AIRLINE PASSENGER SURVEY

AT SELECTED

Michigan Airports

JANUARY 24-30, 1972

MICHIGAN AERONAUTICS COMMISSION
DEPARTMENT OF COMMERCE
in Conjunction With
STANFORD RESEARCH INSTITUTE
under a system planning grant issued by the
FEDERAL AVIATION ADMINISTRATION

STATE OF MICHIGAN

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AERONAUTICS COMMISSION
CAPITAL CITY AIRPORT
LANSING, MICHIGAN 48906

June, 1972

Subject: Airline Passenger Survey at Selected Michigan Airports

Members of the Michigan State Airport Plan Advisory Committee

Dear Member:

We are pleased to submit this report entitled, "Airline Passenger Survey at Selected Michigan Airports", for your consideration. This report contains the results of an airline passenger survey conducted on-board at five selected mid-Michigan airports--Lansing-Capital City, Grand Rapids-Kent County, Saginaw-Tri-City, Flint-Bishop and Kalamazoo Municipal--for a 7-day period, January 24-30, 1972.

We wish to emphasize that this report in and of itself will not determine the location of possible regional airports in the state, however, it is one piece of information that we will use as a planning tool.

The success of our airline passenger survey was due to many individuals and the survey could not have been conducted without their cooperation. Our coordination efforts were made possible by Paul C. Leonard of the Chicago office of the Air Transport Association. We also wish to convey our appreciation to station managers and other personnel of United Air Lines, North Central Airlines, Allegheny Airlines and Trans-Michigan Airlines. Others deserving our thanks were the airport managers of the five airports involved in the survey. We thank them for their efforts in our behalf.

We know this report will be of interest to you and will make it a part of your background material in deliberations involving our State Airport Planning Study efforts.

Sincerely,

James D. Ramsey, Director
MICHIGAN AERONAUTICS COMMISSION

MICHIGAN
THE GREAT LAKE STATE

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May, 1972

A PASSENGER SURVEY AT SELECTED MICHIGAN AIRPORTS

Prepared for the Interagency Transportation Council, and the Michigan Aeronautics Commission, State of Michigan, under Contract Number 2-1971.

This material was prepared under an Airport System Planning Grant financed by the Michigan Aeronautics Commission, Interagency Transportation Council and the Federal Aviation Administration.

R. W. Hall
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ACKNOWLEDGEMENTS

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I. INTRODUCTION

As a part of the State Airport System Plan Study, the Michigan Aeronautics Commission has conducted a passenger survey. The survey had two primary objectives:

1. To gain additional insight on the means (mode) of traveler access to airports, particularly when several options are available.
2. To assess the extent to which Michigan air carrier airports (aside from Detroit Metropolitan) serve regional, in addition to local, needs. That is, to gather data on the propensity of travelers to bypass a nearby airport in favor of a more distant airport that provides better service.

The survey results have contributed to both objectives. This success is due to the excellent cooperation received from parties to the survey--airport managements, airlines, and the responding passengers.

This report is intended to serve several purposes. In Sections II and III, the mechanics of the data collection effort are described. This information is necessary to place survey results in proper perspective. In Section IV, summary results of the survey are presented. Section V explains the detailed tabulations on file at the Michigan Aeronautics Commission and presents selected results derived from the detailed data.

II. SURVEY DESIGN

The basic approach adopted for the passenger survey was that a "self-administered" questionnaire would be employed--passengers would write their responses to a few questions rather than responding to an interviewer. It was also decided that survey objectives could be met by soliciting responses only from passengers initially boarding aircraft at airports in the survey and not from "through", and arriving travelers. The airlines participating in the survey graciously allowed for distribution and collection of survey questionnaires aboard aircraft. Thus, the basic survey design was considerably less taxing on MAC resources than a passenger lounge survey or an approach in which respondents would individually mail their responses.

Additional activities during the design phase of the survey program included selection of airports, airlines and flights for the survey; establishing the duration of the survey; and development of the questionnaire to be completed by passenger respondents.

Airport Selection

Ideally, the objectives of the survey would have been best served by conducting the survey simultaneously for each Michigan air carrier airport. However, available resources (time, money) dictated that only a few airports could be included. The airports selected as most representative for survey purposes were:

- Flint's Bishop Airport
- Grand Rapids' Kent County Airport
- Kalamazoo's Municipal Airport
- Lansing's Capital City Airport
- Tri-City Airport in Saginaw County (for a specific flight)

For brevity, the four airports for which usable data were obtained are referred to in this report only by city name.*

Duration and Dates of Survey

Because the characteristics of air passengers are known to vary significantly by day-of-the-week, a seven-day duration was chosen for the survey. The week selected was January 24 through January 30, 1972. It must be recognized that the necessarily limited survey duration does not provide for an understanding of potentially significant seasonal and special (e.g., holiday) effects.

Airline and Flight Coverage

The goal was to include in the survey all of the departing flights of the airlines serving each of the selected airports, including commuter airlines. Unfortunately, one commuter airline ceased operations just prior to survey implementation.**

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* An insufficient number of responses were obtained at Tri-City Airport for meaningful use.

** The one exception was Tri-City Airport, where the intent was to gather data on a nonstop flight to Newark, New Jersey. Since insufficient data were obtained, the flight is not discussed further in this report.

The number of responses for the other commuter airline within the scope of the survey was far too small for meaningful use. Thus the airlines included in the survey results are as follows:

Allegheny Airlines - Grand Rapids

North Central Airlines - Flint, Grand Rapids, Kalamazoo, and Lansing

United Air Lines - Flint, Grand Rapids, and Lansing

Flight coverage for these airlines is provided in Appendix A.

Questionnaire Design

The questionnaire form used in the survey is displayed in Figure 1. The design objectives were clarity and simplicity. The front of the form briefly describes the purpose of the survey to the passenger respondent. The questions asked of the passenger and the wording of the possible responses were selected after careful deliberation by the MAC staff. Question 1 insures that the respondent boarded the airplane at the airport for which distribution of the questionnaire was intended. Questions 2 and 3 define the passenger's "starting point" and lead directly to the important airport access data, questions 4 and 5. Question 6 provides the traveler's destination. Question 7 differentiates "home-based" from other travelers. Question 8 identifies trip purpose in broad categories. The shaded left margin of the form contains space for precoding of flight information and card-column instructions for subsequent key-punching of the questionnaire.

In order to limit the time required for a response, questions peripheral to the survey objectives were not included in the form design. Thus, passengers were not asked to describe themselves (e.g., sex, occupation, education) and their attitudes were not solicited (e.g., how "good" is the airport access).

FIGURE 1

PASSENGER SURVEY QUESTIONNAIRE

FRONT

MICHIGAN AERONAUTICS COMMISSION

Department of Commerce

PASSENGER SURVEY

The Michigan Aeronautics Commission, is conducting a survey of air passengers boarding at this airport. The results of this survey will assist the state of Michigan in developing a better aviation system.

PLEASE TAKE A MINUTE TO ANSWER THE QUESTIONS ON THE BACK OF THIS CARD.

THANK YOU!

