifications: 1970, U.S. Government Printing Office, Washington, D.C., 1971.

APPENDIX I

SPECIFICATION OF COUNTRIES COMPRISING THE TWELVE DESIGNATED WORLD AREAS

The foreign country of origin or destination was grouped on the tapes by the U.S. Bureau of the Census into twelve "World Areas," which consist of one or more countries in geographical proximity. The specific countries in each World Area are listed on the following pages.

CLASSIFICATION OF FOREIGN COUNTRIES INTO "WORLD AREAS"

Area Number	General Area	Schedule C Codes*
	North America	
1	North	(101-161)
2	South	(201-283) (903-911)
	South America	
3	North and East	(301-317) (351-372)
4	West	(331-337)
	Europe and Mediterranean	
5	U.K. and Ireland	(412-419)
6	Northwest	(400-409)
7	West-Central	(421-428) (433-441)
8	South and Mediterranean	(467-512) (714-732)
9	East (Including USSR in Asia)	(429) (447-461)
	Asia, Australia	
10	Southeast	(513-567) (602-684) (931-951)
11	East Central	(570-590)
	Africa	
12	Africa, Except Mediterranean	(733-798)

*Schedule C: U.S. Bureau of the Census, U.S. Foreign Trade Statistics: Classifications and Cross-Classifications: 1970, U.S. Government Printing Office, Washington, D.C., 1971.

SCHEDULE C--CLASSIFICATION OF COUNTRY DESIGNATIONS FOR U.S. FOREIGN TRADE STATISTICS

World Area 1 - North America: North

Schedule C Code	Foreign Trade Statistics Country Designations
101	Greenland (Danish)
122	Canada Yukon; Northwest Territories; British Columbia, including Vancouver Island and Queen Charlotte Islands; Alberta; Saskatchewan; Manitoba; Ontario; Quebec, including Magdalen Islands and Anticosti Island; Newfoundland, including Labrador; New Brunswick, including Grand Manan Island and Campobello Island; Prince Edward Island; and Nova Scotia; including Cape Breton Island.
161	Miquelon and St. Pierre Island (French)

Schedule C, cont.

World Area 2 - North America: South

Schedule C Code	Foreign Trade Statistics Country Designations
201	Mexico Including Cozumel and Revilla Gigedo Islands.
205	Guatemala
208	British Honduras
211	El Salvador
215	Honduras Including the Bay Islands.
219	Nicaragua
223	Costa Rica
225	Panama
227	Canal Zone
232	Bermuda (British)
236	Bahamas (British) Including Harbor Island, Long Island, and the islands Andros, Abaco, Grand Bahama, Providence, Great Inagua, Eleuthera, and several smaller islands.
239	Cuba Including Isle of Pines.
242	Jamaica Including the Turks, the Caicos, and Cayman Islands, and the Morant and Pedro Cays.
245	Haiti Including Gonave and Tortuga Islands.
247	Dominican Republic
248	Leeward and Windward Islands (British) Leeward Islands: Including the islands of Antigua, Barbuda, Redonda, St. Christopher (St. Kitts), Nevis, Anguilla, Montserrat, and the British Virgin Islands with Sombrera, Tortola, Anegada, Jost Van Dykes, and Virgin Gorda. Windward Islands: Including the islands Grenada, St. Vincent, St. Lucia, Dominica, and the Grenadines with Carriacou, Union, Cannouan, etc.
272	Barbados
274	Trinidad and Tobago

Schedule C, cont.

World Area 2 - North America: South

Schedule C Code	Foreign Trade Statistics Country Designations
277	Netherlands Antilles (formerly Curacao, N.W.I.) Including Curacao, Aruba, Bonaire, Saba, St. Eustache (St. Eustatius), St. Martin (southern part).
283	French West Indies Including the islands Desirade, Guadeloupe, Les Saintes, Martinique, Marie Galante, St. Martin (northern part), and St. Bartholomew.
903	Puerto Rico
911	Virgin Islands of the United States

World Area 3 - South America: North and East

Schedule C Code	Foreign Trade Statistics Country Designations
301	Colombia
307	Venezuela
312	Guyana
315	Surinam (Netherlands Guiana)
317	French Guiana
351	Brazil Including the islands St. Paul, Fernando Noronha, Trinidad (in South Atlantic)
353	Paraguay
355	Uruguay
357	Argentina
372	Falkland Islands (British) Including Falkland Islands and the South Georgia, South Orkney, South Shetland, and South Sandwich Islands.

Schedule C, cont.

World Area 4 - South America: West

Schedule C Code	Foreign Trade Statistics Country Designations
331	Ecuador Including the Galapagos Islands.
333	Peru
335	Bolivia
337	Chile Including the islands Sala-y-Gomez, Juan Fernandez, San Felix, San Ambrosio, and Easter Island.

World Area 5 - Europe and Mediterranean: United Kingdom and Ireland

Schedule C Code	Foreign Trade Statistics Country Designations
412	United Kingdom of Great Britain and Northern Ireland Including England, Wales, the Channel Islands, the Isles of Wight and Man, and the Scilly Islands; Scotland, the Hebrides, Orkney and Shetland Islands; and Northern Ireland, comprising the counties of Londonderry, Antrim, Down, Tyrone, Armagh, and Fermanagh.
419	Ireland (Eire) Ireland except the six counties of Northern Ireland (Londonderry, Antrim, Tyrone, Down, Armagh, and Fermanagh).

Schedule C, cont.

World Area 6 - Europe and Mediterranean: Northwest

Schedule C Code	Foreign Trade Statistics Country Designations
400	Iceland
401	Sweden Including the Islands of Oland and Gotland (Gothland).
403	Norway Including Spitzbergen (Svalbard), Bear Island, and Jan Mayen Island.
405	Finland Including the Aland Islands.
409	Denmark (except Greenland) Including the island of Bornholm, and the Faroe Islands.

World Area 7 - Europe and Mediterranean: West-Central

Schedule C Code	Foreign Trade Statistics Country Designations
421	Netherlands (Holland)
423	Belgium and Luxembourg
427	France Including Corsica, Andorra, and Monaco.
428	Germany: West Germany (Federal Republic of Germany and Western Sectors of Berlin)
433	Austria
435	Czechoslovakia
437	Hungary
441	Switzerland Including Liechtenstein.

Schedule C, cont.

World Area 8 - Europe and Mediterranean:
South and Mediterranean

Schedule C Code	Foreign Trade Statistics Country Designations
467	Azores (Portuguese)
469	Spain Including the Balearic Islands.
471	Portugal
472	Gibraltar (British)
473	Malta and Gozo
475	Italy Including the islands of Sicily, Sardinia, Elba, Pantelleria, and Lampedusa; Vatican City; San Marino; and the portion of the Free Territory of Trieste under the administration of Italy.
481	Albania
484	Greece Including Crete, the Ionian Islands, and the Grecian Archipelago, with the Aegean Islands of Lemnos, Samothrace, Chios, Samos, Lesbos, and the Dodecanese (including Rhodes Island).
485	Romania
487	Bulgaria
489	Turkey (in Europe and Asia)
491	Cyprus
502	Syrian Arab Republic
504	Lebanon
505	Iraq
507	Iran
508	Israel
511	Jordan
512	Gaza Strip
714	Morocco Including former French Morocco; former Spanish Morocco (northern and southern zones); Tangier, formerly the international (neutral) zone; and Ifni.
721	Algeria
723	Tunisia
725	Libya Including Tripolitania, Cyrenaica, and Fezzan.
729	United Arab Republic (Egypt)
732	Sudan

Schedule C, cont.

