

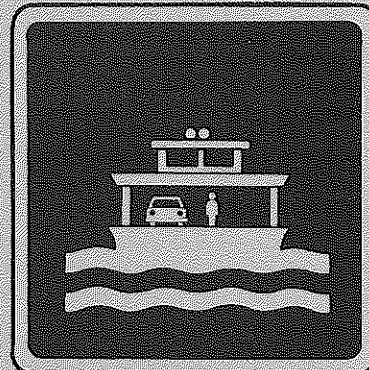
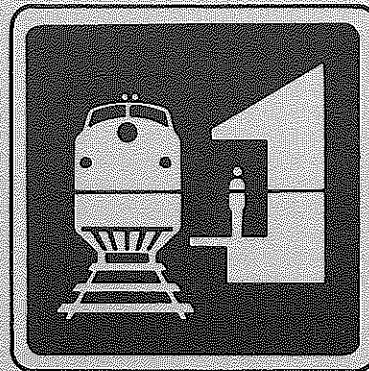
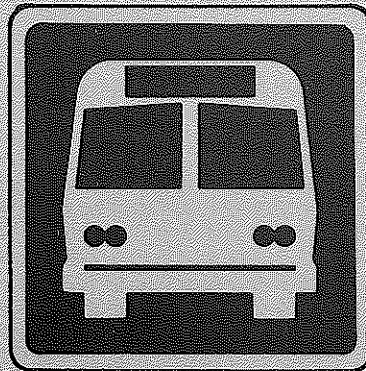
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# PUBLIC TRANSPORTATION IN MICHIGAN

Report 7

CROSS-LAKE MICHIGAN FERRY SURVEY

February 1985



**PASSENGER TRANSPORTATION PLANNING SECTION  
MICHIGAN DEPARTMENT OF TRANSPORTATION**

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OF  
TRANSPORTATION

Report 7

CROSS-LAKE MICHIGAN FERRY SURVEY

February 1985

Bureau of Transportation Planning  
Intercity Transportation Planning Division  
Passenger Transportation Planning Section

This report represents the findings and/or professional opinions of the Michigan Department of Transportation staff. Its publication does not represent an official opinion of the State Transportation Commission.

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## FOREWORD

A significant decline in use of cross-Lake Michigan ferry service during the last two decades has resulted from service reductions and discontinuance of ferry operations. Service has been reduced during this period out of the port of Ludington, and discontinued out of the ports of Frankfort and Muskegon. Total cross-Lake Michigan ridership today is less than one-third what it was in the late sixties. Ridership out of Ludington is one-half of that experienced in the late sixties and early seventies with less than 100,000 passengers transported in 1984.

The purpose of this Cross-Lake Michigan Ferry Survey is to improve the body of knowledge, for private and public sector decision making, regarding current cross-Lake Michigan ferry services. It provides up-to-date information about the trip, the tripmaker, and service features as rated by the tripmaker. This includes travel patterns and volumes, trip purpose, trip frequency, user age and employment, and automobiles per household.

For instance, the average head-of-party ferry user is a male in the 25-54 year old age group from a two-person household with two operating vehicles. He works full-time and earns \$30-40,000 annually. There are 2.5 persons in his party and they are on vacation or otherwise travelling for recreation. He makes one to four crossings a year, has used the service before, and will do so one to four times again in the next 12 months. He lives in either Michigan or Wisconsin and is traveling to the other of the two states.

The Survey was not designed to project the kinds of data necessary to address the potential for additional cross-Lake Michigan ferry services.

It doesn't assess what impact an intensive marketing effort or modified fare structure would have on demand. Further, no attempt is made to consider prospects for increased commercial traffic (trucking) or for passenger trips made in the fall, winter, and spring seasons.

Survey results are presented in four categories: travel characteristics, user characteristics, rating of services by users, and user comment analysis. The findings are grouped by (1) data comparisons, (2) findings, (3) limitations, and (4) user's rating of service. Detailed information in the form of origin-destination maps, data cross-tabulations, ferry service schedule and fare structure, and capacity analysis is also furnished.

## ACKNOWLEDGMENTS

This document was prepared by the staff of the Passenger Transportation Planning Section, Bureau of Transportation Planning. Major staff contributors were Kathy A. Hundt and Robert L. Kuehne of the Passenger Transportation Planning Section.

The origin-destination and mail-back surveys, on which this report is based, were conducted by the Origin and Destination Surveys Unit of the Transportation Planning Services Division. Selected computer graphics were generated by the Transportation Planning Procedures Section. Report contents were reviewed by the Bureau of Urban and Public Transportation Planning.

The excellent cooperation and assistance of Glen Bowden, President, and Mark Gaffney, Assistant Superintendent, of the Michigan-Wisconsin Transportation Company is deeply appreciated. This includes the information and insights they provided during the course of this survey and analysis effort.

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## I. INTRODUCTION

### A. Need for the Survey

The Michigan Department of Transportation (MDOT) initiated a study of cross-Lake Michigan ferry services in order to provide a basis for department policy regarding assistance in support of service expansion. A preliminary report was published in June 1984 entitled "Lake Michigan Cross-Lake Car Ferry Passenger Demand Market Study-Preliminary Report". It presents the history of cross-lake travel; travel variations and trip purposes; market areas and travel forecasts.

Although substantial data was examined, some of the information was dated. Before any final recommendations and/or decisions were made, it was deemed appropriate to perform an origin-destination survey on the current cross-lake operations. In addition to the basic origin-destination information, various social and economic information would be obtained from the travelers together with their impression about the existing service.

### B. Location of the Services

The ferry services operating on Lake Michigan are owned by the Michigan-Wisconsin Transportation Company. Service is provided between Ludington, Michigan and Kewaunee, Wisconsin on a year-round basis. One round trip per day is provided between mid-September and mid-June. During the summer months, two round trips are provided each day. An additional service is operated between Ludington and Milwaukee, Wisconsin during the summer months (see Figure 1).

FIGURE 1

LOCATION OF THE SERVICES

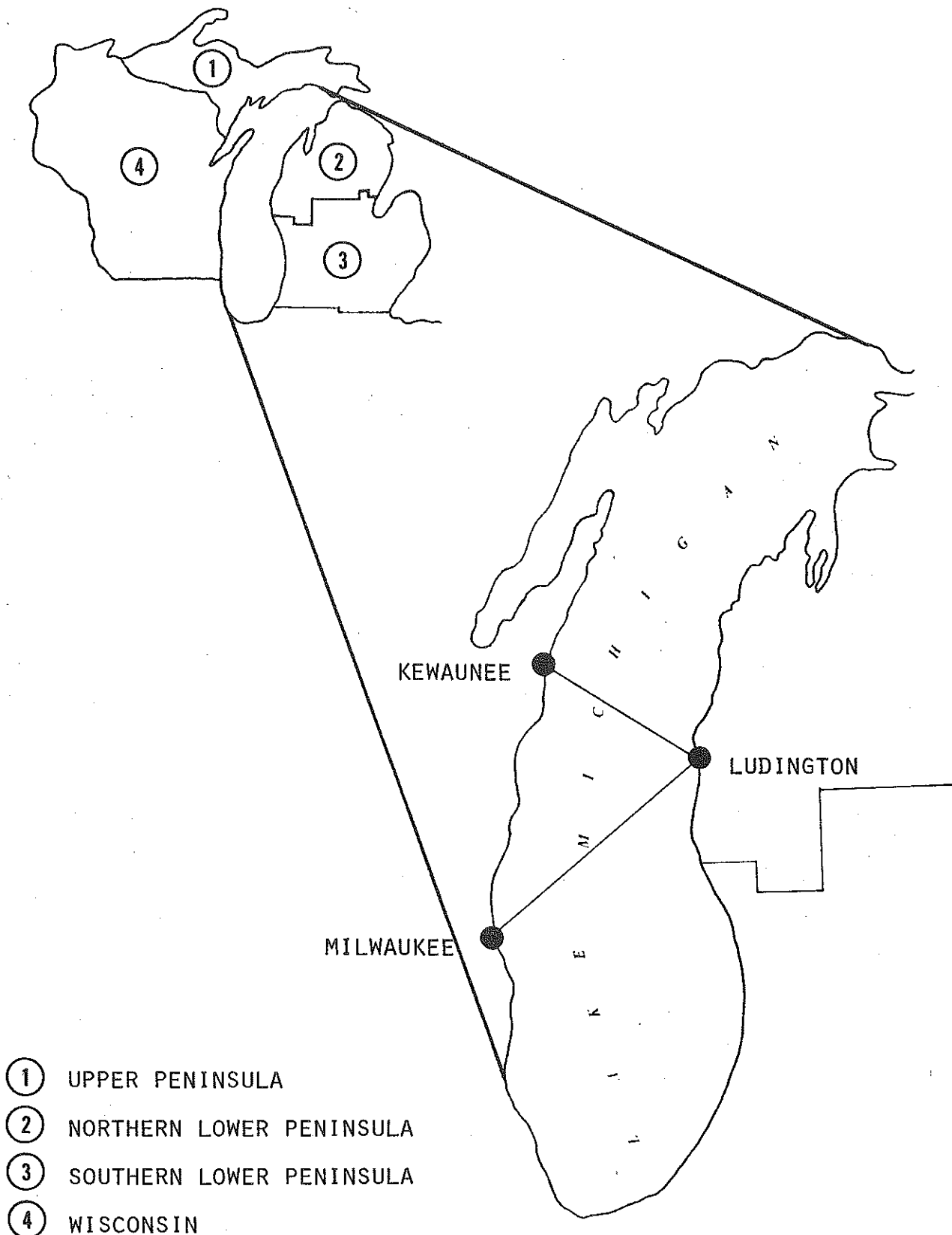


TABLE 1  
 CROSS-LAKE MICHIGAN FERRY RIDERSHIP  
 FY 1983-84

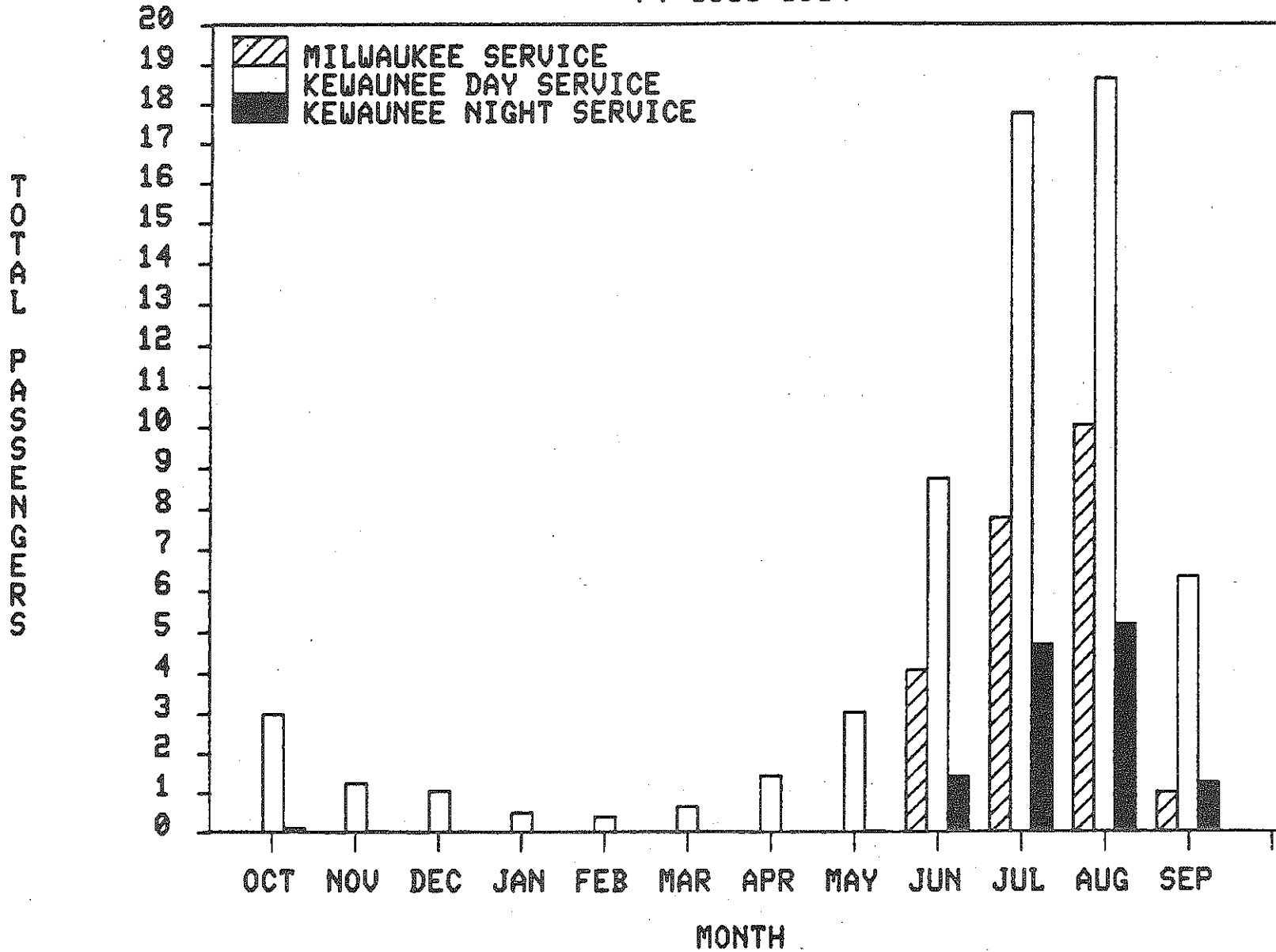
Month	Milwaukee		Kewaunee - Day		Kewaunee - Night		Total	
	Passengers	Autos	Passengers	Autos	Passengers	Autos	Passengers	Autos
Oct. 83			2,991	1,341	102	56	3,093	1,397
Nov.			1,257	611	21	13	1,278	624
Dec.			1,049	441	7	7	1,056	448
Jan. 84			488	226	0	0	488	226
Feb.			383	169	5	2	388	171
Mar.			648	290	19	10	667	300
Apr.			1,439	600	6	5	1,445	605
May			3,025	1,379	19	11	3,044	1,390
June	4,081	711	8,733	3,395	1,404	603	14,218	4,709
July	7,771	2,286	17,787	6,466	4,696	1,924	30,254	10,676
Aug.	10,043	2,671	18,677	6,689	5,170	2,402	33,890	11,762
Sept.	993	242	6,313	2,734	1,228	545	8,534	3,521
Total	22,888	5,910	62,790	24,341	12,677	5,578	98,355	35,829

Note: Service is not provided between Ludington and Milwaukee between mid-September and mid-June.

Source: Michigan-Wisconsin Transportation Company.

FIGURE 2

CROSS-LAKE MICHIGAN FERRY RIDERSHIP (000S)  
FY 1983-1984



During FY1983-84, the Milwaukee service carried 22,888 passengers; the Kewaunee day and Kewaunee night services carried 62,790 and 12,677 passengers respectively. The three services combined carried 98,355 passengers and 35,829 vehicles (see Table 1 and Figure 2).

C. Report Content

Existing service levels, use and operating characteristics of the cross-Lake Michigan services are described in this report. The results of an origin-destination and user survey conducted in August 1984 are presented along with analyses of the information obtained.

In some cases, data for the State of Michigan is analyzed in terms of the Upper Peninsula, northern Lower Peninsula and southern Lower Peninsula. The north-south division of the Lower Peninsula follows county boundaries and can roughly be considered a line between Muskegon and Bay City. This places all the state's urbanized areas in the southern Lower Peninsula.

## II. SURVEY METHODOLOGY

During the period of August 23-30, 1984, user surveys were conducted on board the ferries traveling between Ludington, Michigan and Milwaukee, Wisconsin; and Ludington and Kewaunee, Wisconsin. Three types of data collection were used: the personal interviewing of passengers, a mail-back questionnaire, and vehicle and passenger classifications (counts). These surveys were coordinated and conducted by The Bureau of Transportation Planning's Survey Section, Origin-Destination Unit. Survey crews were on duty during all hours of operation for each ferry. Three daily round trips were made: one to Milwaukee and two to Kewaunee. The survey began with the evening run to Kewaunee on Thursday, August 23 and concluded with the morning runs to Milwaukee and Kewaunee on Thursday, August 30. A sailing schedule is presented in Appendix D.

### A. Personal Interview Survey

The personal interview survey was conducted on board each ferry by the survey crews. During the crossing, the head person of as many parties as possible was asked a series of questions concerning the origin and destination of their trip; their permanent residence; type of vehicle; and the purpose of their trip. A sample of the survey form is included in Appendix B. A total of 1,842 personal interviews were conducted, constituting 84.7 percent of the estimated 2,175 parties using the three ferry services during the survey period see (Table 2).

## B. Mail-Back Survey

The mail-back questionnaire was handed out to all passengers as they boarded the ferries. It consisted of 15 questions concerning user characteristics and travel patterns related to the cross-lake ferry service. Respondents were also asked to rate the service from poor to very good in respect to 10 categories concerning the ferry and it's operation. There was also space available for the respondents to write comments regarding their experience and impressions of the service provided. MDOT's address and a prepaid postage stamp were printed on the questionnaire. Respondents either turned it in to one of the survey crew members or mailed it at their convenience. A sample of the survey form is included in Appendix B.

The information obtained from the mail-back survey supplemented, but was not combined with, the data obtained from the personal interview survey. In order to maintain consistency between the two user surveys, only questionnaires received from those who were the head of a party were used in the analysis for this report. A total of 1,126 questionnaires were returned from the estimated 2,175 heads of parties for a response rate of 51.8 percent (see Table 2).

TABLE 2

## CROSS-LAKE MICHIGAN USER SURVEY SAMPLES SIZES

Service	Total Passengers	Number of Parties	Personal Interview Surveys Completed	Personal Interview Sample Size	Mail-Back Surveys Completed	Mail-Back Survey Sample Size
Milwaukee	1,763	650	617	94.9%	458	70.5%
Kewaunee-Day	2,728	1,140	1,006	88.2%	566	49.6%
Kewaunee-Night	848	385	219	56.9%	102	26.5%
Total	5,339	2,175	1,842	84.7%	1,126	51.8%

Note: Only heads-of-party survey responses were used.

Source: MDOT, Passenger Transportation Planning Section, Cross-Lake Michigan Ferry Survey, August 1984.