JAMES D. RAMSEY, Director
Michigan Aeronautics Commission
Department of Commerce

REAR

Airline	Flight	Day	Hour
1	2 3 4	5	6 7

SURVEY QUESTIONS

(See Reverse Side for Instructions)

8 **1. At what airport did you board this airplane?**

1 ☐ Grand Rapids 3 ☐ Flint 5 ☐ Other
2 ☐ Lansing 4 ☐ Saginaw _____

9 **2. Where did you start your trip to the above airport?**

1 ☐ Home 2 ☐ Business 3 ☐ Hotel/Motel 4 ☐ Other

10 11 12 **3. Where is the starting point in question "2" located?**

_____, _____
(City or Town — or County, if starting point not in City or Town) (State)

13 **4. What kind of transportation did you use to get to this airplane?**

1 ☐ Another Airplane from _____
2 ☐ Private auto parked at airport 6 ☐ Rental Car
3 ☐ Private auto driven away by others 7 ☐ Local rail or bus system
4 ☐ Airport limousine or bus 8 ☐ Motel/hotel courtesy car
5 ☐ Taxi 9 ☐ Other _____

DO NOT WRITE IN SHADED AREA

14 15 16 **5. About how many minutes did it take you to travel from your starting point to the airport?**

_____ (your "best guess" will suffice).
(Minutes)

17 18 19 **6. What is the furthest point of your air travel today?**

_____
(City & State)

20 **7. Are you . . .**

1 ☐ Leaving home to go on a trip? 3 ☐ Returning home from a trip?
2 ☐ Traveling between non-home cities? (If you are a college student: consider school as your "home.")

21 **8. What is the main purpose of your trip?**

1 ☐ Business 3 ☐ Other Personal
2 ☐ Vacation/Recreation 4 ☐ Other

Please hand your completed questionnaire to your stewardess.

THANK YOU FOR YOUR COOPERATION.

III. DATA COLLECTION AND PROCESSING

Prior to the start of the survey on January 24, 1972, MAC staff assembled a flight packet for each of the flights to be surveyed. Instructions to the stewardess and station agent were printed on the outside of this large envelope (see Figure 2). Inside were (1) a supply of questionnaires that had been precoded with flight information and (2) a mailing envelope. The packets were then distributed to airline personnel.

On subsequent receipt of the completed questionnaires, processing by MAC staff entailed numeric coding of the written origin and destination responses and culling questionnaires that had obviously been completed in an incorrect manner.

The basis for the coding of traveler origins and destinations was the zone system adopted for the current State Airport System Plan Study. An additional (third) digit was added to those study zone numbers to identify counties within Michigan and to provide state and major city designations for out-of-state zones. The expanded zone numbering system for the passenger survey is displayed in the maps of Appendix A.

Table 1 displays the number of survey responses by airport. As shown, the rate of responses was quite good at all locations, even after unusable responses were removed. The principal causes for classifying a questionnaire as unusable were:

- no response to question 5--airport access time in minutes
- responses of a "practical joke" nature

FIGURE 2

INSTRUCTIONS TO AIRLINE PERSONNEL*

MICHIGAN PASSENGER SURVEY

TO THE STEWARDESS:

The Michigan Aeronautics Commission, with the cooperation of your airline, is conducting a one-week survey of passengers, who board flights at Grand Rapids, Lansing, Flint and Saginaw. The survey is needed in the planning of future airport development.

Your help in this survey will be greatly appreciated.

*Distribute one questionnaire to all passengers over 12 years of age as they board the airplane at this airport. (Do not distribute questionnaires to "through" passengers.)

*The questionnaires are self-explanatory and take about one minute to complete.

*Collect the questionnaires. Place all completed and unused cards in the enclosed self-addressed envelope and give the envelope to the agent who meets this flight at the next stop.

TO THE AGENT:

Please return these questionnaires to the Michigan Aeronautics Commission using the pre-addressed, postage-prepaid envelope.

THANK YOU FOR YOUR COOPERATION

* These Instructions Appeared on the Survey Flight Packet.

Table 1

NUMBER OF SURVEY RESPONSES

Airport	Total Responses	Usable Responses	Boarding Passengers During Survey	Usable Responses as A Percent of Boardings
Flint	978	896	1,475	61%
Grand Rapids	3,202	2,791	4,562	61%
Kalamazoo	1,239	1,100	1,738	63%
Lansing	1,771	1,624	2,230	73%
Totals	7,190	6,411	10,005	64%

Source: MAC and SRI

- cases where the respondent was apparently confused on what constituted his air trip. This was particularly true where airport access (question 4) was via another airplane. Also, some questionnaires were inadvertantly distributed to "through" passengers.

Both manual and computer editing were employed to identify unusable responses.

IV. SUMMARY RESULTS

Table 2 summarizes usable responses obtained during the survey by day-of-the-week and hour-of-the-day of flight departure. Responses by day-of-the-week were relatively uniform during the survey, and responses by hour-of-departure are an unbiased reflection of flight patterns from each of the airports.

Another means of insuring that survey responses are representative is to examine passenger responses on trip destination (Question 6). These results are summarized in Table 3. They compare favorably with data from the Civil Aeronautics Board origin-destination sample for 1970. Significant in Table 3 are: (1) the general similarity in distribution of destinations among airports, (2) the low percentage of intra-state air trips, and (3) the large fraction of trips accounted for by only nine of the 29 study zones outside Michigan.

Table 2

RESPONSES BY DAY AND HOUR
(percent)

	Airport			
	Flint	Grand Rapids	Kalamazoo	Lansing
Day of Week				
Monday	14	16	21	14
Tuesday	10	13	14	15
Wednesday	15	16	17	15
Thursday	13	18	10	15
Friday	18	17	17	15
Saturday	14	8	10	9
Sunday	16	11	11	17
	100	100	100	100
Hour of Day				
0001 - 0659	0	0	0	0
0700 - 0859	27	22	22	28
0900 - 1059	18	21	16	11
1100 - 1259	25	10	18	7
1300 - 1459	6	3	16	10
1500 - 1659	15	21	13	27
1700 - 1859	0	15	10	10
1900 - 2059	8	5	3	3
2100 - 2259	0	1	2	2
2300 - 2400	0	2	0	3
	100	100	100	100

Detail may not add to total because of independent rounding.

Table 3

TRIP DESTINATIONS
(percent)

Trip Destination	Airport			
	Flint	Grand Rapids	Kalamazoo	Lansing
Intra-State	1	6	4	4
Major External Zone Destinations				
Chicago	21	12	16	18
New York	6	12	11	8
Miami	14	9	6	5
Denver	8	5	6	8
Washington, D.C.	6	5	6	4
Dallas	4	5	6	4
Cleveland	6	6	3	4
Los Angeles	6	3	4	5
Philadelphia	4	4	4	3
Subtotal (Major Destinations)	75	61	61	61
Other Study Area Zones	19	28	30	31
Outside Study Area/No Response	5	5	5	4
	100	100	100	100

Table 4 presents the survey responses to the remaining questions posed on the questionnaire.

Response to the Trip State question (7) discloses that the majority of the departing passengers surveyed at each airport are "home-based" (leaving home to start a trip). In part, this is due to the rejection of some survey responses because of confusion on trip definition. It may also reflect misunderstanding of the term "boarding passengers" on the part of the stewardesses who distributed the questionnaires. Nevertheless, it is clear that the surveyed airports do not merely serve as conveniences for out-of-state visitors.

While business trips constitute a large fraction of the responses, (question 8) the majority of the travelers began their trips at home (question 2).

Results for question 3, as summarized in the table, disclose that the preponderance of airport access trips began in the same study zone as that in which the airport is located.* This suggests that the airports serve relatively limited market areas. Kalamazoo is an exception to this finding with over 23 percent of the originations outside the Kalamazoo zone. Analysis of more detailed survey results discloses that 14 percent of the total Kalamazoo airport trips originate in the adjacent Battle Creek zone.

The private automobile clearly dominates other means of airport access (Question 4). It is interesting, however, that most vehicles are not parked at the airport for the trip duration. Instead, travelers are driven to the airport by others.