World Area 9 - Europe and Mediterranean: East (Including USSR in Asia)

Schedule C Code	Foreign Trade Statistics Country Designations
429	East Germany (Soviet Zone of Germany and the Soviet Sector of Berlin)
447	Estonia
449	Latvia
451	Lithuania
455	Poland
461	Union of Soviet Socialist Republics (in Europe and Asia) Including former Imperial Russia, except Estonia, Latvia, Lithuania, Finland, and Poland, and including Sakhalin Island and the Kurile Islands under USSR administration.

World Area 10 - Asia, Australia: Southeast

Schedule C Code	Foreign Trade Statistics Country Designations
513	Kuwait
517	Saudi Arabia
519	Arabia Peninsula States, n.e.c. Including Yemen, Sultanate of Muscat and Oman, Trucial States, and Qatar.
522	Southern Yemen Including the islands of Kamaran, Perim, and Socotra, and the area formerly included in Aden and South Arabia.
525	Bahrain
531	Afghanistan
533	India Including the Andaman, Nicobar, and Laccadive Islands, and other territory under the administration of India.
535	Pakistan Including territory under the administration of Pakistan.

Schedule C, cont.

World Area 10 - Asia, Australia: Southeast

Schedule C Code	Foreign Trade Statistics Country Designations
536	Nepal
542	Ceylon
546	Burma
549	Thailand (Siam)
550	North Vietnam
551	South Vietnam
553	Laos
555	Cambodia
557	Malaysia Including the former Federation of Malaya, Sarawak, and North Borneo (Sabah).
559	Singapore
560	Indonesia Including Java and Madura; Sumatra; Bangka and Billiton (Belitung); the Riow Islands; Kalimantan (Indonesian Borneo); Sulawesi (Celebes); the Moluccas, including Halmahera and Ceram; the Lesser Sunda Islands, including Bali, Lombok, Sumbawa, Sumba, Flores, and Indonesian Timor; other islands in the archipelago belonging to Indonesia; and West New Guinea (West Irian or Irian Barat; formerly Netherlands New Guinea).
565	Philippines
566	Macao (Macau) (Portuguese territory)
567	Southern and Southeastern Asia, n.e.c. Including Bhutan, the Maldives, Brunei, and Portuguese Timor.
602	Australia Including Tasmania with Macquarie Island and Norfolk Island; Cocos or Keeling Islands, and Christmas Island in the Indian Ocean.
604	New Guinea (Australian) Including the Territory of Papua, and the Territory of New Guinea (trust territory under Australian administration) comprising Northeast New Guinea (former Kaiser Wilhelm's Land), Bismarck Archipelago (including Admiralty Islands), and Australian Solomon Islands with Bougainville, and Buka, and adjacent small islands.

Schedule C, cont.

World Area 10 - Asia, Australia: Southeast

Schedule C Code	Foreign Trade Statistics Country Designations
612	New Zealand and Western Samoa Including Chatham, Kermadec, Antipodes, Bounty, Auckland, Union (Tokelau), Cook (Rarotonga), Three Kings, and Snares Islands, and other small islands in the South Pacific not specified.
620	British Western Pacific Islands Including the New Hebrides, Fiji, Gilbert, Ellice, British Solomon, Tonga (Friendly) Islands, Phoenix Islands (except Canton and Enderbury Islands, see 941); Pitcairn, Henderson, and Ducie Islands; and Nauru.
641	French Pacific Islands Including New Caledonia and dependencies, Isle of Pines and Walpole Island (Loyalty Islands); Society Islands with Tahiti and Raiatea; Rapa, Tuamotu (Low Archipelago), Tubuai (Austral), Marquesas and Gambier Islands; Wallis Archipelago, Clipperton Island (North Pacific), Futuna, Alofi, Huon, Chesterfield Islands and all other French possessions in Oceania.
684	Trust Territory of the Pacific Islands Including the Caroline, Marshall, and Mariana Islands (except Guam) under U.S. administration.
931	Midway Island
933	Wake Island
935	Guam
941	Canton and Enderbury Islands
951	American Samoa (including Tutuila Island and dependencies)

Schedule C, cont.

World Area 11 - Asia, Australia: East Central

Schedule C Code	Foreign Trade Statistics Country Designations
570	China (Mainland) Including Inner Mongolia; the provinces of Tsinghai and Sikang; Sinkiang; Tibet; and Manchuria (including the former Kwantung Leased Territory, the present Port Arthur Naval Base Area and Liaoning Province), but excluding Outer Mongolia, see 574, and Republic of China (Taiwan), see 583.
574	Outer Mongolia
579	North Korea
580	Korea, Republic of
582	Hong Kong (British Crown Colony)
583	Republic of China (Taiwan) Including Pescadores.
588	Japan Including the four main islands of Honshu, Kyushu, Shikoku, and Hokkaido and islands adjacent thereto; the Izu Islands, the Tsushima Islands, and that portion of the Ryukyu Islands located north of 27° north latitude including the island of Yoron-Jima and all other islands of the Amami group except the U.S. administered islands of Tori-Shima and Iheya-Shima, see code 590; the Nanpo Islands (Nanpo Shoto) south of Sofu Gan including the Bonin Islands, Rosario Island, the Volcano Islands, and Parece Vela and Marcus Islands.
590	Nansei Islands, n.e.c. Including islands under United States administration, namely: Nansi Islands (Nansei Shoto) south of 27° north latitude, i.e., that portion of the Ryukyu Islands located south of 27° north latitude, including Okinawa, Sakishima, and the Daito Islands; the islands of Tori-Shima and Iheya-Shima (located north of 27° north latitude but under United States administration).

Schedule C, cont.

World Area 12 - Africa: Africa, Except Mediterranean

Schedule C Code	Foreign Trade Statistics Country Designations
733	Canary Islands (Spanish)
740	Spanish Africa, n.e.c., and Equatorial Guinea Including Spanish Sahara, Ceuta, Melilla, the Chafarinas Islands, Penon de Alhucemas, and Penon de Velez de la Gomera; and Equatorial Guinea, including Fernando Poo, Annobon, and Rio Muni together with the islands of Corisco, Elobey (Grande and Chico) and adjacent islets.
741	Mauritania
742	Federal Republic of Cameroon
744	Senegal
746	Guinea
747	Sierra Leone
748	Ivory Coast
749	Ghana Including former Gold Coast; Ashanti, Northern Territories, and Togoland (former trust territory under British administration).
750	The Gambia
752	Togo
753	Nigeria Including the former Northern British Cameroons.
754	Central African Republic
755	Gabon
757	Western Africa, n.e.c. Including Mali, Niger, Chad, Upper Volta, Dahomey, and Congo (Brazzaville).
758	British West Africa Including St. Helena and dependencies (including the islands of Ascension, Gough, Inaccessible, Nightingale, and Tristan da Cunha).
759	Madeira Islands (Portuguese)
762	Angola (Portuguese) Including Cabinda.
764	Western Portuguese Africa, n.e.c. Including Cape Verde Islands, Portuguese Guinea, with the Bissagos Islands, and the islands of Sao Tome (St. Thomas) and Principe.

Schedule C, cont.

