# 4. Market Analysis

## 4.1 Introduction

The market assessment undertaken in the 2004 plan of the Midwest Regional Rail Initiative (MWRRI) represents an analysis of the full social and business market potential for the Midwest Regional Rail System (MWRRS). The study of the passenger rail market opportunities includes an analysis of consumer preferences, market segments, competitive travel modes and the longer-term socioeconomic trends in income, employment and population that affect overall travel levels and consumer choices and mode selection behavior. An assessment of expected demand and revenue projections is critical to assuring the operational feasibility of a $7.7 billion passenger rail capital infrastructure project[1]. To develop a full understanding of the market for passenger rail service in the Midwest region, an extensive analysis was made of all travel in the Midwest region.

The following discussion presents the work performed to date on the market feasibility of the MWRRS.

## 4.2 Market Opportunities

With a population of just over nine million[2], Chicago is the largest metropolitan area served by the MWRRS. In addition to its renowned financial, commercial and manufacturing sectors, Chicago has long been the largest transportation hub for the Midwest region, as evidenced by its role in rail freight operations, the confluence of interstate highways and as the home of one of the busiest airports in the country – Chicago O'Hare International Airport. Chicago is also home to major arts and entertainment facilities and successful sports franchises. The city's attractions draw visitors not only from the Midwest region but also from all over the country. Nearly 30 percent of intercity trips made by air, rail and bus in the region begin or end in Chicago. Other regional centers connected by the MWRRS include Detroit (population 3.9 million), Cleveland/Akron (3.0 million), Indianapolis (1.6 million), Cincinnati (2.0 million), St. Louis (2.6 million), Kansas City (1.8 million), Omaha (0.7 million), Des Moines (0.5 million), Milwaukee (1.7 million) and Twin Cities (3.0 million). [3]

The MWRRS encompasses a rail network of more than 3,000 route miles and serves a population of nearly 60 million[4]. About 80 percent of the region's population lives within an hour drive of either an MWRRS rail station. The passenger rail market analysis confirms there is a substantial market for intercity travel between all the cities on the MWRRS network. In many markets, the MWRRS provides a faster and more cost-effective alternative to auto and bus travel. Furthermore, the MWRRS provides a more cost-effective means of travel than air in many of the smaller, urban areas on or near an MWRRS corridor.

Increased connectivity between regional centers and smaller urban areas is critical to the region's continued economic growth. In many cases, small, urban areas are today dependent on auto connections and lack competitive public modes of travel. For example, Madison, Wisconsin, the state's capital and home of the University of Wisconsin, has no passenger rail service.

[1] See Chapter 5 for a full breakdown of capital costs
[2] Figure from 2000 U.S. Census for Chicago SMSA
[3] Consolidated SMSA or urbanized area statistics provided by 2000 U.S. Census
[4] Figure from 2000 U.S. Census for nine-state region

## 4.3 Market Analysis Refinements

The MWRRI continues to enhance its understanding of the key market issues and opportunity for passenger rail in the Midwest region. The MWRRI study is ongoing, designed to refine the involved states' knowledge of the marketplace and to increase the reliability of ridership and revenue projections. The initial study focused on the feasibility of the MWRRS on a system-wide basis and the analysis clearly indicated financial feasibility of the proposed system. Since then, there have been further efforts to study and evaluate the MWRRS feasibility for more detailed market segments. These include:

- Branch line services
- Alternative route selection that might attract higher ridership and revenue performance
- Alternative technologies and operating plans to lower costs
- Expanding market definitions to include air connectivity
- An integrated bus plan (system of feeder buses, connecting buses, supplemental service provided by bus, etc.)

Revenue and ridership forecasts are revised through improved analysis of the attributes (*e.g.* time, fare, and frequency) of the service, better operating plans and upgraded technology. Notwithstanding these service and operating refinements, the principal characteristics of the MWRRI strategy remain unchanged. These include:

- Significant reduction in corridor travel times: up to 50 percent
- Significant increase in frequency of service: 4 to 9 round trips per day in each corridor[5]
- Improvement in train reliability
- Introduction of a new train technology offering a marked increase in comfort and amenities
- Upgrading and refurbishing of all stations and terminals
- Development of an intermodal feeder bus network to ensure access to the MWRRS
- Establishment of market-competitive fares

The following section of the report presents the market research and analysis, pricing strategies and the ridership and revenue projections for the current proposed MWRRS. The results from this section comprise key inputs into the economic and financial analyses provided in subsequent chapters of this report.

## 4.4 Research and Analysis

In order to evaluate and quantify the level of demand for passenger rail service in the Midwest region, an extensive market research effort was undertaken. The market research plan included both primary and secondary research. Primary research is information obtained first-hand through field survey work questioning actual and potential rail passengers about their travel behaviors, requirements and preferences. These surveys provide insight into how the travel market might respond to the MWRRS. Secondary research is information collected from published sources and provides broader-based and historical information that describes travel

[5] Except for the Champaign-Carbondale segment, where the proposed MWRRS train frequency is limited to 2 round trips each day.

behavior in the past. Both levels of market research provide critical information necessary for a comprehensive market analysis. The market analysis conducted for the MWRRS is discussed below.

### *4.4.1 Primary Market Research*

The primary market research that was conducted included three types of surveys: stated preference surveys, general behavioral surveys and surveys relating specifically to on-board services and station amenities.

As part of the work plan conducted in the 2004 Plan, a stated preference survey was conducted in two stages. The MWRRI sponsored the first stage, which concentrated on potential station amenities and on-board services that will attract rail passengers. Greyhound Lines, Inc. sponsored the second stage, which focused on bus integration opportunities (*e.g.*, possible feeder bus routes and interlining routes). Both parts of the stated preference survey involved strategic on-board quota sampling techniques. These surveys provided data solely on the rail and bus modes, data on the air and auto modes. Data are taken from previous MWRRI survey studies.

The stated preference data collected in 2001 was compared to the previous survey data collected in prior Plans of the MWRRI. A survey was conducted in February 1997 in major cities that would be served by the MWRRS. The survey effort included stated preference surveys and specific purpose surveys to determine travelers' interest regarding on-board services (OBS) and station services along the branch lines. In October 1998, the survey effort was extended to the smaller MWRRS urban areas (branch lines). In order to obtain a broad sample of travelers from all modes, survey forms were distributed on trains, at Midwestern airports, highway rest areas and toll plazas, and at the Central Chicago (bus) Station.

The following provides a general discussion on the stated preference surveys, with respect to the approach, methodology and findings. A more detailed, technical working paper was published in March 2002 and can be found in the September 2000 Project Notebook.

### *4.4.2 Stated Preference Surveys*

***Survey Objectives***

The stated preference survey was designed to elicit responses from potential MWRRS passengers identifying the passengers' *criteria* in making a travel mode choice. Using an approach designed to collect *attitudinal* data, the survey presented four specific types of choice issues:

- The tradeoff between travel time and travel costs for all modes of travel in order to derive incremental *values of time*
- The tradeoff between frequency of service (headway) and travel costs for rail, air and bus in order to derive incremental *values of frequency*
- The tradeoff between reliability (within 15 minutes of stated arrival time) and travel costs for rail and air in order to derive *values of reliability*
- The tradeoff between the level of amenities and travel costs for rail to help define the train effect (benefit) created by new technology beyond travel time alone

***Survey Methodology***

The surveys were conducted using a quota group sampling approach. The information collected from the respondents is extrapolated to the overall population (*e.g.*, the travelers in a particular corridor) by applying readily available census data (*e.g.*, population and income statistics) to travel information (*e.g.,* mode and purpose of travel, distance, etc.). Quota surveys, which are now widely used for commercial, political and industrial purposes have the advantage of being relatively inexpensive to conduct, while providing much greater coverage and more statistically significant results than simple random surveys.

The survey questions focused on the tradeoffs between travel times and costs for existing and proposed modes of travel (faster journey times/higher fares), measuring the impact of large changes in travel time, such as one or two hours. For an analysis of incremental improvements, tradeoff questions were focused on *specific* options being considered, (*e.g.,* for example a 30-minute improvement in the timetable). This tradeoff analysis assessed the *point* elasticities associated with changes that are more marginal and not the *arc* elasticities associated with large changes in time and costs that are typical of passenger rail improvements.

The three critical factors that determine travel behavior are trip purpose, mode of travel and length of journey. Therefore, the market was segmented into auto, bus, rail and air trips and business and non-business trip purposes. Exhibit 4-1 shows the primary quota groups covered by each of the survey studies.

**Exhibit 4-1**
**Primary Quota Groups for the 1997, 1998 and 2001 Surveys**

| *Trip Purpose\Mode* | *Air* | *Auto* | *Bus* | *Rail* |
|---|---|---|---|---|
| **1997 Corridor Survey** | | | | |
| Business | X | X | X | X |
| Non-Business | X | X | X | X |
| **1998 Carbondale Survey** | | | | |
| Business | -- | X | X | X |
| Non-Business | -- | X | X | X |
| **1998 Grand Rapids Survey** | | | | |
| Business | X | X | -- | X |
| Non-Business | X | X | -- | X |
| **1998 Green Bay Survey** | | | | |
| Business | X | X | X | -- |
| Non-Business | X | X | X | -- |
| **2001 MWWRI Travel Survey** | | | | |
| Business | -- | -- | X | X |
| Non-Business | -- | -- | X | X |

Notes:
1. Modes with no existing service are indicated by dashes.
2. Because commuter traffic represented a very small portion of the survey results, they were jointly evaluated with non-business trips in the 1997 and 1998 surveys.

The surveys were either self-administered or conducted through on-location interviews. The questions were designed to represent a range of travel behavior for main lines and branch line extensions. The questionnaires collected data about each respondent's trip origin and destination and socioeconomic characteristics such as age, employment status and total household income.

To ensure that respondents were asked questions relevant to particular travel modes and categories, different questionnaires were created based on mode of travel. The surveys differentiated between business and non-business travelers and between rail, bus, air and auto travelers. The 2001 travel survey provided data on the bus and rail modes; data from air and auto was taken from previous survey studies and extrapolated to the base year. In developing specific tradeoff questions, existing rail and bus fares and schedules were used as a general guide, and an analysis was made to determine the likely ranges of value of time (VOT) and value of frequency (VOF) responses. Additional tradeoff questions regarding value of reliability (VOR) were asked of the 1997 survey respondents.

For each questionnaire, five VOT and VOF questions were formulated to ensure an appropriate range of answers. Respondents were asked to choose one of five levels of preference to indicate the degree to which they liked or disliked a given choice.

A minimum sample from each travel market segment was required to ensure statistical confidence. Using the Central Limit Theorem, it was determined that a sample size of 40 to 60 participants ensures the statistical validity of each quota sample. For the MWRRI passenger stated preference surveys, the desired quota target was set at 80-100 interviews with a minimum quota of 40 interviews per trip purpose/travel mode established. The responses from the surveys, in conjunction with the tradeoff analysis, were then used to develop the demand forecasting model.

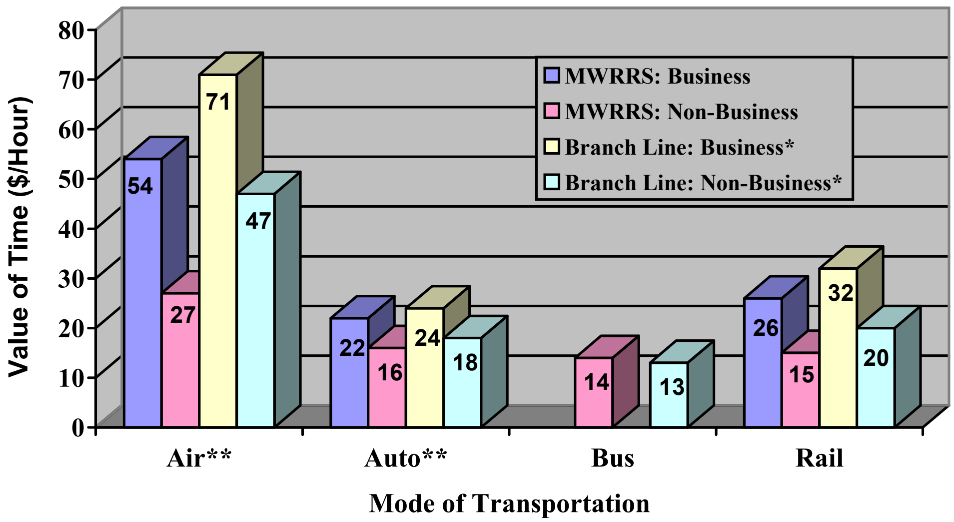
***Findings***

In the 2001 survey, 1,528 surveys were conducted; from the 1997 survey there were 2,038 survey responses; and from the 1998 survey, 1,028 surveys responses were collected - 419 from Grand Rapids, 317 from Green Bay and 292 from Carbondale.

***Value of Time***

As expected, business travelers place a higher value on their time than did non-business (pleasure or personal business) travelers. Since few business travelers use intercity buses, this group was not included in the bus survey as the sample size would have been too small to ensure validity. Exhibit 4-2 illustrates the different values of time expressed by business and non-business travelers in the various modes.

**Exhibit 4-2**
**Value of Time by Trip Purpose and Mode (2000$)**




* Branch Line data obtained from 1998 Branch Line Surveys
** Auto and air data obtained from 1997 Corridor Survey and adjusted for the base year

A comparison among modes indicates that air travelers, particularly business travelers, place the highest premium on time. This suggests that attracting the business traveler from air to rail would require a comparable total trip time for a given city pair, in addition to other improvements discussed below.

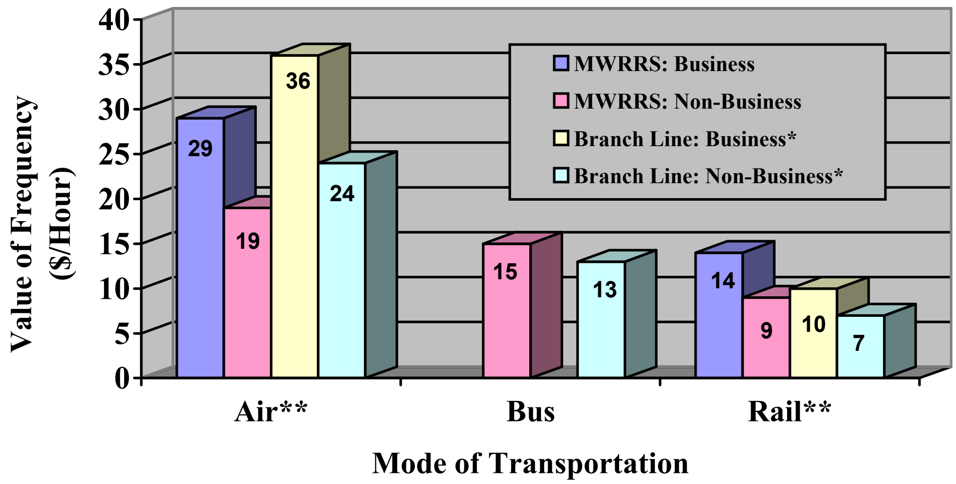
The auto traveler market is very large, representing over 97 percent of intercity passenger travel in the region[6]. Values of time for this group are similar to those of rail travelers in both the business and non-business categories - they place a high value on convenience, flexibility and reliability. Marketing rail's new ability to respond to customer needs (flexibility of schedule, costs, convenience) will attract some portion of auto passengers at current and improved speeds.

***Value of Frequency***

With reasonable levels of frequency, passengers are accustomed to scheduling their trips for intercity travel; those travelers who require immediate or emergency service are likely to use other modes (autos/cabs). It is worth noting that air travelers value frequency more highly than current rail travelers do, roughly proportionate to their value of time compared to rail travelers. This suggests that more frequent service may attract some current air travelers if rail travel times can also be improved. Exhibit 4-3 illustrates the travelers' values of frequency by mode.

[6] From origin-destination database developed for four modes (*i.e.* air, rail, bus and auto) as part of the MWRRI

**Exhibit 4-3**
**Value of Frequency by Trip Purpose and Mode (2002$)**

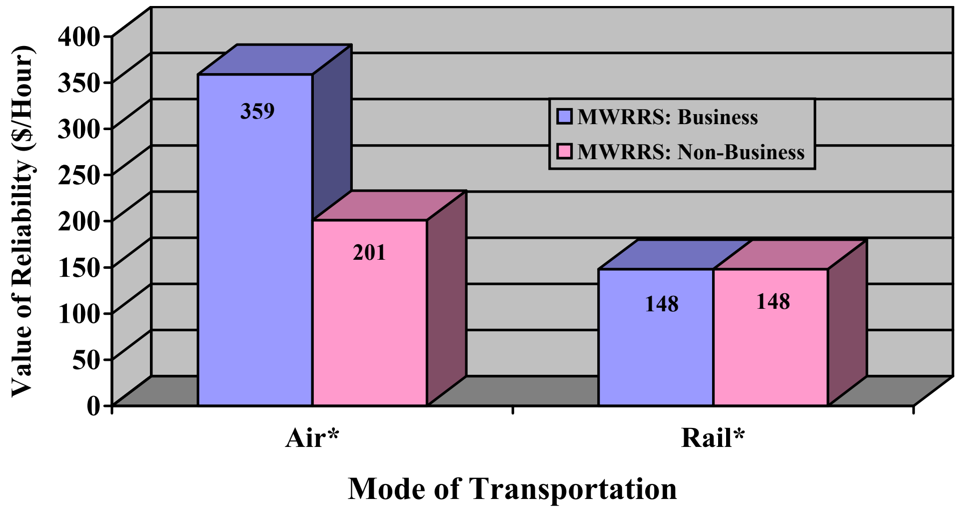



* Branch line data obtained from 1998 Branch Line Surveys
** Rail and air data obtained from 1997 Corridor Survey and adjusted for the base year

***Value of Reliability by Trip Purpose and Mode***

The value of reliability was calculated as part of the 1997 MWRRI Corridor Survey. Value of reliability was defined as the willingness to pay a premium to ensure arrival time within 15 minutes of the scheduled time for a percentage of time (certainty). This is the metric that the Federal Aviation Administration (FAA) uses to determine *on-time arrivals and departures* of flights by a specific carrier. These percentages ranged from 60 percent (lower fare), to 70 percent (base case), to 75 percent, 80 percent, 90 percent or 95 percent of the time. The tradeoff responses assumed there is a diminishing returns effect to increased reliability; because of this, the values of reliability cannot be compared with values of time or frequency.

**Exhibit 4-4**
**Value of Reliability (2002$)**




* Rail and air data obtained from 1997 Corridor Survey and adjusted for the base year

Rail travelers, business and non-business, place very similar values on reliability, and both categories of air travelers place a higher value on reliability than all rail travelers. By contrast, business air travelers are almost twice as concerned about arriving on time with a higher degree of certainty as air non-business travelers are.

This suggests another potential marketing opportunity: if the MWRRS can guarantee on-time performance with equal or more certainty than the airlines, particularly during poor weather conditions, then regional rail should be able to win new customers – and keep them – by providing a highly reliable service. The value of reliability is presented in Exhibit 4-4.

***Comparison with Other Studies***

Exhibit 4-5 shows the comparison between the values of time and frequency by mode and trip purpose from six different studies, including the MWRRI studies. Note that values of time and frequency are generally lower in the Midwest region studies than in other studies, across most categories and modes. For air in particular, it appears that the introduction of Southwest Airline's inexpensive service, with its competitive effect on other airlines, may have lowered the perceived value of airline travel time and frequency savings. In addition, the majority of the other studies represent more urban trip pairs than in the Midwest region studies. The lower incomes found in the more rural areas may have resulted in lower values of time. In addition, the majority of the other studies represent much shorter trip pairs than the Midwest region study. In particular, rail values of frequency decrease substantially with distance.

Overall, the MWRRI 2001 surveys share similar attitudinal parameters for values across all modes as the surveys taken in 1997. Furthermore, the 2001 surveys share similar time values with the 1998 branch line surveys for all but the air mode. Air travelers (both business and non-business) studied in the initial Plan survey were found to place a higher value on time, as compared the results of the 2001 survey. Similarly, air travelers' value of frequency was slightly higher in the initial Plan survey than the 2001 survey. This result can be explained by the inclusion in the 1998 survey of smaller air markets in such locations as Grand Rapids and Green Bay, which tend to have relatively higher airfares and limited service due to deregulation of the air market. Air typically provides the shortest travel time among all modes; thus, where affordable, most business travel is still by air. However, in the smaller urban communities of the Midwest region, the high cost of air sends potential rail users to the auto and other less expensive alternatives. Those who continue to use air for business travel in these more isolated locations have higher values of time. Therefore, the values of time for business air travel for the branch lines that serve Grand Rapids and Green Bay is higher than the average values in larger cities. The higher income levels found along the branch lines (*e.g.,* Grand Rapids) give travelers the option to travel by air. Interestingly, non-business air travelers also have the highest values of time for the MWRRS Branch Line as compared to all the other studies.