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*At the two digit level

Table 4

SURVEY RESPONSES BY QUESTION
(percent)

	Airport			
	Flint	Grand Rapids	Kalamazoo	Lansing
Trip Stage (Question 7)				
Leaving Home (starting trip)	70	58	61	57
Traveling between non-home cities (en route)	7	11	10	9
Returning home	21	29	27	31
No response	2	2	2	3
	100	100	100	100
Purpose of Trip (Question 8)				
Business	51	65	73	65
Vacation/Recreation	26	19	12	16
Other personal	16	12	11	15
Other	6	4	4	4
No response	1	0	0	0
	100	100	100	100
Starting Point (Question 2)				
Home	75	59	60	58
Business	10	19	22	17
Hotel/Motel	8	14	11	13
Other/No response	6	8	8	12
	100	100	100	100
Location of Trip Origin Zone vs Airport Zone (Question 3)				
Same	83	84	74	89
Adjacent	8	9	22	8
Other	1	2	1	1
No Response	8	5	3	2
	100	100	100	100

Table 4 (Concluded)

	Airport			
	Flint	Grand Rapids	Kalamazoo	Lansing
Access Mode (Question 4)				
Private auto - Parked	28	25	28	21
Private auto - Not parked	63	58	52	61
Rental auto	3	8	9	6
Taxi	2	5	5	10
Courtesy Car	2	1	1	1
All other and No response	2	3	5	1
	100	100	100	100
Access Time - minutes (Question 5)				
1 - 10	22	13	29	14
11 - 20	48	42	41	55
21 - 30	17	17	20	19
31 - 40	4	5	4	3
41 - 50	3	10	4	4
51 - 60	3	8	2	3
Over 60	3	5	1	3
	100	100	100	100

Several explanations of this phenomenon can be postulated, among them:

- reluctance to do without the auto while the traveler is away
- cost of airport parking
- capacity of airport parking facilities

Whatever the reason, a potential market for public transit is indicated. Presumably, such a system would have to offer better service or lower cost than the sparsely used (existing) taxi services.

Responses to Question 5 reinforce the notion of relatively limited market areas for the airports surveyed. Well over one-half of the access trips (by all modes) took twenty minutes or less. However, the results also disclose that the "drawing power" of Grand Rapids is somewhat greater than that of the other airports--about one-quarter of the Grand Rapids access trips took more than 40 minutes.

A large number of cross-tabulations of the survey data can be developed. A few of the more significant ones are shown in Table 5 for Grand Rapids. Similar tabulations for the other airports are presented in Appendix B.

Table 5

CROSS-TABULATIONS OF SURVEY DATA*
GRAND RAPIDS AIRPORT

Day of Week	Trip Stage		
	Starting Trip	En Route	Returning Home
Monday	72	10	16
Tuesday	58	13	28
Wednesday	57	17	25
Thursday	60	9	29
Friday	45	10	44
Saturday	65	5	28
Sunday	54	8	34
All Days	58	11	29

Day of Week	Trip Purpose			
	Business	Vacation	Other Personal	Other
Monday	76	13	9	2
Tuesday	77	9	10	4
Wednesday	70	16	11	3
Thursday	58	25	11	5
Friday	66	17	14	3
Saturday	40	36	18	6
Sunday	53	20	18	9
All Days	65	19	12	4

*Percentage of responses by row or column, as appropriate.

Table 5 (Concluded)

GRAND RAPIDS AIRPORT

Location of Trip Origin Zone vs Airport Zone	Trip Stage			
	Starting Trip	En Route	Returning Home	All Stages
Same	86	80	82	84
Adjacent	8	12	10	9
Other	1	4	3	2
No Response	5	4	5	5

Access Mode	Trip Purpose				
	Business	Vacation	Other Personal	Other	All Purposes
Private Auto - parked	29	17	18	13	25
Private Auto - not parked	48	77	72	77	58
Rental Auto	11	1	2	0	8
Taxi	6	2	5	5	5

Access Mode	Access Time - Minutes						
	1-10	11-20	21-30	31-40	41-50	51-60	Over 60
Private Auto - parked	11	39	16	4	14	10	6
Private Auto - not parked	14	42	17	5	10	8	5
Rental Auto	9	37	19	3	15	9	9
Taxi	14	56	22	1	2	4	1
All Access Modes	13	42	17	5	10	8	5

Tabulation of "trip stage" by day-of-the-week discloses reasonably stable percentages during the week. For example, for the whole of the survey at Grand Rapids, 58 percent of the travelers were starting a trip. This ranges from a high of 72 percent on Monday to a low of 45 percent on Friday.

Although somewhat greater variation is observed for "purpose of trip" by day of the week, the importance of business travel on all days is noteworthy.

"Trip Stage" is tabulated against trip origin zone (as related to airport zone) to determine whether home-based travelers behave differently than visitors. The distributions are only slightly different for Grand Rapids in that more visitors (en route travelers and those returning home) begin their trips to the airport outside the Grand Rapids zone. Appendix B discloses a similar phenomenon for the other airports.

The tabulation of access mode by trip purpose discloses the dominance of the private automobile for all trip purposes. As expected, the rental auto is used more frequently by business travelers.

Tabulation of airport access time by access mode shows similar distributions of access time for the private and rental automobile modes. Taxi trips tend to be somewhat shorter. There are the relatively large number of access trips of over 40 minutes duration where the traveler rode to the airport in an automobile driven away by others. That the drivers are willing to subject themselves to the inconvenience, in such circumstances, is noteworthy.

V. DETAILED RESULTS

Four detailed tabulations and cross-tabulations (Tables 2, 3, 4, and 5) of the survey data have been prepared; these print-outs, plus a listing of all usable survey responses (allowing for other data manipulations) are on file at the Michigan Aeronautics Commission. A general purpose computer program was employed to prepare the tabulations. An annotated sample page from Table 2 is displayed in Figure 3.

The computer output labeled "Table 2" contains the following data:

Starting Point	(Question 2) by day and hour
Access Mode	(Question 4) by day and hour
Trip Stage	(Question 7) by day and hour
Trip Purpose	(Question 8) by day and hour

Table 3 lists access time by zone of trip origin and trip stage. These computer tables have been separately prepared by airline.

Two other computer tables are on file with the Michigan Aeronautics Commission. Table 4 provides data on zone of trip destination (at the two digit level) by Michigan airport. Table 5 lists:

Access time by access mode and trip purpose

Access time by access mode and starting point.

The detailed survey data have been used to determine the starting points by Michigan county for surface access to each airport in the survey.* Of particular interest are those travelers who begin their trips to the airport in a county outside the airport zone. Figures 4 through 7 portray

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* Only three survey responses were obtained where surface access began outside Michigan.