World Area 12 - Africa: Africa, Except Mediterranean

Schedule C Code	Foreign Trade Statistics Country Designations
765	Liberia
766	Congo (Kinshasa)
768	Burundi and Rwanda
770	Somali Republic Including former trust territory of Somaliland under Italian administration, or Somalia; and former British Somaliland.
774	Ethiopia Including Eritrea.
777	Afars and Issas (French)
778	Uganda
779	Kenya
782	Seychelles and Dependencies (British) Including 92 islands and islets among which Seychelles are the most important; others are the Amirantes, the Aldabra, and Farquhar Islands.
783	Tanzania Including Tanganyika and Zanzibar.
784	Mauritius and Dependencies Including the islands of Mauritius and Rodrigues, the Agalega Islands, Cargados Carajos Shoals, and the Chagos Archipelago with Diego Garcia Island.
787	Mozambique (Portuguese)
789	Malagasy Republic (formerly Madagascar) Including Ste. Marie, the Glorious Islands, Nosy Be, Bassas de India; the Comoro Islands; Reunion; and St. Paul, Amsterdam, and the Kerguelen Islands.
791	Republic of South Africa Including South-West Africa (Namibia).
794	Zambia
796	Rhodesia (Southern Rhodesia)
797	Malawi
798	Southern Africa, n.e.c. Including Botswana (formerly Bechuanaland), Lesotho (formerly Basutoland), and Swaziland.

APPENDIX J

WORLD AREA MATRICES FOR MAJOR GREAT LAKES PORTS

This appendix contains four sets of six matrices. Each set of six contains one table for each of the six Great Lakes ports selected for more detailed analysis. These were Chicago, Cleveland, Detroit, Duluth, Milwaukee and Toledo. The first set of six matrices contains summary data specifying the World Area of destination and the hinterland state of acquisition of sample export shipments of all commodities shipped through the major Great Lakes ports. Summary data on the World Area of origin and the hinterland state of acquisition of sample import shipments of all commodities shipped through the major Great Lakes ports comprises the second set of six matrices. The third and fourth sets of matrices contain the same summary for export and import shipments respectively but are restricted to sample shipments of the first ranked commodity by weight at each of the selected ports.

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THROUGH THE PORT OF CHICAGO

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
ILLINOIS	1	12	3070702	125410
INDIANA	1	7	465060	20727
MISSOURI	1	1	16160	1256
WYOMING	1	10	2137214	139658
FOREIGN	1	1	228937	16650
	TOTALS	31	5918073	304701
ILLINOIS	2	2	288125	1340
	TOTALS	2	288125	1340
ILLINOIS	3	1	7566	77
	TOTALS	1	7566	77
ILLINOIS	5	31	16090767	173598
INDIANA	5	8	2695490	39061
IOWA	5	5	261846	1135
SOUTH DAKOTA	5	2	392553	21880
WYOMING	5	3	192160	10426
UTAH	5	1	1913	23
	TOTALS	50	19634679	246123
ILLINOIS	6	2	714082	1786
INDIANA	6	1	276640	1743
WYOMING	6	1	113450	3312
	TOTALS	4	1104172	6841
ILLINOIS	7	89	22458677	350561
INDIANA	7	3	4E09588	42310
IOWA	7	13	1937954	30005
MINNESOTA	7	2	273154	4528
NEBRASKA	7	3	260345	3934
SOUTH DAKOTA	7	6	972267	54194
WISCONSIN	7	1	1247	0
WYOMING	7	4	336799	19296
UTAH	7	2	7226	96
FOREIGN	7	17	5538816	87414
	TOTALS	140	36396073	592338
ILLINOIS	8	17	6580733	75079
INDIANA	8	6	3480027	29614
IOWA	8	2	386570	4547
PENNSYLVANIA	8	1	105100	348
WISCONSIN	8	1	21631	25
MASSACHUSETTS	8	1	65964	898
FOREIGN	8	4	721873	8142
	TOTALS	32	11361898	118653
ILLINOIS	9	2	883557	5214
MICHIGAN	9	1	98470	620
NEW YORK	9	1	64005	403
OHIO	9	1	49235	310
	TOTALS	5	1095267	6547

ILLINOIS	10	8	689872	7015
INDIANA	10	1	226655	1289
IOWA	10	1	115602	1152
KENTUCKY	10	1	249562	1816
WISCONSIN	10	2	329302	2188
LOUISIANA	10	1	305145	2784
	TOTALS	14	1916138	16244
ILLINOIS	11	14	4311350	86488
FOREIGN	11	1	589291	10143
	TOTALS	15	4900641	96631
ILLINOIS	12	5	236557	2752
	TOTALS	5	236557	2752
OVERALL	TOTALS	299	82859189	1392247

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THROUGH THE PORT OF CLEVELAND

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
OHIO	1	7	1044917	53584
	TOTALS	7	1044917	53584
OHIO	5	7	3481240	43544
	TOTALS	7	3481240	43544
OHIO	7	14	6797034	61988
PENNSYLVANIA	7	2	449507	4366
FOREIGN	7	1	775390	7716
	TOTALS	17	8021931	74070
OHIO	8	4	1724746	28012
	TOTALS	4	1724746	28012
PENNSYLVANIA	10	1	244240	1896
	TOTALS	1	244240	1896
OVERALL	TOTALS	36	14517074	201106

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THROUGH THE PORT OF DETROIT

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
MICHIGAN	1	31	2893992	206488
FOREIGN	1	4	422975	30788
	TOTALS	35	3316967	237276
MICHIGAN	3	4	79604	216
	TOTALS	4	79604	216
MICHIGAN	5	21	5053774	90288
OHIO	5	1	3350	94
MAINE	5	1	2863	20
FOREIGN	5	2	106819	145
	TOTALS	25	5166806	90547
MICHIGAN	6	3	1433387	27420
	TOTALS	3	1433387	27420
INDIANA	7	1	11830	16
MICHIGAN	7	23	8523962	125023
OHIO	7	1	7023	58
WISCONSIN	7	1	22000	155
FOREIGN	7	2	549512	5548
	TOTALS	28	9114327	130800
MICHIGAN	8	28	9017867	161001
FOREIGN	8	2	108842	2075
	TOTALS	30	9126709	163076
MICHIGAN	9	1	1540000	13228
	TOTALS	1	1540000	13228
MICHIGAN	10	5	112828	392
WASHINGTON STATE	10	1	145417	1051
FOREIGN	10	1	43000	251
	TOTALS	7	301245	1694
ILLINOIS	11	1	8345	38
MICHIGAN	11	20	5690296	118232
FOREIGN	11	2	901500	11505
	TOTALS	23	6600141	129775
MICHIGAN	12	1	33513	21
	TOTALS	1	33513	21
	OVERALL TOTALS	157	36712699	794053

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THROUGH THE PORT OF DULUTH

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
WISCONSIN	1	1	163111	4660
	TOTALS	1	163111	4660
MINNESOTA	2	1	127327	231
	TOTALS	1	127327	231
MINNESOTA	3	3	550000	1020
	TOTALS	3	550000	1020
IOWA	4	1	33046	60
MINNESOTA	4	2	368222	668
WISCONSIN	4	1	70812	129
	TOTALS	4	472080	857
IOWA	5	1	67730	291
MINNESOTA	5	8	1260108	16945
SOUTH DAKOTA	5	1	67730	291
	TOTALS	10	1395568	17527
MINNESOTA	7	56	7606696	122742
NORTH DAKOTA	7	3	893460	17520
	TOTALS	59	8500156	140262
ILLINOIS	8	1	167700	306
MINNESOTA	8	4	1117323	17604
	TOTALS	5	1285023	17910
IOWA	10	1	60733	110
MINNESOTA	10	6	1679230	7991
	TOTALS	7	1739963	8101
MINNESOTA	11	4	1796809	48405
FOREIGN	11	1	24100	200
	TOTALS	5	1820909	48605
MINNESOTA	12	2	106811	231
	TOTALS	2	106811	231
	OVERALL TOTALS	97	16160948	239404

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THRDUGH THE PORT OF MILWAUKEE