FIGURE 3

TOTAL VEHICLES DURING SURVEY PERIOD

NUMBER OF VEHICLES

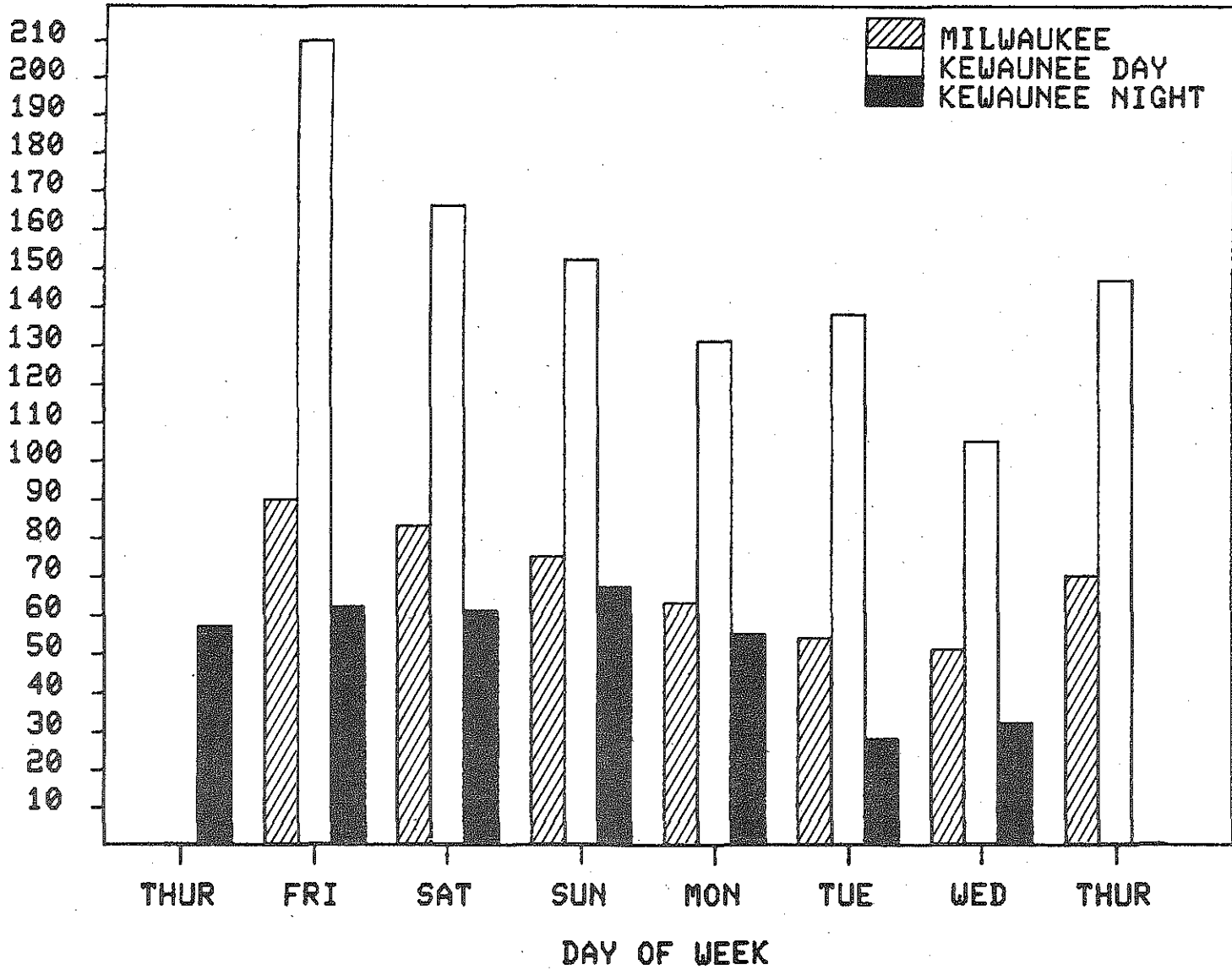
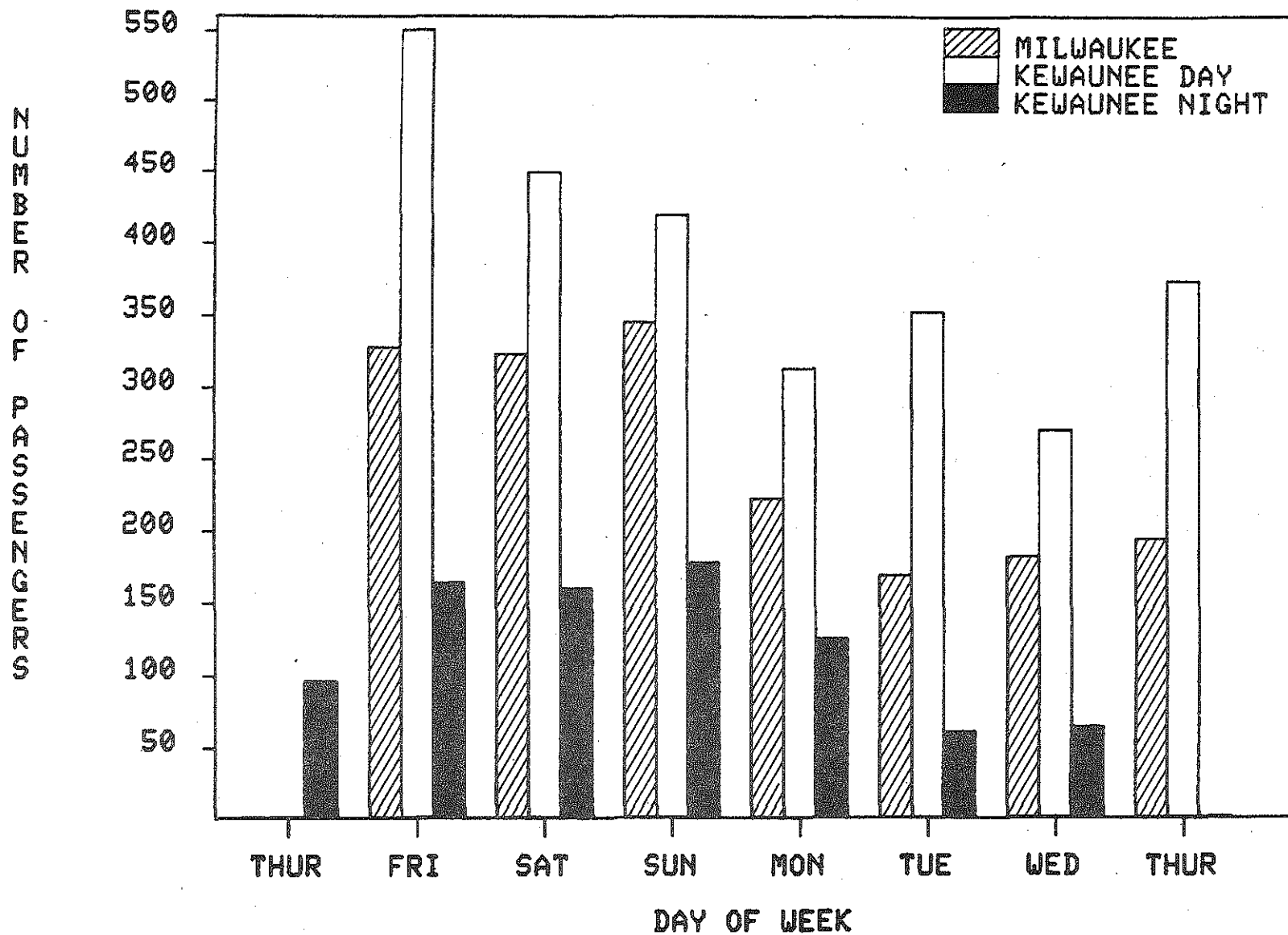


FIGURE 4

TOTAL PASSENGERS DURING SURVEY PERIOD



C. Classification Counts

The classification counts were done in conjunction with the personal interview and mail-back surveys. Vehicles and passengers were counted at each crossing, and vehicle type, as well as number of occupants was noted. During the survey period the total number of vehicles was 1,897; total passengers was 5,339 for all three services combined.

The daily totals of vehicle and passenger counts are represented in figures 3 and 4.

### III. SURVEY RESULTS

The results of the origin-destination and mail-back surveys are presented in this section. These results are representative of the users and their travel patterns during August 1984. Overall results are presented for travel and user characteristics. Brief summaries have been made for the most frequent responses. User ratings of the ferry services are also summarized. Cross tabulations of selected survey results are presented in Appendix C.

#### A. Travel Characteristics

Travel characteristics of the ferry users were obtained from the origin-destination survey, as well as from the mail-back survey. During the personal interview, information was requested concerning users' trip origin, trip destination, permanent residence, vehicle type, vehicle occupancy, and trip purpose. Information regarding number of ferry crossings, length of stay, reason for using service, etc. was obtained from the mail-back survey.

##### 1. Trip Ends and Interchanges

Over 95 percent of the 3,666 user origins and destinations (trip ends) recorded during the August 1984 survey were located in Michigan, Wisconsin and neighboring states. The density of trip ends is highest in Michigan and Wisconsin, with a gradation to lower densities in neighboring states and the remainder of the country (see Figure 5). There were 1,715 (46.8%) trip ends in Michigan and 1,265 (34.5%) trip ends in Wisconsin. A detailed table of trip interchanges, including each neighboring state, is presented in Appendix E. Major places or events visited by ferry users are listed in Table 3.

TABLE 3

## MAJOR PLACES OR EVENTS

Place or Event	Milwaukee	Kewaunee Day	Kewaunee Night	Total
<b>Michigan</b>				
Tour state/Lower Peninsula	22	16	3	41
Tour Upper Peninsula	13	28	1	42
Mackinac Island	34	16	2	52
Ludington	33	13	5	51
Frankenmuth	7	5	1	13
Traverse City	7	6	0	13
<b>Wisconsin</b>				
Tour state	0	16	1	17
Milwaukee	67	13	2	82
Wisconsin Dells	9	15	0	24
Madison	11	7	0	18
<b>Other</b>				
Travel to other states	26	77	22	125
Canada	8	13	7	28
Great America	18	0	0	18
To travel on the boat	10	8	0	18
Chicago	9	2	0	11

Source: MDOT, Passenger Transportation Planning Section, Cross-Lake Michigan Ferry Survey, August, 1984.

FIGURE 5  
TRIP ORIGINS AND DESTINATIONS FOR THE UNITED STATES

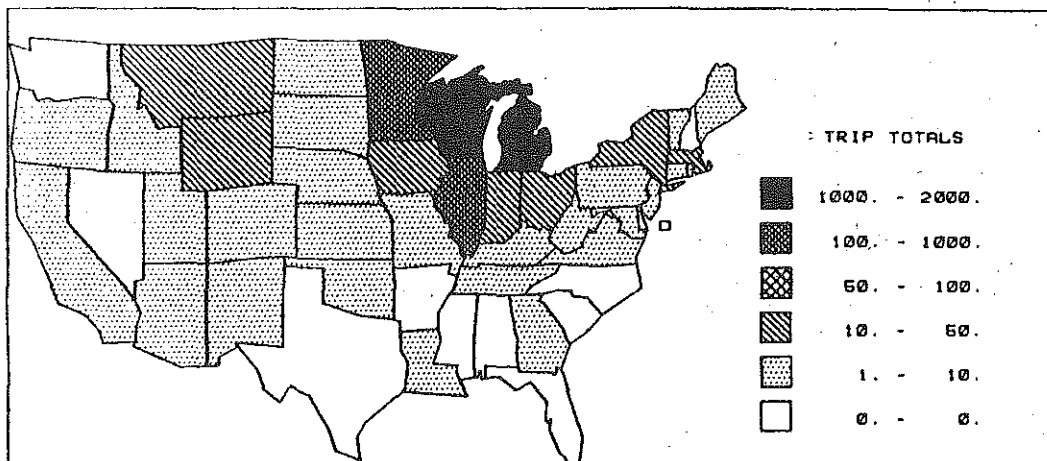


TABLE 4  
PARTIAL TRIP ORIGINS AND DESTINATIONS

	Michigan	Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula	Wisconsin	Neighboring States/Canada	Other	Total
Michigan	69	48	7	14	556	191	46	862
Upper Peninsula	19	0	6	13	12	8	1	40
Northern Lower Peninsula	18	16	1	1	326	120	25	497
Southern Lower Peninsula	32	32	0	0	218	55	20	325
Wisconsin	575	19	125	236	0	44	40	659
Neighboring States/Canada	101	18	40	58	40	17	18	256
Other	28	2	7	10	10	10	8	56
Total	853	87	179	318	606	262	112	1,833

Note: The Michigan figure is comprised of the Upper Peninsula, Northern Lower Peninsula and Southern Lower Peninsula figures.

There were four major travel routes taken by ferry users during the survey period (see Figure 6). The main arteries leading to Ludington in Michigan were:

- I-96 from Detroit via Lansing, Grand Rapids and Muskegon.
- M-21 from Port Huron to Flint, changing to US-10 via Saginaw, Midland Clare.

FIGURE 6  
 FERRY USER'S TRAVEL ROUTES IN THE GREAT LAKES REGION

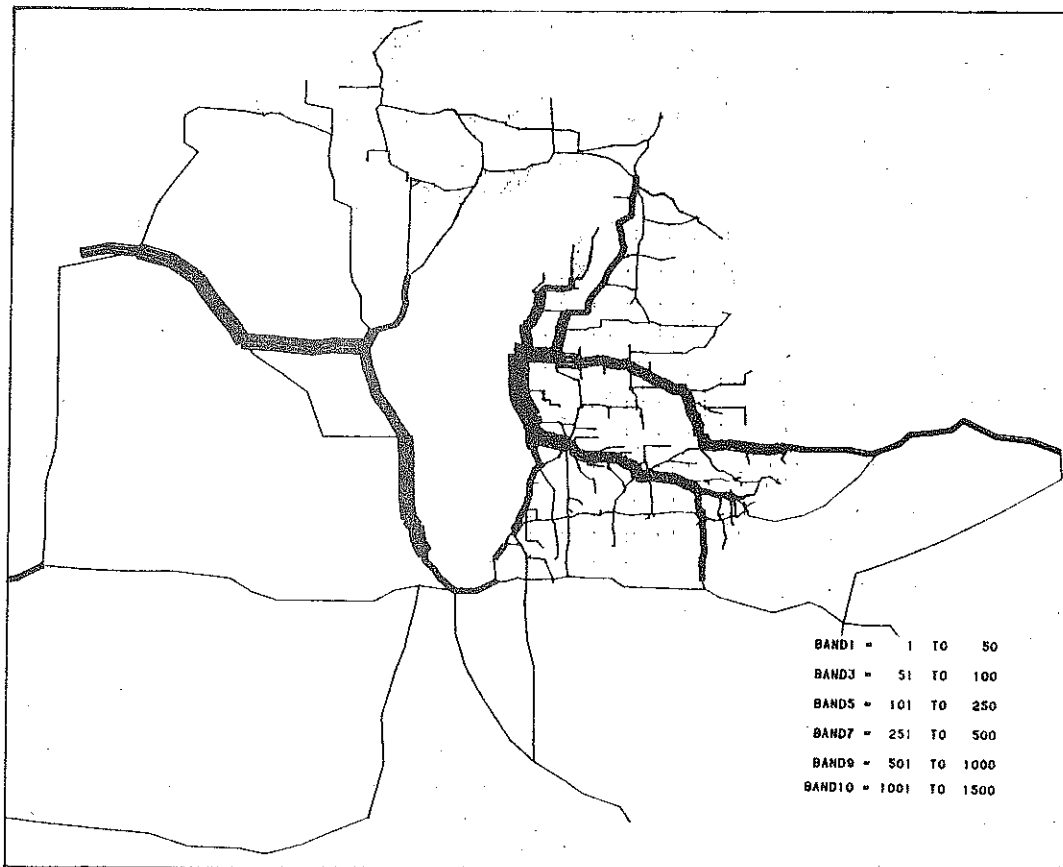
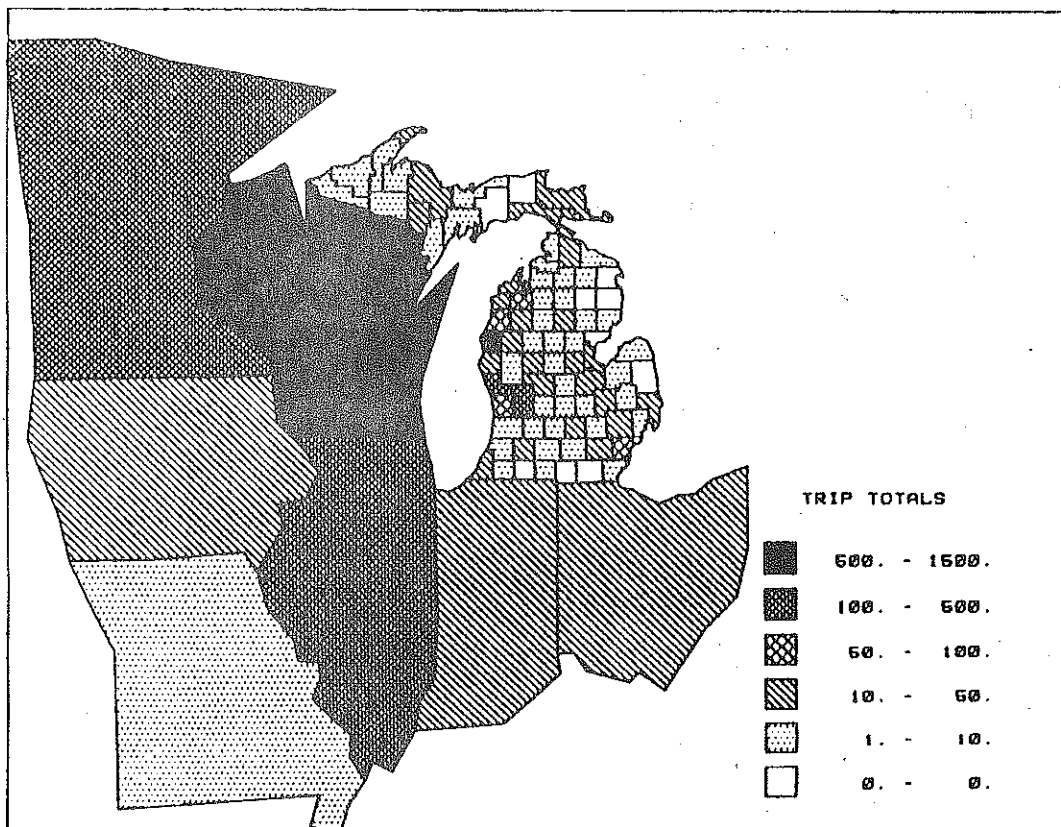


FIGURE 7  
 TRIP ORIGINS AND DESTINATIONS FOR THE GREAT LAKES REGION



The main routes leading to Milwaukee and Kewaunee in Wisconsin were:

- I-94 north from Chicago to Milwaukee.
- I-94 east from Minnesota to Wisconsin Route 21, then US-41 south to Milwaukee or US-41 north to Green Bay, then taking Wisconsin Route 29 on to Kewaunee.