FIGURE 3

SAMPLE DETAILED TABULATION

JHCAR7F 04/21/72
(Disregard)

PAGE 1

(Disregard) { FREQUENCY TABLE 220 DATA ARE NOT WEIGHTED
REFERS TO RECODE 7 BY RECODE 6 BY RECODE 0 BY RECODE 0
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PERCENTAGES ARE BY ROW AND COL

PAGE 1 OF 1 PAGES

MICHIGAN AIRLINE PASSENGER SURVEY - 1972

FLINT : TABLE II DISTRIBUTION OF ALL TRAVELLER STARTING POINTS BY FLIGHT DEPARTURE TIME (QUESTION 2)

STARTING POINT

FLIGHT DEPARTURE TIME

STARTING POINT	TOTAL	BEFORE 7	07-08	09-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
TOTAL (All Rows)	896	0	245	159	224	55	138	0	75	0	0
	100.0	0.0	27.3	17.7	25.0	6.1	15.4	0.0	8.4	0.0	0.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
HOME	675	0	217	133	164	19	92	0	50	0	0
	100.0	0.0	32.1	19.7	24.3	2.8	13.6	0.0	7.4	0.0	0.0
	75.3	0.0	88.6	83.6	73.2	34.5	66.7	0.0	66.7	0.0	0.0
BUSINESS PLACE	90	0	6	6	25	15	27	0	11	0	0
	100.0	0.0	6.7	6.7	27.8	16.7	30.0	0.0	12.2	0.0	0.0
	10.0	0.0	2.4	3.8	11.2	27.3	19.6	0.0	14.7	0.0	0.0
HOTEL OR MOTEL	75	0	7	12	26	18	10	0	8	0	0
	100.0	0.0	9.3	16.0	26.7	24.0	13.3	0.0	10.7	0.0	0.0
	8.4	0.0	2.9	7.5	8.9	32.7	7.2	0.0	10.7	0.0	0.0
OTHER PLACE	45	0	10	6	12	3	9	0	5	0	0
	100.0	0.0	22.2	13.3	26.7	6.7	20.0	0.0	11.1	0.0	0.0
	5.0	0.0	4.1	3.8	5.4	5.5	6.5	0.0	6.7	0.0	0.0
NO ANSWER	11	0	5	2	3	0	0	0	1	0	0
	100.0	0.0	45.5	18.2	27.3	0.0	0.0	0.0	9.1	0.0	0.0
	1.2	0.0	2.0	1.3	1.3	0.0	0.0	0.0	1.3	0.0	0.0

TOTAL (All Columns)

TITLE OF TABLE (Including Airport and/or Carrier Name)

Number of Responses
Percent of Row Total
Percent of Column Total

the results of this investigation by airport. In Figure 4, for example, each line on the map represents a county for which three or more responses were obtained for access trips to Flint's airport. Oakland is one such county; travelers starting there accounted for about two percent of total Flint boardings during the survey (19 of the 820 Flint responses for which a county of origin was provided).

As shown in the figures, counties immediately adjacent to the airport zone account for nearly all traveler origins that are outside the airport zone.

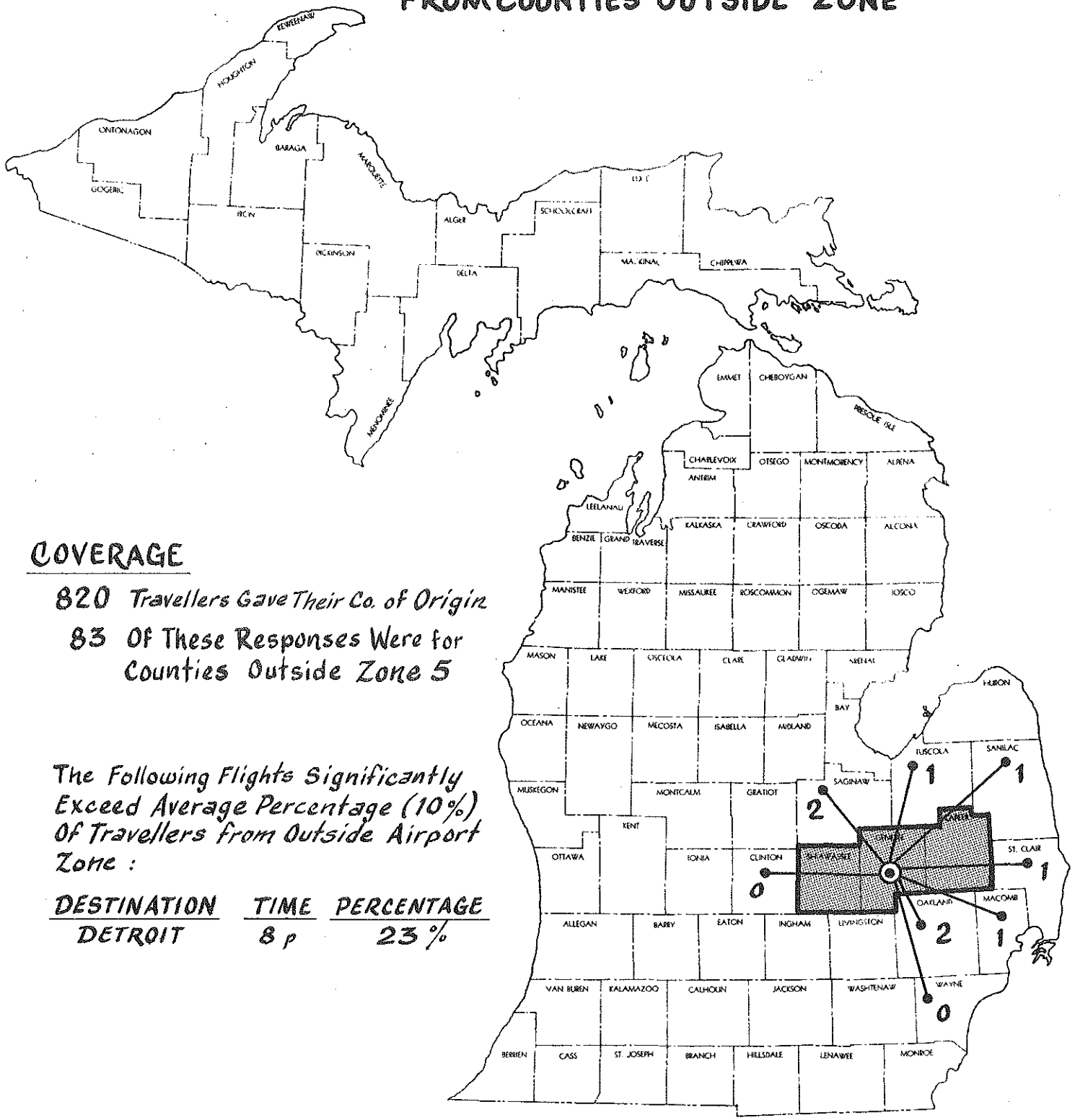
In comparison of the figures, the "drawing power" of Grand Rapids Airport, as measured by the number of lines to external counties, is greater than that for the other survey airports. The 3% figure which represents passengers driven from Muskegon County to Kent County Airport may be somewhat high due to flight cancellations at Muskegon County Airport during the survey week. However, each of the airports draws from "external" counties and in many cases the airport market areas overlap.

The cases of airport competition, as derived from the figures, are summarized in Table 6. The table indicates that the Grand Rapids and Kalamazoo Airports compete for travelers from six counties. Grand Rapids also competes with Lansing. More limited competition is observed between Lansing and Flint. Only in the case of Ingham County can competition between three airports be observed in the survey data.