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
ILLINOIS	2	1	32550	331
	TOTALS	1	32550	331
IOWA	5	1	8643	28
MINNESOTA	5	1	2016	6
WISCONSIN	5	5	1311295	12794
	TOTALS	7	1321954	12828
ILLINOIS	6	2	48547	92
SOUTH DAKOTA	6	1	1002	30
WISCONSIN	6	2	37846	271
	TOTALS	5	87395	393
ILLINOIS	7	3	108475	81
IOWA	7	6	50563	231
KENTUCKY	7	1	9625	13
MINNESOTA	7	1	13050	3
NEBRASKA	7	1	11478	28
SOUTH DAKOTA	7	1	8400	21
WISCONSIN	7	4	33379	157
FOREIGN	7	12	490816	2633
	TOTALS	29	725786	3167
COLORADO	8	1	38170	553
KANSAS	8	3	155997	2212
MINNESOTA	8	1	152720	2300
MISSOURI	8	2	71731	586
NEBRASKA	8	2	125843	1799
WISCONSIN	8	13	2014329	52167
FOREIGN	8	3	680356	2617
	TOTALS	25	3239146	62234
WISCONSIN	9	1	378933	1332
	TOTALS	1	378933	1332
ILLINOIS	10	1	33815	229
IOWA	10	1	101444	688
KANSAS	10	1	30300	505
MINNESOTA	10	1	33815	229
WISCONSIN	10	5	1226873	7970
FOREIGN	10	2	907788	6099
	TOTALS	11	2334035	15720
ILLINOIS	11	1	365568	8960
WISCONSIN	11	11	2597691	73179
	TOTALS	12	2963259	82139
ILLINOIS	12	2	49180	105
IOWA	12	3	147909	274
WISCONSIN	12	2	582304	3558
	TOTALS	7	779393	3937
OVERALL TOTALS		98	11862451	182081

BREAKDOWN OF ALL EXPORT COMMODITIES MOVING THROUGH THE PORT OF TOLEDO

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
OHIO	1	19	1133138	74796
	TOTALS	19	1133138	74796
OHIO	5	2	450577	360
	TOTALS	2	450577	360
IOWA	7	1	3827	11
KENTUCKY	7	1	46033	99
OHIO	7	6	1423668	31810
SOUTH DAKOTA	7	1	8929	25
FOREIGN	7	1	25188	72
	TOTALS	10	1507645	32017
MINNESOTA	8	1	85566	1308
OHIO	8	3	123263	1610
	TOTALS	4	208829	2918
OHIO	11	3	531668	15353
	TOTALS	3	531668	15353
OVERALL	TOTALS	38	3831857	125494

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUGH THE PORT OF CHICAGO

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	ILLINOIS	82	28413903	472494
1	TEXAS	2	357063	5408
1	FOREIGN	2	1199138	8131
	TOTALS	86	29970104	486033
3	ILLINOIS	2	160046	1518
3	INDIANA	1	56776	545
	TOTALS	3	216822	2063
4	ILLINOIS	2	702415	2406
	TOTALS	2	702415	2406
5	ILLINOIS	27	1072349	8834
5	INDIANA	3	161702	1315
5	MICHIGAN	3	78476	665
5	MISSOURI	1	38508	320
5	NEBRASKA	1	24658	196
5	WISCONSIN	3	28827	191
5	FOREIGN	1	13085	60
	TOTALS	39	1417605	11581
6	ILLINOIS	3	80171	703
6	WISCONSIN	1	15764	73
6	FOREIGN	1	8374	40
	TOTALS	5	104309	816
7	ILLINOIS	133	19745085	128489
7	INDIANA	35	2716164	24113
7	IOWA	1	62825	428
7	MICHIGAN	22	1365083	9309
7	MINNESOTA	9	123331	1051
7	MISSOURI	2	49425	281
7	NEBRASKA	2	154371	1118
7	NEW YORK	9	158285	1348
7	OHIO	7	341838	3312
7	PENNSYLVANIA	9	121501	1050
7	WISCONSIN	13	133009	1186
7	DELAWARE	1	96113	1077
7	FOREIGN	16	2148591	20859
	TOTALS	319	27215621	193621
8	ILLINOIS	13	1408117	12274
8	INDIANA	2	115194	3149
8	NEBRASKA	1	6988	14
8	MISSISSIPPI	1	54293	641
8	NEW JERSEY	1	9219	50
	TOTALS	18	1593811	16128
9	ILLINOIS	3	315665	1078
9	NEW YORK	1	9677	18
9	PENNSYLVANIA	1	8467	15
9	FOREIGN	1	17540	14

	TOTALS	6	351349	1125
10	ILLINOIS	3	36377	117
	TOTALS	3	36377	117
11	ILLINOIS	165	8517193	70750
11	INDIANA	30	3510753	27890
11	IOWA	1	195	7
11	KANSAS	1	1238	1
11	MICHIGAN	12	998550	7197
11	MINNESOTA	4	170306	1355
11	MISSOURI	1	382	1
11	OHIO	1	382	1
11	WISCONSIN	4	118167	906
11	LOUISIANA	2	23748	151
11	MASSACHUSETTS	1	2583	10
11	FOREIGN	10	1276617	10892
	TOTALS	172	14590104	119161
12	ILLINOIS	4	1312634	2700
12	INDIANA	2	307964	77
12	KENTUCKY	2	203129	51
12	MICHIGAN	2	351086	88
12	OHIO	3	378342	94
12	CALIFORNIA	1	49691	12
12	TEXAS	2	67164	16
	TOTALS	16	2670620	2938
	OVERALL TOTALS	669	78869137	835663

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUGH THE PORT OF CLEVELAND

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	OHIO	11	2447562	41228
	TOTALS	11	2447562	41228
3	OHIO	5	794639	21167
	TOTALS	5	794639	21167
5	OHIO	14	451743	8721
5	FOREIGN	2	47237	227
	TOTALS	16	498980	8948
6	OHIO	3	27859	155
	TOTALS	3	27859	155
7	ILLINOIS	4	141860	1153
7	INDIANA	5	42659	328
7	MICHIGAN	17	1313880	10265
7	NEW YORK	11	98212	853
7	OHIO	75	5893281	54492
7	PENNSYLVANIA	16	1111974	10514
7	MARYLAND	1	220575	2216
7	MASSACHUSETTS	1	1288	403
7	NORTH CAROLINA	1	6722	6
7	TEXAS	1	219181	2202
7	FOREIGN	15	1693950	13289
	TOTALS	147	10743582	95727
8	OHIO	7	637282	15637
	TOTALS	7	637282	15637
9	OHIO	1	54259	570
	TOTALS	1	54259	570
10	OHIO	2	46551	613
	TOTALS	2	46551	613
11	OHIO	29	2036562	16734
11	PENNSYLVANIA	1	72121	627
11	FOREIGN	1	28281	217
	TOTALS	31	2186964	17578
OVERALL TOTALS		223	17437678	201623