**Exhibit 4-5**
**Comparison of Attitudinal Parameters: Mean Values of Time and Frequency (2002$)**

***Value of Time***

| *Mode* | *Trip Purpose* | *MWRRS 2001* | *MWRRS 1998 (Branch Line)* | *MWRRS 1997* | *Tri-State* | *Boston-Portland* | *Illinois* |
|---|---|---|---|---|---|---|---|
| **Air** | Business | 54 | 71 | 54 | 80 | 62 | 63 |
| | Non-Business | 27 | 47 | 27 | 42 | 24 | 40 |
| **Auto** | Business | 22 | 24 | 22 | 53 | 27 | 35 |
| | Non-Business | 16 | 18 | 16 | 32 | 16 | 20 |
| **Bus** | Business | - | - | - | 31 | 18 | 19 |
| | Non-Business | 14 | 13 | 10 | 27 | 15 | 11 |
| **Rail** | Business | 26 | 32 | 25 | 50 | 27 | 29 |
| | Non-Business | 15 | 20 | 18 | 35 | 15 | 20 |

***Value of Frequency***

| *Mode* | *Trip Purpose* | *MWRRS 2001* | *MWRRS 1998 (Branch Line)* | *MWRRS 1997* | *Tri-State* | *Boston-Portland* | *Illinois* |
|---|---|---|---|---|---|---|---|
| **Air** | Business | 29 | 36 | 29 | 30 | 42 | 42 |
| | Non-Business | 19 | 24 | 19 | 27 | 15 | 30 |
| **Auto** | Business | - | - | - | - | - | - |
| | Non-Business | - | - | - | - | - | - |
| **Bus** | Business | - | - | - | 20 | 14 | 13 |
| | Non-Business | 15 | 13 | 11 | 16 | 11 | 8 |
| **Rail** | Business | 14 | 10 | 14 | 22 | 17 | 14 |
| | Non-Business | 9 | 7 | 10 | 20 | 12 | 10 |

In addition, rail mode has a reverse trend - the value of frequency was slightly lower in the initial plan survey than values in the 2001 survey. This may be due to the current limited service in the branch line extension; therefore, rail dependency, as well as the value of frequency, is low.

Both the earlier and later survey values are consistent with the other studies in the relationships across modes. The sometimes lower values do not change the relative pattern of responses across modes within each study (*e.g.*, air business travelers consistently place the highest values on time, and auto and rail business and non-business travelers typically present very similar patterns to one another in time values). The relative values between modes are the determining factors in demand forecasting models, rather than the absolute values.

***Stated Preference Survey Conclusions***
The study findings indicate that the MWRRS can attract new passengers, primarily from auto and air markets, by providing improved service and amenities. Offering high quality service (competitive in terms of time, price, frequency, and reliability), modern facilities with comfortable stations and state-of-the-art trains will divert passengers into the rail market, yielding increased ridership and revenue.

### 4.4.3 Specific Purpose Surveys

In addition to collecting stated preference data, the surveys included questions designed to capture user preferences for on-board and station services. The 2001 survey results were used to assess the services wanted by bus and rail passengers. The initial Plan survey results were used to determine what air and auto passengers want. For the rail and auto modes, questions regarding service, on-board amenities and station amenities were asked; air and bus travelers were asked questions regarding service and terminal amenities. Each survey questionnaire was tailored to a specific audience and restrictions on the number of questions, based on the general willingness of travelers to respond, limited the coverage. Respondents were instructed to rank the importance of each amenity with 5 being the most important and 1 being the least important (Exhibit 4-6).

***Station and On-board Amenities***
The 2001 survey yielded information regarding the station and on-board services expected by potential rail passengers. The results from this survey were consistent with the results of previous MWRRI surveys. The areas with the highest rankings were:

- Infrastructure improvements at stations (safe stations, ample parking and weather-protected platforms)
- Access to car rentals, taxis and public transit at stations
- Travel information (such as customer service representatives at stations and on trains)
- The availability of luggage carts and a variety of food service options, both at stations and on-board trains

***Comparing Traveler Values on Different Modes***
All three surveys asked respondents to rate features related to the rail service. The surveys were used to gauge the values that travelers assign to different service attributes, (e.g., station amenities, on-board services, planning and scheduling services and other miscellaneous services). The results for the analysis are shown in Exhibit 4-6; results from the 1997 and 1998 surveys are shown in parenthesis.

**Exhibit 4-6**
**Ranking of Service Features by Modal Travelers**

| *Importance Ratings* | *Average Importance Rating 5=Highest, 1=Lowest ( ) indicates values from 1997 and 1998 surveys, others are from the 2001 survey* | | | |
|---|---|---|---|---|
| | ***Rail Survey*** | ***Auto Survey*** | ***Air Survey*** | ***Bus Survey*** |
| ***Miscellaneous*** | | | | |
| Cost of the rail service | | (3.52) | | |
| Convenient schedules | | (4.19) | | |
| Accessibility to stations (home) | | (4.08) | | |
| Accessibility to stations (destination) | | (4.10) | | |
| Accessibility to public transit | | (3.63) | (3.16) | (4.00) |
| Reliability of train service | | (4.13) | | |
| Staffed rental car booths | | | (3.86) | |
| Staff for baggage handling | | | | (3.31) |
| ***Station Amenities*** | | | | |
| Rail service to suburban Chicago locations | 3.06 (3.09) | 3.15 (3.07) | 1.93 | |
| Convenient and ample parking at stations | 3.97 (3.60) | 3.67 (3.74) | 3.92 (4.01) | 3.58 (3.08) |
| Car rental, taxi, shuttle, limousine services | 3.89 (3.63) | 3.18 (3.37) | 4.11 (3.63) | 3.81 (3.76) |
| Availability of luggage carts | 3.39 (3.32) | | 3.05 (2.82) | 3.52 (3.33) |
| Office and meeting facilities | 2.07 | | | 2.71 |
| Weather protected passenger platforms | 4.04 | | | 4.06 |
| Travelers' lounges | 2.67 (3.38) | | 3.01 (3.00) | 3.39 (3.04) |
| Food court | 3.37 | | | 4.03 |
| Restaurant with table service | 3.08 | | | 3.44 |
| Wide variety of high-quality food selections | 3.45 (3.26) | | 3.37 (2.90) | 3.78 |
| ***On-board Service*** | | | | |
| First class seating with food, beverage service | 2.75 (2.63) | 2.62 | | |
| Restaurant car with table service | 3.01 (3.01) | | (2.75) | (3.13) |
| Fast-food cafeteria/snack bar | 3.37 (3.23) | | (3.24) | (3.27) |
| Coffee cart services | 2.77 (2.87) | | | |
| Telephone at seat | 1.86 (1.81) | 2.65 | | |
| Electrical outlets at seat | 2.55 (2.32) | | | |
| Business service area | 1.97 (1.93) | | (2.58) | (2.63) |
| Personal TV/Video movie display | 2.53 (2.40) | | | |
| Music headsets | 2.54 (2.63) | | | |
| Child care services | 2.04 (2.06) | 2.42 | | |
| Connecting train information | 3.69 (3.75) | | (3.58) | |
| Wider seats | 4.16 | | | |
| More legroom | 4.32 | | | |
| ***Planning and Scheduling Services*** | | | | |
| Phone reservation number (toll-free) number | 3.92 | | | 4.01 |
| Internet reservation/info | 3.56 | | | 3.52 |
| Destination Information | 3.61 | | (3.64) | 3.92(4.15) |
| Discounted fares for advance purchase | 4.33 | | | 4.36 |
| Discounted fares for seniors/students/children | 3.87 | | | 4.23 |
| Frequent traveler credits | 3.52 | | | 3.68 |
| Guarantee of a reserved seat | 4.02 | | | 4.10 |
| Not needing a reservation | 3.30 | | | 3.43 |

Convenient schedules, accessibility to stations and reliability of service receive consistently higher rankings than other items, indicating their relative value to customers. For auto travelers, accessibility may be key to attracting portions of this very large market to rail service. For food service, travelers consistently placed the highest value on convenient access.

***Specific Purpose Survey Conclusion***

Attracting travelers from all types of modes to the MWRRS will require a mix of marketing strategies and enhanced service attributes such as comparable trip times and more frequent service. While air service is one of the most expensive travel modes, air travelers place a high value on total trip time and frequency of service. Primary market research concluded that it is important to dramatically improve current on-board and rail station services and continue making improvements. Marketing rail service to auto travelers must also include highlighting service reliability in addition to convenience and reduced travel time. The greatest failures of the current rail system are lack of reliability, infrequent service and travel times equal to or greater than the auto mode.

### *4.4.4 Travel Market Research*

Data was collected on travel behavior and socioeconomic factors to develop a detailed and comprehensive zone system. These data were later used in the *COMPASS*© demand model as the primary source of information for demand and revenue forecasting.

***Data Sources***

Information was collected from existing sources in the travel and transportation industries including maps, government databases and socioeconomic forecasts, published schedules for the existing travel network and travel data from Amtrak, Greyhound and the airlines. Auto origin-destination (O-D) travel data was difficult to obtain and was available only for certain states and regional centers; estimates on O-D travel for zones that were lacking data were made using the travel characteristics of existing and available data, modified by population, income, employment and trip length. A summary of origin-destination sources garnered from travel industry sources is shown in Exhibit 4-7 and information collected from state government sources is shown in Exhibit 4-8. The base year for the data collected was 2000.

**Exhibit 4-7**
**Sources of Overall Travel and Origin-Destination Data by Mode (Year 2000 Data)**

| *Mode* | *Origin-Destination Data Sources* |
|---|---|
| **Rail** | Amtrak Ticketing Data |
| | Station-to-Station Passenger Volume |
| | Access/Egress Simulation |
| **Air** | Federal Aviation Administration (FAA) 10 Percent Sample |
| | Airport-to-Airport Passenger Volume |
| | Access/Egress Simulation |
| **Bus** | Greyhound Station-to-Station Passenger Volumes |
| | Access/Egress Simulation |
| **Auto** | Statewide and Urban O-D Studies |
| | Trip Simulation for Door-to-Door Movement |

**Exhibit 4-8**
**Sources of Auto Origin-Destination Data by State**

| *States* | *Sources* |
|---|---|
| **Illinois** | Illinois Rail Study (1995) |
| | Illinois Statewide Highway Model (1987) |
| | Illinois Rail Passenger Survey (1993) |
| **Indiana** | Statewide Auto Trip Tables (Estimated from AADT) |
| **Iowa** | Highway Traffic Volumes |
| **Michigan** | Statewide Travel Demand Model |
| | Intercity Passenger Rail Surveys (1995) |
| **Minnesota** | Highway Traffic Volumes |
| | Travel Survey for Twin Cities Metro Area |
| | Tri-State High-Speed Rail Study (1991) |
| **Missouri** | Highway Traffic Volumes (2000) |
| **Nebraska** | Statewide Transportation Model |
| **Ohio** | High-Speed Rail Ridership Study (1988) |
| | Pittsburgh-Cleveland Rail Corridor Study (1995) |
| **Wisconsin** | Chicago-Milwaukee Rail Corridor Study (1995) |
| | Statewide Travel Demand Model |

Base year socioeconomic data was provided by the U.S. Census Bureau. Socioeconomic growth rates in population, employment and income are provided by Woods & Poole Economics, Inc. Exhibit 4-9 presents the underlying data assumptions on population, per capita income and employment growth that were used in the models.

**Exhibit 4-9**
**Socioeconomic Growth by State**

| | ***Illinois*** | ***Indiana*** | ***Iowa*** | ***Michigan*** | ***Minnesota*** | ***Missouri*** | ***Nebraska*** | ***Ohio*** | ***Wisconsin*** |
|---|---|---|---|---|---|---|---|---|---|
| ***Population*** | | | | | | | | | |
| 2000 – 2010 | 0.67% | 0.63% | 0.41% | 0.42% | 0.81% | 0.70% | 0.59% | 0.46% | 0.71% |
| 2010 – 2020 | 0.68% | 0.69% | 0.54% | 0.55% | 0.74% | 0.72% | 0.61% | 0.58% | 0.73% |
| 2020 – 2040 | 0.58% | 0.61% | 0.49% | 0.53% | 0.60% | 0.60% | 0.52% | 0.53% | 0.62% |
| | | | | | | | | | |
| ***Employment*** | | | | | | | | | |
| 2000 – 2010 | 0.99% | 0.94% | 0.66% | 0.75% | 1.05% | 0.96% | 0.92% | 0.83% | 0.97% |
| 2010 – 2020 | 0.41% | 0.40% | 0.16% | 0.29% | 0.42% | 0.38% | 0.30% | 0.31% | 0.41% |
| 2020 – 2040 | 0.42% | 0.44% | 0.27% | 0.38% | 0.42% | 0.40% | 0.33% | 0.38% | 0.43% |
| | | | | | | | | | |
| ***Per Capita Income*** | | | | | | | | | |
| 2000 – 2010 | 1.03% | 1.13% | 1.15% | 1.07% | 1.04% | 1.07% | 1.16% | 1.11% | 1.10% |
| 2010 – 2020 | 0.72% | 0.79% | 0.78% | 0.77% | 0.71% | 0.78% | 0.77% | 0.78% | 0.77% |
| 2020 – 2040 | 0.81% | 0.85% | 0.85% | 0.84% | 0.80% | 0.84% | 0.84% | 0.84% | 0.84% |

***Base Travel Results: 2000 Travel between City Pairs***

The summary table, Exhibit 4-10, presents total estimated rail, bus, air and auto travel in the key MWRRS corridors. These estimates include trips that would constitute a potential market for rail. Exhibits 4-11 through 4-14 disaggregate the trips by mode for these same city pairs by trip purpose, (*i.e.,* business and non-business). Exhibits 4.15 and 4.16 present the detailed data for all the cities included in the analysis, and the current estimated modal shares for each.

**Exhibit 4-10**
**Summary of Total Trips in Selected Corridors – Year 2000**

| *Corridor* | *Trips/ Mode Share* | *Mode* | | | | |
|---|---|---|---|---|---|---|
| | | *Air* | *Bus* | *Auto* | *Rail* | *Total* |
| Chicago-Quincy-Omaha | Trips | 1,134,675 | 194,147 | 80,245,776 | 285,033 | 81,859,631 |
| | Mode Share | 1.39% | 0.24% | 98.03% | 0.35% | 100% |
| Chicago-St. Louis | Trips | 1,528,747 | 268,820 | 47,418,580 | 233,076 | 49,449,223 |
| | Mode Share | 3.09% | 0.54% | 95.89% | 0.47% | 100% |
| Chicago-Milwaukee-Minneapolis | Trips | 1,810,910 | 677,974 | 138,446,848 | 282,324 | 141,218,056 |
| | Mode Share | 1.28% | 0.48% | 98.04% | 0.20% | 100% |
| Chicago-Carbondale | Trips[7] | 298,339 | 232,179 | 47,772,320 | 101,235 | 48,404,073 |
| | Mode Share | 0.62% | 0.48% | 98.69% | 0.21% | 100% |
| Chicago-Michigan | Trips | 1,885,901 | 710,720 | 166,087,536 | 398,858 | 169,083,015 |
| | Mode Share | 1.12% | 0.42% | 98.23% | 0.24% | 100% |
| Chicago-Cincinnati | Trips | 1,161,538 | 200,304 | 36,812,032 | 44,062 | 38,217,936 |
| | Mode Share | 3.04% | 0.52% | 96.32% | 0.12% | 100% |
| Chicago-Cleveland | Trips[8] | 946,727 | 530,155 | 99,780,816 | 104,792 | 101,362,490 |
| | Mode Share | 0.93% | 0.52% | 98.44% | 0.10% | 100% |
| St. Louis - Kansas City | Trips | 775,195 | 65,862 | 24,288,942 | 189,375 | 25,319,374 |
| | Mode Share | 3.06% | 0.26% | 95.93% | 0.75% | 100% |
| Milwaukee-Green Bay | Trips | 121,484 | 128,890 | 19,218,692 | 0 | 19,469,066 |
| | Mode Share | 0.62% | 0.66% | 98.71% | 0% | 100% |
| **Total** | **Trips** | **9,663,516** | **3,009,051** | **660,071,542** | **1,638,755** | **674,382,864** |
| | **Mode Share** | **1.43%** | **0.45%** | **97.88%** | **0.24%** | **100.00%** |

[7] The Ohio and Illinois networks have many more detailed zones compared to the Indiana network. This difference generates more short-distance auto trips that account for higher auto trips on Chicago-Cleveland as compared to Chicago-Cincinnati. This inconsistency has no practical effect on rail ridership but appears to affect the modal share calculation.

[8] See footnote 6.

**Exhibit 4-11**
**Rail Trips by Trip Purpose within Selected Corridors – Year 2000**

| *Corridor* | *Trips within Corridor* | | | |
|---|---|---|---|---|
| | *Business* | *Non-business* | *Total* | *Percent of Total* |
| Chicago-Quincy-Omaha | 50,987 | 234,046 | 285,033 | 17.39% |
| Chicago-St. Louis | 78,092 | 154,984 | 233,076 | 14.22% |
| Chicago-Milwaukee-Minneapolis | 49,869 | 232,455 | 282,324 | 17.23% |
| Chicago-Carbondale | 20,070 | 81,165 | 101,235 | 6.18% |
| Chicago-Michigan | 49,545 | 349,313 | 398,858 | 24.34% |
| Chicago-Cincinnati | 6,119 | 37,943 | 44,062 | 2.69% |
| Chicago-Cleveland | 14,754 | 90,038 | 104,792 | 6.39% |
| St. Louis - Kansas City | 66,248 | 123,127 | 189,375 | 11.56% |
| **Total** | 335,684 | 1,303,071 | 1,638,755 | 100.00% |

**Exhibit 4-12**
**Bus Trips by Trip Purpose within Selected Corridors – Year 2000**

| *Corridor* | *Trips within Corridor* | | | |
|---|---|---|---|---|
| | *Business* | *Non-business* | *Total* | *Percent of Total* |
| Chicago-Quincy-Omaha | 8,217 | 185,930 | 194,147 | 6.45% |
| Chicago-St. Louis | 6,727 | 262,093 | 268,820 | 8.93% |
| Chicago-Milwaukee-Minneapolis | 35,374 | 642,600 | 677,974 | 22.53% |
| Chicago-Carbondale | 13,916 | 218,263 | 232,179 | 7.72% |
| Chicago-Michigan | 20,824 | 689,896 | 710,720 | 23.62% |
| Chicago-Cincinnati | 8,414 | 191,890 | 200,304 | 6.66% |
| Chicago-Cleveland | 18,100 | 512,055 | 530,155 | 17.62% |
| St. Louis - Kansas City | 1,584 | 64,278 | 65,862 | 2.19% |
| Milwaukee-Green Bay | 4,047 | 124,843 | 128,890 | 4.28% |
| **Total** | **117,203** | **2,891,848** | **3,009,051** | **100.00%** |

**Exhibit 4-13**
**Air Trips by Trip Purpose within Selected Corridors – Year 2000**

| *Corridor* | *Trips within Corridor* | | | |
|---|---|---|---|---|
| | *Business* | *Non-business* | *Total* | *Percent of Total* |
| Chicago-Quincy-Omaha | 424,749 | 709,926 | 1,134,675 | 11.74% |
| Chicago-St. Louis | 643,645 | 885,102 | 1,528,747 | 15.82% |
| Chicago-Milwaukee-Minneapolis | 812,352 | 998,558 | 1,810,910 | 18.74% |
| Chicago-Carbondale | 106,450 | 191,889 | 298,339 | 3.09% |
| Chicago-Michigan | 775,186 | 1,110,715 | 1,885,901 | 19.52% |
| Chicago-Cincinnati | 466,011 | 695,527 | 1,161,538 | 12.02% |
| Chicago-Cleveland | 353,424 | 593,303 | 946,727 | 9.80% |
| St. Louis - Kansas City | 402,196 | 372,999 | 775,195 | 8.02% |
| Milwaukee-Green Bay | 46,587 | 74,897 | 121,484 | 1.26% |
| **Total** | **4,030,600** | **5,632,916** | **9,663,516** | **100.00%** |