Many of the cases of airport competition are to be expected because the county in question is nearly equidistant from two airports. The interesting cases, relative to the survey objectives, are those where travelers bypass a nearby airport in favor of a more distant one. As shown in the third column of Table 6, the survey data disclose eight counties

FIGURE 4

SURFACE ACCESS TO FLINT AIRPORT FROM COUNTIES OUTSIDE ZONE



COVERAGE

820 Travellers Gave Their Co. of Origin

83 Of These Responses Were for Counties Outside Zone 5

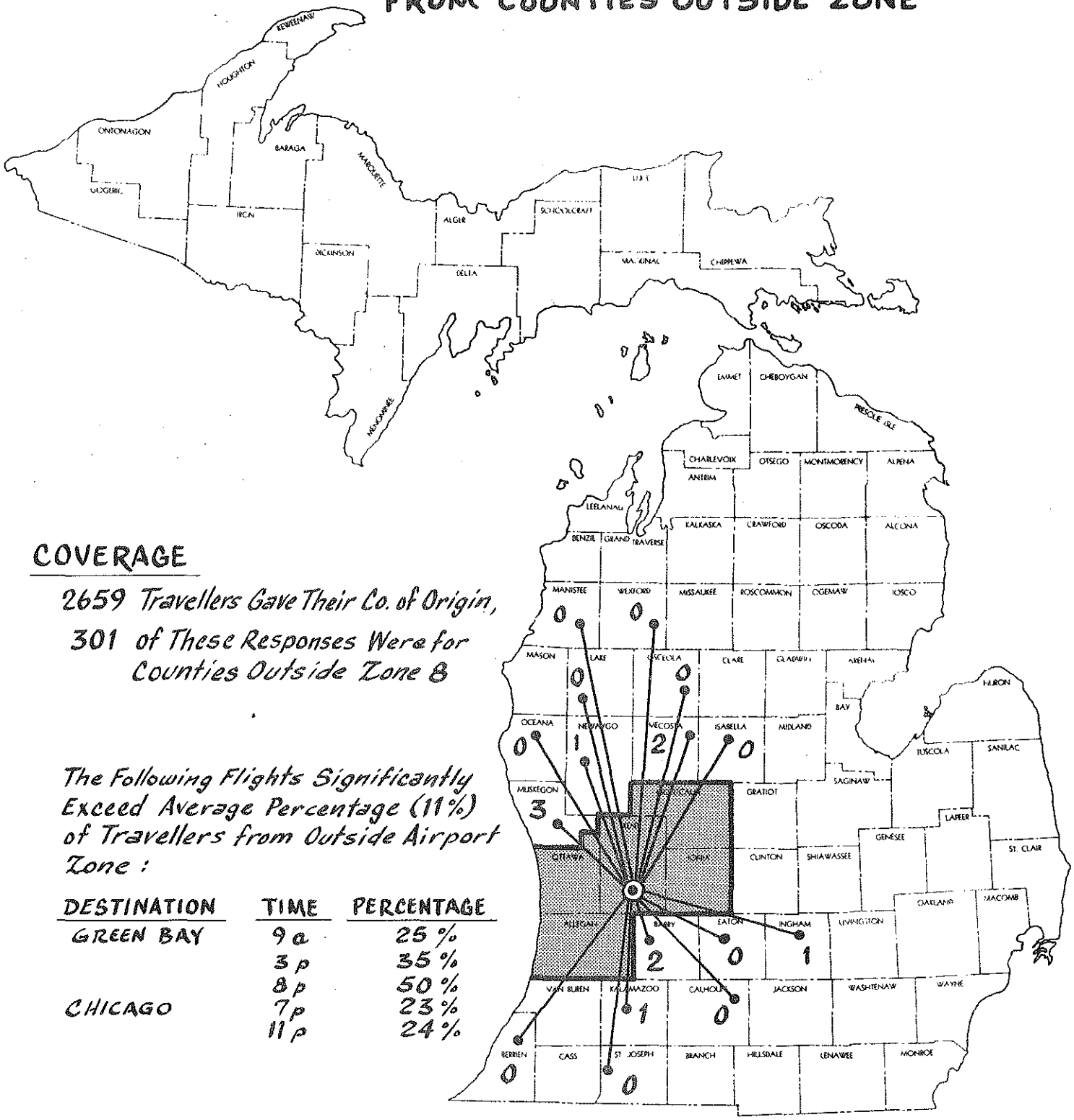
The Following Flights Significantly Exceed Average Percentage (10%) Of Travellers from Outside Airport Zone :

DESTINATION	TIME	PERCENTAGE
DETROIT	8 p	23 %

Lines Represent Counties With Three or More Survey Responses.
Number Within County Boundary Represents Percentage of Total FLINT Traffic.

FIGURE 5

SURFACE ACCESS TO GRAND RAPIDS AIRPORT FROM COUNTIES OUTSIDE ZONE



COVERAGE

2659 Travellers Gave Their Co. of Origin,
301 of These Responses Were for Counties Outside Zone 8

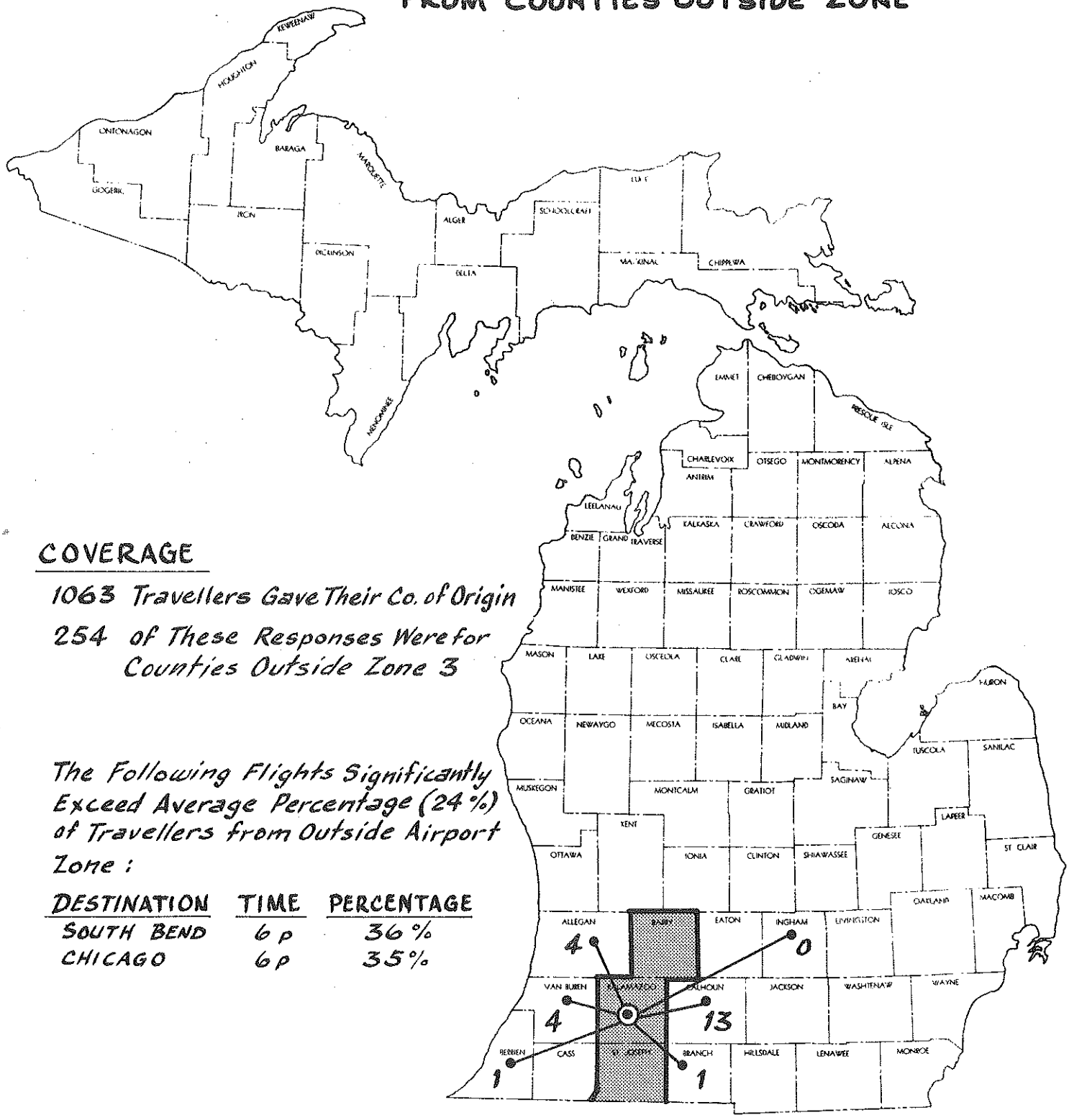
The Following Flights Significantly Exceed Average Percentage (11%) of Travellers from Outside Airport Zone:

DESTINATION	TIME	PERCENTAGE
GREEN BAY	9a	25%
	3p	35%
	8p	50%
CHICAGO	7p	23%
	11p	24%

Lines Represent Counties With Three or More Survey Responses.
Number Within County Boundary Represents Percentage of Total GRAND RAPIDS Traffic.