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUCH THE PORT OF DETROIT

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	INDIANA	4	9344	76
1	MICHIGAN	121	10842068	334132
1	FOREIGN	4	180311	17540
	TOTALS	129	11031723	351748
2	MICHIGAN	1	68993	3000
	TOTALS	1	68993	3000
3	MICHIGAN	1	227981	2170
	TOTALS	1	227981	2170
5	MICHIGAN	51	5326652	41900
5	OHIO	2	109382	940
5	FOREIGN	5	272405	1273
	TOTALS	58	5708439	44113
6	MICHIGAN	1	10711	11
6	OHIO	1	2640	28
	TOTALS	2	13351	39
7	ILLINOIS	16	593473	2281
7	INDIANA	10	433981	2433
7	IOWA	1	18380	66
7	MICHIGAN	264	28703535	234055
7	MINNESOTA	2	3313	29
7	NEBRASKA	2	165515	1386
7	NEW YORK	4	123170	580
7	OHIO	31	883943	6674
7	PENNSYLVANIA	9	228783	1117
7	WISCONSIN	4	22730	187
7	ARKANSAS	1	18433	66
7	CONNETICUT	4	159433	573
7	MAINE	1	12203	44
7	NEW JERSEY	3	27618	287
7	TEXAS	1	11202	46
7	NO ANSWER	3	770618	2781
7	FOREIGN	34	2585073	23481
	TOTALS	390	34761403	278086
8	IOWA	1	7226	15
8	MICHIGAN	19	4385764	50884
8	OHIO	1	239218	2142
8	PENNSYLVANIA	1	4516	9
8	GEORGIA	1	4516	9
8	TEXAS	2	21679	45
8	UTAH	1	2710	6
8	FOREIGN	6	1378984	17707
	TOTALS	32	6044613	70817
9	MICHIGAN	3	59972	635
	TOTALS	3	59972	635

10	ILLINOIS	3	72586	303
10	MICHIGAN	9	678172	5796
10	PENNSYLVANIA	1	159429	1542
10	FOREIGN	1	8550	28
	TOTALS	14	918737	7669
11	INDIANA	1	9277	62
11	KANSAS	1	629	1
11	MICHIGAN	98	9423184	80240
11	MISSOURI	1	944	2
11	OHIO	5	439393	3214
11	LOUISIANA	1	629	1
11	TEXAS	1	944	2
11	NO ANSWER	2	571108	6755
11	FOREIGN	6	291810	2088
	TOTALS	116	10737918	92365
12	MICHIGAN	6	457347	4464
12	PENNSYLVANIA	4	117227	965
	TOTALS	10	574574	5429
	OVERALL TOTALS	756	70147734	859071

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUGH THE PORT OF DULUTH

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	MINNESOTA	3	96891	19757
1	NORTH DAKOTA	2	4034	700
1	WISCONSIN	2	7137	1239
	TOTALS	7	108062	21696
5	MINNESOTA	6	276548	2023
	TOTALS	6	276548	2023
7	IOWA	1	80107	357
7	MINNESOTA	6	395927	1758
7	NORTH DAKOTA	1	1325	11
7	WISCONSIN	1	75395	336
7	NO ANSWER	1	4712	21
	TOTALS	10	557466	2483
10	WISCONSIN	1	66710	56
10	FOREIGN	1	19406	63
	TOTALS	2	86116	119
11	MINNESOTA	1	33373	173
	TOTALS	1	33373	173
12	NO ANSWER	1	113959	600
	TOTALS	1	113959	600
	OVERALL TOTALS	27	1175524	27099

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUGH THE PORT OF MILWAUKEE

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	WISCONSIN	20	3186495	101680
	TOTALS	20	3186495	101680
5	MINNESOTA	1	19614	49
5	WISCONSIN	23	1378806	13418
5	FOREIGN	2	440628	2114
	TOTALS	26	1839048	15581
6	MICHIGAN	1	4031	21
6	WISCONSIN	8	451045	637
	TOTALS	9	455076	658
7	ILLINOIS	1	110400	480
7	INDIANA	1	1840	8
7	IOWA	2	65875	274
7	MINNESOTA	3	142458	716
7	OHIO	1	7360	32
7	WISCONSIN	4	29840	89
	TOTALS	12	357573	1599
8	INDIANA	1	25030	142
	TOTALS	1	25030	142
10	WISCONSIN	9	802124	5516
	TOTALS	9	802124	5516
11	MINNESOTA	2	62755	173
11	WISCONSIN	23	3328415	31593
11	FOREIGN	7	2237434	21129
	TOTALS	32	5628604	52895
12	WISCONSIN	6	1964535	5875
	TOTALS	6	1964535	5875
	OVERALL TOTALS	115	14258485	183946

BREAKDOWN OF ALL IMPORT COMMODITIES MOVING THROUGH THE PORT OF TOLEDO

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	INDIANA	2	30243	4541
1	MICHIGAN	3	96257	4975
1	OHIO	20	3947352	65327
1	GEORGIA	1	175891	1187
	TOTALS	26	4249743	76030
2	OHIO	1	181376	9234
	TOTALS	1	181376	9234
3	OHIO	2	211495	254
	TOTALS	2	211495	254
4	OHIO	3	302499	1060
	TOTALS	3	302499	1060
5	ILLINOIS	1	55166	44
5	INDIANA	2	48869	90
5	OHIO	22	887854	5885
5	FOREIGN	1	8873	13
	TOTALS	26	1000762	6032
7	INDIANA	1	11960	97
7	MICHIGAN	3	801090	961
7	MINNESOTA	1	313603	234
7	OHIO	34	6604706	37813
7	FOREIGN	1	2234	11
	TOTALS	40	7733593	39122
8	ILLINOIS	6	527058	2441
8	MICHIGAN	1	243253	1115
8	NEW YORK	1	228051	935
8	OHIO	14	4300880	34304
8	FOREIGN	1	268023	2194
	TOTALS	23	5567265	40989
10	INDIANA	1	9514	25
10	OHIO	2	46066	129
	TOTALS	3	55580	154
11	ILLINOIS	2	13271	85
11	INDIANA	5	823809	7778
11	OHIO	6	66900	324
11	FOREIGN	2	472401	4150
	TOTALS	15	1376381	12337
	OVERALL TOTALS	139	20678694	185212

BREAKDOWN OF EXPORT COMMODITY 8 MOVING THROUGH
THE PORT OF CHICAGO

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
ILLINOIS	1	3	1432373	24292
	TOTALS	3	1432373	24292
ILLINOIS	5	3	291966	5595
	TOTALS	3	291966	5595
ILLINOIS	7	71	15627751	260449
IOWA	7	13	1937954	30005
MINNESOTA	7	2	273154	4528
NEBRASKA	7	2	206359	3656
FOREIGN	7	12	2740079	53549
	TOTALS	100	20785297	352187
ILLINOIS	8	1	459756	5409
IOWA	8	2	386570	4547
	TOTALS	3	846326	9956
OVERALL	TOTALS	109	23355962	392030

BREAKDOWN OF EXPORT COMMODITY 67 MOVING THROUGH THE PORT OF CLEVELAND

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
OHIO	1	2	759640	8990
	TOTALS	2	759640	8990
OHIO	5	3	3340000	42743
	TOTALS	3	3340000	42743
OHIO	7	11	6669291	58968
PENNSYLVANIA	7	2	449507	4366
FOREIGN	7	1	775390	7716
	TOTALS	14	7894188	71050
OHIO	8	2	1633746	16548
	TOTALS	2	1633746	16548
PENNSYLVANIA	10	1	244240	1896
	TOTALS	1	244240	1896
OVERALL TOTALS		22	13871814	141227

BREAKDOWN OF EXPORT COMMODITY 28 MOVING THROUGH
THE PORT OF DETROIT

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
MICHIGAN	5	7	2509651	59308
	TOTALS	7	2509651	59308
MICHIGAN	6	2	1416137	27345
	TOTALS	2	1416137	27345
MICHIGAN	7	5	572379	13252
	TOTALS	5	572379	13252
MICHIGAN	8	20	6290236	131485
	TOTALS	20	6290236	131485
MICHIGAN	11	16	4814872	105551
FOREIGN	11	1	607500	5625
	TOTALS	17	5422372	111176
OVERALL	TOTALS	51	16210775	342566