**Exhibit 4-14**
**Auto Trips by Trip Purpose within Selected Corridors – Year 2000**

| *Corridor* | *Trips within Corridor* | | | |
|---|---|---|---|---|
| | *Business* | *Non-business* | *Total* | *Percent of Total* |
| Chicago-Quincy-Omaha | 19,367,660 | 60,878,116 | 80,245,776 | 12.16% |
| Chicago-St. Louis | 10,571,812 | 36,846,768 | 47,418,580 | 7.18% |
| Chicago-Milwaukee-Minneapolis | 29,855,214 | 108,591,640 | 138,446,848 | 20.97% |
| Chicago-Carbondale | 11,358,557 | 36,413,764 | 47,772,320 | 7.24% |
| Chicago-Michigan | 32,700,170 | 133,387,362 | 166,087,536 | 25.16% |
| Chicago-Cincinnati | 7,556,624 | 29,255,406 | 36,812,032 | 5.58% |
| Chicago-Cleveland | 19,075,096 | 80,705,720 | 99,780,816 | 15.12% |
| St. Louis - Kansas City | 7,032,668 | 17,256,274 | 24,288,942 | 3.68% |
| Milwaukee-Green Bay | 4,974,274 | 14,244,419 | 19,218,692 | 2.91% |
| **Total** | **142,492,075** | **517,579,469** | **660,071,542** | **100.00%** |

## Exhibit 4-15
## 2000 Base Year Person-Trips between Major Cities

| City Pair | Air | | Auto | | Bus | | Rail | |
|---|---|---|---|---|---|---|---|---|
| | Business | Non-Business | Business | Non-Business | Business | Non-Business | Business | Non-Business |
| Chicago-Cincinnati | 60,598 | 68,540 | 222,325 | 707,658 | 811 | 8,291 | 919 | 4,804 |
| Chicago-Cleveland | 197,364 | 172,437 | 317,834 | 1,029,436 | 2,283 | 21,174 | 847 | 5,678 |
| Chicago-Des Moines | 27,496 | 21,609 | 169,982 | 452,624 | 547 | 5,741 | 983 | 3,306 |
| Chicago-Detroit | 308,179 | 240,186 | 994,835 | 3,186,965 | 3,383 | 32,467 | 11,805 | 61,166 |
| Chicago-Indianapolis | 79,127 | 50,042 | 885,731 | 2,530,507 | 3,014 | 28,614 | 2,135 | 12,478 |
| Chicago-Kalamazoo | 6,001 | 4,340 | 550,626 | 1,774,724 | 947 | 21,252 | 10,469 | 61,774 |
| Chicago-Kansas City | 127,525 | 136,357 | 89,485 | 272,690 | 287 | 3,085 | 2,199 | 3,594 |
| Chicago-Lansing | 22,668 | 23,290 | 288,049 | 921,606 | 512 | 13,822 | 560 | 5,075 |
| Chicago-Madison | 3,280 | 3,597 | 217,417 | 448,207 | 307 | 2,243 | 1,464 | 10,140 |
| Chicago-Milwaukee | 16,980 | 10,796 | 4,016,391 | 10,205,003 | 11,397 | 90,281 | 20,956 | 53,696 |
| Chicago-Omaha | 93,041 | 93,389 | 89,084 | 257,067 | 566 | 4,877 | 1,237 | 5,965 |
| Chicago-Springfield IL | 3,182 | 1,809 | 403,530 | 1,025,807 | 328 | 7,396 | 28,565 | 44,738 |
| Chicago-St. Louis | 267,709 | 139,356 | 514,330 | 1,487,517 | 1,496 | 20,167 | 31,560 | 43,705 |
| Chicago-Toledo | 30,522 | 33,810 | 276,178 | 851,531 | 729 | 11,082 | 2,389 | 15,152 |
| Chicago-Twin Cities | 291,567 | 186,756 | 272,799 | 727,307 | 1,662 | 12,102 | 8,350 | 41,287 |
| Cincinnati-Cleveland | 167,733 | 86,922 | 294,280 | 772,707 | 3,515 | 27,959 | 1,136 | 2,900 |
| Cincinnati-Des Moines | 2,425 | 1,290 | 8,156 | 16,429 | 67 | 1,050 | - | 1 |
| Cincinnati-Detroit | 35,264 | 22,989 | 328,785 | 941,340 | 2,418 | 30,429 | - | 21 |
| Cincinnati-Indianapolis | 479 | 934 | 236,393 | 1,214,907 | 309 | 6,674 | 1 | 16 |
| Cincinnati-Kalamazoo | 656 | 385 | 26,224 | 61,189 | 183 | 3,204 | - | 6 |
| Cincinnati-Kansas City | 18,919 | 19,382 | 18,446 | 39,768 | 385 | 4,222 | 2 | 22 |
| Cincinnati-Lansing | 509 | 1,134 | 36,750 | 89,880 | 239 | 6,963 | - | - |
| Cincinnati-Madison | 2,461 | 1,086 | 13,043 | 28,253 | 232 | 2,975 | - | 1 |
| Cincinnati-Milwaukee | 17,884 | 16,401 | 40,609 | 138,771 | 189 | 2,224 | 35 | 109 |
| Cincinnati-Omaha | 4,558 | 2,778 | 7,587 | 16,483 | 88 | 1,258 | - | 3 |
| Cincinnati-Springfield IL | 119 | 266 | 20,090 | 82,002 | 23 | 716 | 5 | 54 |
| Cincinnati-St. Louis | 4,760 | 14,884 | 33,450 | 225,629 | 150 | 4,133 | 8 | 94 |
| Cincinnati-Toledo | 307 | 248 | 142,224 | 369,973 | 690 | 13,041 | - | - |
| Cincinnati-Twin Cities | 54,425 | 37,550 | 22,574 | 52,489 | 415 | 4,638 | - | 7 |
| Cleveland-Des Moines | 1,606 | 1,888 | 5,136 | 11,223 | 90 | 1,061 | - | 1 |
| Cleveland-Detroit | 24,935 | 13,831 | 524,246 | 1,634,792 | 5,243 | 47,636 | - | 31 |
| Cleveland-Indianapolis | 19,213 | 11,883 | 73,935 | 187,651 | 630 | 5,411 | - | - |
| Cleveland-Kalamazoo | 952 | 766 | 30,375 | 76,822 | 235 | 3,341 | - | 11 |
| Cleveland-Kansas City | 37,643 | 17,586 | 10,351 | 24,254 | 261 | 2,223 | - | 4 |
| Cleveland-Lansing | 1,165 | 1,631 | 48,335 | 125,262 | 241 | 6,110 | - | - |
| Cleveland-Madison | 2,068 | 1,725 | 9,841 | 23,118 | 212 | 2,363 | - | 1 |
| Cleveland-Milwaukee | 766 | 17,625 | 2,870 | 190,760 | 19 | 5,690 | 3 | 607 |
| Cleveland-Omaha | 8,515 | 463 | 4,993 | 11,783 | 117 | 1,271 | - | 3 |
| Cleveland-Springfield IL | 429 | 115 | 6,115 | 13,523 | 42 | 736 | - | 21 |
| Cleveland-St. Louis | 70,248 | 32,015 | 31,885 | 82,885 | 669 | 8,064 | - | 26 |
| Cleveland-Toledo | 1,010 | 1,083 | 649,607 | 2,230,982 | 593 | 12,965 | 70 | 664 |
| Cleveland-Twin Cities | 40,552 | 23,055 | 17,419 | 44,006 | 858 | 6,326 | - | 22 |
| Des Moines-Detroit | 3,463 | 6,185 | 14,688 | 33,353 | 192 | 2,666 | - | 6 |
| Des Moines-Indianapolis | 5,551 | 1,907 | 11,403 | 22,227 | 61 | 830 | - | 1 |
| Des Moines-Kansas City | 17,072 | 5,356 | 95,762 | 184,929 | 223 | 4,606 | - | - |
| Des Moines-Lansing | 337 | 626 | 3,445 | 6,988 | 36 | 1,249 | - | - |
| Des Moines-Madison | 972 | 226 | 12,747 | 23,840 | 40 | 750 | - | - |
| Des Moines-Milwaukee | 46 | 657 | 16,256 | 108,017 | 51 | 1,865 | 27 | 190 |
| Des Moines-Omaha | 11 | 26 | 189,665 | 373,527 | 236 | 5,318 | 30 | 148 |
| Des Moines-Springfield IL | 5 | 22 | 817 | 15,663 | - | 307 | - | 28 |
| Des Moines-St. Louis | 14,168 | 4,483 | 23,263 | 47,292 | 60 | 1,729 | - | - |
| Des Moines-Toledo | 167 | 203 | 3,371 | 7,046 | 38 | 743 | - | 1 |
| Des Moines-Kansas City | 17,072 | 5,356 | 95,762 | 184,929 | 223 | 4,606 | - | - |
| Des Moines-Twin Cities | 34,653 | 9,610 | 112,839 | 229,562 | 186 | 3,416 | - | - |
| Detroit-Indianapolis | 64,027 | 46,290 | 163,598 | 432,106 | 998 | 10,310 | - | 27 |
| Detroit-Kalamazoo | 3,269 | 2,426 | 609,611 | 1,631,315 | 582 | 16,121 | 660 | 5,467 |
| Detroit-Kansas City | 58,158 | 67,777 | 28,681 | 69,735 | 502 | 4,845 | - | 22 |
| Detroit-Lansing | 545 | 624 | 335,459 | 959,655 | 24 | 1,227 | 81 | 634 |
| Detroit-Madison | 11,903 | 10,763 | 30,562 | 74,864 | 393 | 5,214 | - | - |

**Exhibit 4-15 (Continued)**
**2000 Base Year Person-Trips between Major Cities**

| City Pair | Air | | Auto | | Bus | | Rail | |
|---|---|---|---|---|---|---|---|---|
| | Business | Non-Business | Business | Non-Business | Business | Non-Business | Business | Non-Business |
| Detroit-Milwaukee | 28,929 | 31,391 | 163,061 | 456,573 | 794 | 8,066 | 169 | 2,770 |
| Detroit-Omaha | 15,337 | 10,716 | 13,621 | 33,313 | 247 | 3,175 | - | 28 |
| Detroit-Springfield IL | 845 | 905 | 33,646 | 106,544 | 113 | 2,477 | 20 | 308 |
| Detroit-St. Louis | 55,354 | 58,337 | 63,329 | 243,799 | 511 | 8,359 | 14 | 204 |
| Detroit-Toledo | 228 | 1,930 | 954,396 | 5,535,567 | 1,510 | 35,683 | 48 | 509 |
| Detroit-Twin Cities | 128,712 | 72,088 | 47,926 | 125,506 | 1,517 | 13,334 | - | - |
| Indianapolis-Kalamazoo | 382 | 210 | 34,752 | 77,945 | 180 | 3,438 | - | 7 |
| Indianapolis-Kansas City | 866 | 7,963 | 3,316 | 33,238 | 6 | 357 | 2 | 27 |
| Indianapolis-Lansing | 2,052 | 3,555 | 42,492 | 101,166 | 197 | 4,680 | - | - |
| Indianapolis-Madison | 3,333 | 647 | 19,780 | 41,385 | 231 | 2,953 | - | 1 |
| Indianapolis-Milwaukee | 1,192 | 808 | 113,010 | 304,353 | 631 | 5,708 | 51 | 145 |
| Indianapolis-Omaha | 12,464 | 4,049 | 9,433 | 19,783 | 77 | 950 | - | 5 |
| Indianapolis-Springfield IL | 37 | 38 | 62,075 | 207,172 | 34 | 1,346 | 6 | 78 |
| Indianapolis-St. Louis | 13,442 | 16,730 | 126,635 | 621,781 | 351 | 8,687 | 22 | 202 |
| Indianapolis-Toledo | 176 | 626 | 53,562 | 129,863 | 249 | 3,825 | - | - |
| Indianapolis-Twin Cities | 39,559 | 26,715 | 26,933 | 60,365 | 331 | 3,608 | - | 14 |
| Kalamazoo-Kansas City | 1,346 | 585 | 6,396 | 13,329 | 65 | 1,170 | - | 6 |
| Kalamazoo-Lansing | 188 | 145 | 211,685 | 603,802 | 112 | 11,975 | 28 | 430 |
| Kalamazoo-Madison | 9 | 24 | 4,233 | 9,042 | - | - | 6 | 42 |
| Kalamazoo-Omaha | 1,602 | 364 | 2,901 | 6,064 | 31 | 704 | - | 13 |
| Kalamazoo-Springfield IL | 65 | 25 | 15,098 | 31,328 | 22 | 940 | 12 | 154 |
| Kalamazoo-St. Louis | 289 | 354 | 16,528 | 62,902 | 85 | 3,302 | 5 | 88 |
| Kalamazoo-Toledo | 99 | 260 | 15,354 | 303,922 | - | 1,412 | 23 | 300 |
| Kalamazoo-Twin Cities | 5,703 | 5,103 | 10,472 | 23,423 | 227 | 3,589 | - | - |
| Kansas City-Lansing | 1,888 | 1,920 | 6,586 | 14,280 | 94 | 2,127 | - | - |
| Kansas City-Madison | 1,233 | 3,812 | 10,027 | 19,830 | 70 | 1,006 | - | 2 |
| Kansas City-Milwaukee | 8,213 | 11,697 | 26,621 | 76,985 | 81 | 1,156 | 45 | 613 |
| Kansas City-Omaha | 1,473 | 405 | 120,438 | 248,877 | 203 | 4,494 | 1 | 4 |
| Kansas City-Springfield IL | 502 | 420 | 30,914 | 63,040 | 16 | 498 | 331 | 1,219 |
| Kansas City-St. Louis | 140,935 | 75,974 | 307,235 | 732,879 | 390 | 8,655 | 14,919 | 42,338 |
| Kansas City-Toledo | 1,222 | 1,292 | 6,407 | 14,348 | 102 | 1,423 | - | 4 |
| Kansas City-Twin Cities | 87,775 | 53,549 | 69,852 | 150,681 | 293 | 3,941 | - | 20 |
| Lansing-Madison | 471 | 1,222 | 7,586 | 16,685 | 73 | 2,334 | - | - |
| Lansing-Milwaukee | 2,223 | 2,532 | 47,272 | 126,523 | 104 | 2,947 | 34 | 535 |
| Lansing-Omaha | 502 | 993 | 3,095 | 6,742 | 45 | 1,404 | - | - |
| Lansing-Springfield IL | 45 | 56 | 5,398 | 15,296 | 4 | 364 | 8 | 64 |
| Lansing-St. Louis | 6,113 | 6,673 | 17,762 | 42,685 | 244 | 8,388 | - | - |
| Lansing-Toledo | 2 | 3 | 61,188 | 157,124 | 129 | 6,087 | - | 2 |
| Lansing-Twin Cities | 4,713 | 8,485 | 10,957 | 25,542 | 243 | 5,162 | - | - |
| Madison-Milwaukee | 67 | 51 | 574,414 | 1,373,962 | 30 | 1,062 | 1,305 | 5,704 |
| Madison-Omaha | 1,678 | 677 | 8,278 | 16,540 | 49 | 845 | - | - |
| Madison-Springfield IL | 7 | 79 | 2,894 | 25,436 | - | 145 | 3 | 93 |
| Madison-St. Louis | 3,647 | 2,206 | 39,544 | 87,125 | 285 | 5,421 | - | 5 |
| Madison-Toledo | 329 | 228 | 7,538 | 16,984 | 95 | 1,793 | - | 1 |
| Madison-Twin Cities | 5,212 | 8,708 | 45,406 | 148,768 | 25 | 825 | 292 | 3,672 |
| Milwaukee-Omaha | 7,678 | 5,373 | 21,765 | 48,859 | 161 | 2,012 | - | 47 |
| Milwaukee-Springfield IL | 358 | 189 | 71,909 | 158,359 | 81 | 1,883 | 27 | 387 |
| Milwaukee-St. Louis | 17,451 | 13,441 | 140,289 | 366,889 | 432 | 6,380 | 303 | 2,666 |
| Milwaukee-Toledo | 870 | 564 | 29,523 | 75,025 | 522 | 6,460 | - | 379 |
| Milwaukee-Twin Cities | 46,888 | 37,439 | 161,317 | 384,960 | 456 | 4,438 | 420 | 3,223 |
| Omaha-Springfield IL | 358 | 58 | 4,362 | 8,184 | 22 | 563 | - | - |
| Omaha-St. Louis | 71,010 | 24,655 | 27,611 | 59,974 | 189 | 4,448 | - | - |
| Omaha-Toledo | 92 | 57 | 3,004 | 6,762 | 47 | 851 | - | 2 |
| Omaha-Twin Cities | 62,879 | 16,732 | 61,081 | 132,788 | 208 | 3,423 | - | - |
| Springfield IL-St. Louis | 577 | 436 | 526,494 | 1,215,141 | 305 | 13,002 | 2,742 | 7,494 |
| Springfield IL-Toledo | 37 | 102 | 2,738 | 28,689 | 5 | 772 | 5 | 85 |
| Springfield IL-Twin Cities | 2,315 | 468 | 12,146 | 24,330 | 49 | 1,029 | - | 121 |
| St. Louis-Toledo | 912 | 6,333 | 1,653 | 76,218 | 15 | 2,969 | 1 | 51 |
| St. Louis-Twin Cities | 120,110 | 40,115 | 51,703 | 121,161 | 3,299 | 5,490 | - | 106 |
| Toledo-Twin Cities | 2,390 | 1,646 | 10,646 | 25,653 | 356 | 4,336 | - | 15 |