FIGURE 6

SURFACE ACCESS TO KALAMAZOO AIRPORT FROM COUNTIES OUTSIDE ZONE



COVERAGE

1063 Travellers Gave Their Co. of Origin

254 of These Responses Were for Counties Outside Zone 3

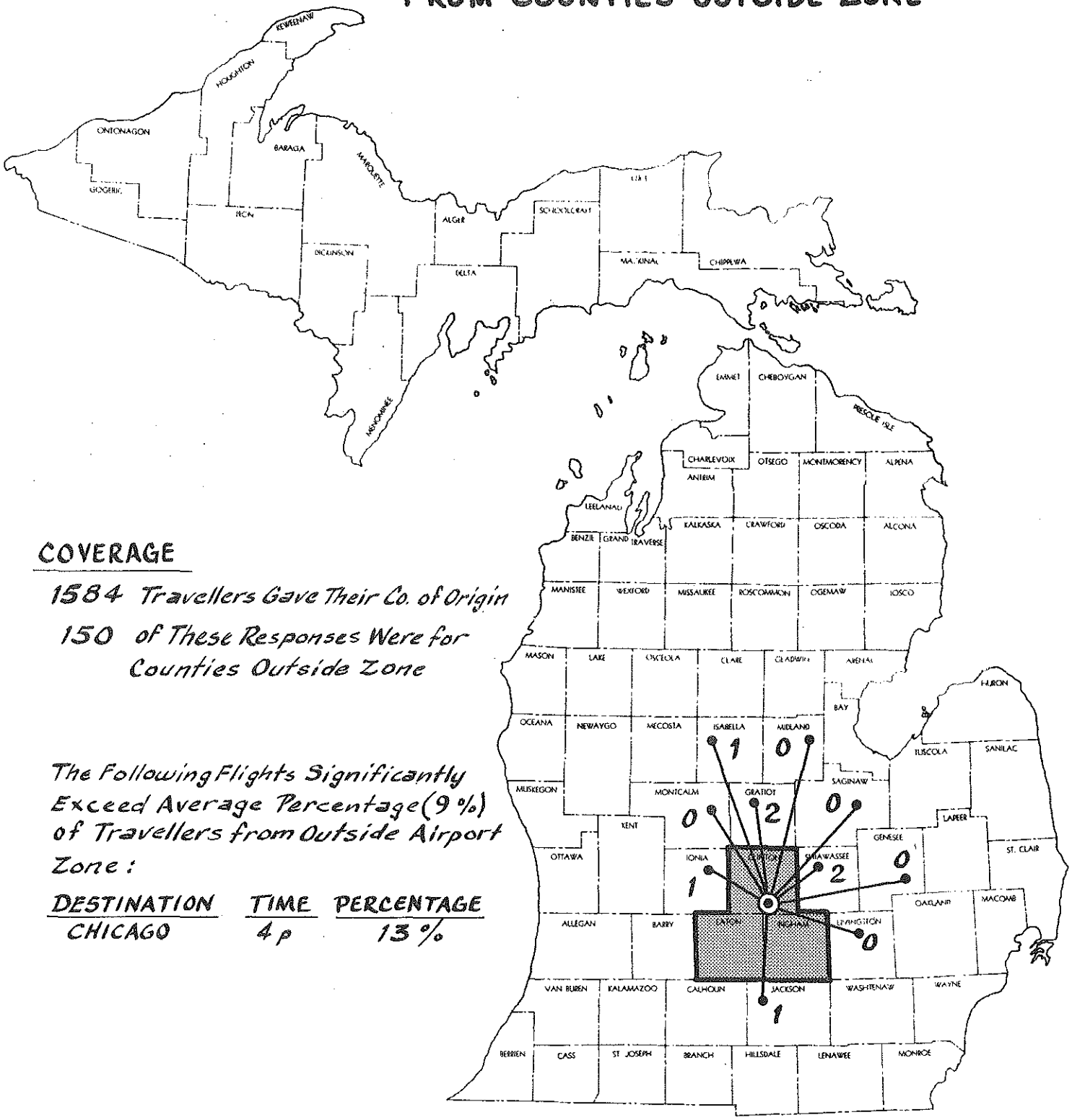
The Following Flights Significantly Exceed Average Percentage (24%) of Travellers from Outside Airport Zone:

DESTINATION	TIME	PERCENTAGE
SOUTH BEND	6 p	36%
CHICAGO	6 p	35%

Lines Represent Counties With Three or More Survey Responses. Number Within County Boundary Represents Percentage of Total KALAMAZOO Traffic.

FIGURE 7

SURFACE ACCESS TO LANSING AIRPORT FROM COUNTIES OUTSIDE ZONE



COVERAGE

1584 Travellers Gave Their Co. of Origin

150 of These Responses Were for Counties Outside Zone

The Following Flights Significantly Exceed Average Percentage (9%) of Travellers from Outside Airport Zone:

DESTINATION	TIME	PERCENTAGE
CHICAGO	4p	13%

Lines Represent Counties With Three or More Survey Responses. Number Within County Boundary Represents Percentage of Total LANSING Traffic.

Table 6

COMPETITION AMONG SURVEY AIRPORTS

County	Competing Survey Airports	Closest of Competing Airports*	Number of Responses Closest Airport: Other(s)
Allegan	Grand Rapids and Kalamazoo	ns	
Berrien	Grand Rapids and Kalamazoo	Kalamazoo	8 : 4
Barry	Grand Rapids and Kalamazoo	ns	
Kalamazoo	Grand Rapids and Kalamazoo	Kalamazoo	770 : 25
St. Joseph	Grand Rapids and Kalamazoo	Kalamazoo	34 : 4
Calhoun	Grand Rapids and Kalamazoo	Kalamazoo	137 : 6
Ingham	Grand Rapids, Kalamazoo and Lansing	Lansing	1342 : 20
Isabella	Grand Rapids and Lansing	ns	
Montcalm	Grand Rapids and Lansing	Grand Rapids	69 : 3
Ionia	Grand Rapids and Lansing	ns	
Eaton	Grand Rapids and Lansing	Lansing	55 : 3
Saginaw	Lansing and Flint	ns	
Shiawassee	Lansing and Flint	ns	
Genesee	Lansing and Flint	Flint	686 : 7

*ns indicates no significant advantage.

where such action is apparent. However, as indicated by the passenger ratios in the fourth column, the effect is relatively small. For example, of the 795 survey respondents who began their trip in Kalamazoo County, 770 used the Kalamazoo Airport and only 25 used the Grand Rapids Airport.

To understand why competition between a nearby and distant airport occurs, the flight schedules of the survey airports are summarized in Table 7. Each of the airports enjoys good service to Detroit and Chicago and, it therefore can be assumed, reasonably good service to most destinations outside Michigan. There are only a few cases where one of the survey airports has a distinct advantage over the others in nonstop and direct flights (e.g., Grand Rapids to Green Bay). The survey data on traveler destinations disclose that it is the cases of better service to a destination that account for most of the traveler diversions from their closest airport. As an example, for the 25 Kalamazoo County survey respondents using Grand Rapids Airport, the principal destinations were Green Bay, Minneapolis/St. Paul (via Milwaukee), and New York City. Thus, the survey has demonstrated that passengers will bypass a local airport, even when the service advantage at a more distant airport is rather small. This behavior has significant bearing on regional airport planning in Michigan.