Michigan's 13 urbanized areas and other major cities were the largest trip generators for the state as a whole (see Figure 7). Because all urbanized areas are located in the southern half of the lower peninsula, the greatest number of trip ends were recorded south of a line from Muskegon to Bay City (see Table 4). Many ferry users indicated Ludington to be their origin, destination, or both (as in the case of a round trip), resulting in Mason County having the highest density origin-destination pattern. Muskegon and Kent counties had the next highest number of trip ends.

## 2. Other Travel Features

Travel characteristics of the ferry users revealed that 32.9 percent were residents of Michigan, 25.1 percent were Wisconsin residents and the remaining 42.0 percent were from other states and Canada. The majority (61.8%) were previous ferry users and 89.8 percent expected to make one to four more ferry crossings within the next 12 months.

Two thirds (66.2%) of the users indicated their trip purpose was "vacation", while only 6.2 percent were using it for a work related trip. Overall results for each ferry service are shown in Table 5. A brief summary for each item is presented as well.



TABLE 5

## TRAVEL CHARACTERISTICS

Data Item	Milwaukee		Kewaunee Day		Kewaunee Night		Total	
	No.	%	No.	%	No.	%	No.	%
<b>Permanent Residence</b>								
Northern Lower Michigan	89	15.1	56	10.1	22	10.4	207	11.8%
Southern Lower Michigan	74	12.5	240	25.4	39	18.5	353	20.2%
Upper Peninsula	2	0.3	11	1.2	4	1.9	17	1.0%
Wisconsin	174	29.5	180	19.0	83	39.3	437	25.0%
Other	252	42.6	419	44.3	63	29.9	734	42.0%
Total	591	100.0	946	100.0	211	100.0	1748	100.0%
<b>Number of Previous Ferry Crossings</b>								
None	180	40.0	218	38.9	26	26.3	424	38.2%
1-4	144	32.0	195	35.0	39	39.4	379	34.2%
5 or More	126	28.0	146	26.1	34	34.3	306	27.6%
Total	450	100.0	560	100.0	99	100.0	1109	100.0%
<b>Expected Crossings in Next 12 Months</b>								
None	0	0.0	5	1.7	3	3.2	12	1.1%
1-4	384	91.0	481	90.1	77	81.8	942	89.8%
5 or More	37	9.0	44	8.2	14	15.0	95	9.1%
Total	421	100.0	534	100.0	94	100.0	1049	100.0%
<b>Length of Stay in Community Ferry Embarked From</b>								
One Day	174	51.0	360	74.0	81	86.1	615	66.3%
2 Days to 1 Week	95	29.0	100	20.0	8	8.5	203	21.9%
1-2 Weeks	19	6.0	14	3.0	1	1.1	34	3.7%
Permanent Residence	44	13.0	11	2.0	3	3.2	58	6.3%
Other	8	1.0	9	1.0	1	1.1	18	1.9%
Total	340	100.0	494	100.0	94	100.0	928	100.0%
<b>Length of Stay in Community Ferry Arrived At</b>								
One Day	156	49.0	365	75.0	71	77.2	592	65.9%
2 Days to 1 Week	101	32.0	83	17.0	14	15.2	198	22.0%
1-2 Weeks	13	5.0	13	2.0	2	2.2	28	3.1%
Permanent Residence	45	14.0	24	5.0	5	5.4	74	8.2%
Other	4	0.0	2	1.0	0	0.0	6	0.7%
Total	319	100.0	487	100.0	92	100.0	898	100.0%
<b>Reason for Using Ferry Service</b>								
Convenient Schedule	92	9.3	162	12.4	31	12.6	285	11.2%
Convenient Location	117	11.9	144	11.0	34	13.8	295	11.6%
To Save Time	160	16.3	290	22.1	68	27.5	518	20.4%
To Save Money	66	6.7	74	5.6	18	7.3	158	6.2%
To Relax	256	26.0	304	23.2	45	18.2	605	23.8%
For the Experience	230	23.4	256	19.5	34	13.8	520	20.5%
Other	63	6.4	81	6.2	17	6.8	161	6.3%
Total	984	100.0	1311	100.0	247	100.0	2542	100.0%
<b>Option Chosen if Cross-Lake Service Were Abandoned</b>								
Not Take the Trip	107	21.1	95	14.5	14	11.9	216	16.9%
Drive Around to the North	103	20.3	211	32.2	42	35.6	356	27.8%
Drive Around to the South	234	46.2	272	41.5	44	37.3	550	43.0%
Fly Via a Commercial Airline	49	9.7	64	9.8	14	11.9	127	9.9%
Other	14	2.7	13	2.0	4	3.3	31	2.4%
Total	507	100.0	655	100.0	118	100.0	1280	100.0%
<b>Trip Purpose</b>								
Work	27	4.4	59	5.9	27	13.0	113	6.2%
Personal Business	39	6.4	26	2.6	17	8.2	82	4.5%
Shopping	2	0.3	0	0.0	0	0.0	2	0.1%
Vacation	403	66.1	701	69.8	102	49.0	1206	66.2%
Other-Social/Recreation	131	21.5	174	17.3	53	25.5	358	19.6%
All Other	8	1.3	44	4.4	9	4.3	61	3.3%
Total	610	100.0	1004	100.0	208	100.0	1822	100.0%
<b>Interviews Conducted by Day of week</b>								
Thursday	74	12.1	148	14.7	34	15.5	256	13.9%
Friday	123	19.9	168	16.7	56	25.6	347	18.8%
Saturday	107	17.3	158	15.7	14	6.4	279	15.1%
Sunday	91	14.7	160	15.9	35	16.0	286	15.5%
Monday	90	14.6	136	13.5	29	13.2	255	13.8%
Tuesday	63	10.2	123	12.2	29	13.2	215	11.7%
Wednesday	69	11.2	113	11.3	22	10.1	204	11.1%
Total	617	100.0	1006	100.0	219	100.0	1842	100.0%
<b>Household Members on Trip</b>								
1	182	41.6	184	34.0	40	43.1	406	37.9%
2	178	40.7	244	45.1	28	30.1	450	42.0%
3	31	7.2	53	9.8	11	11.8	95	8.9%
4	34	7.8	39	7.2	7	7.5	80	7.5%
5 or More	12	2.7	21	3.9	7	7.5	40	3.7%
Total	437	100.0	541	100.0	93	100.0	1071	100.0%
<b>Vehicle on Board Ferry</b>								
Yes	254	59.9	427	79.5	73	76.0	754	71.3%
No	170	40.1	110	20.5	23	24.0	303	28.7%
Total	424	100.0	537	100.0	96	100.0	1057	100.0%

Notes: Percentages may have been adjusted slightly to compensate when no response was made. These results are for heads of parties only. The results shown for the "Reason for using ferry service" and "Option chosen if service were abandoned" reflect multiple responses.

Source: MDOT, Passenger Transportation Planning Section, Cross-Lake Michigan Ferry Survey, August 1984.

- a. Permanent Residence: One-third of the respondents were residents of Michigan; 25 percent were residents of Wisconsin.

Service	Michigan		Wisconsin		Other	
	No.	%	No.	%	No.	%
Milwaukee	165	27.9	174	29.5	252	42.6
Kewaunee - Day	347	36.7	180	19.0	419	44.3
Kewaunee - Night	65	30.8	83	39.3	63	29.9
Total	577	33.0	437	25.0	734	42.0

- b. Number of Previous Ferry Crossings: Nearly four out of 10 respondents had never used the ferry before, while approximately three of every 10 respondents had used it five or more times.

Service	None		5 or More	
	No.	%	No.	%
Milwaukee	180	40.0	126	28.0
Kewaunee - Day	218	38.9	146	26.1
Kewaunee - Night	26	26.3	34	34.3
Total	424	38.2	306	27.6

- c. Expected Crossings in the Next 12 Months: Approximately nine out of 10 respondents expected to make from one to four crossings in the next year. Very few (about 1%) responded zero.

Service	1 to 4		None	
	No.	%	No.	%
Milwaukee	384	91.0	0	0.0
Kewaunee - Day	481	90.1	9	1.7
Kewaunee - Night	77	81.8	3	3.2
Total	942	89.8	12	1.1

- d. Length of Stay in Community Ferry Embarked From: Two-thirds (66.3%) of the respondents were "passing through" the port the ferry left from; i.e., staying one day or less. Two of 10 stayed two days to one week.

<u>Service</u>	One day or less		2 days to 1 week	
	No.	%	No.	%
Milwaukee	174	51.0	95	29.0
Kewaunee - Day	360	74.0	100	20.0
Kewaunee - Night	81	86.1	8	8.5
Total	615	66.3%	203	21.9%

- e. Length of Stay in Community in Which Ferry Arrived: Approximately two-thirds (65.9%) of the respondents were "passing through" the port the ferry arrived at; i.e., staying one day or less. Two of 10 stayed two days to one week.

<u>Service</u>	One day or less		2 days to 1 week	
	No.	%	No.	%
Milwaukee	156	49.0	101	32.0
Kewaunee - Day	365	75.0	83	17.0
Kewaunee - Night	71	77.2	14	15.2
Total	592	65.9%	198	22.0%

- f. Reason for Using Ferry Service: Multiple responses were accepted for this question. The most frequent responses were: to relax, for the experience and to save time. For each of these, approximately two out of every 10 respondents chose this to be part of their reason for taking the ferry.

<u>Service</u>	To Relax		For the Experience		To Save Time	
	No.	%	No.	%	No.	%
Milwaukee	256	26.0	230	23.4	160	16.3
Kewaunee - Day	304	23.2	256	19.5	290	22.1
Kewaunee - Night	45	18.2	34	13.8	68	27.5
Total	605	23.8	520	20.5	518	20.4

- g. Option Chosen if Cross-Lake Service Were Abandoned: Over two-thirds of the respondents would make the trip anyway, driving either to the north (27.8%) or south (43.0%) around Lake Michigan. Nearly two of every 10 would not make the trip at all; one in 10 would fly via a commercial airline.

Service	Drive Around		Not Make Trip		Fly	
	No.	%	No.	%	No.	%
Milwaukee	337	66.5	107	21.1	49	9.7
Kewaunee - Day	483	73.7	95	14.5	64	9.8
Kewaunee - Night	86	72.9	14	11.9	14	11.9
Total	906	70.8	216	16.9	127	9.9

- h. Trip Purpose: Two thirds (66.2%) of the respondents were using the ferry as part of a vacation trip; somewhat less than one of 10 were using it for a work related trip.

Service	Vacation		Work	
	No.	%	No.	%
Milwaukee	403	66.1	27	4.4
Kewaunee - Day	701	69.8	59	5.9
Kewaunee - Night	102	49.0	27	13.0
Total	1,206	66.2	113	6.2

- i. Interviews Conducted by Day of Week: More interviews were conducted on Friday than any other day, followed by Saturday and Sunday, Monday and Thursday, and Tuesday and Wednesday. This reflects the large amount of weekend vacation travel.

Service	Friday	Sat. & Sun.	Mon. & Thurs	Tues. & Wed.
	%	%	%	%
Milwaukee	19.9	32.0	26.7	21.4
Kewaunee-Day	16.7	31.6	28.2	23.5
Kewaunee-Night	25.6	22.4	28.7	23.3
Total	18.8	30.6	27.7	22.8
Daily Total	18.8	15.3	13.8	11.4

- j. Household Members on Trip: Four out of 10 respondents were traveling with one other family member; over one-third (37.9%) were traveling alone.

Service	Two Household Members		One Household Member	
	No.	%	No.	%
Milwaukee	178	40.7	182	41.6
Kewaunee - Day	244	45.1	184	34.0
Kewaunee - Night	28	30.1	40	43.1
Total	450	42.0	406	37.9

- k. Vehicle on Board Ferry: The majority (71.3%) of respondents had a vehicle on board.

Service	Yes		No	
	No.	%	No.	%
Milwaukee	254	59.9	170	40.1
Kewaunee - Day	427	79.5	110	20.5
Kewaunee - Night	73	76.0	23	24.0
Total	754	71.3	303	28.7

B. User Characteristics

The user characteristics were obtained from the mail-back questionnaires. Information concerning users' sex, age, employment status, household size, family income range and vehicles per household was requested. Overall results for each ferry service is shown in Table 6. A brief summary for each response is also presented.

1. Sex: Slightly over half (54.4%) of those who responded were male.

<u>Service</u>	Male		Female	
	No.	%	No.	%
Milwaukee	239	53.5	208	46.5
Kewaunee - Day	292	52.2	267	47.8
Kewaunee - Night	70	70.7	29	29.3
Total	601	54.4	504	45.6

2. Age: Five of every 10 respondents were in the 25 to 54 age group. Nearly two of 10 were senior citizens.

<u>Service</u>	25 to 54		65 or over	
	No.	%	No.	%
Milwaukee	245	55.4	59	13.3
Kewaunee - Day	286	51.3	100	18.1
Kewaunee - Night	63	63.6	9	9.1
Total	594	54.1	168	15.3

TABLE 6  
USER CHARACTERISTICS

Data Item	Milwaukee		Kewaunee Day		Kewaunee Night		Total	
	No.	%	No.	%	No.	%	No.	%
<b>Sex</b>								
Male	239	53.5	292	52.2	70	70.7	601	54.4%
Female	208	46.5	267	47.8	29	29.3	504	45.6%
Total	447	100.0	559	100.0	99	100.0	1105	100.0%
<b>Age</b>								
17 or under	14	3.2	8	1.4	1	1.0	23	2.1%
18 to 24	38	8.6	37	6.6	8	8.1	83	7.6%
25 to 54	245	55.4	286	51.3	63	63.6	594	54.1%
55 to 64	86	19.5	126	22.6	18	18.2	230	20.9%
65 or over	59	13.3	100	18.1	9	9.1	168	15.3%
Total	442	100.0	557	100.0	99	100.0	1098	100.0%
<b>Employment Status</b>								
Employed Full-Time	262	58.6	278	49.5	69	69.7	609	55.0%
Employed Part-Time	40	8.9	57	10.1	6	6.1	103	9.3%
Unemployed	6	1.3	7	1.2	3	3.0	16	1.4%
Homemaker	34	7.6	64	11.4	6	6.1	104	9.4%
College Student	16	3.6	11	2.0	2	2.0	29	2.6%
Other Student	9	2.1	12	2.1	1	1.0	22	2.0%
Retired	72	16.1	129	23.0	12	12.1	213	19.2%
Other	8	1.8	4	0.7	0	0.0	12	1.1%
Total	447	100.0	562	100.0	99	100.0	1108	100.0%
<b>Household Size</b>								
One	72	16.2	70	12.7	12	12.2	154	14.1%
Two	175	39.3	252	45.6	33	33.7	460	42.0%
Three	76	17.1	97	17.5	18	18.4	191	17.4%
Four	73	16.5	86	15.6	19	19.4	178	16.2%
Five or More	49	10.9	48	8.6	16	16.3	113	10.3%
Total	445	100.0	553	100.0	98	100.0	1096	100.0%
<b>Family Income Range</b>								
Under \$10,000	34	8.4	31	6.0	8	8.7	73	7.2%
\$10,000-\$19,999	68	16.9	94	18.3	14	15.2	176	17.4%
\$20,000-\$29,999	88	21.8	116	22.6	27	29.4	231	22.9%
\$30,000-\$39,999	88	21.8	110	21.4	15	16.3	213	21.1%
\$40,000-\$49,999	50	12.5	70	13.6	14	15.2	134	13.3%
\$50,000 or More	75	18.6	93	18.1	14	15.2	182	18.0%
Total	403	100.0	514	100.0	92	100.0	1009	100.0%
<b>Operating Vehicles per Household</b>								
None	6	1.5	3	0.6	2	2.1	11	1.0%
One	113	26.9	142	26.4	22	23.4	277	26.4%
Two	185	44.0	276	51.4	51	54.3	512	48.7%
Three or More	116	27.6	116	21.6	19	20.2	251	23.9%
Total	420	100.0	537	100.0	94	100.0	1051	100.0%

Notes: Percentages may have been adjusted slightly to compensate when no response was made. These results are for heads of parties only.

Source: MDOT, Passenger Transportation Planning Section, Cross-Lake Michigan Ferry Survey, August 1984.

3. Employment Status: Approximately two-thirds (64.3%) of the respondents were employed full or part-time; two of 10 were retired.

Service	Full or Part-time		Retired	
	No.	%	No.	%
Milwaukee	302	67.5	72	16.1
Kewaunee - Day	335	59.6	129	23.0
Kewaunee - Night	75	75.8	12	12.1
Total	712	64.3	213	19.2

4. Household Size: Over half (56.1%) of the respondents were from households of one or two persons. Four of 10 were from households of three or more.

Service	One		Two		Three or More	
	No.	%	No.	%	No.	%
Milwaukee	72	16.2	175	39.3	198	44.5
Kewaunee - Day	70	12.7	252	45.6	231	41.7
Kewaunee - Night	12	12.2	33	33.7	53	54.1
Total	154	14.1	460	42.0	482	43.9

5. Family Income Range: Four of 10 respondents were from households with an annual income between \$20,000 and \$39,999. Some what less than one of 10 was from a household in the Under \$10,000 range; two of 10 were in the \$50,000 or more range.

Service	Under \$10,000		\$20,000 to \$39,999		\$50,000 or More	
	No.	%	No.	%	No.	%
Milwaukee	34	8.4	176	43.6	75	18.6
Kewaunee - Day	31	6.0	226	44.0	93	18.1
Kewaunee - Night	8	8.7	42	45.7	14	15.2
Total	73	7.2	444	44.1	182	18.0



6. Operating Vehicles per Household: Over three-fourths (76.1%) of the respondents were from households having two vehicles or less. Almost three of 10 had one vehicle, with only one percent having none.