BREAKDOWN OF EXPORT COMMODITY 8 MOVING THROUGH
THE PORT OF DULUTH

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
MINNESOTA	7	55	7490076	122055
NORTH DAKOTA	7	3	893460	17520
	TOTALS	58	8383536	139575
OVERALL TOTALS		58	8383536	139575

BREAKDOWN OF EXPORT COMMODITY 28 MOVING THROUGH
THE PORT OF MILWAUKEE

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
WISCONSIN	5	1	467810	11480
	TOTALS	1	467810	11480
WISCONSIN	8	7	1334926	43628
	TOTALS	7	1334926	43628
ILLINOIS	11	1	365568	8960
WISCONSIN	11	10	2380491	70164
	TOTALS	11	2746059	79124
OVERALL	TOTALS	19	4548795	134232

BREAKDOWN OF EXPORT COMMODITY 33 MOVING THRDUGH
THE PORT OF TOLEDO

PLACE OF ACQUISITION	WORLD AREA	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
OHIO	1	19	1133138	74796
	TOTALS	19	1133138	74796
	OVERALL TOTALS	19	1133138	74796

BREAKDOWN OF IMPORT COMMODITY 67 MOVING THROUGH THE PORT OF CHICAGO

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	ILLINOIS	8	2620802	45970
	TOTALS	8	2620802	45970
3	ILLINOIS	1	149921	1435
3	INDIANA	1	56776	545
	TOTALS	2	206697	1980
5	ILLINOIS	13	845793	8433
5	INDIANA	3	161702	1315
5	MICHIGAN	3	78476	665
5	MISSOURI	1	38508	320
5	NEBRASKA	1	24658	196
5	WISCONSIN	3	28827	191
	TOTALS	30	1177964	11120
6	ILLINOIS	1	67056	682
	TOTALS	1	67056	682
7	ILLINOIS	171	14266996	122360
7	INDIANA	35	2716164	24113
7	IOWA	1	62825	428
7	MICHIGAN	21	980267	9191
7	MINNESOTA	9	123331	1051
7	MISSOURI	1	37563	262
7	NEBRASKA	2	154371	1118
7	NEW YORK	9	158285	1348
7	OHIO	7	341838	3312
7	PENNSYLVANIA	9	121501	1050
7	WISCONSIN	12	128589	1185
7	DELAWARE	1	96113	1077
7	FOREIGN	16	2148591	20859
	TOTALS	294	21336434	187354
8	ILLINOIS	5	1352565	7985
8	MISSISSIPPI	1	54293	641
	TOTALS	6	1406858	8626
10	ILLINOIS	1	10937	86
	TOTALS	1	10937	86
11	ILLINOIS	79	8305853	69819
11	INDIANA	23	3396639	27364
11	MICHIGAN	10	849407	6645
11	MINNESOTA	2	146945	1241
11	WISCONSIN	2	117166	905
11	LOUISIANA	2	33748	151
11	MASSACHUSETTS	1	2583	10
11	FOREIGN	9	1232789	10869
	TOTALS	128	14085130	117004
	OVERALL TOTALS	470	40911878	372922

BREAKDOWN OF IMPORT COMMODITY 67 MOVING THROUGH
THE PORT OF CLEVELAND

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
5	OHIO	9	112586	873
5	FOREIGN	1	44611	226
	TOTALS	10	157197	1099
6	OHIO	2	21716	143
	TOTALS	2	21716	143
7	ILLINOIS	4	141860	1153
7	INDIANA	5	42659	328
7	MICHIGAN	17	1313880	10265
7	NEW YORK	9	81662	544
7	OHIO	72	5861877	53783
7	PENNSYLVANIA	16	1111374	10514
7	MARYLAND	1	220575	2216
7	TEXAS	1	219181	2282
7	FOREIGN	14	1686381	13233
	TOTALS	139	10680049	94348
8	OHIO	1	54259	570
	TOTALS	1	54259	570
10	OHIO	2	46551	613
	TOTALS	2	46551	613
11	OHIO	23	1881085	15982
11	PENNSYLVANIA	1	72121	827
11	FOREIGN	1	28281	217
	TOTALS	25	1981487	16826
	OVERALL TOTALS	179	12941259	113599

BREAKDOWN OF IMPORT COMMODITY 67 MOVING THROUGH THE PORT OF DETROIT

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	INDIANA	4	9344	76
1	MICHIGAN	21	1607078	23631
	TOTALS	25	1616422	23707
3	MICHIGAN	1	227981	2170
	TOTALS	1	227981	2170
5	MICHIGAN	44	4442917	36194
5	OHIO	2	109382	940
5	FOREIGN	4	158911	1183
	TOTALS	50	4711210	38317
6	MICHIGAN	1	10711	11
	TOTALS	1	10711	11
7	ILLINOIS	10	195269	347
7	INDIANA	8	175973	1505
7	MICHIGAN	253	27175558	232215
7	MINNESOTA	2	3313	29
7	NEBRASKA	2	165515	1386
7	NEW YORK	3	25543	227
7	OHIO	30	810211	6409
7	PENNSYLVANIA	9	228783	1117
7	WISCONSIN	4	22730	187
7	NEW JERSEY	3	27618	287
7	FOREIGN	34	2585073	23481
	TOTALS	358	31415586	267690
8	MICHIGAN	13	3623672	32372
8	OHIO	1	239218	2142
8	FOREIGN	4	1085771	10085
	TOTALS	18	4948661	44599
9	MICHIGAN	3	59972	635
	TOTALS	3	59972	635
10	ILLINOIS	1	17717	166
10	MICHIGAN	4	586472	5569
10	PENNSYLVANIA	1	159429	1542
	TOTALS	6	763618	7277
11	INDIANA	1	9277	62
11	MICHIGAN	88	9237524	79573
11	OHIO	5	439393	3214
11	NO ANSWER	2	571108	6755
11	FOREIGN	4	266603	2015
	TOTALS	100	10523905	91619
12	PENNSYLVANIA	4	117227	965
	TOTALS	4	117227	965
	OVERALL TOTALS	566	54395293	476990

BREAKDOWN OF IMPORT COMMODITY 27 MOVING THROUGH THE PORT OF DULUTH

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	MINNESOTA	3	96891	19757
1	NORTH DAKOTA	2	4034	700
1	WISCONSIN	2	7137	1239
	TOTALS	7	108062	21696
	OVERALL TOTALS	7	108062	21696

BREAKDOWN OF IMPORT COMMODITY 27 MOVING THROUGH
THE PORT OF MILWAUKEE

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	WISCONSIN	8	342317	77639
	TOTALS	8	342317	77639
6	WISCONSIN	1	13461	168
	TOTALS	1	13461	168
OVERALL TOTALS		9	355778	77807

BREAKDOWN OF IMPORT COMMODITY 67 MOVING THROUGH
THE PORT OF TOLEDO

WORLD AREA	DESTINATION	NO. SHIPMENTS	VALUE	WEIGHT(TONS)
1	OHIO	5	1132115	19250
	TOTALS	5	1132115	19250
5	OHIO	7	694686	5582
	TOTALS	7	694686	5582
7	INDIANA	1	11960	97
7	OHIO	22	2347119	20971
	TOTALS	23	2359079	21068
8	ILLINOIS	4	522801	2429
8	MICHIGAN	1	243253	1115
8	NEW YORK	1	228051	935
8	OHIO	12	4016759	33322
8	FOREIGN	1	268023	2194
	TOTALS	19	5278887	39995
11	ILLINOIS	2	13271	85
11	INDIANA	5	823809	7778
11	OHIO	2	26106	195
11	FOREIGN	2	472401	4150
	TOTALS	11	1335587	12208
	OVERALL TOTALS	65	10800354	98103

APPENDIX K

COMMODITIES SHIPPED THROUGH MAJOR GREAT LAKES PORTS

As indicated in Chapter III, six Great Lakes ports were selected for more detailed analysis. These were Chicago, Cleveland, Detroit, Duluth, Milwaukee and Toledo. The following pages contain twelve tables with the first six listing the breakdown of sample export commodities for the selected ports and the second six tables providing the same breakdown for sample imports. Each table contains a tabulation of the number, weight and value of sample shipments subtotaled by 2-digit commodity code. Each subtotal is also expressed as a per cent of total for each of the three informational categories. Totals represent the total sample Great Lakes related traffic moving through each port in 1970 as recorded on the Great Lakes Vessel Tapes.