Table 7

DAILY NONSTOP AND DIRECT FLIGHTS IN SURVEY* ORIGINATIONS

Destination	Kalamazoo		Grand Rapids		Lansing		Flint	
	NS	(Direct)	NS	(Direct)	NS	(Direct)	NS	(Direct)
Detroit	4	(2)	4	(4)	6		4	
Chicago	4	(4)	7	(5)	2	(3)	1	(3)
Green Bay			3			(2)		
Milwaukee		(2)	1	(2)		(2)		
South Bend	4							(1)
Toledo			2					
Cleveland		(2)	2	(5)	2	(3)	2	(1)
Pittsburgh				(2)				
Des Moines				(1)				
Washington, D.C.				(1)		(2)		
New York				(2)				(1)
Tampa								(1)

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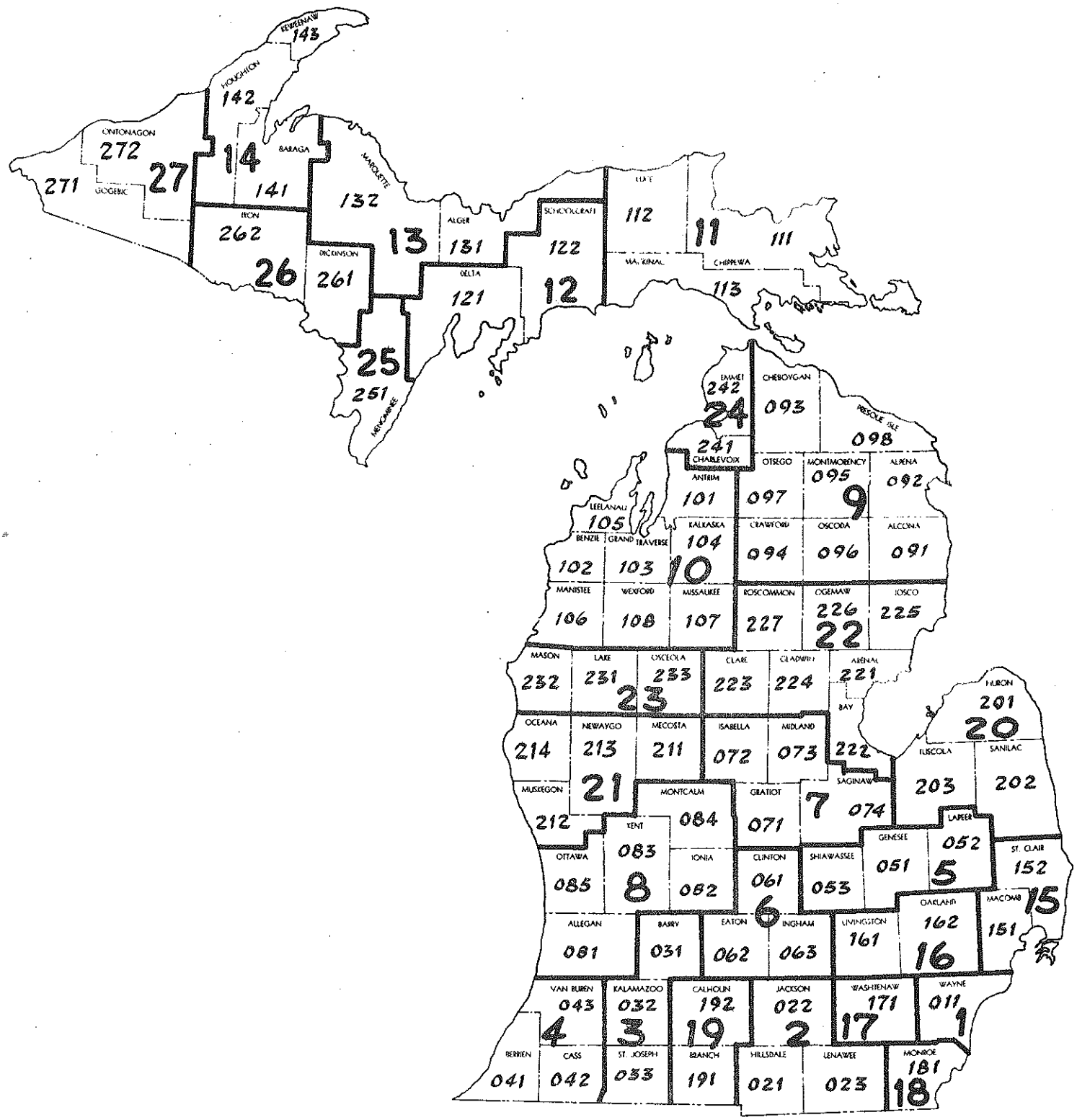
* Except for nonstops to Detroit, intra-Michigan flights are not included. Direct flights, in parenthesis above, are defined as same plane service with two intermediate stops or less, and less than 20% circuitry.