## Exhibit 4-16
## 2000 Base Year Market Share by Mode

| City Pair | Air | | Auto | | Bus | | Rail | |
|---|---|---|---|---|---|---|---|---|
| | *Business* | *Non-Business* | *Business* | *Non-Business* | *Business* | *Non-Business* | *Business* | *Non-Business* |
| Chicago-Cincinnati | 21.3% | 8.7% | 78.1% | 89.7% | 0.3% | 1.1% | 0.3% | 0.6% |
| Chicago-Cleveland | 38.1% | 14.0% | 61.3% | 83.8% | 0.4% | 1.7% | 0.2% | 0.5% |
| Chicago-Des Moines | 13.8% | 4.5% | 85.4% | 93.7% | 0.3% | 1.2% | 0.5% | 0.7% |
| Chicago-Detroit | 23.4% | 6.8% | 75.5% | 90.5% | 0.3% | 0.9% | 0.9% | 1.7% |
| Chicago-Indianapolis | 8.2% | 1.9% | 91.3% | 96.5% | 0.3% | 1.1% | 0.2% | 0.5% |
| Chicago-Kalamazoo | 1.1% | 0.2% | 96.9% | 95.3% | 0.2% | 1.1% | 1.8% | 3.3% |
| Chicago-Kansas City | 58.1% | 32.8% | 40.8% | 65.6% | 0.1% | 0.7% | 1.0% | 0.9% |
| Chicago-Lansing | 7.3% | 2.4% | 92.4% | 95.6% | 0.2% | 1.4% | 0.2% | 0.5% |
| Chicago-Madison | 1.5% | 0.8% | 97.7% | 96.6% | 0.1% | 0.5% | 0.7% | 2.2% |
| Chicago-Milwaukee | 0.4% | 0.1% | 98.8% | 98.5% | 0.3% | 0.9% | 0.5% | 0.5% |
| Chicago-Omaha | 50.6% | 25.8% | 48.4% | 71.2% | 0.3% | 1.3% | 0.7% | 1.7% |
| Chicago-Springfield IL | 0.7% | 0.2% | 92.6% | 95.0% | 0.1% | 0.7% | 6.6% | 4.1% |
| Chicago-St. Louis | 32.8% | 8.2% | 63.1% | 88.0% | 0.2% | 1.2% | 3.9% | 2.6% |
| Chicago-Toledo | 9.9% | 3.7% | 89.1% | 93.4% | 0.2% | 1.2% | 0.8% | 1.7% |
| Chicago-Twin Cities | 50.8% | 19.3% | 47.5% | 75.2% | 0.3% | 1.3% | 1.5% | 4.3% |
| Cincinnati-Cleveland | 35.9% | 9.8% | 63.1% | 86.8% | 0.8% | 3.1% | 0.2% | 0.3% |
| Cincinnati-Des Moines | 22.8% | 6.9% | 76.6% | 87.5% | 0.6% | 5.6% | 0.0% | 0.0% |
| Cincinnati-Detroit | 9.6% | 2.3% | 89.7% | 94.6% | 0.7% | 3.1% | 0.0% | 0.0% |
| Cincinnati-Indianapolis | 0.2% | 0.1% | 99.7% | 99.4% | 0.1% | 0.5% | 0.0% | 0.0% |
| Cincinnati-Kalamazoo | 2.4% | 0.6% | 96.9% | 94.5% | 0.7% | 4.9% | 0.0% | 0.0% |
| Cincinnati-Kansas City | 50.1% | 30.6% | 48.9% | 62.7% | 1.0% | 6.7% | 0.0% | 0.0% |
| Cincinnati-Lansing | 1.4% | 1.2% | 98.0% | 91.7% | 0.6% | 7.1% | 0.0% | 0.0% |
| Cincinnati-Madison | 15.6% | 3.4% | 82.9% | 87.4% | 1.5% | 9.2% | 0.0% | 0.0% |
| Cincinnati-Milwaukee | 30.5% | 10.4% | 69.2% | 88.1% | 0.3% | 1.4% | 0.1% | 0.1% |
| Cincinnati-Omaha | 37.3% | 13.5% | 62.0% | 80.3% | 0.7% | 6.1% | 0.0% | 0.0% |
| Cincinnati-Springfield IL | 0.6% | 0.3% | 99.3% | 98.8% | 0.1% | 0.9% | 0.0% | 0.1% |
| Cincinnati-St. Louis | 12.4% | 6.1% | 87.2% | 92.2% | 0.4% | 1.7% | 0.0% | 0.0% |
| Cincinnati-Toledo | 0.2% | 0.1% | 99.3% | 96.5% | 0.5% | 3.4% | 0.0% | 0.0% |
| Cincinnati-Twin Cities | 70.3% | 39.7% | 29.2% | 55.4% | 0.5% | 4.9% | 0.0% | 0.0% |
| Cleveland-Des Moines | 23.5% | 13.3% | 75.2% | 79.2% | 1.3% | 7.5% | 0.0% | 0.0% |
| Cleveland-Detroit | 4.5% | 0.8% | 94.6% | 96.4% | 0.9% | 2.8% | 0.0% | 0.0% |
| Cleveland-Indianapolis | 20.5% | 5.8% | 78.8% | 91.6% | 0.7% | 2.6% | 0.0% | 0.0% |
| Cleveland-Kalamazoo | 3.0% | 0.9% | 96.2% | 94.9% | 0.7% | 4.1% | 0.0% | 0.0% |
| Cleveland-Kansas City | 78.0% | 39.9% | 21.5% | 55.0% | 0.5% | 5.0% | 0.0% | 0.0% |
| Cleveland-Lansing | 2.3% | 1.2% | 97.2% | 94.2% | 0.5% | 4.6% | 0.0% | 0.0% |
| Cleveland-Madison | 17.1% | 6.3% | 81.2% | 85.0% | 1.8% | 8.7% | 0.0% | 0.0% |
| Cleveland-Milwaukee | 20.9% | 8.2% | 78.5% | 88.9% | 0.5% | 2.7% | 0.1% | 0.3% |
| Cleveland-Omaha | 62.5% | 3.4% | 36.6% | 87.2% | 0.9% | 9.4% | 0.0% | 0.0% |
| Cleveland-Springfield IL | 6.5% | 0.8% | 92.8% | 93.9% | 0.6% | 5.1% | 0.0% | 0.1% |
| Cleveland-St. Louis | 68.3% | 26.0% | 31.0% | 67.4% | 0.7% | 6.6% | 0.0% | 0.0% |
| Cleveland-Toledo | 0.2% | 0.0% | 99.7% | 99.3% | 0.1% | 0.6% | 0.0% | 0.0% |
| Cleveland-Twin Cities | 68.9% | 31.4% | 29.6% | 59.9% | 1.5% | 8.6% | 0.0% | 0.0% |
| Des Moines-Detroit | 18.9% | 14.7% | 80.1% | 79.0% | 1.0% | 6.3% | 0.0% | 0.0% |
| Des Moines-Indianapolis | 32.6% | 7.6% | 67.0% | 89.0% | 0.4% | 3.3% | 0.0% | 0.0% |
| Des Moines-Kalamazoo | 14.9% | 1.3% | 84.5% | 90.5% | 0.6% | 8.1% | 0.0% | 0.0% |
| Cleveland-Detroit | 4.5% | 0.8% | 94.6% | 96.4% | 0.9% | 2.8% | 0.0% | 0.0% |
| Cleveland-Indianapolis | 20.5% | 5.8% | 78.8% | 91.6% | 0.7% | 2.6% | 0.0% | 0.0% |
| Des Moines-Kansas City | 15.1% | 2.7% | 84.7% | 94.9% | 0.2% | 2.4% | 0.0% | 0.0% |
| Des Moines-Lansing | 8.8% | 7.1% | 90.2% | 78.8% | 0.9% | 14.1% | 0.0% | 0.0% |
| Des Moines-Madison | 7.1% | 0.9% | 92.6% | 96.1% | 0.3% | 3.0% | 0.0% | 0.0% |
| Des Moines-Milwaukee | 0.3% | 0.6% | 99.2% | 97.6% | 0.3% | 1.7% | 0.2% | 0.2% |
| Des Moines-Omaha | 0.0% | 0.0% | 99.9% | 98.6% | 0.1% | 1.4% | 0.0% | 0.0% |
| Des Moines-Springfield IL | 0.6% | 0.1% | 99.4% | 97.8% | 0.0% | 1.9% | 0.0% | 0.2% |
| Des Moines-St. Louis | 37.8% | 8.4% | 62.1% | 88.4% | 0.2% | 3.2% | 0.0% | 0.0% |
| Des Moines-Toledo | 4.7% | 2.5% | 94.3% | 88.2% | 1.1% | 9.3% | 0.0% | 0.0% |
| Des Moines-Twin Cities | 23.5% | 4.0% | 76.4% | 94.6% | 0.1% | 1.4% | 0.0% | 0.0% |
| Detroit-Indianapolis | 28.0% | 9.5% | 71.6% | 88.4% | 0.4% | 2.1% | 0.0% | 0.0% |
| Detroit-Kalamazoo | 0.5% | 0.1% | 99.3% | 98.5% | 0.1% | 1.0% | 0.1% | 0.3% |
| Detroit-Kansas City | 66.6% | 47.6% | 32.8% | 49.0% | 0.6% | 3.4% | 0.0% | 0.0% |
| Detroit-Lansing | 0.2% | 0.1% | 99.8% | 99.7% | 0.0% | 0.1% | 0.0% | 0.1% |
| Detroit-Madison | 27.8% | 11.8% | 71.3% | 82.4% | 0.9% | 5.7% | 0.0% | 0.0% |

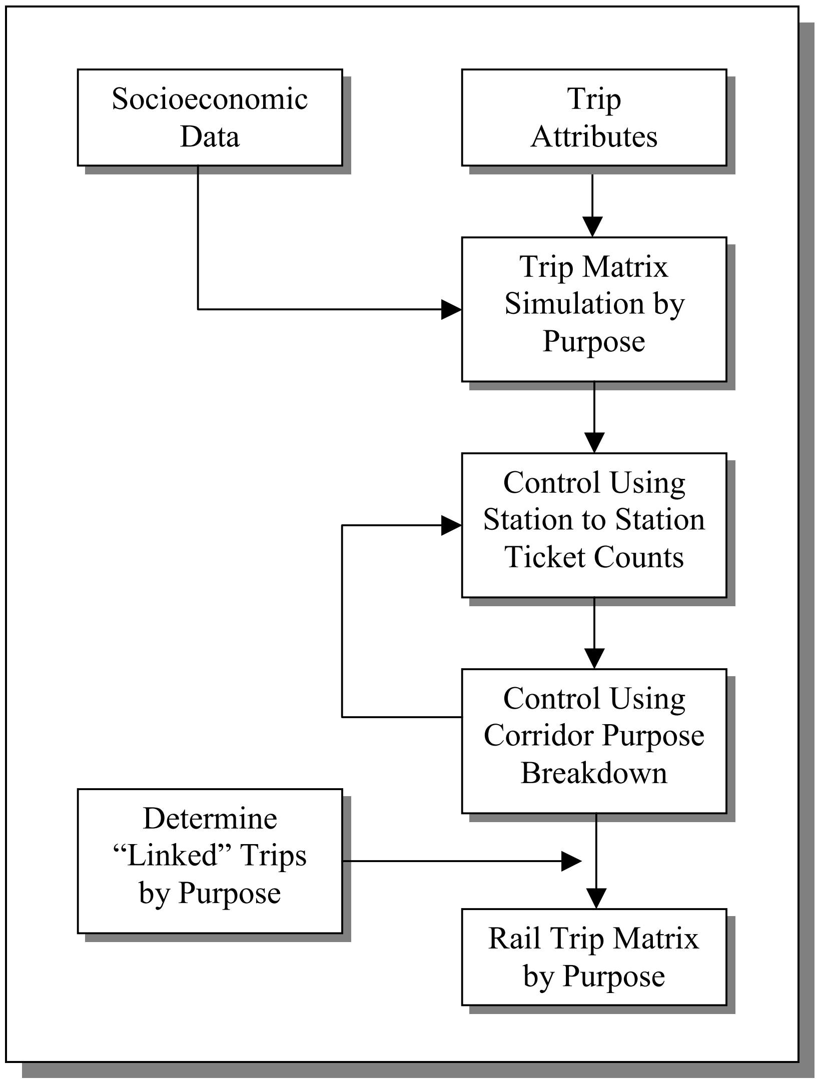
## Exhibit 4-16 (Continued)
## 2000 Base Year Market Share by Mode

| City Pair | Air | | Auto | | Bus | | Rail | |
|---|---|---|---|---|---|---|---|---|
| | Business | Non-Business | Business | Non-Business | Business | Non-Business | Business | Non-Business |
| Detroit-Milwaukee | 15.0% | 6.3% | 84.5% | 91.5% | 0.4% | 1.6% | 0.1% | 0.6% |
| Detroit-Omaha | 52.5% | 22.7% | 46.6% | 70.5% | 0.8% | 6.7% | 0.0% | 0.1% |
| Detroit-Springfield IL | 2.4% | 0.8% | 97.2% | 96.7% | 0.3% | 2.2% | 0.1% | 0.3% |
| Detroit-St. Louis | 46.4% | 18.8% | 53.1% | 78.5% | 0.4% | 2.7% | 0.0% | 0.1% |
| Detroit-Toledo | 0.0% | 0.0% | 99.8% | 99.3% | 0.2% | 0.6% | 0.0% | 0.0% |
| Detroit-Twin Cities | 72.2% | 34.2% | 26.9% | 59.5% | 0.9% | 6.3% | 0.0% | 0.0% |
| Indianapolis-Kalamazoo | 1.1% | 0.3% | 98.4% | 95.5% | 0.5% | 4.2% | 0.0% | 0.0% |
| Indianapolis-Kansas City | 20.7% | 19.1% | 79.1% | 79.9% | 0.1% | 0.9% | 0.0% | 0.1% |
| Indianapolis-Lansing | 4.6% | 3.2% | 95.0% | 92.5% | 0.4% | 4.3% | 0.0% | 0.0% |
| Indianapolis-Madison | 14.3% | 1.4% | 84.7% | 92.0% | 1.0% | 6.6% | 0.0% | 0.0% |
| Indianapolis-Milwaukee | 1.0% | 0.3% | 98.4% | 97.9% | 0.5% | 1.8% | 0.0% | 0.0% |
| Indianapolis-Omaha | 56.7% | 16.3% | 42.9% | 79.8% | 0.3% | 3.8% | 0.0% | 0.0% |
| Indianapolis-Springfield IL | 0.1% | 0.0% | 99.9% | 99.3% | 0.1% | 0.6% | 0.0% | 0.0% |
| Indianapolis-St. Louis | 9.6% | 2.6% | 90.2% | 96.0% | 0.2% | 1.3% | 0.0% | 0.0% |
| Indianapolis-Toledo | 0.3% | 0.5% | 99.2% | 96.7% | 0.5% | 2.8% | 0.0% | 0.0% |
| Indianapolis-Twin Cities | 59.2% | 29.5% | 40.3% | 66.6% | 0.5% | 4.0% | 0.0% | 0.0% |
| Kalamazoo-Kansas City | 17.2% | 3.9% | 81.9% | 88.3% | 0.8% | 7.8% | 0.0% | 0.0% |
| Kalamazoo-Lansing | 0.1% | 0.0% | 99.8% | 98.0% | 0.1% | 1.9% | 0.0% | 0.1% |
| Kalamazoo-Madison | 0.2% | 0.3% | 99.6% | 99.3% | 0.0% | 0.0% | 0.1% | 0.5% |
| Kalamazoo-Milwaukee | 0.3% | 0.2% | 99.3% | 96.9% | 0.3% | 2.7% | 0.0% | 0.2% |
| Kalamazoo-Omaha | 35.3% | 5.1% | 64.0% | 84.9% | 0.7% | 9.8% | 0.0% | 0.2% |
| Kalamazoo-Springfield IL | 0.4% | 0.1% | 99.3% | 96.6% | 0.1% | 2.9% | 0.1% | 0.5% |
| Kalamazoo-St. Louis | 1.7% | 0.5% | 97.8% | 94.4% | 0.5% | 5.0% | 0.0% | 0.1% |
| Kalamazoo-Toledo | 0.6% | 0.1% | 99.2% | 99.4% | 0.0% | 0.5% | 0.1% | 0.1% |
| Kalamazoo-Twin Cities | 34.8% | 15.9% | 63.8% | 72.9% | 1.4% | 11.2% | 0.0% | 0.0% |
| Kansas City-Lansing | 22.0% | 10.5% | 76.9% | 77.9% | 1.1% | 11.6% | 0.0% | 0.0% |
| Kansas City-Madison | 10.9% | 15.5% | 88.5% | 80.4% | 0.6% | 4.1% | 0.0% | 0.0% |
| Kansas City-Milwaukee | 23.5% | 12.9% | 76.1% | 85.1% | 0.2% | 1.3% | 0.1% | 0.7% |
| Kansas City-Omaha | 1.2% | 0.2% | 98.6% | 98.1% | 0.2% | 1.8% | 0.0% | 0.0% |
| Kansas City-Springfield IL | 1.6% | 0.6% | 97.3% | 96.7% | 0.1% | 0.8% | 1.0% | 1.9% |
| Kansas City-St. Louis | 30.4% | 8.8% | 66.3% | 85.2% | 0.1% | 1.0% | 3.2% | 4.9% |
| Kansas City-Toledo | 15.8% | 7.6% | 82.9% | 84.1% | 1.3% | 8.3% | 0.0% | 0.0% |
| Kansas City-Twin Cities | 55.6% | 25.7% | 44.2% | 72.4% | 0.2% | 1.9% | 0.0% | 0.0% |
| Lansing-Madison | 5.8% | 6.0% | 93.3% | 82.4% | 0.9% | 11.5% | 0.0% | 0.0% |
| Lansing-Milwaukee | 4.5% | 1.9% | 95.2% | 95.5% | 0.2% | 2.2% | 0.1% | 0.4% |
| Lansing-Omaha | 13.8% | 10.9% | 85.0% | 73.8% | 1.2% | 15.4% | 0.0% | 0.0% |
| Lansing-Springfield IL | 0.8% | 0.4% | 99.0% | 96.9% | 0.1% | 2.3% | 0.1% | 0.4% |
| Lansing-St. Louis | 25.3% | 11.6% | 73.6% | 73.9% | 1.0% | 14.5% | 0.0% | 0.0% |
| Lansing-Toledo | 0.0% | 0.0% | 99.8% | 96.3% | 0.2% | 3.7% | 0.0% | 0.0% |
| Lansing-Twin Cities | 29.6% | 21.7% | 68.9% | 65.2% | 1.5% | 13.2% | 0.0% | 0.0% |
| Madison-Milwaukee | 0.0% | 0.0% | 99.8% | 99.5% | 0.0% | 0.1% | 0.2% | 0.4% |
| Madison-Omaha | 16.8% | 3.8% | 82.7% | 91.6% | 0.5% | 4.7% | 0.0% | 0.0% |
| Madison-Springfield IL | 0.2% | 0.3% | 99.7% | 98.8% | 0.0% | 0.6% | 0.1% | 0.4% |
| Madison-St. Louis | 8.4% | 2.3% | 91.0% | 91.9% | 0.7% | 5.7% | 0.0% | 0.0% |
| Madison-Toledo | 4.1% | 1.2% | 94.7% | 89.4% | 1.2% | 9.4% | 0.0% | 0.0% |
| Madison-Twin Cities | 10.2% | 5.4% | 89.1% | 91.8% | 0.0% | 0.5% | 0.6% | 2.3% |
| Milwaukee-Omaha | 25.9% | 9.5% | 73.5% | 86.8% | 0.5% | 3.6% | 0.0% | 0.1% |
| Milwaukee-Springfield IL | 0.5% | 0.1% | 99.4% | 98.5% | 0.1% | 1.2% | 0.0% | 0.2% |
| Milwaukee-St. Louis | 11.0% | 3.5% | 88.5% | 94.2% | 0.3% | 1.6% | 0.2% | 0.7% |
| Milwaukee-Toledo | 2.8% | 0.7% | 95.5% | 91.0% | 1.7% | 7.8% | 0.0% | 0.5% |
| Milwaukee-Twin Cities | 22.4% | 8.7% | 77.2% | 89.5% | 0.2% | 1.0% | 0.2% | 0.7% |
| Omaha-Springfield IL | 7.5% | 0.7% | 92.0% | 93.0% | 0.5% | 6.4% | 0.0% | 0.0% |
| Omaha-St. Louis | 71.9% | 27.7% | 27.9% | 67.3% | 0.2% | 5.0% | 0.0% | 0.0% |
| Omaha-Toledo | 2.9% | 0.7% | 95.6% | 88.1% | 1.5% | 11.1% | 0.0% | 0.0% |
| Omaha-Twin Cities | 50.6% | 10.9% | 49.2% | 86.8% | 0.2% | 2.2% | 0.0% | 0.0% |
| Springfield IL-St. Louis | 0.1% | 0.0% | 99.3% | 98.3% | 0.1% | 1.1% | 0.5% | 0.6% |
| Springfield IL-Toledo | 1.3% | 0.3% | 98.3% | 96.8% | 0.2% | 2.6% | 0.2% | 0.3% |
| Springfield-Twin Cities | 16.0% | 1.8% | 83.7% | 93.8% | 0.3% | 4.0% | 0.0% | 0.5% |
| St. Louis-Toledo | 35.3% | 7.4% | 64.0% | 89.1% | 0.6% | 3.5% | 0.0% | 0.1% |
| St. Louis-Twin Cities | 68.6% | 24.0% | 29.5% | 72.6% | 1.9% | 3.3% | 0.0% | 0.1% |
| Toledo-Twin Cities | 17.8% | 5.2% | 79.5% | 81.1% | 2.7% | 13.7% | 0.0% | 0.0% |

***Data Validation Process***

Data, particularly data from disparate sources that are collected for a multitude of purposes, cannot simply be treated as equal units and summed, multiplied or divided. Data must be *cleaned up* and compared with actual counts, or surrogates of counts. Exhibit 4-17 depicts the steps that were undertaken to generate rail mode trips between each city pair.

**Exhibit 4-17**
**Rail Trip Matrix Generation and Validation**




Similar processes were used for other modes, chiefly differing in the source of the control totals. Air travel control totals are based on the *airline ten percent sample* data provided by the Federal Aviation Administration (FAA). Control totals for highways are based on each state's highway model origin-destination matrix and on highway traffic volumes. Bus control totals are based on station pair data provided by Greyhound.