PORT OF CHICAGO - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
4	20	6.69	17231	1.24	1688624	2.04
5	2	.67	389	.03	73786	.09
8	109	36.45	392030	28.16	23355962	28.19
9	23	7.69	8435	.61	1905561	2.30
21	2	.67	42	.00	16552	.02
24	2	.67	70	.01	13612	.02
27	29	9.70	248885	17.88	4153582	5.01
28	33	11.04	194101	13.94	11940564	14.41
33	16	5.35	138801	9.97	1942207	2.34
41	13	4.35	12448	.89	2050799	2.48
42	2	.67	1490	.11	361978	.44
51	1	.33	105	.01	34888	.04
55	1	.33	44	.00	12096	.01
59	1	.33	695	.05	139051	.17
64	2	.67	25	.00	22878	.03
67	41	13.71	377372	27.11	34996460	42.24
71	2	.67	84	.01	150589	.18
TOTAL	299		1392247		82853189	

PORT OF CLEVELAND, OHIO - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
23	1	2.78	471	.23	84240	.58
27	4	11.11	41589	20.68	224580	1.55
28	2	5.56	1918	.95	41370	.28
33	2	5.56	11464	5.70	91000	.63
41	4	11.11	1432	.71	143373	.99
52	1	2.78	3005	1.49	60697	.42
67	22	61.11	141227	70.23	13371814	95.56
TOTAL	36		201106		14517074	

PORT OF DETROIT, MICHIGAN - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
5	12	7.64	375	.05	57214	.16
9	3	1.91	2414	.30	453784	1.24
21	3	1.91	155	.02	32095	.09
24	3	1.91	167	.02	20507	.06
27	21	13.38	155731	19.61	908223	2.47
28	51	32.48	342566	43.14	16210775	44.16
33	12	7.64	66748	8.41	1755414	4.78
41	8	5.10	3071	.39	527135	1.44
51	3	1.91	6585	.83	220237	.60
52	1	.64	5712	.72	242760	.66
58	2	1.27	69	.01	28909	.08
59	1	.64	12	.00	3795	.01
63	1	.64	16	.00	11830	.03
67	26	16.56	210037	26.45	15203060	41.41
71	3	1.91	122	.02	725294	1.98
72	1	.64	60	.01	123262	.34
73	6	3.82	213	.03	188405	.51
TOTAL	157		794053		36712699	

PORT OF DULUTH - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
2	16	16.49	4616	1.93	2493810	15.47
4	4	4.12	8727	3.65	1163546	7.20
8	58	59.79	139575	58.30	8383536	51.88
9	7	7.22	3019	1.26	700359	4.33
21	1	1.03	200	.08	24100	.15
28	8	8.25	77394	32.33	3026383	18.73
41	2	2.06	1213	.51	200103	1.24
56	1	1.03	4660	1.95	163111	1.01
TOTAL	97		239404		16160948	

PORT OF MILWAUKEE - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
1	11	11.22	186	.10	110679	.93
2	3	3.06	274	.15	147909	1.25
4	24	24.49	32724	17.97	3196641	26.95
8	3	3.06	252	.14	77624	.65
9	12	12.24	10350	5.68	1681901	14.18
21	10	10.20	1694	.93	500000	4.21
24	2	2.04	201	.11	19331	.16
27	2	2.04	251	.14	8939	.08
28	19	19.39	134232	73.72	4548795	38.35
29	1	1.02	6	.00	2016	.02
41	2	2.04	1092	.60	191754	1.62
68	1	1.02	321	.18	481296	4.06
69	1	1.02	3	.00	13050	.11
71	7	7.14	495	.27	882516	7.44
TOTAL	98		182081		11862451	

PORT OF TOLEDO, OHIO - EXPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
4	2	5.26	2823	2.25	191766	5.00
8	6	15.79	31810	25.36	1423668	37.15
9	1	2.63	74	.06	18337	.48
24	4	10.53	207	.17	83977	2.19
27	1	2.63	65	.05	13063	.34
28	3	7.89	15353	12.24	531668	13.87
33	19	50.00	74796	59.63	1133138	29.57
67	1	2.63	30	.02	4000	.10
71	1	2.63	286	.23	432240	11.28
TOTAL	38		125444		3831857	

PORT OF CHICAGO — IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
3	1	.15	5	.00	5934	.01
4	1	.15	3600	.43	325082	.41
5	4	.60	43	.01	29893	.04
7	1	.15	1140	.14	764226	.97
11	10	1.49	223	.03	131387	.17
26	1	.15	83	.01	10125	.01
27	24	3.59	235257	28.15	1066847	1.35
42	3	.45	2206	.26	621321	.79
51	8	.30	10492	1.26	768765	.97
63	3	.45	132	.02	28036	.04
64	51	7.62	191922	22.97	25352611	32.15
65	1	.15	86	.01	21215	.03
66	17	2.54	3528	.42	224927	.29
67	470	70.25	372822	44.61	40911878	51.87
68	20	2.99	4437	.53	2754988	3.49
69	21	3.14	894	.11	230111	.29
71	11	1.64	4475	.54	498634	.63
72	1	.15	20	.00	2103	.00
73	17	2.54	4299	.51	5113046	6.48
85	5	.75	19	.00	7632	.01
89	1	.15	1	.00	576	.00
TOTAL	669		835689		78869137	

PORT OF CLEVELAND, OHIO - IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
3	1	.45	12	.01	6143	.04
5	2	.90	31	.02	6975	.04
27	11	4.93	68511	33.98	1777979	10.20
51	1	.45	18	.01	4053	.02
56	1	.45	51	.03	7569	.04
59	1	.45	21	.01	6962	.04
62	1	.45	1	.00	2626	.02
64	9	4.04	17228	8.54	2345019	13.45
66	3	1.35	1151	.57	3680	.02
67	179	80.27	113599	56.34	12941259	74.21
68	1	.45	17	.01	21767	.12
69	7	3.14	274	.13	66030	.38
71	3	1.35	33	.04	73494	.42
73	3	1.35	660	.33	174122	1.00
TOTAL	223		201623		17437678	

PORT OF DETROIT, MICHIGAN - IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS (TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
5	7	.40	56	.01	21544	.03
11	4	.53	472	.08	297844	.42
23	7	.93	369	.04	135545	.19
27	68	8.99	195835	22.91	2134411	3.13
52	1	.13	2075	.24	42500	.06
63	2	.26	77	.01	11458	.02
64	27	3.57	50519	5.92	7433515	10.60
65	1	.13	33	.00	13574	.03
66	26	3.44	118142	13.83	1273399	1.82
67	556	74.87	476382	55.85	54395233	77.54
68	22	2.91	6637	.78	1843258	2.64
69	5	.66	422	.05	103956	.15
71	3	.40	603	.08	567047	.81
72	2	.26	68	.01	94494	.13
73	14	1.85	1953	.23	1683378	2.40
86	1	.13	4	.00	15842	.02
89	4	.53	6	.00	3146	.00
TOTAL	756		854071		70147704	