<u>Service</u>	Two or Less		One or None	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Milwaukee	304	72.4	119	28.4
Kewaunee - Day	421	78.4	145	27.0
Kewaunee - Night	75	79.8	24	25.5
Total	800	76.1	288	27.4

C. Rating of Services by Users

One of the questions on the mail-back survey form asked respondents to rate the ferry service regarding the following: departure/arrival times, frequency of service, availability of information, announcement of schedule changes, ease of getting on/off ferry, condition of vessel, quality of food and beverage service, parking/waiting area, courtesy of ferry employees and fare structure. Overall results for each ferry service are shown in Table 7 and are illustrated in Figure 8. Following is a brief summary of the most frequent responses for each of the 10 categories.

1. Departure/Arrival Times: Approximately eight of 10 respondents considered the departure/arrival times to be good or very good.

<u>Service</u>	Good		Very Good	
	No.	%	No.	%
Milwaukee	143	33.6	201	47.3
Kewaunee - Day	157	29.6	256	48.2
Kewaunee - Night	35	36.5	34	35.4
Total	335	31.8	491	46.7

2. Frequency of Service: Over two-thirds (67.0%) of the respondents rated this item good or very good.

<u>Service</u>	Good		Very Good	
	No.	%	No.	%
Milwaukee	170	42.1	81	20.1
Kewaunee - Day	244	47.1	121	23.4
Kewaunee - Night	48	51.6	16	17.2
Total	462	45.5	218	21.5

TABLE 7

## RATING OF SERVICES BY USERS

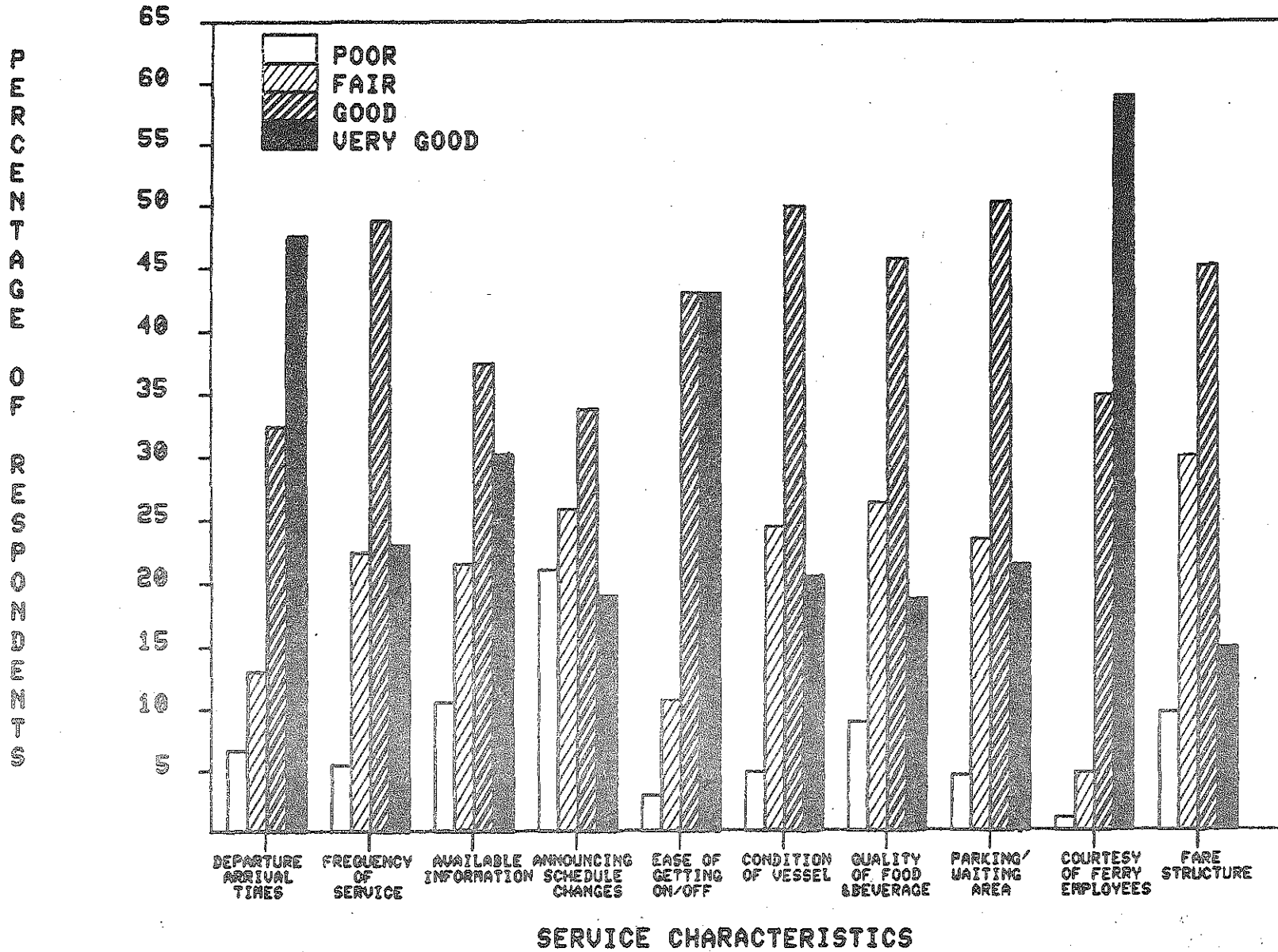
Data Item	Milwaukee		Kewaunee Day		Kewaunee Night		Total	
	No.	%	No.	%	No.	%	No.	%
<b>Departure/Arrival Times</b>								
Poor	20	4.7	43	8.1	6	6.3	69	6.6%
Fair	54	12.7	61	11.5	20	20.8	135	12.8%
Good	143	33.6	157	29.6	35	36.5	335	31.8%
Very Good	201	47.3	256	48.2	34	35.4	491	46.7%
Don't Know	7	1.7	14	2.6	1	1.0	22	2.1%
Total	425	100.0	531	100.0	96	100.0	1052	100.0%
<b>Frequency of Service</b>								
Poor	32	7.9	16	3.1	4	4.3	52	5.1%
Fair	89	22.0	100	19.3	24	25.8	213	21.0%
Good	170	42.1	244	47.1	48	51.6	462	45.5%
Very Good	81	20.1	121	23.4	16	17.2	218	21.5%
Don't Know	32	7.9	37	7.1	1	1.1	70	6.9%
Total	404	100.0	518	100.0	93	100.0	1015	100.0%
<b>Availability of Information</b>								
Poor	59	13.8	41	7.6	9	9.5	109	10.3%
Fair	101	23.7	101	18.8	20	21.1	222	21.0%
Good	143	33.6	210	39.2	32	33.7	385	36.4%
Very Good	109	25.6	171	31.8	32	33.7	312	29.5%
Don't Know	14	3.3	14	2.6	2	2.0	30	2.8%
Total	426	100.0	537	100.0	95	100.0	1058	100.0%
<b>Announcement of Schedule Changes</b>								
Poor	35	8.9	43	8.8	6	6.5	84	8.6%
Fair	34	8.6	59	12.1	10	10.9	103	10.6%
Good	42	10.6	77	15.7	16	17.4	135	13.8%
Very Good	41	10.4	30	6.1	5	5.4	76	7.8%
Don't Know	243	61.5	280	57.3	55	59.8	578	59.2%
Total	395	100.0	489	100.0	92	100.0	976	100.0%
<b>Ease of Getting On/Off Ferry</b>								
Poor	12	2.8	18	3.3	2	2.0	32	3.0%
Fair	53	12.2	53	9.8	9	9.2	115	10.7%
Good	181	41.5	237	43.8	43	43.9	461	42.9%
Very Good	186	42.7	231	42.7	44	44.9	461	42.9%
Don't Know	4	0.8	2	0.4	0	0.0	6	0.6%
Total	436	100.0	541	100.0	98	100.0	1075	100.0%
<b>Condition of Vessel</b>								
Poor	23	5.3	22	4.1	6	6.3	51	4.8%
Fair	117	27.0	121	22.7	17	17.7	255	24.0%
Good	213	49.1	260	48.8	46	47.9	519	48.8%
Very Good	71	16.4	121	22.7	22	22.9	214	20.1%
Don't Know	10	2.2	9	1.7	5	5.2	24	2.3%
Total	434	100.0	533	100.0	96	100.0	1063	100.0%
<b>Quality of Food and Beverage Service</b>								
Poor	29	6.9	36	7.1	11	11.7	76	7.5%
Fair	107	25.5	97	19.2	19	20.2	223	21.9%
Good	167	39.9	189	37.4	31	33.0	387	38.0%
Very Good	65	15.5	82	16.2	12	12.8	159	15.6%
Don't Know	51	12.2	101	20.1	21	22.3	173	17.0%
Total	419	100.0	505	100.0	94	100.0	1018	100.0%
<b>Parking/Waiting Area</b>								
Poor	13	3.0	30	5.6	5	5.1	48	4.5%
Fair	100	23.3	119	22.2	27	27.6	246	23.1%
Good	208	48.4	269	50.1	49	50.0	526	49.4%
Very Good	94	21.9	115	21.4	16	16.3	225	21.1%
Don't Know	15	3.4	4	0.7	1	1.0	20	1.9%
Total	430	100.0	537	100.0	98	100.0	1065	100.0%
<b>Courtesy of Ferry Employees</b>								
Poor	7	1.6	1	0.2	3	3.1	11	1.0%
Fair	24	5.6	21	3.9	5	5.1	50	4.7%
Good	145	33.7	193	35.8	28	28.6	366	34.3%
Very Good	243	56.5	315	58.4	60	61.2	618	57.9%
Don't Know	11	2.6	9	1.7	2	2.0	22	2.1%
Total	430	100.0	539	100.0	98	100.0	1067	100.0%
<b>Fare Structure</b>								
Poor	38	9.2	42	8.1	12	12.5	92	9.0%
Fair	125	30.3	130	25.1	31	32.3	286	27.9%
Good	160	38.8	232	44.9	39	40.6	431	42.0%
Very Good	61	14.8	74	14.3	7	7.3	142	13.9%
Don't Know	28	6.9	39	7.6	7	7.3	74	7.2%
Total	412	100.0	517	100.0	96	100.0	1025	100.0%

Notes: Percentages may have been adjusted slightly to compensate when no response was made. These results are for heads of parties only.

Source: MD01, Passenger Transportation Planning Section, Cross Lake Michigan Ferry Survey, August 1984.

FIGURE 8

RATING OF SERVICES BY USERS  
ALL SERVICES COMBINED



3. Availability of Information: Nearly two-thirds (65.9%) of the respondents rated the availability of information good or very good; of the remaining third, 31.3 percent rated this item poor or fair; 2.8 percent of the respondents checked "don't know."

<u>Service</u>	Good		Very Good	
	No.	%	No.	%
Milwaukee	143	33.6	109	25.6
Kewaunee - Day	210	39.2	171	31.8
Kewaunee - Night	32	33.7	32	33.7
Total	385	36.4	312	29.5

4. Announcement of Schedule Changes: The majority (59.2%) of the respondents checked "don't know" for this item; two of 10 considered it to be fair or good.

<u>Service</u>	Fair		Good		Don't Know	
	No.	%	No.	%	No.	%
Milwaukee	34	8.6	42	10.6	243	61.5
Kewaunee - Day	59	12.1	77	15.7	280	57.3
Kewaunee - Night	10	10.9	16	17.4	55	59.8
Total	103	10.6%	135	13.8%	578	59.2%

5. Ease of Getting On/Off Ferry: Eight out of 10 respondents rated this item good or very good.

<u>Service</u>	Good		Very Good	
	No.	%	No.	%
Milwaukee	181	41.5	186	42.7
Kewaunee - Day	237	43.8	231	42.7
Kewaunee - Night	43	43.9	44	44.9
Total	461	42.9	461	42.9

6. Condition of Vessel: Seven of 10 respondents rated the condition of the vessel to be fair or good; two of 10 rated it very good.

<u>Service</u>	Fair		Good		Very Good	
	No.	%	No.	%	No.	%
Milwaukee	117	27.0	213	49.1	71	16.4
Kewaunee - Day	121	22.7	260	48.8	121	22.7
Kewaunee - Night	17	17.7	46	47.9	22	22.9
Total	255	24.0	419	48.8	214	20.1

7. Quality of Food and Beverage Service: Over half (59.9%) of the respondents rated this item fair or good.

<u>Service</u>	Fair		Good	
	No.	%	No.	%
Milwaukee	107	25.5	167	39.9
Kewaunee - Day	97	19.2	189	37.4
Kewaunee - Night	19	20.2	31	33.0
Total	223	21.9	387	38.0

8. Parking/Waiting Area: Nearly three-fourths (72.5%) of the respondents rated the parking/waiting area fair or good. Two of 10 rated it very good.

<u>Service</u>	Fair		Good		Very Good	
	No.	%	No.	%	No.	%
Milwaukee	100	23.3	208	48.4	94	21.9
Kewaunee - Day	119	22.2	269	50.1	115	21.4
Kewaunee - Night	27	27.6	49	50.0	16	16.3
Total	246	23.1	526	49.4	225	21.1

9. Courtesy of Ferry Employees: Nine of 10 respondents rated this item good or very good.

<u>Service</u>	<u>Good</u>		<u>Very Good</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Milwaukee	145	33.7	243	56.5
Kewaunee - Day	193	35.8	315	58.4
Kewaunee - Night	28	28.6	60	61.2
				9%

10. Fare Structure: Over two-thirds (69.9%) of the respondents rated the fare structure as fair or good; approximately one of 10 rated it poor.

<u>Service</u>	<u>Poor</u>		<u>Fair</u>		<u>Good</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Milwaukee	38	9.2	125	30.3	160	38.8
Kewaunee - Day	42	8.1	130	25.1	232	44.9
Kewaunee - Night	12	12.5	31	32.3	39	40.6
Total	92	9.0	286	27.9	431	42.0

#### D. User Comment Analysis

Over 1,000 written user comments were received in response to questions 15 and 16 of the mail-back survey. Question 15, "If you could, what one thing would change about the ferry service?" received 817 written responses, while there were 500 responses to question 16, "Other Comments." There were very few completely negative comments from users who were so dissatisfied that they planned to never use the ferry service again. The majority of comments received seemed to be of the constructive criticism variety from users who generally enjoy the service, but would like to see some improvements made. Many positive comments were also received from users who were happy with everything as it is. Following are brief summaries of user comments, grouped in categories similar to those used to rate the ferry services.

1. Departure/Arrival Schedule: Comments regarding two rating categories are included in this topic: departure/arrival times and frequency of service. While these items were generally rated to be good, many written comments concerned a need to adjust the daily schedule and increase the service level.

- Daily Schedules: A common complaint concerned the 7:00 a.m. departure time for the Ludington to Milwaukee ferry. Users commented that a later departure, such as 8:00 or 9:00 a.m. would be more convenient. Some users expressed a desire for an earlier afternoon departure from Milwaukee in order to arrive in Ludington earlier in the evening.

- Service Level: Provision of service to Milwaukee year round or begin service earlier in the spring and terminate later in the fall.



2. Information Flow: Two rating features pertain to this subject:

availability of information and announcement of schedule changes. Both of these features received relatively low user ratings. Based on user comments and other information, it appears that more needs to be done to (a) attract users, (b) enhance user knowledge, (c) improve accuracy, and (d) improve convenience.

- Attract Users: Better distribution of schedule information in such items as brochures, newspapers, AAA travel guide, TV, and radio. Focus on Chicago and other urbanized areas in Michigan, Wisconsin, and neighboring states.
- Enhance User Knowledge: Increased provision of interest items such as car ferry history, vessel size and components, and trip distance. Also, as a courtesy, keep the users informed as to why departure delays are occurring.
- Improve Accuracy: Dissemination of correct information such as that portrayed on signs, in brochures, communicated over the telephone, and provided at dockside.
- Improved Convenience: Provision of a reservation source in Kewaunee and Milwaukee and/or an 800 number to contact Ludington.

3. Ease of Getting On/Off Ferry: Stairs were a problem for handicapped and elderly persons. Several users expressed a desire to drive their

own vehicle on board and to be able to lock it for security purposes. Insitute a system of claim checks to retrieve one's car.

4. Condition of Vessels: Physical condition of the vessels did not appear to concern ferry users as much as did cleanliness. Many felt the vessels should be kept cleaner in virtually every public area: lounge, cafeteria, staterooms, restrooms and deck furniture. Users also complained of flies on board.
  
5. Quality of Food/Beverage Service: The aspects found lacking by the users pertained to conditions, food, and service.
  - Conditions: Need for improved cleanliness, elimination of flies, better seating, dishes other than styrofoam, clean salt shakers, etc.
  
  - Food: Improved quality and variety of food, better tasting water, and a children's menu.
  
  - Service: Need for more responsive and courteous service, improved availability of waiters, and more responsive issuing of checks. Service is generally slow and not caring.
  
6. Parking/Waiting Area: Written comments regarding this category seemed to be concerned with incorrect information as to where to wait to board ferry. The condition of parking lots was also mentioned as being poor, especially in bad weather.

7. Courtesy of Ferry Employees: The majority of comments received regarding ferry employees were complimentary and positive. Users were pleased with employee assistance, especially with elderly and handicapped persons. Negative comments were received concerning cafeteria waiters and snack bar attendant.
8. Fare Structure: The fare structure was viewed by the users as somewhat high, particularly for certain types of users and trips.
- Types of Users: Reduced fares for retirees, children, families, and frequent users.
  - Types of Trips: Reduced fares for round trips made within a certain number of days.
  - Other: Lower fares for motorcycles than automobiles, a fare for animals, particularly dogs, possibly a combined fare for vehicle and driver, and consideration of the cost to drive around versus ferrying across Lake Michigan in determining fares.
9. Other Comments: A few comments were received from users suggesting a southern Lake Michigan operation. These included (1) adding Muskegon as a port, (2) adding Chicago as a port, (3) making more trips to Milwaukee, and (4) instituting a Milwaukee to Holland/Benton Harbor ferry service.

#### IV. FINDINGS

##### A. Data Comparisons

1. Trip Purpose: Approximately, 86 percent of the trips are for vacation, social or recreational purposes. An Interstate Commerce Commission Passenger Ridership Survey conducted in 1976 reported 85.2 percent of the trips being made were for vacation and social/recreational purposes. The 1984 MDOT survey reported 85.7 percent for these purposes (see Table 5). Work and personal business was 7.9 percent in 1976 and 10.7 percent in 1984.
2. Trip Origins and Destinations: Some 81 percent of the trip origins and destinations are in Michigan and Wisconsin (see Appendix E). This is somewhat higher than the 1976 Interstate Commerce Commission Survey indicated.