## 4.5 System Zones

A 385-zone system was developed to represent the Midwest region using the data collected for each zone, integrating the information from the following sources:

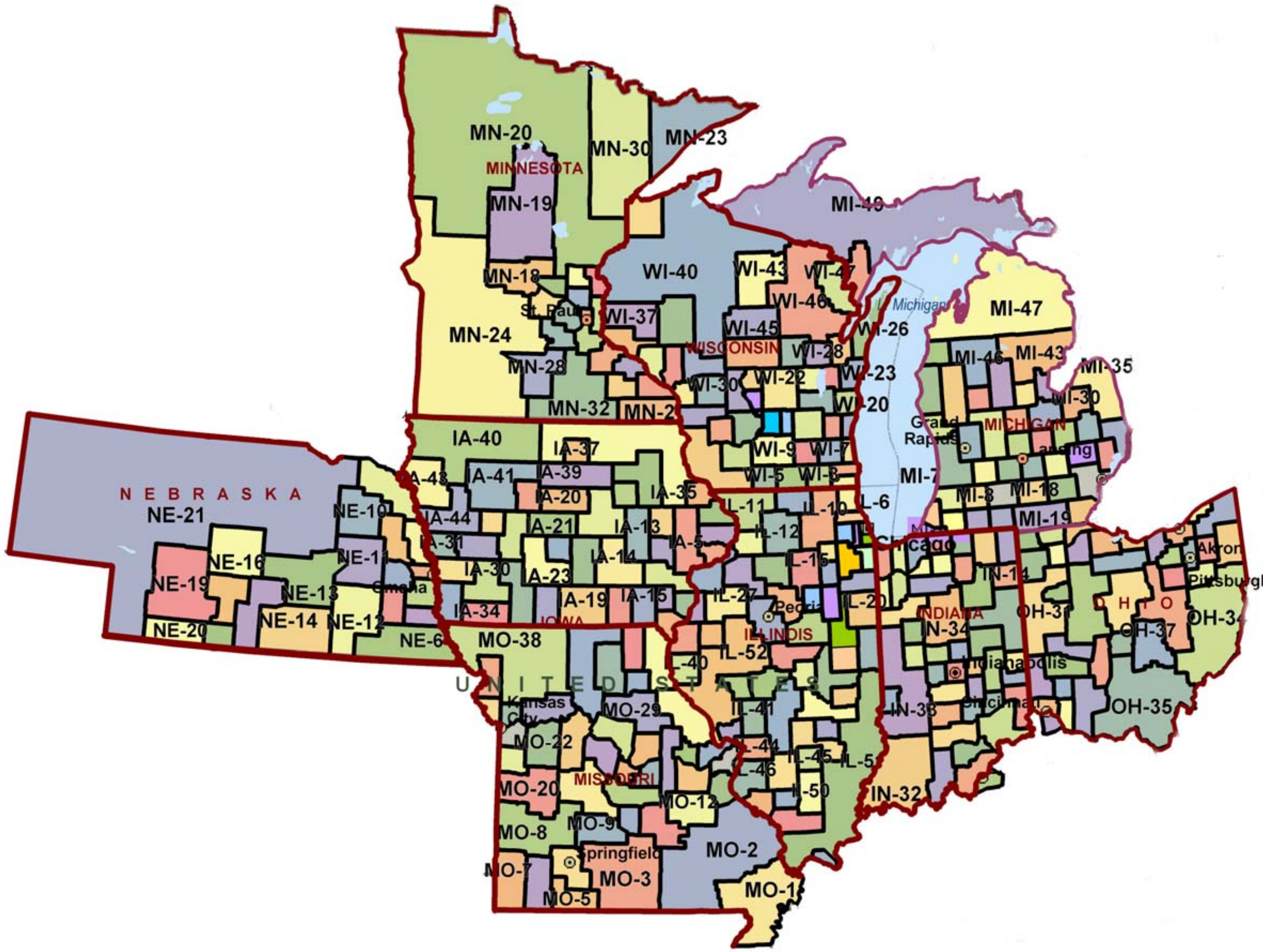
- U.S. Census Bureau and Woods & Poole socioeconomic data on population, employment and income
- Network data on all existing travel modes (auto, air, rail, bus)
- Traveler origin and destination data by mode and trip purpose
- Attitudinal data on the preferences and priorities of travelers

An early step in the development of the forecasting tool for modeling public responses to various levels of service, costs and amenities was the establishment of a zone system that would give a reasonable representation of travel between the origins and destinations in the region. The zone system used is mostly county-based, with urban areas subdivided (Exhibits 4-18 and 4-19). Individual state zone maps may be found in Appendix A3. County-based zones provide compatibility with the socioeconomic baseline and forecast data (discussed below) that are derived from the U.S. Census Bureau and Woods & Poole data and are county-based. Zones are defined relative to the rail network, such that small zones are defined for areas close to stations and larger zones for areas farther away. Network links are defined from the centroid of each zone to the nearest MWRRS station representing the cost of system access/egress. Airport-specific zones are introduced to aid in the measurement of MWRRS use for airport access.

**Exhibit 4-18**
**Number of Zones by State**

| ***States*** | ***Number of Zones*** | | |
|---|---|---|---|
| | ***Statewide Zones*** | ***Airport Zones*** | ***Total*** |
| Illinois | 57 | 5 | 62 |
| Indiana | 43 | 2 | 45 |
| Iowa | 42 | 2 | 44 |
| Michigan | 48 | 1 | 49 |
| Minnesota | 23 | 1 | 24 |
| Missouri | 45 | 2 | 47 |
| Nebraska | 21 | 1 | 22 |
| Ohio | 36 | 3 | 39 |
| Wisconsin | 47 | 2 | 49 |
| Other | 4 | - | 4 |
| **Total** | **366** | **19** | **385** |

**Exhibit 4-19**
**Zone System Map**



The following table shows the number of zones allocated for the major cities to be served by the MWRRS (Exhibit 4-20). Large cities have more zones because of the impact of station accessibility on ridership and revenue.

**Exhibit 4-20**
**Number of Zones by Major City**

| ***City*** | ***State*** | ***Number of Zones*** |
|---|---|---|
| Chicago | Illinois | 8 |
| Cincinnati | Ohio | 3 |
| Cleveland | Ohio | 3 |
| Columbus | Ohio | 2 |
| Des Moines | Iowa | 2 |
| Detroit | Michigan | 5 |
| Indianapolis | Indiana | 4 |
| Kalamazoo | Michigan | 1 |
| Kansas City | Missouri | 6 |
| Lansing | Michigan | 2 |
| Madison | Wisconsin | 2 |
| Milwaukee | Wisconsin | 4 |
| Omaha | Nebraska | 4 |
| Springfield | Illinois | 2 |
| St. Louis | Illinois | 2 |
| St. Louis | Missouri | 4 |
| Toledo | Ohio | 2 |
| Twin Cities | Minnesota | 6 |

## *4.6 Network Attributes*

The variables modeled for the MWRRI are shown in Exhibit 4-21. For all four modes of intercity travel (air, auto, bus, and rail), the data for the base year have been assembled into *COMPASS*© databases. The assumptions on the changes in the modes from the base year conditions determine the modal shifts in travel patterns.

**Exhibit 4-21**
**Modal Attributes Used in the *COMPASS*© Demand Model**

| | *Public Modes* | *Auto* |
|---|---|---|
| **Time** | • In-vehicle time<br>• Access/egress times<br>• Number of interchanges<br>• Connection wait times | • Travel time |
| **Cost** | • Fare<br>• Access/egress costs | • Operating cost<br>• Tolls<br>• Parking<br>(all divided by occupancy) |
| **Reliability** | • On-time performance | |
| **Schedule** | • Frequency of service<br>• Convenience of times | |

## 4.7 Market Analysis and Forecasting

This data collection effort provided the underlying basis for MWRRS market analysis and demand revenue forecasts. The following sections present the findings on the current travel market in the Midwest region under study.

### 4.7.1 Background – The Midwest Region

The agricultural and industrial heartland of the U.S., the Midwest region experienced rapid growth in the late 1800s and early 1900s, as it became the nation's center for heavy manufacturing. In recent years, the region's manufacturing base has been supplemented and, in some cases, supplanted by a growing and highly diverse service industry. Smaller urban and rural areas are very dependent upon effective transportation connections, more so than the large urban areas with their extensive transit networks. Their connectivity with the larger metropolitan areas is critical to the region's continued economic growth.

The MWRRS encompasses a rail network of more than 3,000 route miles and serves a nine-state population of nearly 60 million[9]. More than 80 percent of the region's population lives within a one-hour drive of either an MWRRS rail station or feeder bus connection. Various socioeconomic trends will impact the current travel market, the longer-term travel market and the target markets for passenger rail in the Midwest region.

***Socioeconomic Trends***

The projections for long-term growth in intercity travel were based on an analysis of socioeconomic trends. As shown in Exhibits 4.22 through 4.24 that are based on Woods & Poole data, annual growth rates for population, employment and per capita income are uniform for all of the nine states and are projected to grow almost linearly over the next thirty years. Average annual growth rates are 0.6 percent for population, 0.5 percent for employment and nearly 0.9

[9] Figure from 2000 U.S. Census for the 9-state region

percent for per capita income. The net effect of this growth will be to expand the market for intercity travel in the region by 13 percent between 2010 and 2020 and an additional 28 percent by 2040.

**Exhibit 4-22**
**Population Trends**

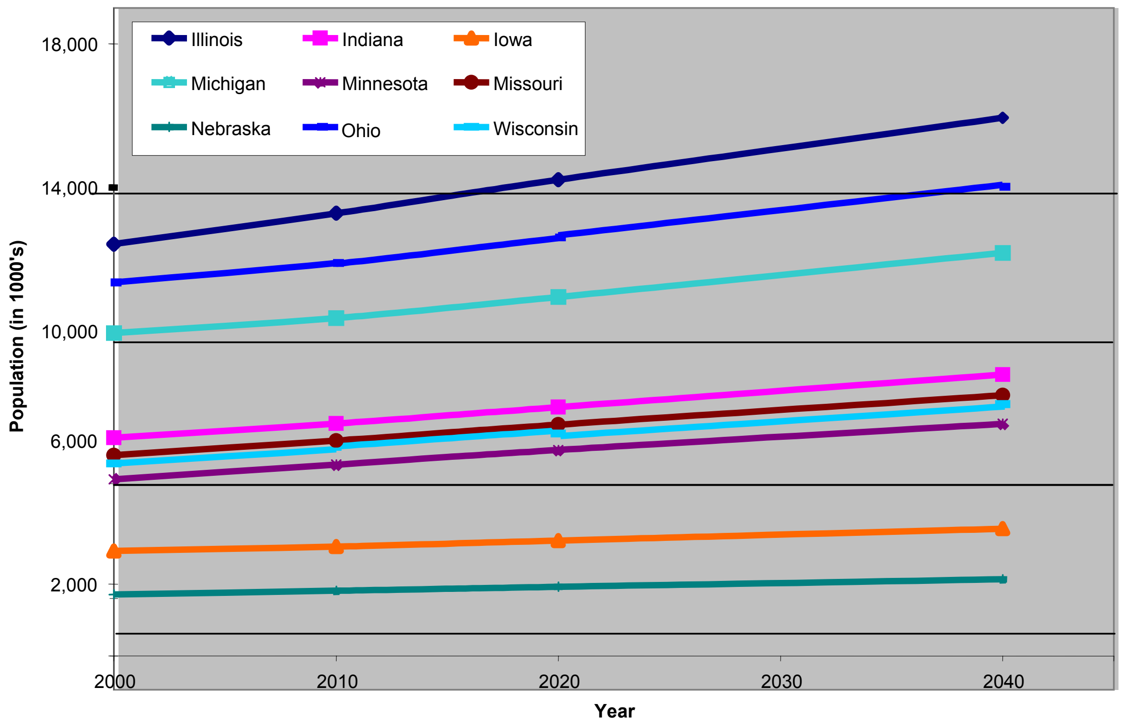


**Exhibit 4-23**
**Employment Trends**

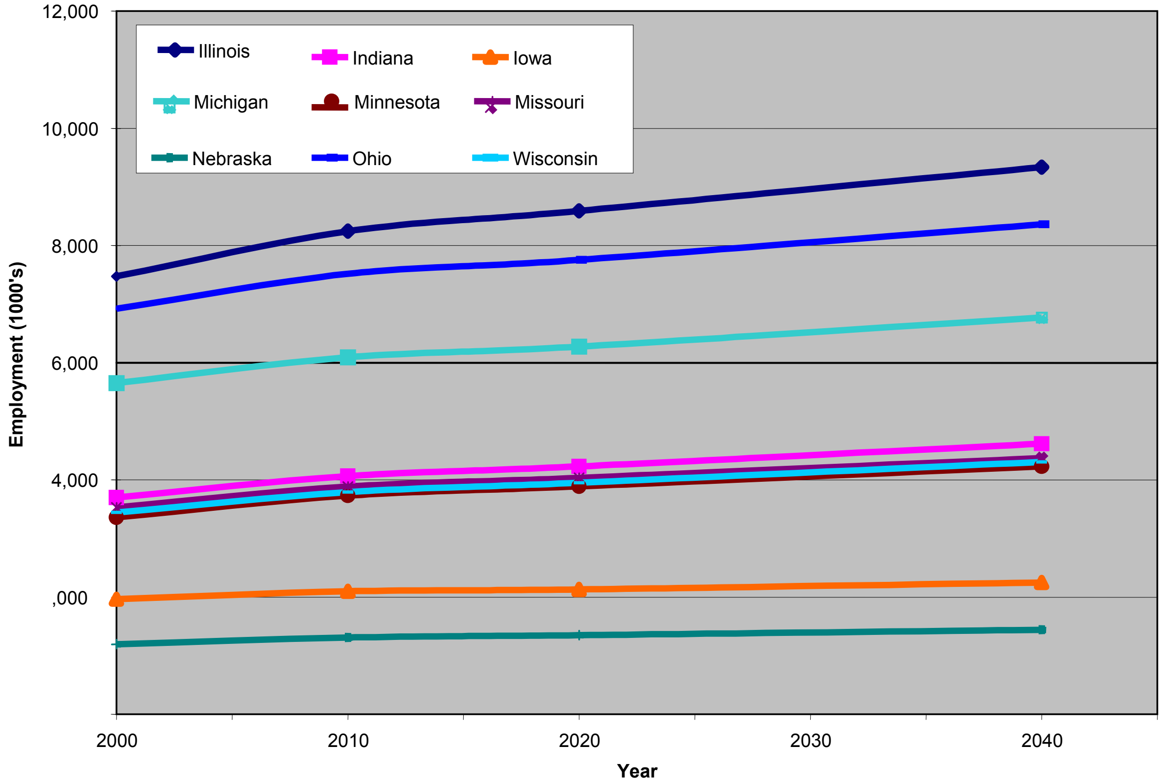
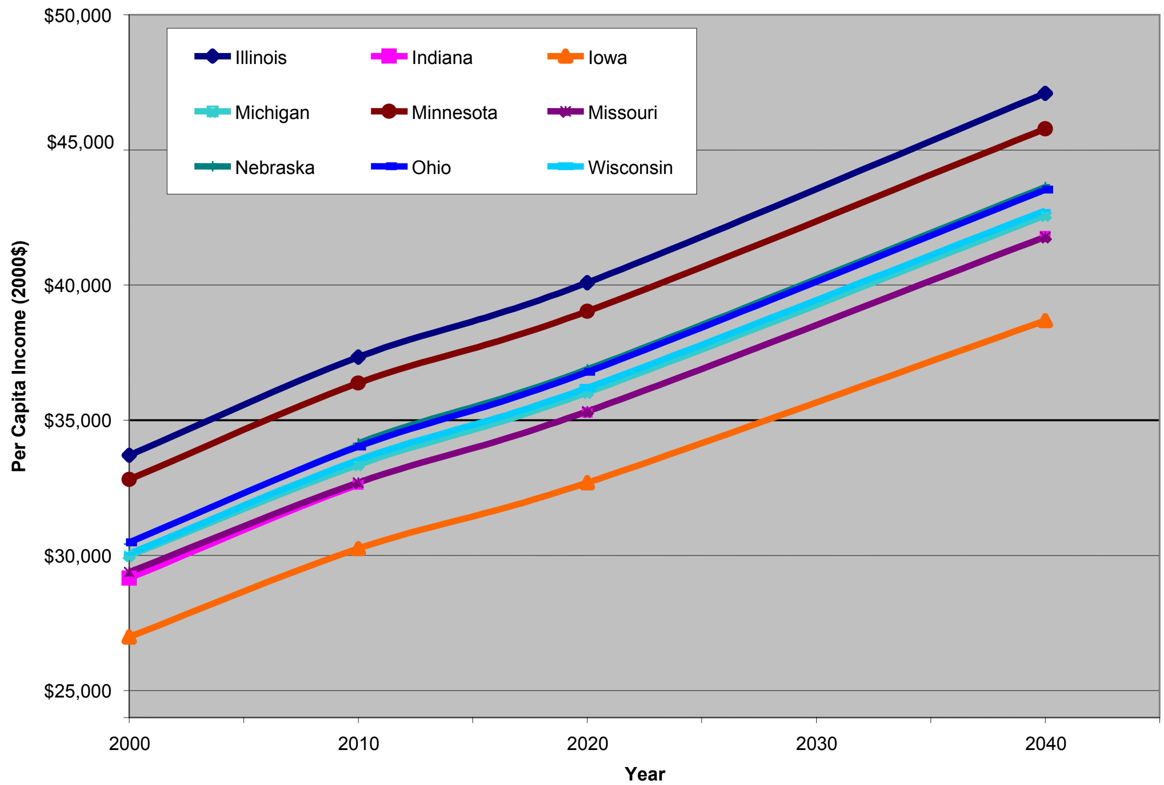


**Exhibit 4-24**
**Per Capita Income Trends**



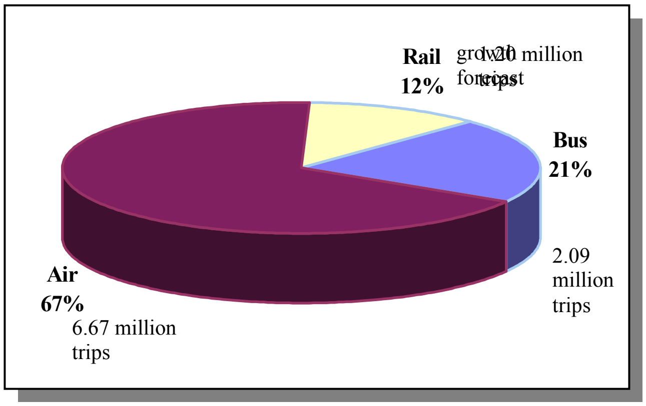

### *4.7.2 Midwest Region Travel Market Characteristics*

The travel market can be characterized by travel mode and trip purpose. A discussion of each follows.

***Travel Modes and Modal Share***

Of the 2000 base year 498 million trips within the Midwest region, 98 percent are made by auto; 1.3 percent by air; 0.4 percent by bus and 0.3 percent by rail. The auto trips include a large number of relatively short trips (100 to 150 miles), while the public modes generally include longer trip lengths, typically 150 to 250 miles for bus and rail and 250 to 500 miles for air. In other words, while the market share of the public modes is small (2.0 percent for air, rail and bus), the public modes have a larger share of the total vehicle or passenger miles, and therefore account for a much larger proportion of the miles traveled. Of the public modes, of the existing market, 67 percent of the trips are made by air, 21 percent by bus and 12 percent by rail (Exhibit 4-25).

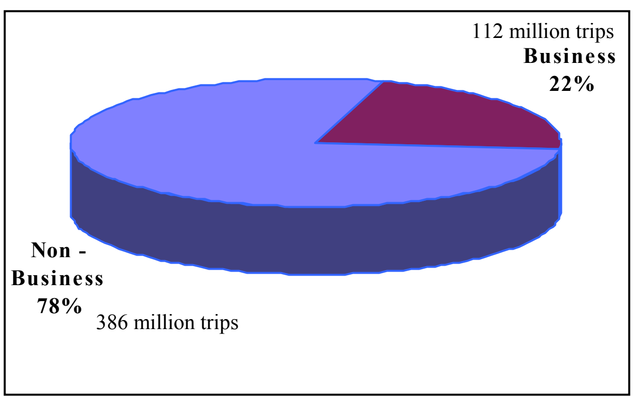
**Exhibit 4-25**
**Intercity Public Mode Market Shares for the Base Year**




### *Trip Purpose*

Trip purposes are segmented into business (non-commuter) and non-business (leisure/commuter). Exhibit 4-26 illustrates the breakdown by trip purpose of the current travel market in the Midwest region for the base year. Of the 498 million intercity trips in the region, approximately 22 percent or 112 million are for business travel; and 78 percent or 386 million are for commuter and leisure travel. Air modal shares are for intercity trips only within the study network. For example, a Chicago-Cleveland air trip would be counted in this total, but a Chicago-New York trip would not be. Exhibits 4-25 and 4-26 do not add up to the same values, since 4-25 gives travel only by public transport modes; whereas 4-26 gives travel by *all* modes.

**Exhibit 4-26**
**Intercity Travel Market by Trip Purpose**




### *Leisure/Commuter Travel Market*

The Midwest region abounds with tourist attractions, so the market for leisure travel is very large. Because trip length for leisure travel is often long and highway congestion can add significantly to travel time, travel by rail would be an attractive alternative. In addition, trains offer a unique travel experience with special appeal to families with children. Special fares and promotions should be utilized to attract this market sector.