PORT OF DULUTH - IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
5	1	3.70	173	.64	33373	2.84
23	2	7.41	119	.44	86116	7.33
27	7	25.93	21696	80.06	108062	9.19
65	6	22.22	1942	7.17	409460	34.83
66	1	3.70	36	.13	5810	.49
67	9	33.33	3068	11.32	433124	36.85
71	1	3.70	65	.24	99579	8.47
TOTAL	27		27099		1175524	

PORT OF MILWAUKEE - IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
3	1	.87	1	.00	463	.00
7	1	.87	2280	1.24	1417015	9.94
8	3	2.61	2201	1.20	442080	3.10
11	7	6.09	19	.01	21778	.15
27	9	7.83	77807	42.30	355778	2.50
42	1	.87	851	.46	199274	1.40
61	2	1.74	23	.01	5315	.04
63	21	18.26	8373	4.88	1269334	8.90
64	12	10.43	17139	9.32	2780933	19.50
65	8	6.96	1643	.89	349090	2.45
66	1	.87	7	.00	3848	.03
67	33	28.70	72321	39.32	6978852	48.95
68	3	2.61	54	.03	37569	.26
69	6	5.22	339	.18	83468	.59
71	6	5.22	287	.16	311968	2.19
82	1	.87	1	.00	1720	.01
TOTAL	115		183946		14258485	

PORT OF TOLEDO, OHIO - IMPORTS

COMMODITY CATEGORY	NO. OF SHIPMENTS	% OF TOTAL	WEIGHT OF SHIPMENTS(TONS)	% OF TOTAL	VALUE OF SHIPMENTS	% OF TOTAL
5	4	2.88	997	.54	290072	1.40
6	1	.72	9234	4.99	181376	.88
7	1	.72	169	.09	183975	.89
11	18	12.67	377	.20	267383	1.29
23	3	2.16	154	.08	55580	.27
27	5	3.60	23215	12.53	146402	.71
42	2	1.44	1103	.60	244779	1.18
56	3	2.16	35310	19.06	1706591	8.25
62	1	.72	19	.01	33040	.16
64	15	10.79	11279	6.09	1695086	8.20
66	2	1.44	393	.21	65250	.32
67	65	46.76	98103	52.97	10800354	52.23
68	3	2.16	1060	.57	302499	1.46
69	4	2.88	126	.07	39100	.19
71	1	.72	84	.05	40927	.20
73	10	7.19	3590	1.94	4626280	22.37
TOTAL	139		185212		20678694	

APPENDIX L

MAP GENERATION PROCEDURE

Each of the 70 individual maps appearing in the body of this report was drawn, shaded and lettered mechanically prior to photographic reproduction. This was accomplished by having a UNIVAC 1110 computer generate plotting instructions for a CALCOMP Model 563 incremental drum plotter equipped with a .4 millimeter liquid pen. Capability to generate these instructions was attained through use of a commercially available computer program entitled CALFORM (CALcomp FORMs) marketed by the Laboratory for Computer Graphics and Spatial Analysis at Harvard University. A description of the program and its use follows.

CALFORM is a computer program designed to produce "conformant" maps on a pen (or CRT) plotter. A conformant map depicts a study area that has been subdivided into a number of data zones in which symbolism (usually shading) represents the values of data attributed to each data zone. The shading entirely covers and "conforms" to the shape of each zone. In the case of all maps in this report, the study area consists of the 48 contiguous states of the United States as a whole whereas each state individually constitutes a data zone. The program is not limited to this format and may depict a state subdivided into counties or census tracts; i.e., in short it is capable of generating plotting instructions for whatever shapes or forms the user specifies.

Three steps are necessary to prepare a conformant map. These involve the definition of locations, values, and map options. Locations need be defined only once for a series of maps which portray various subjects for the same data zones.

The location of each data zone must be described as a series of straight line segments. Curved lines may be approximated by several straight line segments in order to preserve the degrees of detail desired. Straight line segments are defined in terms of the x-y coordinates at their end points. The resulting description of zone boundaries is called a computer readable base map or geographic base file. This data is punched onto cards and organized in the form of several functional "packages." For this report each state constituted a package thereby providing the capability to select a subgroup of states for special analysis if so desired.

The following procedures may be used to prepare a geographical base file for use with CALFORM.

1. Obtain a map which illustrates the location of each data zone plus any other geographic features (e.g., a major highway) which are to appear on the final computer-produced map.
2. Select points (vertices) on the boundary of each zone which when connected by straight lines will approximate the outline of each zone with the degree of precision desired. Mark

these vertices on the map. Also mark vertices to locate "cosmetic" features. Examples of cosmetic features are lines and symbols which define the location of landmarks, rivers, bodies of water, etc. In this report only the rectangular border circumscribing each map is included as a cosmetic feature.

3. Assign a unique identification number to each vertex. A vertex common to two or more zones will have only one number.
4. Assign a unique name to each zone. Each name should contain no more than four alphanumeric characters. The codes used for the 48 states appear below.

Code	Interpretation
AL 1	Alabama
AZ 3	Arizona
AR 4	Arkansas
CA 5	California
CO 6	Colorado
CT 7	Connecticut
DE 8	Delaware
FL10	Florida
GA11	Georgia
ID13	Idaho
IL14	Illinois
IN15	Indiana
IA16	Iowa
KS17	Kansas
KY18	Kentucky
LA19	Louisiana
ME20	Maine
MD21	Maryland
MA22	Massachusetts
MI23	Michigan

MN24	Minnesota
MS25	Mississippi
MO26	Missouri
MT27	Montana
NE28	Nebraska
NV29	Nevada
NH30	New Hampshire
NJ31	New Jersey
NM32	New Mexico
NY33	New York
NC34	North Carolina
ND35	North Dakota
OH36	Ohio
OK37	Oklahoma
OR38	Oregon
PA39	Pennsylvania
RI40	Rhode Island
SC41	South Carolina
SD42	South Dakota
TN43	Tennessee
TX44	Texas
UT45	Utah
VT46	Vermont
VA47	Virginia
WA48	Washington
WV49	West Virginia
WI50	Wisconsin
WY51	Wyoming

5. Measure and record an x and y coordinate for each vertex identified in step 2 above.

Input of the above information, steps 2 through 5, into the CALFORM program results in generation of the instructions to plot the basic map. Additional information such as the titles, legends, shading options and numerical data are provided on a per run basis.

The user can describe his data value interval scheme in one of four ways: equal intervals, rank intervals, quartiles, or user-specified intervals. A maximum of 10 data value intervals are allowed for any given map. In this report only 7 user-specified intervals resulting in 7 levels

of shading were employed because tests indicated that resolution could not be retained when photographically reducing the map size for multiple-map presentation on a single page.

Mechanically plotting maps as a means of presenting information offers the opportunity of achieving the advantages of visual impact efficiently and economically. For example, the charges (at convenience rates) for plotting a typical set of 4 commodity maps amounted to approximately $.75 for the computer and $2.40 for the plotter. The plotting instructions were generated in less than 8 seconds and estimated plotting time was approximately 20 minutes. Thus, each coastal commodity map was drawn, shaded and titled in about 5 minutes at a cost of less than $1.00. Maps that are larger and more densely shaded cost proportionately more. For example, the large densely shaded maps cost nearly $5.00 each. All costs would of course increase if incurred at peak demand times. Nonetheless, it is clear that manual cartography cannot compete for situations involving repetitive mapping such as that done herein.