	<u>Origins</u>		<u>Destinations</u>	
	<u>MDOT</u>	<u>ICC</u>	<u>MDOT</u>	<u>ICC</u>
Michigan/Wisconsin	83.0%	67.2%	79.6%	77.1%
Other Locations	17.0%	32.8%	20.4%	22.9%

Of the remaining 19 percent, 14 percent of the origins and destinations are in neighboring states and Canada, 5 percent are in other areas. The most frequently visited places/events were Mackinac Island (52), Canada (28), Wisconsin Dells (24), Great Americas (18), Madison (18), Travel on Boat (18), Frankenmuth (13), Traverse City (13), and Chicago (11). For a more detailed listing, see Table 3.

3. User Characteristics

a. Family Size: The typical user's family size is two persons.

Some 42 percent of the ferry users were in this category. This is a smaller family size than the Bureau of the Census, 1977 National Travel Survey determined for Michigan and Wisconsin vacationers.

<u>Family Size</u>	<u>1984 MDOT</u>	<u>1977 NTS</u>	
		<u>Michigan</u>	<u>Wisconsin</u>
One	14.1%	--	--
Two	42.0%	34.1%	37.0%
Three	17.4%	17.2%	17.8%
Four	16.2%	25.2%	25.8%
Five or More	10.3%	23.7%	19.4%

b. Household Income: The typical user's income is about \$31,200. The distribution of user's by income group is fairly even with no dominant income group. This is about the same as the income reported in the 1977 National Travel Survey when the figures are adjusted to 1984 dollars using a 1.72 factor.

c. Party Size: The number of individuals in each party making the trip is typically 2.5. This compares to the National Transportation Survey figures of 3.1/3.7 people per trip and 2.3/2.3 adults per trip for Michigan/Wisconsin.

- d. Weekend Trips: The weekend (Saturday/Sunday) tripmaking percentage for the ferry service users is 30.6 percent. When Friday is added to the Saturday/Sunday figure, the percentage is approximately 50 percent. This compares to the 1977 National Travel Survey percentages of 32.7 and 37.2 for Michigan and Wisconsin respectively. The highest tripmaking day is Friday (18.8 percent).

B. Findings

1. Finding: Approximately 17.5 percent of the trips have origins and destinations south of a line between Bay City and Muskegon. These connect lower Michigan with the Upper Peninsula, Wisconsin, parts of Canada, neighboring states, and the remainder of the United States. This amounts to 320 trips during the seven day survey period or 46 per day. Over 71 percent of these are between Wisconsin and the southern part of Michigan's lower peninsula.
2. Finding: The three services operated at approximately 25 percent of capacity (vehicles 45%) during the survey period. The day Kewaunee trip is well above and the night Kewaunee trip is well below this percentage (see Table 8 and Appendix F). This is less than the August average of 36 percent with the day Kewaunee trip being 60 percent. August is the highest use month of the year as it comprises one-third of the annual use (see Table 1).
3. Finding: The high majority of the trips are for vacation and other social/recreation purposes. This amounts to 85.7

TABLE 8  
VESSEL PRODUCTIVITY

Service	Total Passengers	Total Vehicles	Total Vessel Crossings (1 Way)	Passengers Per Vessel Crossing	Vehicles Per Vessel Crossing	Vehicle Capacity (Passenger/Vehicle)
Milwaukee	1,763	486	14	125.9	34.7	500+/100
Kewaunee-Day	2,728	1,049	14	194.9	74.9	500+/140
Kewaunee-Night	848	362	14	60.6	25.9	500+/60
Total	5,339	1,897	42	127.1	45.2	500+/100

Note: These figures represent passenger and vehicle counts during the survey period of August 23-30, 1984.

Source: MDOT, Passenger Transportation Planning Section, Cross-Lake Michigan Ferry Survey, August 1984.

percent. The work trip is the second most frequent trip purpose, but only comprises 6.2 percent of all tripmaking.

<u>Service</u>	<u>Vacation &amp; Social/Recreation</u>	<u>Work</u>
Milwaukee	87.6%	4.4%
Day Kewaunee	87.1%	5.9%
Night Kewaunee	74.5%	13.0%
Average	85.8%	6.2%

4. Finding: The cross-Lake Michigan ferry service is a tourist attraction. Some 20 percent of the users indicated that the reason for using the service was for the experience (see Table 4). Also 16.9 percent stated they would not take the trip if no cross-lake service were available. That is, they wouldn't drive or fly instead.
5. Finding: A significant number of users reside in states other than Michigan and Wisconsin. Approximately 42 percent have their permanent residence outside of these two states; only one-third of the users reside in Michigan. This means income to the state (see Table 5 and Appendix E).

### C. Limitations

1. Limitation: The survey does not identify the potential for additional services. These could include more frequent service from Ludington to Kewaunee and Milwaukee as well as totally new cross-Lake Michigan services. The reason is that the location and schedule of the existing service affect which trips will be made using cross-Lake Michigan ferry services.



2. Limitation: The survey does not indicate what impact an intensive marketing program would have on use of a cross-Lake Michigan service.

In fact, users rate marketing associated features of the existing service relatively low. Therefore, a comprehensive marketing program could have a significant impact on service use.

3. Limitation: The survey does not indicate what the demand for the existing service would be if the fare structure were modified.

One-third of the users rated the fare structure as fair or poor. Perhaps potential or past users chose a different way to make their trip because of the fare structure.

4. Limitation: The survey does not portray year round travel patterns and trip purposes. While the summer months' trips are largely made by vacationers and tourists travelling considerable distances, the same may not hold true for the remainder of the year. Not only can the trip purpose profile change markedly, but also the origin and destination of the trips.

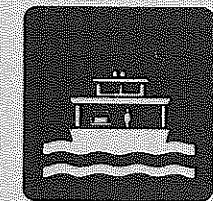
#### D. User's Rating of Service

The users of the cross-Lake Michigan ferry service are satisfied with the way they are treated and the service; generally dissatisfied with information flow, food service, and fare structure. Using the sum of "good" and "very good" responses (see Table 7) as the basis, ten service features rank as follows in descending satisfaction level order.

<u>Service Feature</u>	<u>Poor</u>	<u>Good &amp; Very Good</u>
Courtesy of Employees	1.1%	94.2%
Ease of Getting On/Off Ferry	3.0%	86.2%
Departure/Arrival Times	6.7%	80.0%
Frequency of Service	5.5%	72.0%
Parking/Waiting Area	4.6%	71.9%
Condition of Vessel	4.9%	70.5%
Availability of Information	10.6%	67.8%
Quality of Food/Beverage Service	9.0%	64.6%
Fare Structure	9.7%	60.3%
Announcement of Schedule Changes	21.1%	53.0%

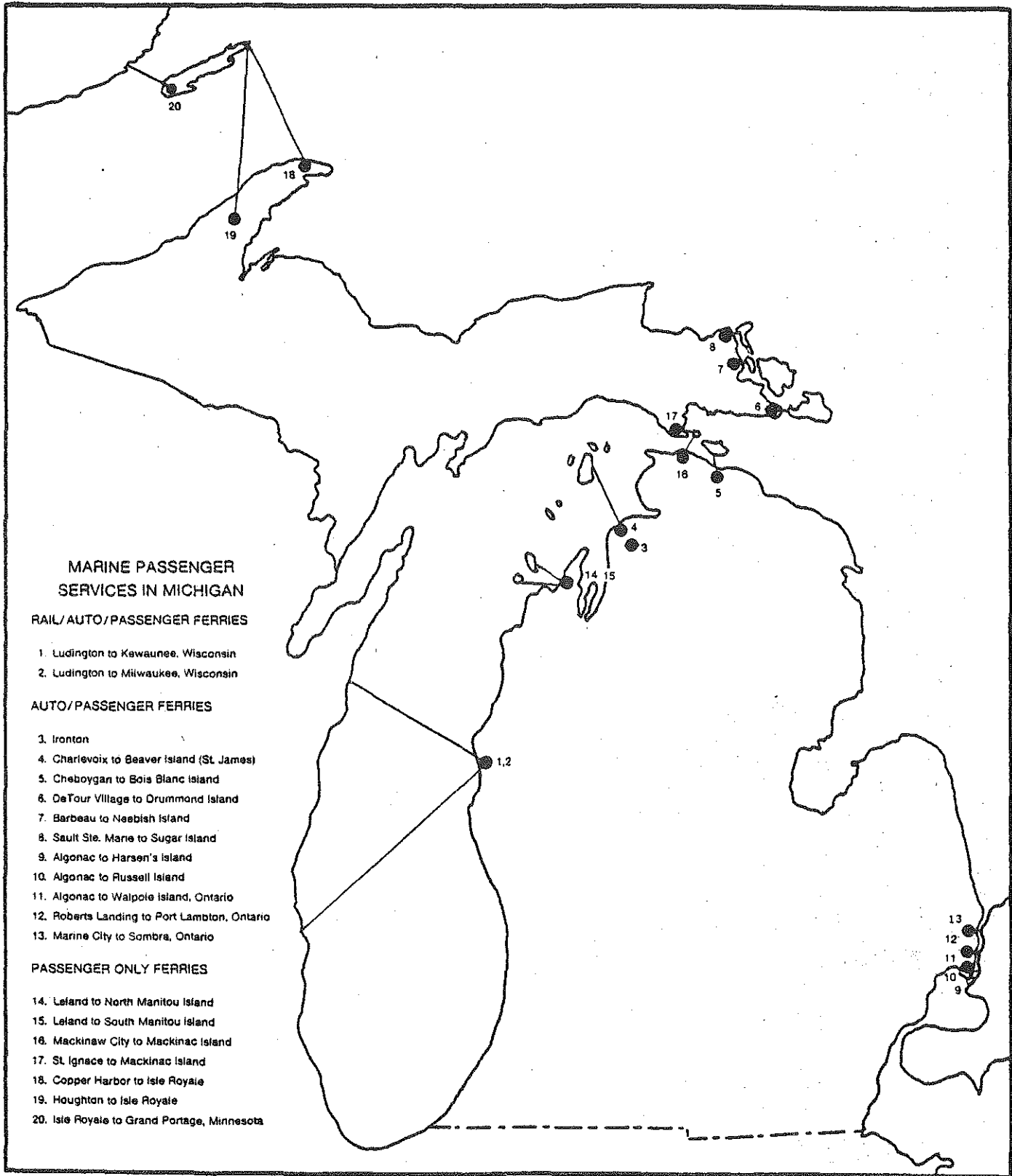
These numbers were determined by adjusting those contained in Table 7 (by subtracting the "don't know" responses from the total and recalculating the percentages). This restricts the percentages to those who had some familiarity with the service feature they were asked to rate.

# APPENDICES



APPENDIX A

Marine Passenger Services in Michigan



**SUMMARY OF SELECTED MARINE PASSENGER OPERATING CHARACTERISTICS  
IN MICHIGAN, 1982**

Origin	Destination	Waterway	Scheduled Operating Period	Annual Number of Operating Days 1/	Daily Round Trips	Annual Crossings 2/	Annual Passengers 3/	Annual Vehicles 4/	Trip Length Minutes - Miles	Annual Passenger Miles Per Vessel Mile	Number of Vessels	Vessel Capacity	Ownership
<u>Rail/Auto/Passenger Ferries</u>													
* Ludington	Kewaunee, Wisconsin	Lake Michigan	Year Round	300	2	1,040	187,000	21,000	240 - 61	179.8	1	500 passengers; 25-30 vehicles; 23 railroad cars	C and O Railroad
<u>Auto/Passenger ferries</u>													
Ironton	Ironton	Lake Charlevoix	Seasonal-No Winter Service	275	On demand	22,000	135,500	45,185	5 - 1/8 5/	6.1	1	4 vehicles	Charlevoix Co. Road Commission
Charlevoix	Beaver Island (St. James)	Lake Michigan	Apr-Dec	197	1	430	18,050	2,940	135 - 32	41.9	2	120 passengers; 6 vehicles 200 passengers; 12 vehicles	Private
Cheboygan	Bois Blanc Island	Lake Huron	Apr-Dec	275	On demand	1,500	10,500	1,300	35 - 6	7.0	1	3 vehicles	Private
DeTour Village	Drummond Island	St. Mary's River	Year Round	365	Hourly	18,720	218,010	118,410	10 - 1	11.7	2	12 vehicles each	EUPTA
Barbeau	Neebish Island	St. Mary's River	Year Round	365	6	6,100	20,100	11,000	5 - 1/4	3.3	1	5 vehicles	EUPTA
Sault Ste. Marie	Sugar Island	St. Mary's River	Year Round	365	Hourly (On demand)	25,220	191,030	95,140	5 - 1/4	7.6	1	12 vehicles	EUPTA
Algonac	Harsen's Island	St. Clair River	Year Round	365	Every 20 Min. (On demand)	77,340	1,462,000	594,000	5 - 1/4	18.9	4	12 vehicles	Private
Algonac	Russell Island	St. Clair River	Year Round	365	On demand	18,000	162,000	54,000	5 - 1/2	9.0	1	6 vehicles	Private
Algonac	Walpole Island, Ontario 14/	St. Clair River	Year Round	365	On demand	9,000	225,000	27,000	10 - 3/4	25.0	1	6 vehicles; 50 passengers	Private
50 Marine City	Sombra, Ontario	St. Clair River	Year Round	365	On demand	18,000	162,000	108,000	5 - 1/2	9.0	1	12 vehicles	Private
Roberts Landing	Port Lambton, Ontario	St. Clair River	Year Round	365	On demand	18,000	324,000	108,000	5 - 1/2	18.0	1	12 vehicles	Private
<u>Passenger Only Ferries</u>													
Leland	Manitou Islands	Lake Michigan	May-Oct	156	1; 5 days per week 1; 7 days per week 6/	320	8,000	0	105 - 17	25.2	2	136 passengers 66 passengers	Private
Mackinac City	Mackinac Island	Straits of Mackinac	May-Nov Apr-Dec 7/	214 275	16 23 8/	9,160	450,000	0	30 - 8	50.0	9-12 9/	100 passengers 10/	Private
St. Ignace	Mackinac Island	Straits of Mackinac	Apr-Dec May-Oct 11/	184 275	16 18 12/	8,062	403,000	0	20 - 7	50.3	8-11 9/	100 passengers 10/	Private
Copper Harbor	Isle Royale	Lake Superior	May-Sept	153	1	220	6,600	0	240 - 60	30.0	1	60 passengers	Private
Houghton	Isle Royale	Lake Superior	June 7 to Sept 10	96	2 per week	60	4,500	0	360 - 70	75.0	1	123 passengers	National Park Service
Isle Royale	Grand Portage, Minnesota	Lake Superior	May to Sept	153	3 per week 1 daily 13/	360	18,000	0	120 - 25	50.0	2	49 passengers 150 passengers	Private

\* This table does not include information for the Ludington to Milwaukee, Wisconsin service.

Notes:

- 1/ The estimated number of operating days based on scheduled operating period or on published schedules when available.
- 2/ Estimated annual one way crossing figures. Figures for Drummond, Neebish and Sugar Islands are actual figures for 1981.
- 3/ Estimated number of passengers carried annually. Figures for Drummond and Sugar Islands are actual figures for 1980.
- 4/ Estimated number of vehicles carried annually. Figures for Drummond and Sugar Islands are actual 1980 figures, the figure for Ironton is the actual number of vehicles carried in 1982.
- 5/ Actual distance is 700 ft.
- 6/ During the months of May, September and October the service operates five days per week, providing one round trip per day. During June, July and August the service operates seven days per week and provides one round trip daily.
- 7/ Two companies provide service between Mackinaw City and Mackinac Island. One operates from April to December, the other from May to November.
- 8/ During the peak season, one company provides 16 round trips per day, the other provides 23 round trips per day.
- 9/ A total of 20 vessels are used to provide service between Mackinaw City and Mackinac Island, and St. Ignace and Mackinac Island.
- 10/ Capacities of the 20 vessels range from 70 to 125 passengers, the average being 100 passengers.
- 11/ Two companies provide service between St. Ignace and Mackinac Island. One operates from April to December, the other from May to October.
- 12/ During the peak season, one company provides 16 round trips per day, the other provides 18 round trips per day.
- 13/ Two vessels provide service between Isle Royale and Grand Portage, Minnesota. One provides one round trip per day, the other provides three round trips per week.
- 14/ Walpole Island is connected to the Canadian mainland by a bridge.

Source: MDOT, Passenger Transportation Planning Section, Surface Systems Unit

APPENDIX B  
Survey Forms





1757 (2/79)

# SINGLE STATION RURAL O-D STUDY

STA. LOCATION AND NUMBER

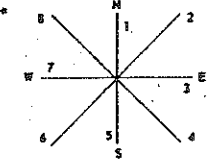
FORM NUMBER	6	COUNTY NUMBER		STATEWIDE NUMBER		HOUR PERIOD ENDING		* DIRECTION		DAY ** OF TRAVEL		MO.		DATE	
	1		2 3		4 5 6 7		8 9		10		11		12 13	14 15	

INTERVIEW NUMBER	VEH. TYPE	NO. IN VEH.	ORIGIN Where did this trip begin?  Co. or State	DESTINATION Where will this trip end?  Co. or State	WHERE IS VEHICLE GARAGED	TRIP PURPOSE	ROUTE OF EXIT OR ENT.																																													
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68

\* REVISIONS TO THIS FORM ARE DESCRIBED ON THE REVERSE SIDE.

55

- VEHICLE TYPE**
- 1 PASSENGER CAR WITHOUT A TRAILER
  - 2 PASSENGER CAR WITH A TRAILER
  - 3 PANEL OR PICK-UP WITHOUT A TRAILER
  - 4 PANEL OR PICK-UP WITH A TRAILER
  - 5 OTHER SINGLE UNIT TRUCKS
  - 6 COMBINATIONS & TRUCKS WITH TRAILERS



- DAY OF TRAVEL \*\***
- SUNDAY 1 THURSDAY 5
  - MONDAY 2 FRIDAY 6
  - TUESDAY 3 SATURDAY 7
  - WEDNESDAY 4

- GARAGED**
- 1 ORIGIN
  - 2 DESTINATION
  - 3 OTHER

- TRIP PURPOSE**
- 1 WORK
  - 2 PERS. BUSINESS
  - 3 SHOPPING
  - 4 VACATION
  - 5 OTHER SOC. OR REC.
  - 6 ALL OTHER

Revisions to Origin-Destination Survey Form

Column 19: Vehicle Type - Three additional codes were added for bus, motorcycle and "walk on" passengers without a vehicle.