Two other potentially important markets for the MWRRI are students and senior citizens. These target populations often do not own, or have only limited access to, an auto and they typically have schedules that are more flexible. Discount ticketing and special promotions can – and should – be used to encourage them to use the train during off-peak hours.

***Business Travel Market***
The MWRRS will be a strong contender with the airlines for the business travel market, which accounts for approximately 22 percent of all intercity trips. For business travelers, travel time, frequency of service and reliability are the primary factors that determine choice of mode. Passenger rail systems offer a high degree of reliability (because congestion and severe weather conditions rarely cause delays), and minimal waiting time at stations. In addition, trains typically provide a comfortable and work-friendly environment with economical fares.

### *4.7.3 Target Market Segments*

The MWRRS market can be segmented into base passenger rail service and air connect service. Both of these markets contribute to the overall, long-term viability of a quality, passenger rail service. A brief description of each is presented below.

***Base-level Passenger Market***
The socioeconomic characteristics of the Midwest region, combined with increased traffic congestion and travel times, support the development of quality, passenger rail as a competitive alternative to air and auto travel over the medium-distance travel range. The initial MWRRI survey focused on passenger rail service in four corridors (Chicago-Detroit, Chicago-Milwaukee, Chicago-St. Louis and St. Louis-Kansas City). An initial assumption was made that travelers in the smaller, surrounding markets would exhibit the same characteristics as travelers in these larger markets. Subsequently, studies identified the characteristics of lower density routes and special population groups (*e.g.*, students, government employees, routes without current rail service). Stated preference surveys were conducted in Carbondale, Grand Rapids and Green Bay and targeted specific markets to determine whether *branch line* patrons would have different travel characteristics and preferences than *main line* patrons. Government employees in Missouri were also surveyed to identify the potential impact of encouraging or requiring them to use passenger rail for trips between St. Louis, Jefferson City and Kansas City. The results of these surveys were used to develop a branch line demand model, which complemented the established main line model, and provided a finer level of market segmentation. In general, since smaller branch line cities often lack competitive air service, they have a stronger per-capita utilization of rail than major urban centers. The finer level of market segmentation provided stronger and more reliable demand projections.

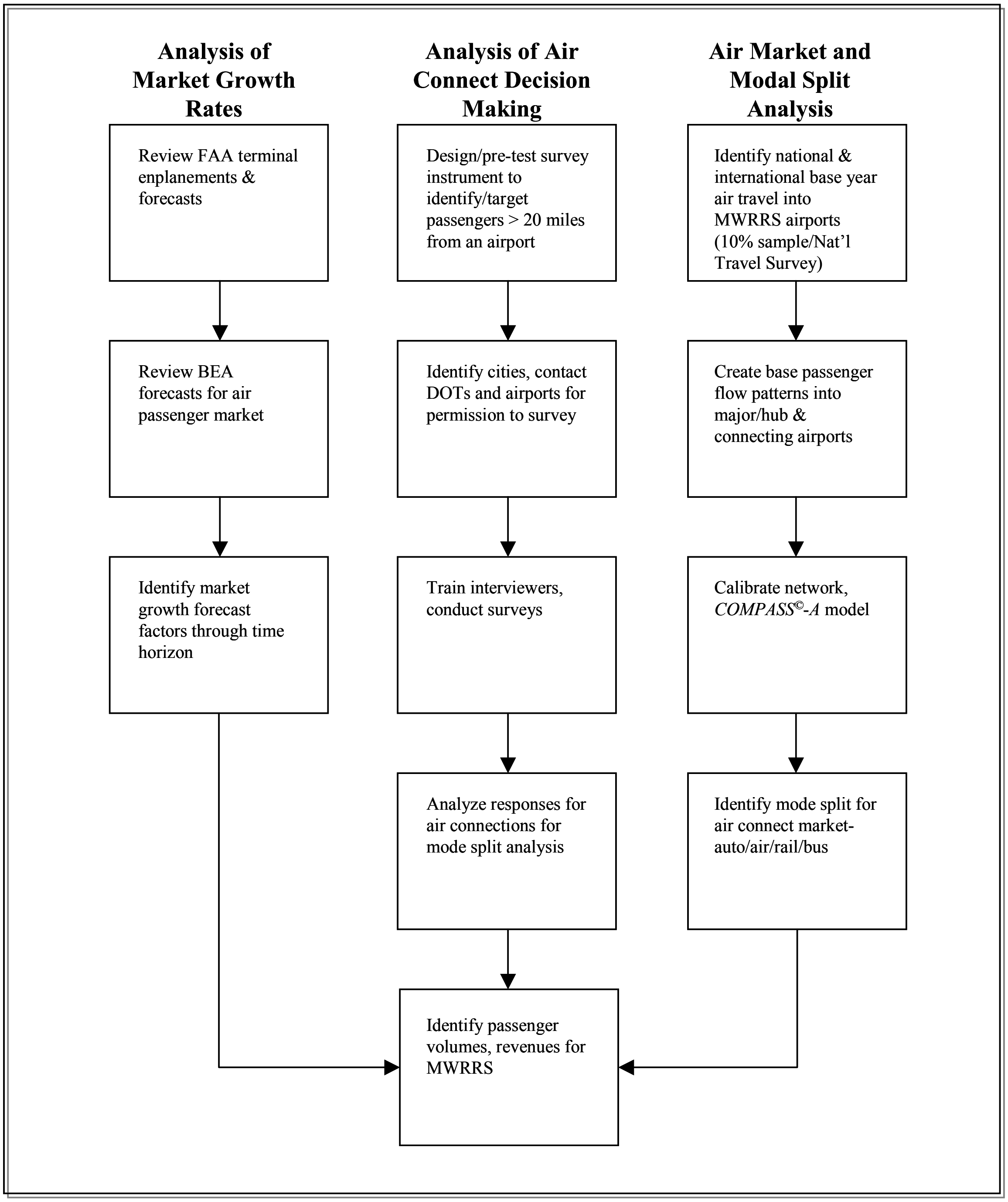
***Air Connect Market***
This market represents demand that results from the proximity of airports to rail stations and the convenience of multimodal transit. This is a relatively small market, and one that is particularly useful for those traveling to an airport for a trip outside the Midwest region. The initial study focused on travel within the Midwest region, currently served by intercity train, auto or plane. Since many of the current and proposed rail lines operate in close proximity to airports, providing an effective intermodal connection could increase MWRRS revenues at little or no

incremental cost. In this study, to help forecast air-connect ridership and revenue, airport-specific zones were created. An air connection was not modeled at Indianapolis.

The analysis methodology for the air connect market is presented in Exhibit 4-27.

Stated preference data used for this analysis was obtained from surveys conducted in St. Louis, Cleveland and Madison focusing on mode of access to the airports. Regional air traffic patterns and connections between the rail stations and airports were analyzed. The catchment area for an airport can extend 50 to 100 miles or more depending on population density, size of the airport, and frequency and cost of flights. It was found that the MWRRS could attract a portion of these trips, if it offers easy intermodal connections. Since travelers are already accustomed to satellite parking lots and shuttles to rental cars, the MWRRS could offer a competitive service in many communities, one that would pick travelers up at the terminal and transport them to a station close to their home or business.

**Exhibit 4-27**
**Air Connect Analysis Methodology**



### *Feeder Bus Integration Plan*

#### *Introduction*

An MWRRI Feeder Bus network has been defined for providing connectivity and enhancing mobility in some of the smaller cities, at which MWRRI train service cannot be made directly available. An in-depth bus integration analysis was undertaken in the earlier MWRRI study that was conducted in 2000. The survey work undertaken as part of the 2000 Plan examined the unique travel characteristics and preferences of potential feeder bus routes and stations. Additionally, Greyhound Lines, Inc. was a study partner during the 2000 Plan, and as such, provided inputs on the entire integration plan. More specifically, Greyhound provided inputs on bus operating costs, fare levels and possible operating strategies. The analysis performed used an iterative process to optimize the relationship between the benefit of the feeder bus system and its operating costs. The full feeder bus system is shown in Exhibit 3-1.

#### *Potential Benefits of Bus Integration*

One of the fundamental assumptions in the early design of the MWRRS was that there would be a feeder bus network to facilitate access to stations, and its schedules would coordinate with the passenger rail schedules to provide essentially *seamless* travel throughout the Midwest region. Coordinated feeder bus services could introduce the MWRRS to new cities and markets. There are many markets within the region that would generate ridership and revenue for the MWRRS, but are not connected to the MWRRS network.

Rail stations will have intermodal connections providing easy access for travelers who are unable or prefer not to drive to stations. The feeder bus operation would be privately owned and operated, and operating hours and schedules would be coordinated with train schedules to maximize the system's utility and minimize transfer times. Taxis, rental cars and limousine services will also be available at all major MWRRS stations.

#### *MWRRS Bus System Design*

The buses used in the integration plan are intended to be co-branded with the MWRRS identity, livery, ticketing and standards. Additionally, the bus stations will offer through ticketing under the MWRRS network brand. Buses would operate to and from MWRRS rail terminals. Lastly, feeder bus passengers would be guaranteed a rail connection. The feeder bus fare is set at 12.5 cents per bus mile. The bus fares are set lower than rail rates, and lower than the charges applied to many auto travelers to entice people to use the feeder bus system and the associated rail network..

The design of the feeder bus network was based on past studies and recommendations from the nine participating states and Greyhound. The system of feeder bus routes that was included in the MWRRS Business Plan is shown in Technical Appendix A2. Exhibit 4-28 provides details on the routes including a description of the route, the frequency of service offered, the route lengths and travel time. Routes shown in red were originally proposed by the MWRRS states, but failed the MWRRS profitability criteria and were subsequently dropped from the network. Likewise, bus routes and frequencies in Exhibit 4-28 have been optimized for the rail network. However, the scope of our effort has been to develop a *rail* feeder bus network that could operate profitably, not to develop a statewide bus strategy for each of the MWRRS states.

If buses can generate enough local traffic, it is quite possible that the "outside of MWRRI" bus routes will be able to operate profitably. For example, Van Galder today operates a very successful bus service from Madison, WI, via Rockford and O'Hare airport to Chicago. In the Greyhound Analysis, it was assumed that such services would continue to operate independently of the MWRRI. As a result, it is not anticipated that MWRRS will assume financial responsibility for providing this bus service. Although Van Galder may continue to bring passenger train riders, the MWRRS business plan simply assumes that this service will continue to operate independently. Hence, the Madison-Rockford-Chicago bus system is shown in Appendix A2 as "outside of MWRRI."

It is quite possible that many of the links shown as "outside of MWRRI" can be justified as stand alone bus operations, however, our analysis showed that they generate insufficient MWRRS feeder traffic to be sustained and supported by the rail system alone. However, detailed state assessment of short-haul bus route potential is beyond the scope of our current study, which focuses more on forecasting longer-haul rail trips.

Bus frequencies were adjusted based on the projected level of demand, to produce a reasonable load factor. In general buses were not scheduled to meet every train, but only those morning and evening trains having peak demand. A minimum frequency would be one round trip per day, where a bus meets the first inbound train in the morning and last outbound train at night. It was seldom the case that a bus could be scheduled to meet every train.

**Exhibit 4-28**
**Feeder Bus System Detail**

| *Corridor* | *From/To* | *To/From* | *Dist. mile* | *Time min.* | *Speed mph* | *Freq (rt/wk)* | *Annual Bus Miles* | *Corridor Subtotal* | *Percentage* |
|---|---|---|---|---|---|---|---|---|---|
| CA | CHARLESTON (BUS-IL) | MATTOON (IL) | 11 | 25 | 26 | 7 | 8008 | | |
| CA | DANVILLE (BUS-IL) | CHAMPAIGN-URBANA (IL) | 36 | 52 | 41 | 7 | 26208 | | |
| CA | DECATUR (BUS-IL) | CHAMPAIGN-URBANA (IL) | 46 | 63 | 44 | 7 | 33488 | | |
| CA | MARION (BUS-IL) | CARBONDALE (IL) | 16 | 31 | 31 | 7 | 11648 | | |
| CA | PADUCAH (BUS-IL) | MARION (BUS-IL) | 56 | 74 | 45 | 14 | 81536 | | |
| CA | TERRE HAUTE (BUS-IN) | CHARLESTON (BUS-IL) | 48 | 65 | 44 | 7 | 34944 | 195832 | 4.02% |
| CI | ANDERSON (BUS-IN) | INDIANAPOLIS (IN) | 43 | 60 | 43 | 14 | 62608 | | |
| CI | BLOOMINGTON (BUS-IN) | INDIANAPOLIS (IN) | 53 | 71 | 45 | 35 | 192920 | | |
| CI | COLUMBUS (BUS-IN) | INDIANAPOLIS (IN) | 42 | 59 | 43 | 14 | 61152 | | |
| CI | COLUMBUS (BUS-IN) | LOUISVILLE (BUS-KY) | 68 | 87 | 47 | 14 | 99008 | | |
| CI | COLUMBUS (BUS-OH) | DAYTON (BUS-OH) | 71 | 91 | 47 | 14 | 103376 | | |
| CI | COLUMBUS1 (BUS-OH) | LIMA (BUS-OH) | 126 | 151 | 50 | 7 | 91728 | | |
| CI | DANVILLE (BUS-IL) | INDIANAPOLIS (IN) | 90 | 111 | 49 | 7 | 65520 | | |
| CI | DAYTON (BUS-OH) | CINCINNATI (OH) | 54 | 72 | 45 | 14 | 78624 | | |
| CI | DAYTON (BUS-OH) | RICHMOND (BUS-IN) | 40 | 57 | 42 | 7 | 29120 | | |
| CI | LEXINGTON (BUS-KY) | CINCINNATI (OH) | 76 | 96 | 48 | 14 | 110656 | | |
| CI | NEW CASTLE (BUS-IN) | INDIANAPOLIS (IN) | 49 | 67 | 44 | 14 | 71344 | | |
| CI | RICHMOND (BUS-IN) | NEW CASTLE (BUS-IN) | 37 | 53 | 42 | 14 | 53872 | 1019928 | 20.92% |
| CL | AKRON (BUS-OH) | CLEVELAND (OH) | 38 | 55 | 42 | 21 | 82992 | | |
| CL | CANTON (BUS-OH) | AKRON (BUS-OH) | 23 | 38 | 36 | 21 | 50232 | | |
| CL | FT. WAYNE (IN) | WATERLOO (BUS-IN) | 29 | 45 | 39 | 14 | 42224 | | |
| CL | LIMA (BUS-OH) | FT. WAYNE (IN) | 61 | 80 | 46 | 7 | 44408 | | |
| CL | WARREN (BUS-OH) | CLEVELAND (OH) | 55 | 73 | 45 | 21 | 120120 | | |
| CL | YOUNGSTOWN (BUS-OH) | WARREN (BUS-OH) | 13 | 27 | 29 | 21 | 28392 | 368368 | 7.56% |
| MI | ANCHORVILLE (BUS-MI) | DETROIT (MI) | 35 | 51 | 41 | 7 | 25480 | | |
| MI | BRIGHTON (BUS-MI) | ANN ARBOR (MI) | 19 | 34 | 34 | 7 | 13832 | | |
| MI | CADILLAC (BUS-MI) | GRAND RAPIDS (MI) | 97 | 125 | 47 | 7 | 70616 | | |
| MI | MOUNT PLEASANT (BUS-MI) | LANSING (MI) | 73 | 96 | 46 | 7 | 53144 | | |
| MI | BAY CITY (BUS-MI) | FLINT (MI) | 64 | 75 | 51 | 7 | 46592 | | |
| MI | DETROIT (MI) | TOLEDO (OH) | 57 | 70 | 49 | 7 | 41496 | | |

## Exhibit 4-28 (continued)
## Feedeer Bus System Detail

| *Corridor* | *From/To* | *To/From* | *Dist. mile* | *Time min.* | *Speed mph* | *Freq (rt/wk)* | *Annual Bus Miles* | *Corridor Subtotal* | *Percentage* |
|---|---|---|---|---|---|---|---|---|---|
| MI | HOWELL (BUS-MI) | BRIGHTON (BUS-MI) | 12 | 26 | 28 | 7 | 8736 | | |
| MI | LUDINGTON (BUS-MI) | MUSKEGON (BUS-MI) | 56 | 74 | 45 | 7 | 40768 | | |
| MI | MUSKEGON (BUS-MI) | GRAND RAPIDS (MI) | 40 | 57 | 42 | 21 | 87360 | 388024 | 7.96% |
| MO | COLUMBIA (BUS-MO) | JEFFERSON (MO) | 31 | 47 | 40 | 21 | 67704 | | |
| MO | FT. LEONARD WOOD (BUS-MO) | ROLLA (BUS-MO) | 30 | 46 | 39 | 14 | 43680 | | |
| MO | KIRKSVILLE (BUS-MO) | COLUMBIA (BUS-MO) | 92 | 113 | 49 | 7 | 66976 | | |
| MO | LAWRENCE (BUS-KS) | KANSAS CITY (MO) | 38 | 55 | 42 | 28 | 110656 | | |
| MO | ROLLA (BUS-MO) | WASHINGTON (MO) | 71 | 91 | 47 | 14 | 103376 | | |
| MO | SPRINGFIELD (BUS-MO) | BRANSON (BUS-MO) | 42 | 59 | 43 | 14 | 61152 | | |
| MO | SPRINGFIELD (BUS-MO) | FT. LEONARD WOOD (BUS-MO) | 72 | 92 | 47 | 14 | 104832 | | |
| MO | SPRINGFIELD (BUS-MO) | JOPLIN (BUS-MO) | 73 | 93 | 47 | 7 | 53144 | | |
| MO | ST. JOSEPH (BUS-MO) | KANSAS CITY (MO) | 56 | 74 | 45 | 21 | 122304 | | |
| MO | TOPEKA (BUS-KS) | LAWRENCE (BUS-KS) | 27 | 43 | 38 | 28 | 78624 | 812448 | 16.66% |
| QU | AMES (BUS-IA) | DES MOINES (IA) | 34 | 50 | 41 | 7 | 24752 | | |
| QU | BLAIR (BUS-NE) | OMAHA (NE) | 31 | 47 | 40 | 7 | 22568 | | |
| QU | CEDAR FALLS (BUS-IA) | CEDAR RAPIDS (BUS-IA) | 61 | 80 | 46 | 7 | 44408 | | |
| QU | CEDAR RAPIDS (BUS-IA) | IOWA CITY (IA) | 28 | 44 | 39 | 7 | 20384 | | |
| QU | FT. DODGE (BUS-IA) | WEBSTER CITY (BUS-IA) | 18 | 33 | 33 | 7 | 13104 | | |
| QU | KIRKSVILLE (BUS-MO) | QUINCY (IL) | 71 | 91 | 47 | 7 | 51688 | | |
| QU | LINCOLN (BUS-NE) | OMAHA (NE) | 58 | 76 | 46 | 21 | 126672 | | |
| QU | NEBRASKA CITY (BUS-NE) | OMAHA (NE) | 50 | 68 | 44 | 7 | 36400 | | |
| QU | NEBRASKA CITY (BUS-NE) | ST. JOSEPH (BUS-MO) | 90 | 111 | 49 | 7 | 65520 | | |
| QU | PEORIA (BUS-IL) | GALESBURG (IL) | 45 | 62 | 43 | 14 | 65520 | | |
| QU | SIOUX CITY (BUS-IA) | BLAIR (BUS-NE) | 85 | 106 | 48 | 7 | 61880 | | |
| QU | WEBSTER CITY (BUS-IA) | AMES (BUS-IA) | 48 | 65 | 44 | 7 | 34944 | 567840 | 11.65% |
| SL | DECATUR (BUS-IL) | SPRINGFIELD (IL) | 38 | 55 | 42 | 7 | 27664 | | |
| SL | JACKSONVILLE (BUS-IL) | SPRINGFIELD (IL) | 36 | 52 | 41 | 7 | 26208 | | |

**Exhibit 4-28 (continued)**
**Feeder Bus System Detail**

| *Corridor* | *From/To* | *To/From* | *Dist. mile* | *Time min.* | *Speed mph* | *Freq (rt/wk)* | *Annual Bus Miles* | *Corridor Subtotal* | *Percentage* |
|---|---|---|---|---|---|---|---|---|---|
| SL | PEORIA (BUS-IL) | BTN-NORMAL (IL) | 44 | 61 | 43 | 14 | 64064 | 117936 | 2.42% |
| TC | BLACK RIVER FALLS (BUS-WI) | TOMAH (WI) | 30 | 46 | 39 | 21 | 65520 | | |
| TC | DULUTH (BUS-MN) | MPLS/ST.PAUL (MN) | 150 | 177 | 51 | 21 | 327600 | | |
| TC | EAU CLAIRE (BUS-WI) | BLACK RIVER FALLS (BUS-WI) | 49 | 67 | 44 | 21 | 107016 | | |
| TC | MANKATO (BUS-MN) | ROCHESTER (BUS-MN) | 79 | 99 | 48 | 7 | 57512 | | |
| TC | MARINETTE (BUS-WI) | GREEN BAY (WI) | 53 | 71 | 45 | 7 | 38584 | | |
| TC | ROCHESTER (BUS-MN) | LA CROSSE (WI) | 70 | 89 | 47 | 21 | 152880 | | |
| TC | SHEBOYGAN (BUS-WI) | MANITOWOC (BUS-WI) | 29 | 45 | 39 | 21 | 63336 | | |
| TC | SHEBOYGAN (BUS-WI) | MILWAUKEE (WI) | 50 | 68 | 44 | 21 | 109200 | | |
| TC | ST. CLOUD (BUS-MN) | MPLS/ST.PAUL (MN) | 75 | 95 | 47 | 28 | 218400 | | |
| TC | STAPLES (BUS-MN) | ST. CLOUD (BUS-MN) | 67 | 86 | 47 | 7 | 48776 | | |
| TC | STEVENS POINT (BUS-WI) | APPLETON (WI) | 59 | 77 | 46 | 21 | 128856 | | |
| TC | STURGEON BAY (BUS-WI) | GREEN BAY (WI) | 18 | 33 | 33 | 7 | 13104 | | |
| TC | WAUSAU (BUS-WI) | STEVENS POINT (BUS-WI) | 34 | 50 | 41 | 21 | 74256 | 1405040 | 28.81% |
| TOTAL | | | | | | | | 4875416 | 100.00% |

Corridor abbreviations: CA- Carbondale, CI- Cincinnati, CL- Cleveland, MI- Michigan, MO- Kansas City, QU- Quincy/Omaha, SL- St. Louis, TC- Twin Cities

### *Bus Operating Costs*

Base operating costs for the bus service were obtained from the American Bus Association (ABA) via their 2001 Industry Survey and from recommendations provided by Greyhound. The ABA survey set included 161 bus companies, both charter/tour and regular route service providers. The average cost per mile for a 40-foot bus was $1.90 in 2001. The cost figure provided by the ABA includes bus ownership (purchase or lease), fuel cost including tax, labor (driver and mechanic salaries/benefits), supplies (equipment and maintenance), insurance, tolls and driving expenses, and purchase of transportation. The items not included in this cost estimate were overhead and profit margin, which, in consultation with Greyhound, were assumed to be an additional 15 percent. The costs provided in the ABA survey were for 40-feet or larger buses. It was determined by Greyhound that smaller buses, as would be used for much of the MWRRS service, would have costs 20 percent less than exhibited by the larger buses. It was therefore estimated that the per-mile bus operating cost would be $2.15 for a large bus and $1.72 for a small bus.