Appendix A

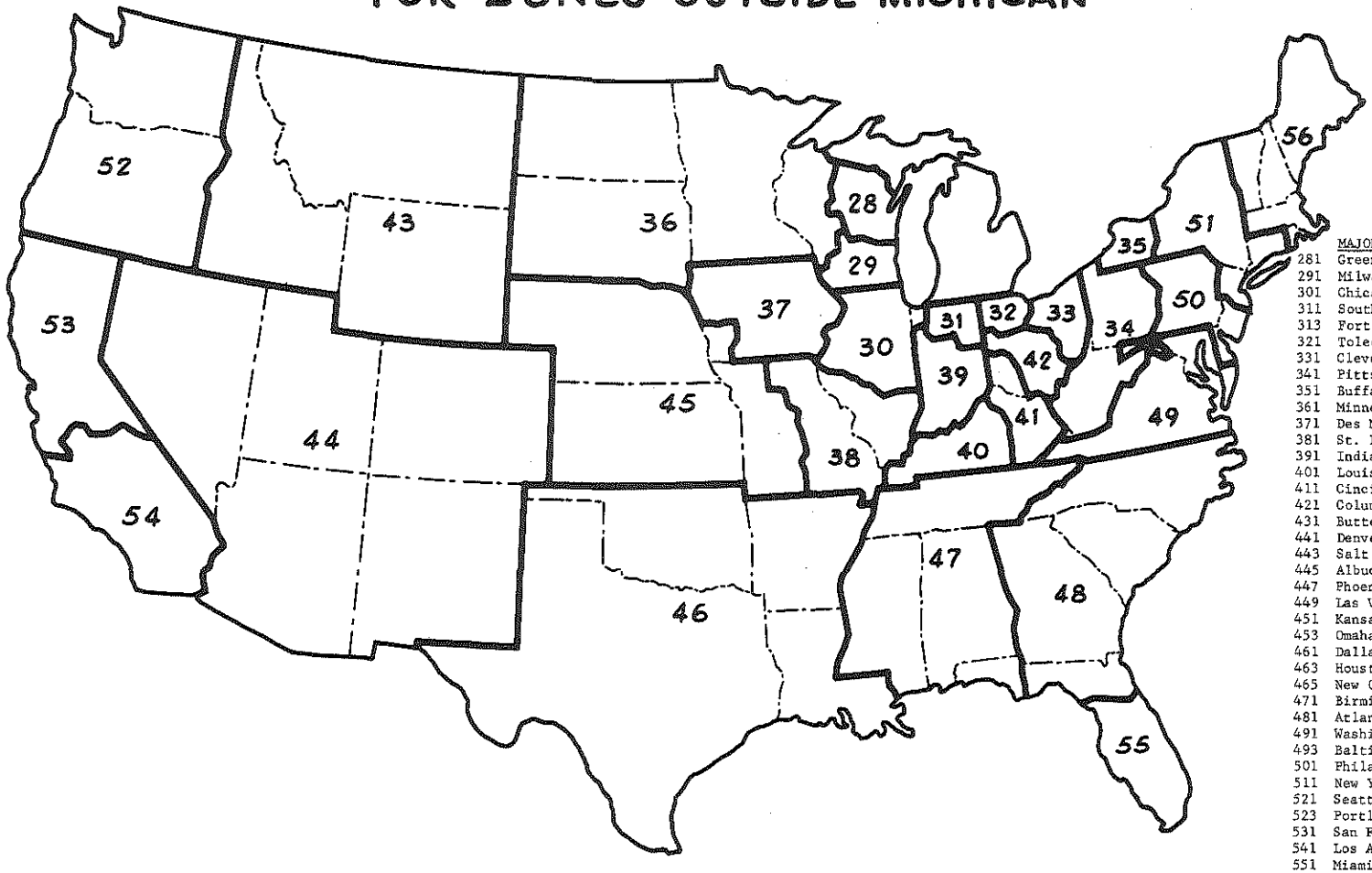
SURVEY ZONE NUMBERS

INTERNAL ZONE SYSTEM

SURVEY CODES FOR MICHIGAN COUNTIES



SURVEY CODE NUMBERS FOR ZONES OUTSIDE MICHIGAN



	MAJOR CITY
281	Green Bay
291	Milwaukee
301	Chicago
311	South Bend
313	Fort Wayne
321	Toledo
331	Cleveland
341	Pittsburgh
351	Buffalo
361	Minneapolis
371	Des Moines
381	St. Louis
391	Indianapolis
401	Louisville
411	Cincinnati
421	Columbus
431	Butte
441	Denver
443	Salt Lake City
445	Albuquerque
447	Phoenix
449	Las Vegas
451	Kansas City
453	Omaha
461	Dallas
463	Houston
465	New Orleans
471	Birmingham
481	Atlanta
491	Washington, D.C.
493	Baltimore
501	Philadelphia
511	New York
521	Seattle
523	Portland
531	San Francisco
541	Los Angeles
551	Miami
553	Tampa
561	Boston

Appendix B

CROSS-TABULATIONS OF SURVEY DATA

Table B-1

CROSS-TABULATIONS OF SURVEY DATA*
FLINT AIRPORT

Day of Week	Trip Stage		
	Starting Trip	En Route	Returning Home
Monday	75	9	16
Tuesday	64	8	24
Wednesday	70	10	18
Thursday	77	4	16
Friday	61	7	30
Saturday	75	5	17
Sunday	69	6	22
All Days	70	7	21

Day of Week	Trip Purpose			
	Business	Vacation	Other Personal	Other
Monday	71	12	12	5
Tuesday	71	10	16	3
Wednesday	50	24	19	7
Thursday	45	36	14	4
Friday	45	31	17	5
Saturday	30	47	14	8
Sunday	52	22	17	10
All Days	51	26	16	6

* Percentage of responses by row or column, as appropriate.

Table B-1 (Concluded)

FLINT AIRPORT

Location of Trip Origin Zone vs Airport Zone	Trip Stage			
	Starting Trip	En Route	Returning Home	All Stages
Same	85	80	80	83
Adjacent	8	8	8	8
Other	0	2	2	1
No Response	7	10	10	8

Access Mode	Trip Purpose				
	Business	Vacation	Other Personal	Other	All Purposes
Private Auto - parked	35	22	24	4	28
Private Auto - not parked	52	73	72	95	63
Rental Auto	6	0	1	0	3
Taxi	2	2	0	2	2

Access Mode	Access Time - Minutes						
	1-10	11-20	21-30	31-40	41-50	51-60	Over 60
Private Auto - parked	20	41	20	4	5	4	5
Private Auto - not parked	22	52	16	3	3	2	2
Rental Auto	26	48	10	0	3	6	6
Taxi	21	50	21	7	0	0	0
All Access Modes	22	48	17	4	3	3	3

Table B-2

CROSS-TABULATIONS OF SURVEY DATA*
KALAMAZOO AIRPORT

Day of Week	Trip Stage		
	Starting Trip	En Route	Returning Home
Monday	76	7	15
Tuesday	71	7	21
Wednesday	52	17	28
Thursday	61	13	23
Friday	41	8	49
Saturday	63	11	24
Sunday	65	5	28
All Days	61	10	27

Day of Week	Trip Purpose			
	Business	Vacation	Other Personal	Other
Monday	80	7	11	1
Tuesday	87	4	6	3
Wednesday	88	5	5	2
Thursday	68	16	11	5
Friday	70	13	14	4
Saturday	48	29	14	9
Sunday	52	18	21	8
All Days	73	12	11	4

*Percentage of responses by row or column, as appropriate.

Table B-2 (Concluded)

KALAMAZOO AIRPORT

Location of Trip Origin Zone vs Airport Zone	Trip Stage			
	Starting Trip	En Route	Returning Home	All Stages
Same	77	65	73	74
Adjacent	20	31	25	22
Other	0	1	1	1
No Response	3	3	1	3

Access Mode	Trip Purpose				
	Business	Vacation	Other Personal	Other	All Purposes
Private Auto - parked	32	25	12	13	28
Private Auto - not parked	45	70	75	72	52
Rental Auto	12	0	2	2	9
Taxi	6	2	5	2	5

Access Mode	Access Time - Minutes						
	1-10	11-20	21-30	31-40	41-50	51-60	Over 60
Private Auto - parked	28	43	19	4	3	2	1
Private Auto - not parked	28	43	19	4	4	1	1
Rental Auto	38	24	23	4	4	6	2
Taxi	36	50	7	2	4	2	0
All Access Modes	29	41	20	4	4	2	1

Table B-3

CROSS-TABULATIONS OF SURVEY DATA*
LANSING AIRPORT

Day of Week	Trip Stage		
	Starting Trip	En Route	Returning Home
Monday	62	12	23
Tuesday	55	9	34
Wednesday	51	11	36
Thursday	58	9	28
Friday	54	9	37
Saturday	58	11	28
Sunday	62	5	31
All Days	57	9	31

Day of Week	Trip Purpose			
	Business	Vacation	Other Personal	Other
Monday	67	15	14	4
Tuesday	71	11	14	4
Wednesday	77	8	10	4
Thursday	70	15	12	3
Friday	61	16	19	3
Saturday	44	26	26	4
Sunday	56	20	17	7
All Days	65	16	15	4

* Percentage of responses by row or column, as appropriate.

Table B-3 (Concluded)

LANSING AIRPORT

Location of Trip Origin Zone vs Airport Zone	Trip Stage			
	Starting Trip	En Route	Returning Home	All Stages
Same	90	83	87	89
Adjacent	8	12	9	8
Other	0	0	1	1
No Response	2	5	3	2

	Trip Purpose				
Access Mode	Business	Vacation	Other Personal	Other	All Purposes
Private Auto - parked	24	12	21	9	21
Private Auto - not parked	54	79	67	84	61
Rental Auto	8	2	2	0	6
Taxi	12	6	8	4	10

	Access Time - Minutes						
Access Mode	1-10	11-20	21-30	31-40	41-50	51-60	Over 60
Private Auto - parked	15	53	19	3	5	3	2
Private Auto - not parked	15	53	21	3	4	3	2
Rental Auto	4	57	16	2	5	5	10
Taxi	11	71	14	3	0	0	1
All Access Modes	14	55	19	3	4	3	3