Column 61-64: Where is Vehicle Garaged - If column 61 was coded 3 (other), the home state of the respondent was coded in columns 62-64.

Column 66: Round Trip - If the respondent was making a continuous round trip, a "R" was coded in column 66.

Note: In the space above columns 16-18, the state in which the respondent's vehicle was registered, if other than Michigan, was coded.

CROSS LAKE MICHIGAN FERRY USER SURVEY

This survey is being conducted by the Michigan Department of Transportation (MDOT) in cooperation with the Michigan-Wisconsin Transportation Company. We hope that by learning more about the people who use the cross lake ferries and their trip, more efficient service can be provided. Please take a few minutes to fill out this questionnaire by marking the boxes appropriately. All information is requested on a voluntary basis, will be treated as confidential and used only in combination with other questionnaires received. This information will supplement that obtained from the origin and destination survey being conducted on board by MDOT staff. Thank you for your assistance.

Larry K. Britton, Manager  
 Passenger Transportation Planning Section  
 Bureau of Transportation Planning  
 Michigan Department of Transportation

1. How many ferry crossings (consider a round trip as two crossings) have you made across Lake Michigan before today?

- (1) None  (2) 1-4  (3) 5 or more

2. How many ferry crossings do you expect to make across Lake Michigan in the next 12 months (Include this trip)?

3. How long did you stay in the community from where the ferry embarked (Number of days)?

4. How long will you stay in the community where the ferry will arrive (Number of days)?

5. What is the primary place or event you will visit or have visited (Please specify)? \_\_\_\_\_

6. Why did you decide to use this ferry service?

- (1) Convenient schedule  (5) To relax   
 (2) Convenient location  (6) For the experience   
 (3) To save time  (7) Other (Please specify) \_\_\_\_\_  
 (4) To save money

7. If all cross Lake Michigan ferry services were abandoned, which of the following options would you choose?

- (1) Not take the trip   
 (2) Drive around the lake to the north (for instance via the Upper Peninsula)   
 (3) Drive around the lake to the south (for instance via Indiana and Illinois)   
 (4) Fly via a commercial airline   
 (5) Other (Please explain) \_\_\_\_\_

8. Sex: (1) Male  (2) Female

9. Age: (1) 17 or under  (3) 25-54  (5) 65 or over   
 (2) 18-24  (4) 55-64

10. Employment Status:

- (1) Employed full time  (5) College student   
 (2) Employed part time  (6) Other student   
 (3) Unemployed  (7) Retired   
 (4) Homemaker  (8) Other (Please specify) \_\_\_\_\_

11. How many persons are in your household?  How many of these are with you on this trip?

12. What is your family income range (before taxes)?

- (1) Under \$10,000  (3) \$20,000-29,999  (5) \$40,000-49,999   
 (2) \$10,000-19,999  (4) \$30,000-39,999  (6) \$50,000 or more

13. How many operating cars or light trucks are in your household?  Do you have one of these vehicles aboard today? (1) Yes  (2) No

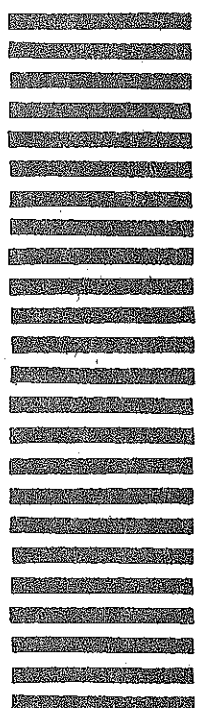
14. Please rate this ferry service regarding the following:

	POOR	FAIR	GOOD	VERY GOOD	DON'T KNOW
(1) Departure/Arrival times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Frequency of service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Availability of information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Announcement of schedule changes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) Ease of getting on/off the ferry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) Condition of the vessel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(7) Quality of food and beverage service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) Parking/waiting area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) Courtesy of ferry employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) Fare structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. If you could, what one thing would you change about the ferry service? \_\_\_\_\_

16. Other Comments: \_\_\_\_\_

*Please fold and tape or staple before mailing.*



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 Bureau of Transportation Planning  
 Transportation Surveys Section  
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APPENDIX C

Survey Results - Cross Tabulations

CROSSTABULATION OF ORIGCODE ORIGIN BY GROUPS BY DESTCODE DESTINATION BY GROUPS PAGE 1

ORIGCODE	COUNT ROW PCT COL PCT TOT PCT	DESTCODE													ROW TOTAL
		1. I	2. I	3. I	4. I	5. I	6. I	7. I	8. I	9. I	10. I	11. I	12. I	13. I	
LUDINGTON	1.	0	31	77	0	1	10	99	31	31	1	0	3	11	295
		0.0	10.5	26.1	0.0	0.3	3.4	33.6	10.5	10.5	0.3	0.0	1.0	3.7	16.1
		0.0	50.8	41.0	0.0	0.3	11.5	27.7	23.3	41.9	10.0	0.0	11.5	9.8	
		0.0	1.7	4.2	0.0	0.1	0.5	5.4	1.7	1.7	0.1	0.0	0.2	0.6	
KEWAUNEE	2.	13	0	0	10	10	2	0	0	0	3	3	1	4	46
		28.3	0.0	0.0	21.7	21.7	4.3	0.0	0.0	0.0	6.5	6.5	2.2	8.7	2.5
		4.7	0.0	0.0	5.8	3.1	2.3	0.0	0.0	0.0	30.0	15.8	3.8	3.6	
		0.7	0.0	0.0	0.5	0.5	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.2	
MILWAUKEE	3.	82	0	0	29	36	7	0	0	0	0	1	4	3	162
		50.6	0.0	0.0	17.9	22.2	4.3	0.0	0.0	0.0	0.0	0.6	2.5	1.9	8.8
		29.8	0.0	0.0	16.8	11.3	8.0	0.0	0.0	0.0	0.0	5.3	15.4	2.7	
		4.5	0.0	0.0	1.6	2.0	0.4	0.0	0.0	0.0	0.0	0.1	0.2	0.2	
NORTHERN LOWER P	4.	1	5	38	0	0	6	76	38	22	0	1	1	14	202
		0.5	2.5	18.8	0.0	0.0	3.0	37.6	18.8	10.9	0.0	0.5	0.5	6.9	11.0
		0.4	8.2	20.2	0.0	0.0	6.9	21.3	28.6	29.7	0.0	5.3	3.8	12.5	
		0.1	0.3	2.1	0.0	0.0	0.3	4.1	2.1	1.2	0.0	0.1	0.1	0.8	
SOUTHERN LOWER P	5.	0	19	53	0	0	32	146	48	6	1	0	0	20	325
		0.0	5.8	16.3	0.0	0.0	9.8	44.9	14.8	1.8	0.3	0.0	0.0	6.2	17.7
		0.0	31.1	28.2	0.0	0.0	36.8	40.9	36.1	8.1	10.0	0.0	0.0	17.9	
		0.0	1.0	2.9	0.0	0.0	1.7	8.0	2.6	0.3	0.1	0.0	0.0	1.1	
UPPER P	6.	5	0	9	1	13	0	3	0	6	0	2	0	1	40
		12.5	0.0	22.5	2.5	32.5	0.0	7.5	0.0	15.0	0.0	5.0	0.0	2.5	2.2
		1.8	0.0	4.8	0.6	4.1	0.0	0.8	0.0	8.1	0.0	10.5	0.0	0.9	
		0.3	0.0	0.5	0.1	0.7	0.0	0.2	0.0	0.3	0.0	0.1	0.0	0.1	
WISCONSIN-OTHER	7.	100	0	0	86	190	10	0	0	5	5	11	11	33	451
		22.2	0.0	0.0	19.1	42.1	2.2	0.0	0.0	1.1	1.1	2.4	2.4	7.3	24.6
		36.4	0.0	0.0	49.7	59.7	11.5	0.0	0.0	6.8	50.0	57.9	42.3	29.5	
		5.5	0.0	0.0	4.7	10.4	0.5	0.0	0.0	0.3	0.3	0.6	0.6	1.8	
MINNESOTA	8.	8	0	0	12	40	5	0	0	0	0	1	2	8	76
		10.5	0.0	0.0	15.8	52.6	6.6	0.0	0.0	0.0	0.0	1.3	2.6	10.5	4.1
		2.9	0.0	0.0	6.9	12.6	5.7	0.0	0.0	0.0	0.0	5.3	7.7	7.1	
		0.4	0.0	0.0	0.7	2.2	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.4	
ILLINOIS	9.	55	0	1	26	17	13	1	1	1	0	0	3	4	122
		45.1	0.0	0.8	21.3	13.9	10.7	0.8	0.8	0.8	0.0	0.0	2.5	3.3	6.7
		20.0	0.0	0.5	15.0	5.3	14.9	0.3	0.8	1.4	0.0	0.0	11.5	3.6	
		3.0	0.0	0.1	1.4	0.9	0.7	0.1	0.1	0.1	0.0	0.0	0.2	0.2	
INDIANA	10.	2	1	2	2	0	0	3	0	0	0	0	0	0	10
		20.0	10.0	20.0	20.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
		0.7	1.6	1.1	1.2	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	
		0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	
OHIO	11.	0	3	4	0	0	0	8	1	0	0	0	0	2	18
		0.0	16.7	22.2	0.0	0.0	0.0	44.4	5.6	0.0	0.0	0.0	0.0	11.1	1.0
		0.0	4.9	2.1	0.0	0.0	0.0	2.2	0.8	0.0	0.0	0.0	0.0	1.8	
		0.0	0.2	0.2	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.1	
CANADA	12.	0	1	2	0	1	0	14	7	1	0	0	0	4	30
		0.0	3.3	6.7	0.0	3.3	0.0	46.7	23.3	3.3	0.0	0.0	0.0	13.3	1.6
		0.0	1.6	1.1	0.0	0.3	0.0	3.9	5.3	1.4	0.0	0.0	0.0	3.6	
		0.0	0.1	0.1	0.0	0.1	0.0	0.8	0.4	0.1	0.0	0.0	0.0	0.2	
OTHER	13.	9	1	2	7	10	2	7	7	2	0	0	1	8	56
		16.1	1.8	3.6	12.5	17.9	3.6	12.5	12.5	3.6	0.0	0.0	1.8	14.3	3.1
		3.3	1.6	1.1	4.0	3.1	2.3	2.0	5.3	2.7	0.0	0.0	3.8	7.1	
		0.5	0.1	0.1	0.4	0.5	0.1	0.4	0.4	0.1	0.0	0.0	0.1	0.4	
COLUMN TOTAL		275	61	188	173	318	87	357	133	74	10	19	26	112	1833
		15.0	3.3	10.3	9.1	17.3	4.7	19.5	7.3	4.0	0.5	1.0	1.4	6.1	100.0

CHI SQUARE = 1946.60835 WITH 144 DEGREES OF FREEDOM SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 9

\*\*\*\*\* CROSSTABULATION OF \*\*\*\*\*  
 AGE BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

AGE	COUNT COL PCT	ROUTE			ROW TOTAL
		MILWAUKEE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1.I	2.I	3.I	
17 OR UNDER	1.	14 I 3.2 I	8 I 1.4 I	1 I 1.0 I	23 2.1
18 TO 24	2.	38 I 8.6 I	37 I 6.6 I	8 I 2.1 I	83 7.6
25 TO 54	3.	245 I 55.4 I	286 I 51.3 I	63 I 63.6 I	594 54.1
55 TO 64	4.	86 I 19.5 I	126 I 22.6 I	18 I 18.2 I	230 20.9
65 OR OVER	5.	59 I 13.3 I	100 I 18.0 I	9 I 9.1 I	168 15.3
	COLUMN TOTAL	442 40.3	557 50.7	99 9.0	1098 100.0

CHI SQUARE = 15.74364 WITH 8 DEGREE OF FREEDOM SIGNIFICANCE = 0.0462  
 NUMBER OF MISSING OBSERVATIONS = 28

62

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* CROSSTABULATION OF \*\*\*\*\*  
 SEX BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

SEX	COUNT	ROUTE			ROW TOTAL
		MILWAUKEE	KEWAUNEE DAY	KEWAUNEE NIGHT	
MALE	1.	239	292	70	601
		53.5	52.2	70.7	54.4
FEMALE	2.	208	267	29	504
		46.5	47.8	29.3	45.6
COLUMN TOTAL		447	559	99	1105
		40.5	50.6	9.0	100.0

CHI SQUARE = 11.82394 WITH 2 DEGREES OF FREEDOM SIGNIFICANCE = 0.0027

NUMBER OF MISSING OBSERVATIONS = 21



CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N O F \*\*\*\*\*  
 EMPLOYMNT EMPLOYMENT STATUS BY INCOME  
 \*\*\*\*\* PAGE 1 OF 1

EMPLOYMNT	COUNT	INCOME						ROW TOTAL	
		COL PCT	UNDER \$10,000	\$10,000 TO 19,99	\$20,000 TO 29,99	\$30,000 TO 39,99	\$40,000 TO 49,99		\$50,000 OR MORE
			1	2	3	4	5	6	
FULL TIME	1	17	83	147	131	91	110	579	579
		23.0	46.9	62.6	61.2	67.4	60.4	56.9	
PART TIME	2	8	18	16	20	14	17	93	93
		10.8	10.2	6.8	9.3	10.4	9.3	9.1	
UNEMPLOYED	3	3	3	3	3	1	0	13	13
		4.1	1.7	1.3	1.4	0.7	0.0	1.3	
HOMEMAKER	4	6	14	19	20	8	25	92	92
		8.1	7.9	8.1	9.3	5.9	13.7	9.0	
COLLEGE STUDENT	5	8	2	6	2	5	3	26	26
		10.8	1.1	2.6	0.9	3.7	1.6	2.6	
OTHER STUDENT	6	7	2	1	1	2	4	17	17
		9.5	1.1	0.4	0.5	1.5	2.2	1.7	
RETIRED	7	21	54	39	36	13	23	186	186
		28.4	30.5	16.6	16.8	9.6	12.6	18.3	
OTHER	8	4	1	4	1	1	0	11	11
		5.4	0.6	1.7	0.5	0.7	0.0	1.1	
COLUMN TOTAL		74	177	235	214	135	182	1017	1017
		7.3	17.4	23.1	21.0	13.3	17.9	100.0	

RAW CHI SQUARE = 139.97627 WITH 35 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 109

64

\*\*\*\*\*  
 INCOME BY PREVCROS CROSSINGS MADE BEFORE TODAY  
 \*\*\*\*\* PAGE 1 OF 1

INCOME	COUNT COL PCT	PREVCROS			ROW TOTAL
		INONE	1 TO 4	5 OR MOR E	
	1	21	29	22	72
UNDER \$10,000		5.5	8.6	7.5	7.1
	2	64	60	52	176
\$10,000 TO 19,99		16.8	17.7	17.7	17.4
	3	72	96	67	235
\$20,000 TO 29,99		18.9	28.3	22.9	23.2
	4	103	64	40	213
\$30,000 TO 39,99		27.0	18.9	15.7	21.0
	5	59	35	41	135
\$40,000 TO 49,99		15.5	10.3	14.0	13.3
	6	62	55	65	182
\$50,000 OR MORE		16.3	16.2	22.2	18.0
COLUMN TOTAL		381	339	293	1013
		37.6	33.5	28.9	100.0

65

RAW CHI SQUARE = 28.47182 WITH 10 DEGREES OF FREEDOM. SIGNIFICANCE = 0.0015

NUMBER OF MISSING OBSERVATIONS = 113

FILE FERRY (CREATION DATE = 11/07/84) WITH HAS/FERRY/INTER/DATA

CROSS TABULATION OF PURPOSE OF TRIP BY DAY DAY OF WEEK  
 \*\*\*\*\*  
 PURPOSE PURPOSE OF TRIP BY DAY DAY OF WEEK  
 \*\*\*\*\* PAGE 1 OF 1

PURPOSE	COUNT	DAY							ROW TOTAL
		1.I	2.I	3.I	4.I	5.I	6.I	7.I	
WORK	1.	19	19	14	18	9	22	12	113
		16.8	16.8	12.4	15.9	8.0	19.5	10.6	6.2
		6.7	7.5	6.5	8.9	3.6	6.5	4.3	
		1.0	1.0	0.8	1.0	0.5	1.2	0.7	
PERSONAL BUSINES	2.	13	12	5	12	6	21	13	82
		15.9	14.6	6.1	14.6	7.3	25.6	15.9	4.5
		4.6	4.8	2.3	5.9	2.4	6.2	4.7	
		0.7	0.7	0.3	0.7	0.3	1.2	0.7	
SHOPPING	3.	0	1	0	0	0	0	1	2
		0.0	50.0	0.0	0.0	0.0	0.0	50.0	0.1
		0.0	0.4	0.0	0.0	0.0	0.0	0.4	
		0.0	0.1	0.0	0.0	0.0	0.0	0.1	
VACATION	4.	161	180	145	129	170	210	211	1206
		13.3	14.9	12.0	10.7	14.1	17.4	17.5	66.2
		56.5	71.4	67.8	63.9	67.5	61.8	76.2	
		8.8	9.9	8.0	7.1	9.3	11.5	11.6	
OTHER SOC OR REC	5.	84	33	36	34	60	80	31	358
		23.5	9.2	10.1	9.5	16.8	22.3	8.7	19.6
		29.5	13.1	16.8	16.8	23.8	23.5	11.2	
		4.6	1.8	2.0	1.9	3.3	4.4	1.7	
ALL OTHER	6.	8	7	14	9	7	7	9	61
		13.1	11.5	23.0	14.8	11.5	11.5	14.8	3.3
		2.8	2.8	6.5	4.5	2.8	2.1	3.2	
		0.4	0.4	0.8	0.5	0.4	0.4	0.5	
COLUMN TOTAL		285	252	214	202	252	340	277	1822
		15.6	13.8	11.7	11.1	13.8	18.7	15.2	100.0

CHI SQUARE = 76.81057 WITH 30 DEGREES OF FREEDOM SIGNIFICANCE = 0.0000

NUMBER OF MISSING OBSERVATIONS = 20

66

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N O F \* \* \* \* \*  
 RATING1 DEPARTURE-ARRIVAL TIMES BY ROUTE SURVEY ROUTE GROUPINGS  
 \* \* \* \* \* PAGE 1 OF 1