***Feeder Bus System Iterative Process***

An iterative process was used to outline the feeder bus system. Operating characteristics and market analysis drove the selection of large or small buses on each route. Large buses were assumed to carry between 39 and 47 passengers, while small buses can carry 22 passengers. Smaller buses are less expensive to operate, but are not efficient over longer routes, while larger buses, although more expensive to operate, are more efficient on longer routes.

The study team worked with Greyhound to optimize the frequency of service provided on each route (*i.e.*, 1, 2, 3, or 4 daily) and the most efficient size of bus for the route. The optimization was intended to balance the supply and demand on the given routes. The frequency of service was varied based on the incremental net benefit that was added. The size of the bus was used in the measurement of passenger capacity.

***Summary of Key Findings on Bus Integration***

The feeder bus system described here shows that feeder buses have the ability to generate additional MWRRS rail ridership and revenue. Riders who would not otherwise use the rail system are connected by virtue of the feeder bus system, greatly enhancing transportation access. Although bus-specific costs exceed bus-specific revenue the additional rail revenue from bus passengers fed into rail trips justifies the costs of the buses. Another finding is that feeder bus/rail travelers will pay an average rail fare of $50 to $75 per trip, so rail revenues compensate for the bus cross-subsidy. Average bus loadings, with as few as seven riders paying up to 80 cents per mile on trips 200 miles from a rail station, are sufficient to make an extensive feeder bus system financially viable. However, bus routes that were projected to be unprofitable, even including connecting rail revenues, were eliminated from the plan.

The feeder bus system can generate an additional $48 million dollars in rail revenue. Exhibit 4-29 shows the results of the operating revenues and costs associated with the feeder bus system.

**Exhibit 4-29**
**Summary of Feeder Bus System**

| ***Revenue Source*** | ***2015 Revenue ($2002)*** |
|---|---|
| Forecast Rail Fare Revenue Generated from Feeder Bus System | $47,767,000 |
| Forecast Bus Fare Revenue Generated from Feeder Bus System | $6,218,430 |
| *Minus* Total Cost of Feeder Bus System | ($7,461,932) |
| **Contribution of Feeder Bus System to Rail Revenue** | **$46,523,498** |

### *4.7.4 Competitive Issues*

Intercity travel in the region is growing rapidly, and the increasing demand for travel cannot be easily met by existing modes. Regulatory, environmental and budgetary constraints are making it increasingly difficult to expand highway capacity and, in particular, to build new or expand existing highways. An analysis of the impact of congestion suggests that MWRRS demand in 2020 could be as much as ten percent higher if current congestion trends continue.

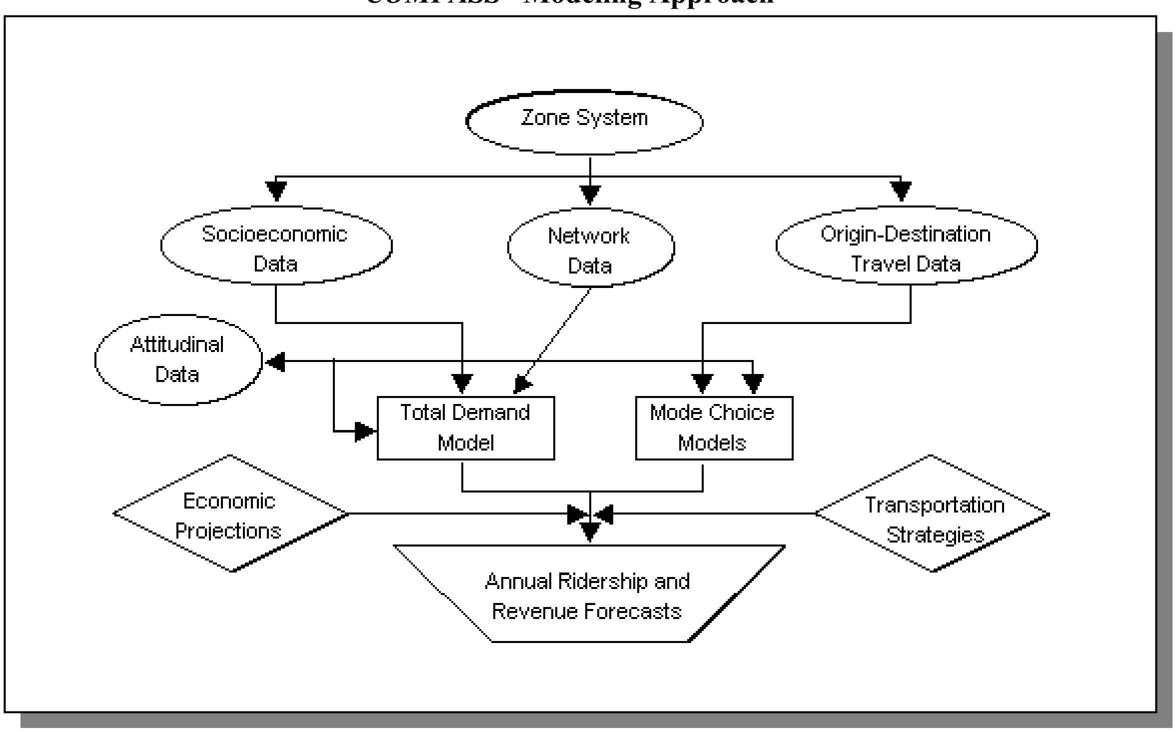
In the case of air travel, deregulation has resulted in the reduction of service on shorter routes and significant fare increases. The four major carriers in the region – United, American, Northwest and Delta – have increased their average flight length to more than 900 miles and find that flights of less than 300 miles are costlier and less efficient to operate, usually requiring cross-subsidy from longer flights. Southwest Airlines, the other important carrier in the region, serves just seven of the cities on the MWRRS. An analysis was undertaken to test the potential impact on a competitive response by the airlines to the MWRRS. The analysis showed that if all the airlines, except Southwest, reduced their fares by 25 percent on all routes except those also served by Southwest, then MWRRS ridership and revenue would fall by only two to three percent.

Because the air and highway modes (auto and bus) are finding it increasingly difficult to meet the regional demand for travel, the MWRRS will not be a replacement for existing travel modes but rather an enhancement and necessary alternative.

## *4.8 Model Development –* COMPASS© *Interactive Process*

The *COMPASS*© Demand Modeling System is a powerful yet flexible demand forecasting tool that forecasts long-term intercity travel demand and assesses the relationships among all competitive modes of travel (rail, auto, air, and bus). *COMPASS*© uses local socioeconomic forecasts for each area to determine the growth of long-term total travel demand. *COMPASS*© computes competitive mode market shares based on the levels of service, fares or costs, and attractiveness or bias for each mode. *COMPASS*© is structured on three principal models: Total Demand Model, Induced Demand Model and Hierarchical Modal Split Model. For the MWRRS,

**Exhibit 4-30**
***COMPASS*© Modeling Approach**



each model was calibrated separately for each of the two trip purposes (business and other). *Other* included commuter, tourist, social, personal business, school, recreation, etc. The modeling approach and critical data flow are shown in Exhibit 4-30.

The core of the ridership estimation approach incorporates the *COMPASS*© model working interactively with the technology and operations plans. An interactive analysis in the strategic demand forecast process allows a wide range of demand, fare levels, revenue, technology, service levels, capital improvements, and right-of-way (guideway) issues to be assessed by a *what if* evaluation of possible options. For example, annual average daily traffic at a station, for a given fare and frequency scenario, determines parking requirements. Similarly, average passengers on board for any given segment can be calculated and factored to estimate peak requirements for rail car capacity and associated power usage estimates. Through the interactive analysis, *fatal flaws* can also be identified, such as a low service frequency that does not generate enough riders to cover costs, so that other options that are more favorable can then be developed.

Once the model was calibrated, forecasts were used to identify ridership and revenues associated with the passenger rail operating strategy. Standard *COMPASS*© outputs included the following:

- Total corridor travel demand by trip purpose
- Total demand by mode
- Natural growth, induced growth and diverted trips by trip purpose and mode
- Market share by trip purpose and mode
- Consumer surplus by trip purpose and mode
- Passenger revenue by trip purpose and mode
- Passenger miles by trip purpose and mode
- Station volumes by trip purpose

## 4.9 Pricing Strategy

The development of a competitive, market-driven pricing strategy for the MWRRS considered both the willingness of travelers to pay for service and the character of the demand for service on a daily, weekly and annual basis. The willingness to pay for service is captured by the stated preference attitudinal surveys. These surveys contained a series of questions designed to identify how individuals value different travel attributes – travel time, frequency, reliability and quality of service. These preference factors were then used in the calibration of the *COMPASS*© demand model to describe how travelers choose among modes and their responsiveness to different travel options.

### 4.9.1 Assumptions

The development of a fare structure for the MWRRS is based on a number of strategic objectives and pricing policies, including the following:

- Passenger rail prices will be based on what the market can bear.
- Fares will be established that maximize revenue yields. Since this approach can produce lower ridership levels, consideration will be given to balancing the loss in ridership while maintaining positive operating performance.

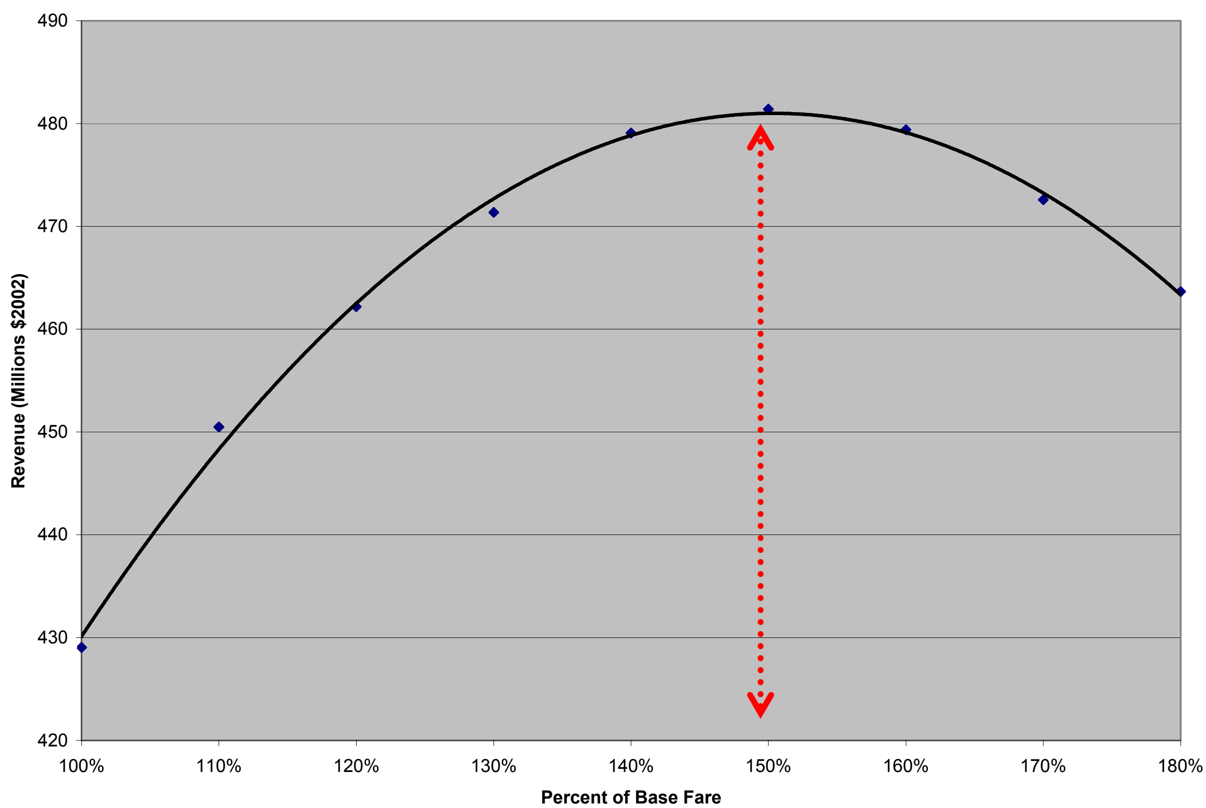
- There will be a two-tier fare structure to reflect the composition of the MWRRS market with a business class fare and a 25 percent lower, non-business class fare. Price elasticity estimates were derived on a trip-purpose basis. The analysis assumed that the selected technology could encompass first and economy class fares.

### *4.9.2 Competitive Fares that Maximize Revenue Yields*

The use of revenue yield techniques to maximize revenues was a key component in the planning of the MWRRS. The MWRRS fares were initially set to existing intercity passenger rail fares. MWRRS fares were then determined from an analysis of the revenue potential as forecasted by *COMPASS*© under different fare scenarios. The fares were set on a segment-by-segment basis in an attempt to maximize revenues while maintaining fares within a competitive range.

In the revenue optimization process, these fares were increased incrementally by as much as 80 percent to test the impact of fares on ridership levels for the MWRRS. It was also verified that each corridor was not optimal at a point below the base fare level. The analysis showed that, generally, fares were maximized, with respect to revenue, at approximately 150 percent of current fare levels (Exhibit 4-31).

**Exhibit 4-31**
**Revenue Maximization for the Overall MWRRS System (2015)**

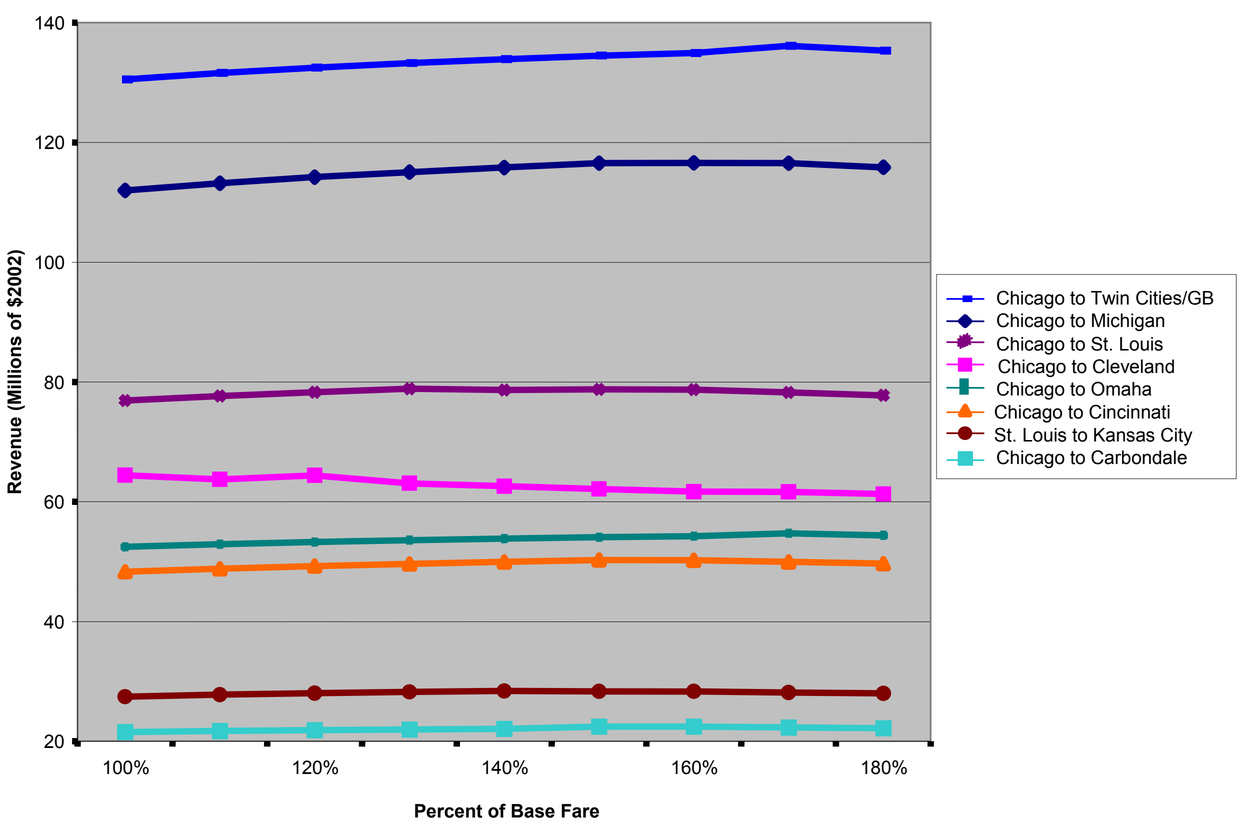


The revenue curve shows that the level of fares that maximize revenues for the entire system is about 50 percent above base year fare levels (*i.e.,* Amtrak fares in the year 2000). Above the optimal point, additional increases in fares *lower* system revenue. This is because the declines in ridership levels offsets, or negates the impact of increasing the fare. Therefore, since revenue-maximizing fare policies result in lower ridership and often by significant amounts, the fares actually used in the MWRRS feasibility analysis were restricted to a range of 25 percent to 50 percent above base year fare levels.

The revenue maximization analysis also showed that the fare levels at which revenues are maximized on different MWRRS corridors vary significantly (Exhibit 4-32). The curves in the exhibit show that these corridors that are most effective with fare optimization are Chicago-Omaha, Chicago-St. Paul, Chicago-Michigan and St. Louis-Kansas City. In other words, the lack of alternative modes of travel in the corridor allows the MWRRS rail network to charge higher fares for the service being offered. Adopting discount fares for all markets on these corridors would possibly generate additional ridership and revenues.