RATING1	COUNT COL PCT	ROUTE				ROW TOTAL
		IMILWAUKE IE	KEWAUNEE DAY	KEWAUNEE NIGHT		
		1.I	2.I	3.I		
1. POOR	I 20 I 43 I 6 I 69	I 4.7 I 8.1 I 6.3 I 6.6				
2. FAIR	I 54 I 61 I 20 I 135	I 12.7 I 11.5 I 20.8 I 12.8				
3. GOOD	I 143 I 157 I 35 I 335	I 33.6 I 29.6 I 36.5 I 31.8				
4. VERY GOOD	I 201 I 256 I 34 I 491	I 47.3 I 48.2 I 35.4 I 46.7				
5. DON'T KNOW	I 7 I 14 I 1 I 22	I 1.6 I 2.6 I 1.0 I 2.1				
	COLUMN TOTAL	425 40.4	531 50.5	96 9.1	1052 100.0	

CHI SQUARE = 16.21128 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0395

NUMBER OF MISSING OBSERVATIONS = 74

67

\*\*\*\*\* CROSSTABULATION OF \*\*\*\*\*  
 RATING2 FREQUENCY OF SERVICE BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING2	COUNT COL	ROUTE			ROW TOTAL
		IMILWAUKE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1.I	2.I	3.I	
1. POOR	52	32	16	4	5.1
		7.9	3.1	4.3	
2. FAIR	213	89	100	24	21.0
		22.0	19.3	25.8	
3. GOOD	462	170	244	48	45.5
		42.1	47.1	51.6	
4. VERY GOOD	218	81	121	16	21.5
		20.0	23.4	17.2	
5. DON'T KNOW	70	32	37	1	6.9
		7.9	7.1	1.1	
	COLUMN TOTAL	404	518	93	1015
		39.8	51.0	9.2	100.0

CHI SQUARE = 21.76904 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0054

NUMBER OF MISSING OBSERVATIONS = 111

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N O F \* \* \* \* \*  
 RATING3 AVAILABILITY OF INFORMATION BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING3	COUNT	ROUTE			ROW TOTAL
		IMILWAUKE	KEWAUNEE DAY	KEWAUNEE NIGHT	
1. POOR	59	41	9	109	
	13.8	7.6	9.5	10.3	
2. FAIR	101	101	20	222	
	23.7	18.8	21.1	21.0	
3. GOOD	143	210	32	385	
	33.6	39.1	33.7	36.4	
4. VERY GOOD	109	171	32	312	
	25.6	31.8	33.7	29.5	
5. DON'T KNOW	14	14	2	30	
	3.3	2.6	2.1	2.8	
COLUMN TOTAL	426	537	95	1058	
	40.3	50.8	9.0	100.0	

CHI SQUARE = 18.26558 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0193

NUMBER OF MISSING OBSERVATIONS = 68

69

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\*  
 RATING4 ANNOUNCEMENT OF SCHEDULE CHANGES BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING4	COUNT COL PCT	ROUTE			ROW TOTAL
		MILWAUKEE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1. I	2. I	3. I	
POOR	1.	I 35 I	I 43 I	I 6 I	84
		I 8.9 I	I 8.8 I	I 6.5 I	8.6
FAIR	2.	I 34 I	I 59 I	I 10 I	103
		I 8.6 I	I 12.1 I	I 10.9 I	10.6
GOOD	3.	I 42 I	I 77 I	I 16 I	135
		I 10.6 I	I 15.7 I	I 17.4 I	13.8
VERY GOOD	4.	I 41 I	I 30 I	I 5 I	76
		I 10.4 I	I 6.1 I	I 5.4 I	7.8
DON'T KNOW	5.	I 243 I	I 280 I	I 55 I	578
		I 61.5 I	I 57.3 I	I 59.8 I	59.2
	COLUMN	395	489	92	976
	TOTAL	40.5	50.1	9.4	100.0

CHI SQUARE = 14.51254 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0693

NUMBER OF MISSING OBSERVATIONS = 150

70

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N O F \* \* \* \* \*  
 RATINGS EASE OF GETTING ON-OFF FERRY BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATINGS	COUNT	ROUTE			ROW TOTAL
		1. MILWAUKEE	2. KFWAUNEE	3. KEWAUNEE	
		IE	DAY	NIGHT	
		1. I	2. I	3. I	
POOR	1.	I 12 I	I 18 I	I 2 I	32
		I 2.8 I	I 3.3 I	I 2.0 I	3.0
FAIR	2.	I 53 I	I 53 I	I 9 I	115
		I 12.2 I	I 9.8 I	I 9.2 I	10.7
GOOD	3.	I 181 I	I 237 I	I 43 I	461
		I 41.5 I	I 43.8 I	I 43.9 I	42.9
VERY GOOD	4.	I 186 I	I 231 I	I 44 I	461
		I 42.7 I	I 42.7 I	I 44.9 I	42.9
DON'T KNOW	5.	I 4 I	I 2 I	I 0 I	6
		I 0.9 I	I 0.4 I	I 0.0 I	0.6
	COLUMN TOTAL	436	541	98	1075
		40.6	50.3	9.1	100.0

CHI SQUARE = 4.39544 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.8198

NUMBER OF MISSING OBSERVATIONS = 51

71



FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N   O F   \* \* \* \* \*  
 RATING6    CONDITION OF THE VESSEL                    BY ROUTE            SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING6	COUNT COL PCT	ROUTE						ROW TOTAL
		MILWAUKEE		KEWAUNEE DAY		KEWAUNEE NIGHT		
		1.I	2.I	1.I	2.I	1.I	2.I	
1. POOR	23 5.3	22 4.1	6 1.1	4 0.8	6 1.1	6 1.1	51 10.1	
2. FAIR	117 27.0	121 22.7	17 3.1	17 3.1	17 3.1	17 3.1	255 50.9	
3. GOOD	213 49.1	260 48.8	46 8.6	46 8.6	46 8.6	46 8.6	519 103.8	
4. VERY GOOD	71 16.4	121 22.7	22 4.1	22 4.1	22 4.1	22 4.1	214 42.8	
5. DON'T KNOW	10 2.3	9 1.7	5 0.9	5 0.9	5 0.9	5 0.9	24 4.8	
COLUMN TOTAL	434 40.8	533 50.1	96 9.0	96 9.0	96 9.0	96 9.0	1063 100.0	

CHI SQUARE = 14.37000 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0726  
 NUMBER OF MISSING OBSERVATIONS = 63

72

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* CROSSTABULATION OF \*\*\*\*\*  
 RATING7 QUALITY OF FOOD AND BEVERAGE SERVICE BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1 \*\*\*\*\*

RATING7	COUNT COL PCT	ROUTE			ROW TOTAL
		IMILWAUKE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1.1	2.1	3.1	
1. POOR	76 6.9	29 6.9	36 7.1	11 11.7	76 7.5
2. FAIR	223 25.5	107 25.5	97 19.2	19 20.2	223 21.9
3. GOOD	387 39.9	167 39.9	189 37.4	31 33.0	387 38.0
4. VERY GOOD	159 15.5	65 15.5	82 16.2	12 12.8	159 15.6
5. DON'T KNOW	173 12.2	51 12.2	101 20.0	21 22.3	173 17.0
	COLUMN TOTAL	419 41.2	505 49.6	94 9.2	1018 100.0

CHI SQUARE = 18.48925 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0178

NUMBER OF MISSING OBSERVATIONS = 108

73

\*\*\*\*\* CROSSTABULATION OF \*\*\*\*\*  
 RATINGS PARKING-WAITING AREA BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATINGS	COUNT COL PCT	ROUTE			ROW TOTAL
		MILWAUKEE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1. I	2. I	3. I	
POOR	1.	I 13 I I 3.0 I	I 30 I I 5.6 I	I 5 I I 5.1 I	48 4.5
FAIR	2.	I 100 I I 23.3 I	I 119 I I 22.2 I	I 27 I I 27.6 I	246 23.1
GOOD	3.	I 208 I I 48.4 I	I 269 I I 50.1 I	I 49 I I 50.0 I	526 49.4
VERY GOOD	4.	I 94 I I 21.9 I	I 115 I I 21.4 I	I 16 I I 16.3 I	225 21.1
DON'T KNOW	5.	I 15 I I 3.5 I	I 4 I I 0.7 I	I 1 I I 1.0 I	20 1.9
	COLUMN TOTAL	430 40.4	537 50.4	98 9.2	1065 100.0

CHI SQUARE = 15.96070 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.0429

NUMBER OF MISSING OBSERVATIONS = 61.

74

CROSSTABS FOR MAIL BACK FERRY SURVEY

FILE FERRYDAT (CREATION DATE = 10/24/84) HAS/SPSS/FERRY/DATA  
 SUBFILE WITH

\*\*\*\*\* C R O S S T A B U L A T I O N O F \* \* \* \* \*  
 RATINGS9 COURTESY OF FERRY EMPLOYEES BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING9	COUNT	ROUTE			ROW TOTAL
		IMILWAUKE	KEWAUNEE DAY	KEWAUNEE NIGHT	
1. POOR	11	7	1	3	11
	1.0	1.6	0.2	3.1	1.0
2. FAIR	50	24	21	5	50
	4.7	5.6	3.9	5.1	4.7
3. GOOD	366	145	193	28	366
	34.3	33.7	35.8	28.6	34.3
4. VERY GOOD	618	243	315	60	618
	57.9	56.5	58.4	61.2	57.9
5. DON'T KNOW	22	11	9	2	22
	2.1	2.6	1.7	2.0	2.1
COLUMN TOTAL	1067	430	539	98	1067
	100.0	40.3	50.5	9.2	100.0

CHI SQUARE = 13.24075 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.1038

NUMBER OF MISSING OBSERVATIONS = 59

75

\*\*\*\*\* C R O S S T A B U L A T I O N O F \* \* \* \* \*  
 RATING10 FARE STRUCTURE BY ROUTE SURVEY ROUTE GROUPINGS  
 \*\*\*\*\* PAGE 1 OF 1

RATING10	COUNT COL PCT	ROUTE			ROW TOTAL
		IMILWAUKE IE	KEWAUNEE DAY	KEWAUNEE NIGHT	
		1.I	2.I	3.I	
POOR	1.	I 38 I I 9.2 I	I 42 I I 8.1 I	I 12 I I 12.5 I	92 9.0
FAIR	2.	I 125 I I 30.3 I	I 130 I I 25.1 I	I 31 I I 32.3 I	286 27.9
GOOD	3.	I 160 I I 38.8 I	I 232 I I 44.9 I	I 39 I I 40.6 I	431 42.0
VERY GOOD	4.	I 61 I I 14.8 I	I 74 I I 14.3 I	I 7 I I 7.3 I	142 13.9
DON'T KNOW	5.	I 28 I I 6.8 I	I 39 I I 7.5 I	I 7 I I 7.3 I	74 7.2
	COLUMN TOTAL	412 40.2	517 50.4	96 9.4	1025 100.0

CHI SQUARE = 10.27384 WITH 8 DEGREES OF FREEDOM SIGNIFICANCE = 0.2463  
 NUMBER OF MISSING OBSERVATIONS = 101

APPENDIX D

Cross-Lake Michigan Ferry Schedule  
and Fare Structure

CROSS-LAKE MICHIGAN FERRY SCHEDULE

Ludington to Milwaukee

June 15 - September 3, 1984

Leave Ludington  
7:00 AM E.D.T.

Arrive Milwaukee  
12:00 Noon C.D.T.

Leave Milwaukee  
3:00 PM C.D.T.

Arrive Ludington  
10:00 PM E.D.T.

Ludington to Kewaunee

January 1 - June 15, 1984  
September 17 - December 31, 1984

Leave Ludington  
9:30 AM (Mich. Time)

Leave Kewaunee  
2:30 PM (Wisc. Time)

Ludington to Kewaunee

June 16 - September 15, 1984

Leave Ludington  
9:30 AM E.D.T.  
9:30 PM E.D.T.

Arrive Kewaunee  
12:30 PM C.D.T.  
12:30 AM C.D.T.

Leave Kewaunee  
2:30 PM C.D.T.  
2:00 AM C.D.T.

Arrive Ludington  
7:30 PM E.D.T.  
7:00 AM E.D.T.

FARE STRUCTURE

Ludington to Milwaukee

Ludington to Kewaunee

06/15/84 - 09/03/84

01/01/84 - 12/31/84

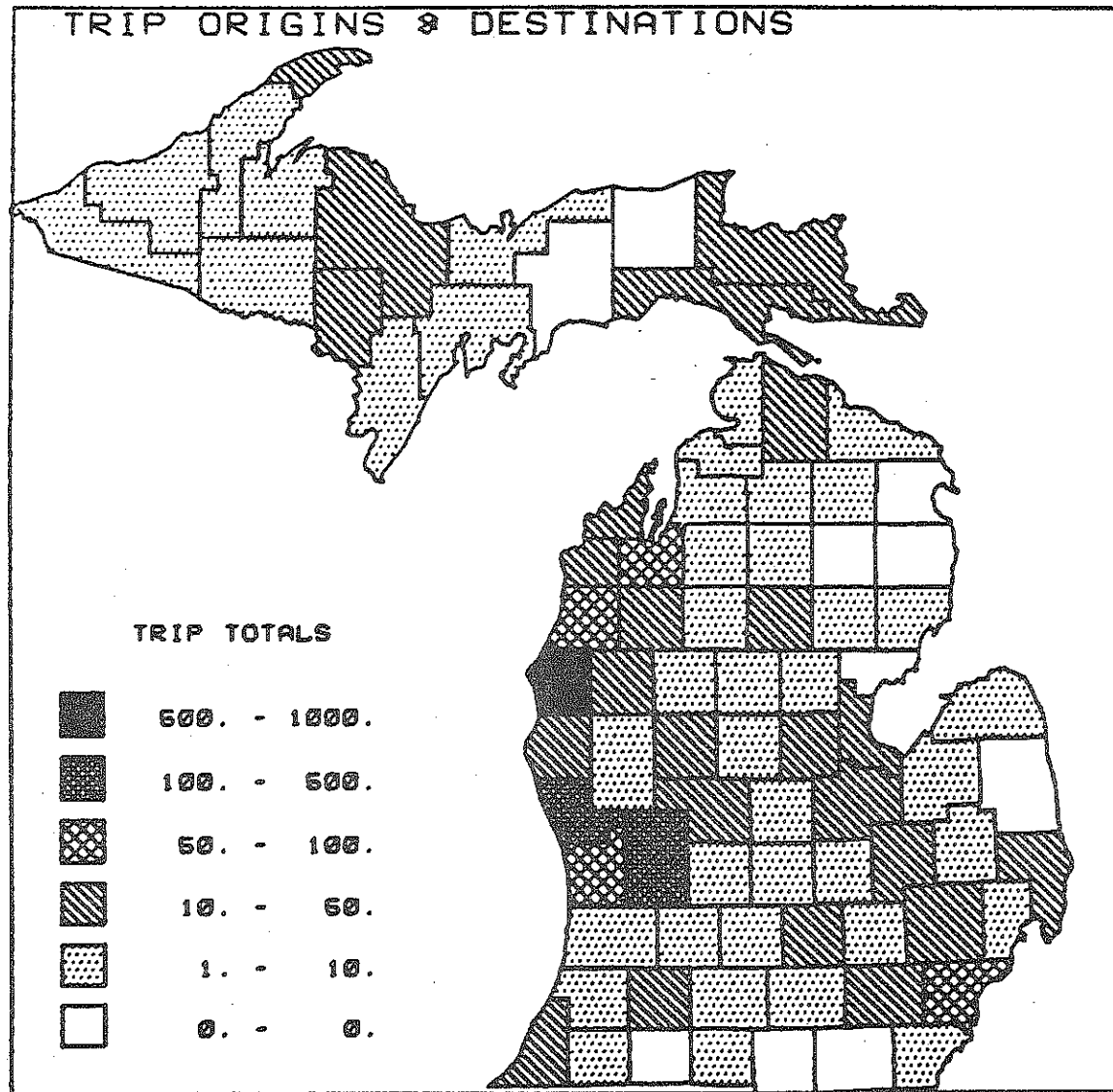
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Passengers	One Way Fare	One Way Fare
Adults	\$22.00	\$17.00
Children	\$11.00	\$ 8.50
*Automobiles	\$40.00	\$30.50
*Pickup with camper on top	\$50.00	\$38.00
*Motorcycle	\$40.00	\$30.50
*Bicycle/Moped	\$ 6.00	\$ 5.00
Utility trailer (up to 20 feet)	\$50.00	\$38.00
House trailer (up to 20 feet)	\$74.00	\$56.00
*Motorized home (up to 20 feet)	\$50.00	\$38.00
*Passenger fare extra		
Stateroom - day occupancy	\$14.00	\$11.00
- night occupancy	---	\$16.00



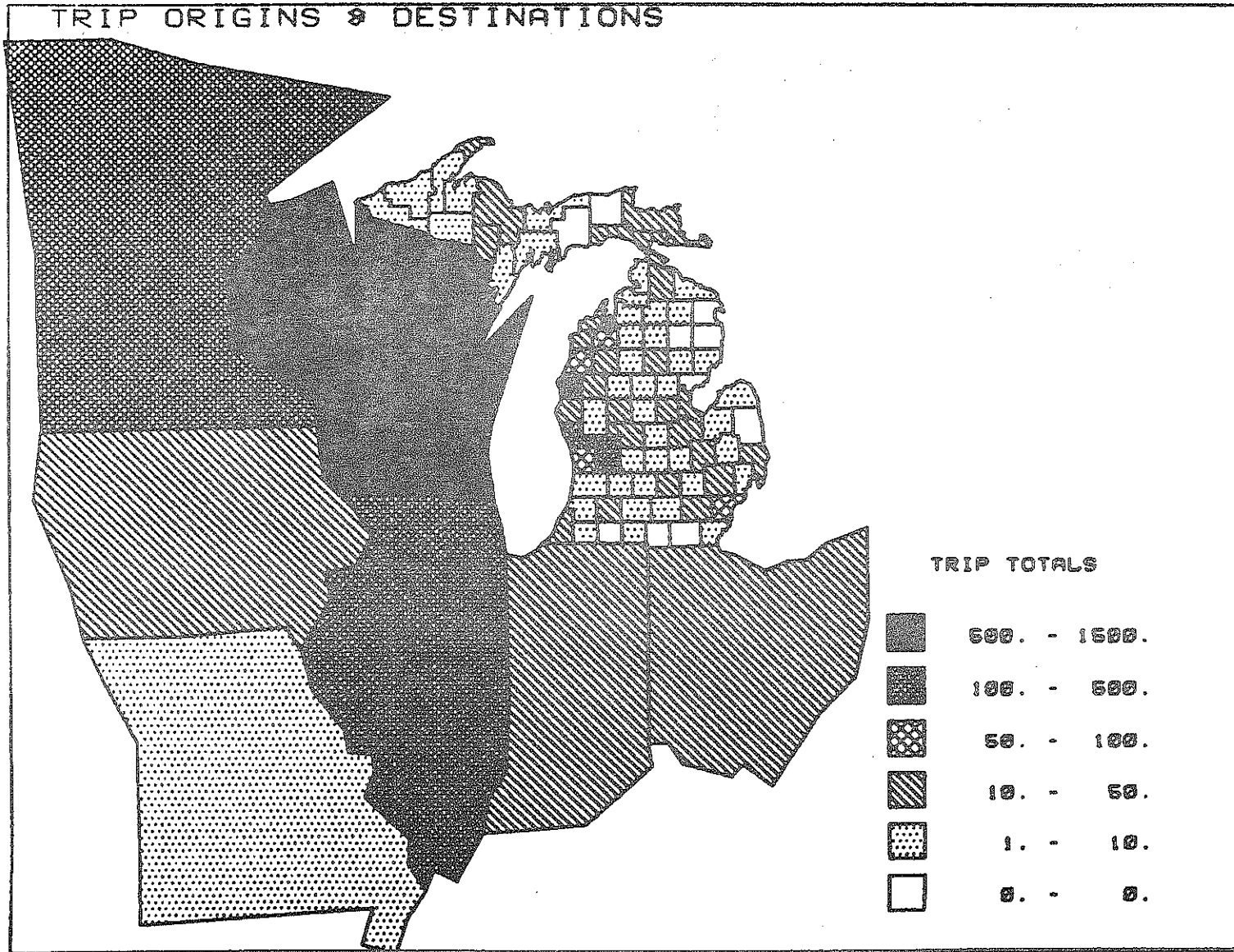
APPENDIX E

Trip Origin-Destination Maps



Source: Cross-Lake Michigan Ferry Survey (Aug. 84)  
Passenger Planning Section, MDOT

Prepared by: Transportation Planning  
Procedures Section

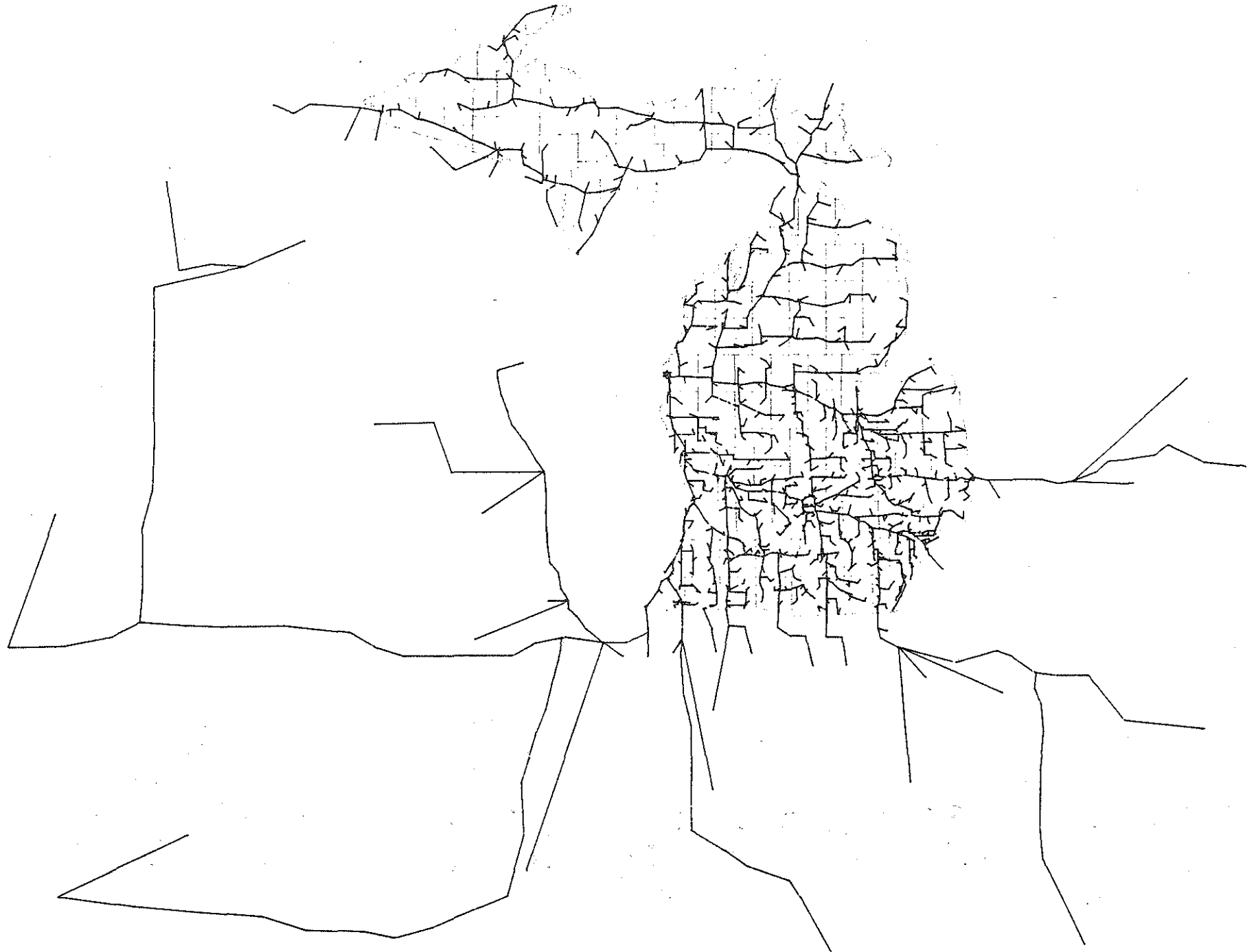


Source: Cross-Lake Michigan Ferry Survey (Aug. 84)  
Passenger Planning Section, MDOT

Prepared by: Transportation Planning  
Procedures Section

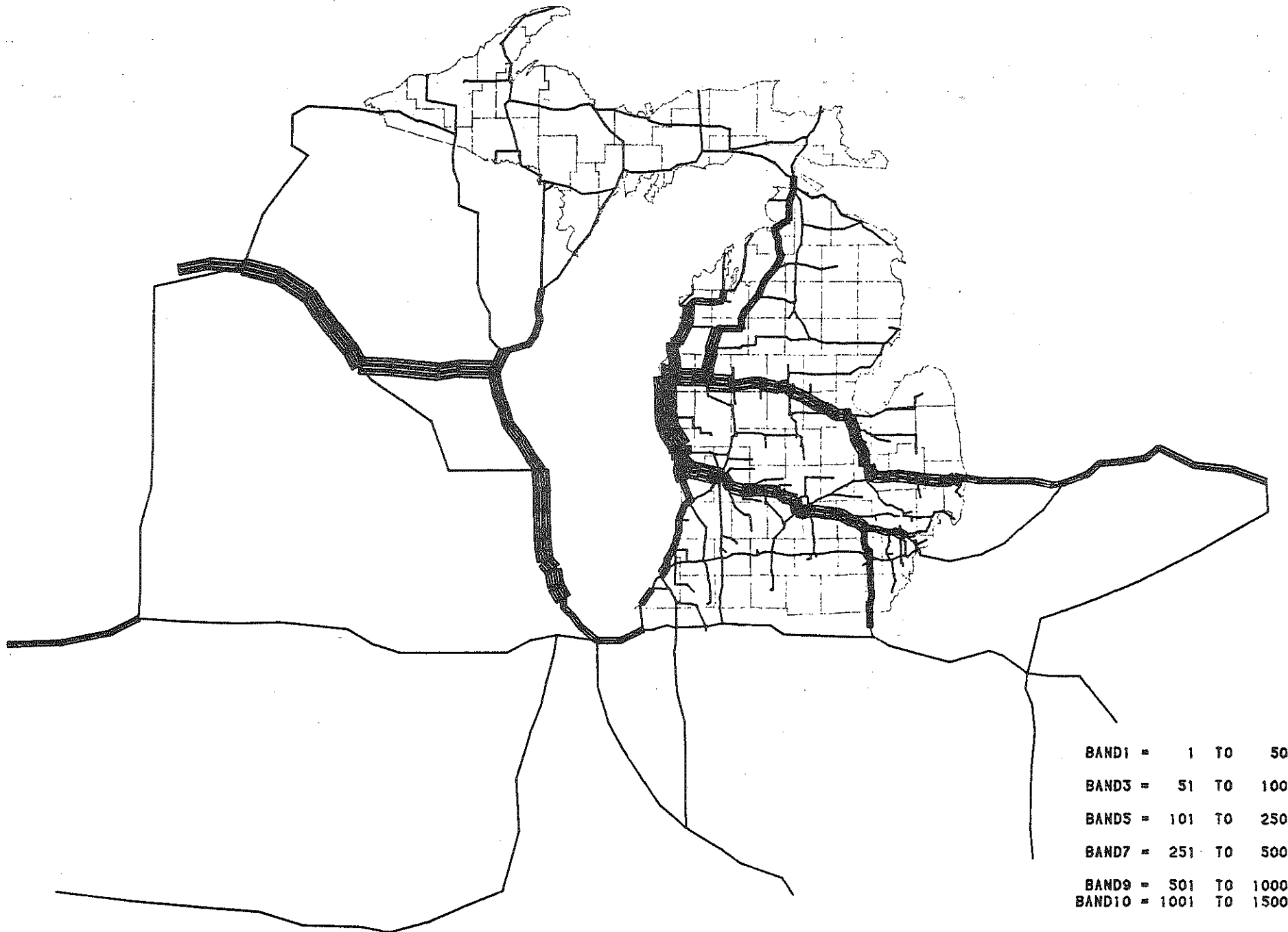


MINIMUM TIME PATHS BETWEEN LUDINGTON AND OTHER PLACES IN THE GREAT LAKES REGION



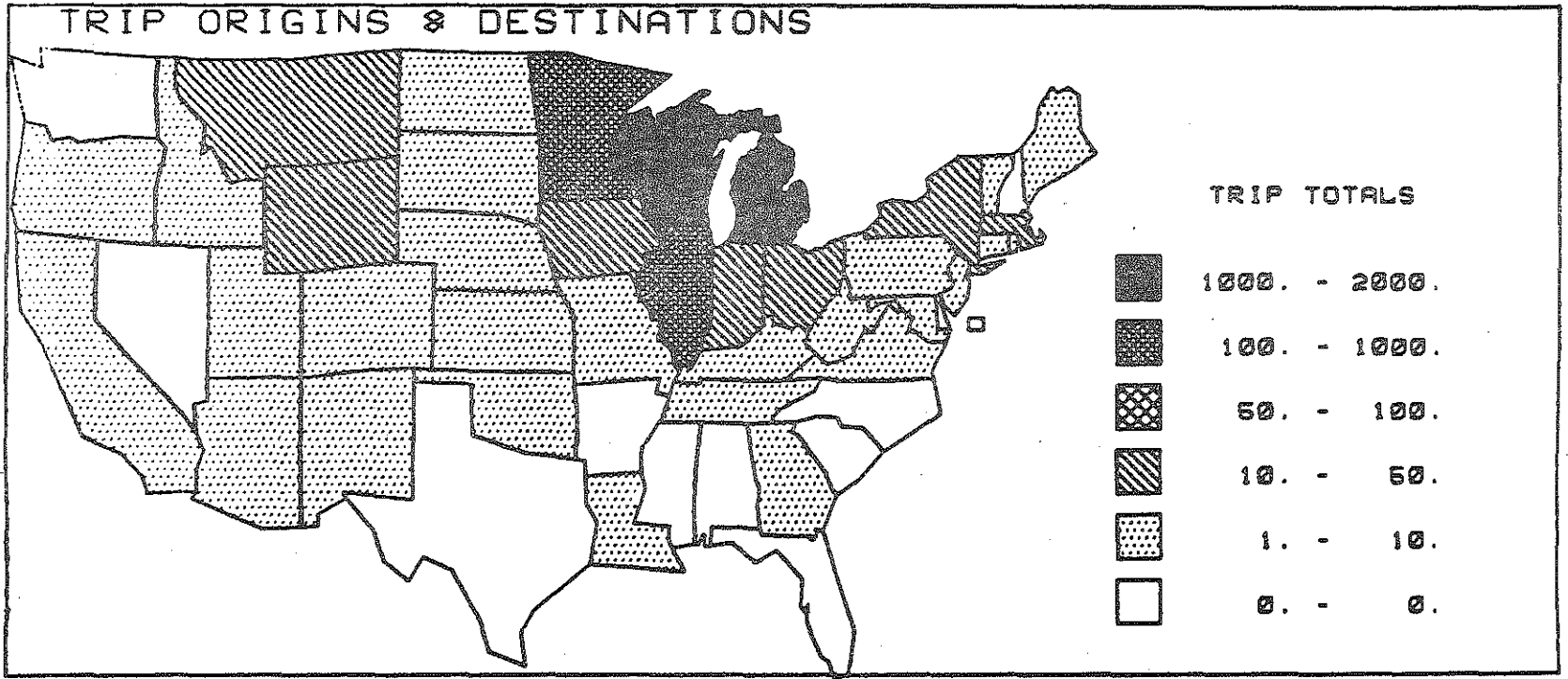
# FERRY USER'S TRAVEL ROUTES IN THE GREAT LAKES REGION

98



Source: Cross-Lake Michigan Ferry Survey (Aug. 84)  
Passenger Planning Section, MDOT

Prepared by: Transportation Planning  
Procedures Section



Source: Cross-Lake Michigan Ferry Survey (Aug. 84)  
Passenger Planning Section, MDOT

Prepared by: Transportation Planning  
Procedures Section

PARTY TRIP ORIGINS AND DESTINATIONS

Michigan		1715	46.3%
Ludington	570		
Upper Peninsula	127		
Northern Lower Peninsula	375		
Southern Lower Peninsual	643		
Wisconsin		1265	34.5%
Kewaunee	107		
Milwaukee	350		
Other	808		
Neighboring States		462	12.6%
Illinois	196		
Indiana	20		
Minnesota	209		
Ohio	37		
Canada		56	1.5%
Other		168	4.6%
Total		3666	100.0%

APPENDIX F

Ferry Service Capacity Analysis



CROSS-LAKE MICHIGAN FERRY SERVICE CAPACITY ANALYSIS, 1983-1984

Service & Month	Volume (Use)		(3) Capacity		V/C%		Remarks
	Passenger	Auto	(1) Passenger	(2) Auto	P	A	
<u>Ludington - Milwaukee</u>							
Oct. 1983	0	0	0	0	--	--	Service scheduled for June 15 thru September 3; no service remainder of year.  Vessel size is 500-520 passengers, 100-125 cars, and 0 rail cars. Use 500 passenger and 100 car average. One round trip/day.
Nov. 1983	0	0	0	0	--	--	
Dec. 1983	0	0	0	0	--	--	
Jan. 1984	0	0	0	0	--	--	
Feb. 1984	0	0	0	0	--	--	
Mar. 1984	0	0	0	0	--	--	
Apr. 1984	0	0	0	0	--	--	
May 1984	0	0	0	0	--	--	
June 1984	4,081	711	16,000	3,200	25.5	22.2	
July 1984	7,771	2,286	31,000	6,200	25.1	36.9	
Aug. 1984	10,043	2,671	31,000	6,200	32.4	43.1	
Sept. 1984	993	242	3,000	600	33.1	40.3	
<u>Ludington - Kewaunee (Day)</u>							
Oct. 1983	2,991	1,341	12,400	3,720	9.6	36.0	Service scheduled daily June 16 thru December 31; Tuesday thru Saturday January 1 thru June 15.  Vessel size is 500-520 passengers (200 passengers from September 16 thru May 15), 60 cars, and 23 rail cars (or 80-100 cars). Use 500 passenger and 140 car average from June 16 thru September 15; 60 car average for remainder of the year. One round trip/day.
Nov. 1983	1,257	611	12,000	3,600	4.2	17.0	
Dec. 1983	1,049	441	12,400	3,720	3.4	11.8	
Jan. 1984	488	226	8,400	2,520	2.3	9.0	
Feb. 1984	383	169	8,400	2,520	1.8	6.8	
Mar. 1984	648	290	9,200	2,760	2.8	10.6	
Apr. 1984	1,439	600	8,000	2,400	7.2	25.0	
May 1984	3,025	1,379	16,400	2,760	13.2	50.0	
June 1984	8,733	3,395	26,000	7,280	33.6	46.6	
July 1984	17,787	6,466	31,000	8,680	57.4	74.5	
Aug. 1984	18,677	6,689	31,000	8,680	60.2	77.1	
Sept. 1984	6,313	2,734	21,000	6,000	21.0	45.6	
<u>Ludington - Kewaunee (Night)</u>							
Oct. 1983	102	56	Some	Some	--	--	Service unscheduled from September 16 thru June 15; number of runs based on freight movements during this period.  Vessel size is 500-520 passengers, 60 cars, and 23 rail cars (or 80-100 cars). Use 500 passenger and 60 car average. One round trip/day.
Nov. 1983	21	13	Some	Some	--	--	
Dec. 1983	7	7	Some	Some	--	--	
Jan. 1984	0	0	0	0	--	--	
Feb. 1984	5	2	Some	Some	--	--	
Mar. 1984	19	10	Some	Some	--	--	
Apr. 1984	6	5	Some	Some	--	--	
May 1984	19	11	Some	Some	--	--	
June 1984	1,404	603	15,000	1,800	9.4	33.5	
July 1984	4,696	1,924	31,000	3,720	15.1	51.7	
Aug. 1984	5,170	2,402	31,000	3,720	16.7	64.6	
Sept. 1984	1,228	545	15,000	1,800	8.2	30.3	

- Note: (1) Passenger capacities are a function of the vessel's automobile capacity as well as the vessel's passenger capacity. When the vessel reaches its automobile capacity of, say, 140-160, the passenger count may be below the vessel's 500-520 passenger capacity due to the average party size being less than three.
- (2) Auto capacities assume that the lower deck on the Kewaunee night trip will be used for rail cars during the summer months; that the lower deck on the Kewaunee trip will be used for rail cars during the non-summer months.
- (3) These capacities are based on the scheduled trips. Scheduled trips not made and extra trips made to accommodate demand have not been considered in this capacity analysis.

Source: MDOT. Passenger Transportation Planning Section.