The fares adopted for the MWRRS forecasts are considered reasonably optimal at an aggregate level. The revenue maximization graph shows the 50 percent increase over current fares is close to the optimal fare level for most corridors. Nonetheless, further adjustments could well improve both ridership and revenues. For example, market-specific fares could be developed to attract certain population segments – students, senior citizens and families with children – and to encourage travel during off-peak hours.

**Exhibit 4-32**
**Revenue Maximization by Corridor**



A comparison of base year city-pair full fares with those in the MWRRS system is shown in Exhibit 4-33. The full fares cited here ignore any discounts that are available to various groups (*e.g.*, senior citizens, students, etc.).

**Exhibit 4-33**
**Comparison of Full Fares**
**Base Year and MWRRS System (2000$)**

| *Corridor/Branch Line and City-Pair* | *Base Year Full Fare* | *MWRRS Optimized Full Fare* | *Percent Change* |
|---|---|---|---|
| Chicago-Detroit | $52.15 | $77.92 | 49.4% |
| Chicago-Port Huron | $65.31 | $95.18 | 45.7% |
| Chicago-Grand Rapids | $48.27 | $67.03 | 38.9% |
| Chicago-Cleveland | $94.37 | $114.73 | 21.6% |
| Chicago-Cincinnati | $70.78 | $102.20 | 44.4% |
| Chicago-Carbondale | $68.32 | $102.08 | 49.4% |
| Chicago-St. Louis | $59.58 | $89.02 | 49.4% |
| St. Louis-Kansas City | $63.38 | $95.61 | 50.9% |
| Chicago-Quincy | $55.99 | $99.79 | 78.2% |
| Chicago-Omaha | $115.53 | $150.65 | 30.4% |
| Chicago-St. Paul | $107.22 | $180.78 | 68.6% |
| Chicago-Green Bay* | --- | $109.86 | --- |

* No existing rail service

The difference in the fare increases between segments can be partly attributed to the differences in the current fare levels. Fares on a per-mile basis vary substantially across the Midwest region with base year full fares ranging from approximately 19 cents per mile (Chicago-Detroit) to 28 cents per mile (Chicago-Cleveland). In general, segments with relatively higher fares tend to have lower rates of increase. The exception is the Chicago-Twin Cities corridor, which has a significant change in corridor-level service due to the introduction of service to Madison, Wisconsin.

As stated previously, the demand forecasts are disaggregated by business and non-business travel. The fares shown in the exhibit above relate to the full business travel fares. An average fare is obtained by taking the weighted average of the two fare and passenger levels. Under the proposed MWRRS system, average fares rise to a range of $0.23 to almost $0.36 per mile. These average fares-per-mile are shown on a city-pair basis in Exhibit 4-34.

**Exhibit 4-34**
**Comparison of Base Year and MWRRS Fares per Mile**

| *Corridor/Branch Line and City-Pairs* | *Base Year Fares per Mile* | *MWRRS Optimized Fares per Mile* | *Percent Change* | *Base Year Miles* | *MWRRS Miles* |
|---|---|---|---|---|---|
| Chicago-Detroit | $0.19 | $0.28 | 47.3% | 283 | 283 |
| Chicago-Port Huron | $0.20 | $0.30 | 46.2% | 319 | 319 |
| Chicago-Pontiac | $0.18 | $0.28 | 49.8% | 305 | 305 |
| Chicago-Grand Rapids | $0.27 | $0.36 | 31.4% | 177 | 191 |
| Chicago-Cleveland | $0.28 | $0.34 | 21.6% | 341 | 354 |
| Chicago-Cincinnati | $0.22 | $0.32 | 49.9% | 327 | 315 |
| Chicago-Carbondale | $0.22 | $0.33 | 49.4% | 308 | 308 |
| Chicago-St. Louis | $0.21 | $0.32 | 49.9% | 282 | 282 |
| St. Louis-Kansas City | $0.23 | $0.34 | 49.8% | 281 | 281 |
| Chicago-Quincy | $0.22 | $0.39 | 77.5% | 258 | 258 |
| Chicago-Omaha | $0.23 | $0.32 | 37.0% | 501 | 477 |
| Chicago-St. Paul | $0.26 | $0.42 | 62.4% | 418 | 434 |
| Chicago-Green Bay | --- | $0.51 | --- | --- | 214 |

### *4.9.3 Conclusions*

The analysis shows that additional revenue can be generated by the use of fare optimization techniques. In the analysis of fares, the potential for increasing business fares on specific routes or for an improved service that offers some or all of the facilities typically offered by the airlines (*e.g.*, business clubs at terminals, frequent flyer points and business facilities on board the train) have not been considered. In addition to full fares, a series of market-specific, promotional and discount fares should be established to fill off-peak trains and encourage certain segments of the population, (*e.g.*, seniors and students), to travel at off-peak times. A range of travel cards and other promotional ticketing systems should also be developed to further promote widespread use of the system. Later refinements might include developing, where appropriate; discount fares for special consumer market segments (*e.g.,* seniors, students, and commuters). In addition, specific *spot* fares should be used to solve specific problems such as suburban station overload, peak-hour overload and airline competition for *end* cities.

## *4.10 Ridership Projections*

### *4.10.1 Introduction*

The 1998 Plan of the MWRRI Study produced preliminary ridership and revenue demand estimates. It was recognized that certain areas of the analysis could be strengthened, and the overall study enhanced by additional analysis that focused on specific goals and objectives of the MWRRI states. In particular, additional corridor-level information was required to improve the overall understanding of the feasibility issues on a corridor and state basis as well as to gain an improved understanding of the full ridership potential and revenue sources for the states. This provided the context for the 2000 Plan of the MWRRI study.

The 2000 Plan, which represented an on-going effort to ensure the viability of a passenger rail service in the Midwest region, focused on three major areas. The scope of the analysis aimed at refining market demand estimates by developing finer segmentation within some of the corridor segments and by evaluating additional consumer and business market segments. These areas are summarized below and are presented in detail later in this chapter.

- Ridership model enhancements were made to increase the level of corridor segmentation in the *COMPASS*© demand model by developing 'branch line' models to capture the smaller, less populated regional markets within a corridor. In addition, the model was used to assess the sensitivity of the impact of strategic and policy assumptions about these markets.
- Additional gains in passenger rail ridership and revenue due to modal connectivity with airports were assessed

Additionally, further refinements in implementation plans and operating schedules (discussed later in this report) impacted the demand and revenue projections. Changes on the operational side of the analysis impact travel times, frequency of service, accessibility, reliability and the overall general quality of service. Since these are the key elements in determining the choice of travel mode, the MWRRS ridership and revenue projections needed to be updated to reflect operating refinements, as well.

### *4.10.2 New Developments in Ridership Analysis*

A brief description of the new developments in the ridership analysis is provided below. A more detailed discussion is included in the September 2000 Project Notebook.

#### *Branch Line Analysis*

The purpose of the branch line analysis was to identify characteristics of lower density routes. Stated preference surveys were conducted in three cities (Carbondale, Grand Rapids and Green Bay) targeting specific markets to determine whether branch line patrons have different travel characteristics and preferences from main line patrons. As a special case, government employees in Missouri were also surveyed to identify the potential impact of encouraging or requiring Missouri state employees to use passenger rail for trips between St. Louis, Jefferson City and Kansas City. Survey results were used to develop a distinct branch line demand model, complementing the established main line model.

- Green Bay was included in the survey because it is a city with no current rail service. Air, bus and auto travelers were surveyed. The characteristics identified in the area (values of time and frequency) are essentially the same as those in other corridors and did not result in a change to forecast parameters.
- Grand Rapids was included in order to analyze the business market for a relatively small community experiencing high airfares. Air, rail and auto travelers were surveyed. Surveys revealed values of time for air that were higher than general values in the rest of the region. However, because the air market is a small part of the Grand Rapids total travel market, the change in values of time had a negligible impact on model results.

- Carbondale was included because it has a large student population. Rail, bus and auto travelers were surveyed. The survey revealed that students in the Carbondale corridor had lower value of time than the average regional travelers in the main model. This result illustrates that students were more sensitive to cost such that substantially lower revenue and ridership estimates were obtained, compared to the main line model.
- The Missouri analysis focused on state government employees. Total state government travel to the respective cities was estimated from the surveys. The proportion and number of state government employee business trips that would be made on passenger rail was projected, assuming a policy requiring the use of rail whenever feasible. This ridership and revenue increment was then factored into the demand forecasts for the Missouri corridor.

A more detailed technical discussion on the branch line analysis and the Missouri Department of Transportation travel study are given in the September 2000 Project Notebook.

***Air Connect Analysis***

The air connect survey and analysis conducted in the 2000 Plan evaluated the market niche that could capitalize on good multimodal connections between airports and MWRRS passenger rail stations. Air connect trips are shorter than the average intercity trip, as they represent *local* connections to airports. However, the MWRRS can attract a portion of these trips if it offers near-seamless connections between rail stations and airports. This assessment included:

- Analyzing national and regional air traffic growth rates and national air travel patterns connecting within the region
- Analyzing the accessibility of specific Midwest airports to relevant rail stations
- Conducting and analyzing stated preference surveys at representative airports
- Estimating the mode split for air connect base and forecast years for auto, air, rail and bus using existing and proposed airport accessibility to the rail system

Federal Aviation Administration (FAA) base enplanement data and forecasts were evaluated for each major airport. In addition, the study reviewed travel patterns into and out of the region for the MWRRS cities included in the American Travel Survey. Profiles were examined for Chicago, Cleveland, Cincinnati, Indianapolis, St. Louis, Kansas City, Twin Cities and Milwaukee; profiles included detailed demographics, top ten destinations, distance traveled, etc.

For each city, the proximity of major airports to the rail corridors and stations was examined. The potential for direct access availability, (*e.g.*, a shuttle bus) was considered to connect a rail station to an airport, if the two were not contiguous. Stated preference survey findings were modeled to identify the likely mode split for air travelers from outside the region into regional auto, air, rail and bus services. Air volume forecasts, airport accessibility, and survey findings were then used to estimate rail ridership related to air connections, as well as to revise ridership and revenue by corridor and for the system as a whole. The air connect ridership is added to the base level ridership forecast. Additional discussion of the air connect analysis can be found in the September 2000 Project Notebook.

### *4.10.3 Ridership Projections*

The *COMPASS*© demand model was used to produce ridership forecasts on a system, main line and branch line basis. The multimodal forecasting model incorporates the comprehensive database developed for the market analysis (origin-destination, network, socioeconomic and stated preference attitudinal data), the fare structure and analysis described earlier, long-term rail and other modal strategies, and the operating service and equipment selected for the MWRRS and the branch lines.

***Corridor Ridership and Market Shares***

The ridership results by corridor are provided in Exhibit 4-35. The revenue impact will be proportionally smaller than the ridership impact because the air connect passenger trips are much shorter than the average MWRRS intercity trip. This is demonstrated in the shorter-than-average trip length and lower-than-average fares identified for air connect passengers.

**Exhibit 4-35**
**Base System Passenger Trips and**
**Passenger Miles for Full MWRRS Operation in 2025**

| *Corridor* | *Passenger Trips* | *Passenger Miles (Millions)* | *Average Trip Length (Miles)* |
|---|---|---|---|
| Michigan | 3,674,940 | 603.14 | 164.1 |
| Cleveland | 1,120,108 | 252.14 | 225.1 |
| Cincinnati | 894,669 | 213.79 | 239.0 |
| Carbondale | 769,911 | 87.08 | 113.1 |
| St. Louis | 1,757,123 | 336.91 | 191.7 |
| Kansas City | 804,498 | 116.28 | 144.5 |
| Quincy – Omaha | 1,440,132 | 238.04 | 165.3 |
| Green Bay – St. Paul | 4,362,404 | 540.23 | 123.8 |
| Cross Chicago | (2,187,778) | -- | -- |
| **Total** | **14,823,786** | **2387.62** | **161.1** |

The ridership and revenue forecasts for the eight principal corridors used in the financial analysis of the MWRRS are given in Exhibit 4-36. It is estimated that, by 2025, the MWRRS will attract an annual ridership of 14.8 million. (Eliminating double-counting of riders who transfer in Chicago, ridership would be 12.6 million.) There are significant differences between the corridors. Not surprisingly, the forecasts show that Chicago-Michigan, Chicago-St. Louis, Chicago-Cincinnati and Chicago-Twin Cities are the corridors with the largest ridership and market shares in rail. Although the corridors with the lowest market shares are Chicago-Cleveland, Chicago-Carbondale and Chicago-Quincy-Omaha, the analysis shows they are significant components of the MWRRS network.

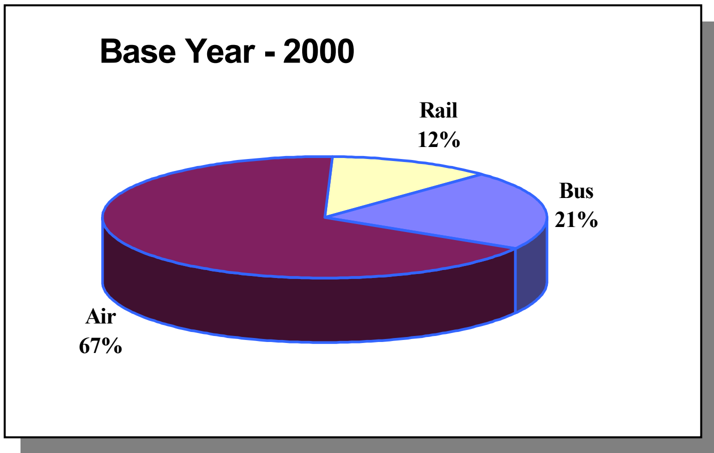
**Exhibit 4-36**
**2025 Passenger Rail Forecasts and**
**Corridor Market Shares for the Intercity Modes**

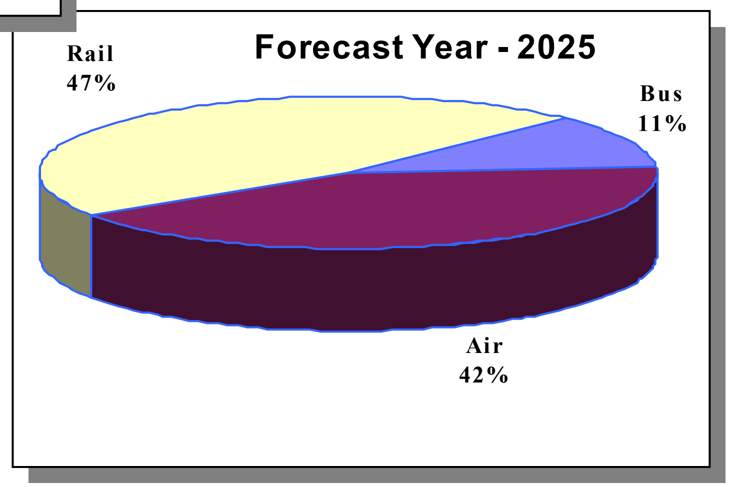
| *Corridor* | *Rail Demand* | *Corridor Market Share (%)* | | | |
|---|---|---|---|---|---|
| | | *Air* | *Bus* | *Auto* | *Rail* |
| Michigan | 3,674,940 | 0.94% | 0.34% | 97.29% | 1.43% |
| Cleveland | 1,120,108 | 1.15% | 0.51% | 97.31% | 1.03% |
| Cincinnati | 894,669 | 3.48% | 0.45% | 93.74% | 2.33% |
| Carbondale | 769,911 | 0.48% | 0.42% | 98.10% | 1.00% |
| St. Louis | 1,757,123 | 2.77% | 0.43% | 94.61% | 2.19% |
| Kansas City | 804,498 | 2.95% | 0.22% | 95.35% | 1.48% |
| Quincy – Omaha | 1,440,132 | 1.25% | 0.17% | 97.45% | 1.13% |
| Green Bay – St. Paul | 4,362,404 | 1.07% | 0.29% | 96.97% | 1.67% |
| Cross Chicago | (2,187,778) | 2.75% | 0.58% | 94.36% | 2.31% |
| **Total** | **14,823,786** | **1.15%** | **0.29%** | **96.41%** | **2.15%** |

Of the total rail ridership forecast for 2025, 6 percent is a result of the natural growth of travel demand in the region, 10 percent is due to increased mobility or induced demand, and 84 percent is due to diverted demand. Induced demand is defined as those trips that would not have been made without the introduction of the overall MWRRS, while diverted demand is the result of travelers changing travel mode. Of the diverted demand for the MWRRS, 58 percent is from auto, 23 percent from bus and 20 percent from air.

By 2025, rail's market share will increase to 47 percent of the intercity public modes, making rail travel as popular as air travel (Exhibit 4-37). The market share for air travel falls by 23 percent because most of the diverted demand for rail is from the air mode.

**Exhibit 4-37**
**Market Shares for the Public Modes**




Average annual station-to-station ridership by corridor and city pair in 2025 is shown in Exhibit 4-38. While these traffic volumes are not additive along the corridor, they do represent the shifts (ons, offs and through-ridership) in activity levels throughout the region.

**Exhibit 4-38**
**Station-to-Station Ridership in 2025**

| *City Pair* | *Number of Riders* |
|---|---|
| ***Milwaukee- Green Bay*** | |
| Milwaukee-Granville | 510,040 |
| Granville-West Bend | 446,375 |
| West Bend-Fond du Lac | 423,827 |
| Fond du Lac-Oshkosh | 389,991 |
| Oshkosh-Neenah | 295,782 |
| Neenah-Appleton | 288,367 |
| Appleton-Green Bay | 99,243 |
| ***Chicago-Milwaukee-Minneapolis*** | |
| Chicago-Glenview | 1,823,621 |
| Glenview-Sturtevant | 1,740,675 |
| Sturtevant-GMIA | 1,538,850 |
| GMIA-Milwaukee | 1,436,260 |
| Milwaukee-Brookfield | 1,358,915 |
| Brookfield-Oconomowoc | 962,052 |
| Oconomowoc-Watertown | 1,016,597 |
| Watertown-Madison | 903,617 |
| Madison-Portage | 530,983 |
| Portage-Wisconsin Dells | 517,035 |
| Wisconsin Dells-Tomah | 497,560 |
| Tomah-La Crosse | 482,059 |
| La Crosse-Winona | 397,234 |
| Winona-Red Wing | 357,088 |
| Red Wing-Minneapolis/St. Paul | 337,306 |
| ***Chicago-Cincinnati*** | |
| Chicago-Gary Airport | 789,350 |
| Gary Airport-Lafayette | 794,381 |
| Lafayette-Indianapolis Airport | 711,678 |
| Indianapolis Airport-Indianapolis | 696,407 |
| Indianapolis-Shelbyville | 304,061 |
| Shelbyville-Greensburg | 300,061 |
| Greensburg-Cincinnati | 295,061 |

**Exhibit 4-38 (continued)**
**Station-to-Station Ridership in 2025**

| *City Pair* | *Number of Riders* |
|---|---|
| ***Chicago-Quincy-Omaha*** | |
| Chicago-La Grange | 1,064,746 |
| La Grange-Naperville | 1,130,123 |
| Naperville-Plano | 879,195 |
| Plano-Mendota | 865,916 |
| Mendota-Princeton | 833,048 |
| Princeton-Kewanee | 314,381 |
| Kewanee-Galesburg | 299,489 |
| Galesburg-Macomb | 132,436 |
| Macomb-Quincy | 62,957 |
| Rock Island-Princeton | 530,081 |
| Rock Island-Iowa City | 305,979 |
| Iowa City-Newton | 151,472 |
| Newton-Des Moines | 133,761 |
| Des Moines-Atlantic | 66,617 |
| Atlantic-Omaha | 66,249 |
| ***St. Louis-Kansas City*** | |
| St. Louis-Kirkwood | 450,247 |
| Kirkwood-Washington | 481,569 |
| Washington-Hermann | 447,572 |
| Hermann-Jefferson | 435,171 |
| Jefferson-Sedalia | 288,977 |
| Sedalia-Warrensburg | 268,456 |
| Warrensburg-Lees Summit | 252,361 |
| Lees Summit-Independence | 202,475 |
| Independence-Kansas City | 186,349 |
| ***Chicago-St. Louis*** | |
| Chicago-Joliet | 1,304,621 |
| Joliet-Dwight | 1,242,250 |
| Dwight-Pontiac | 1,220,536 |
| Pontiac-Normal | 1,206,642 |
| Normal-Lincoln | 987,083 |
| Lincoln-Springfield | 969,551 |
| Springfield-Carlinville | 775,826 |
| Carlinville-Upper Alton | 755,455 |
| Upper Alton-St. Louis | 622,638 |

**Exhibit 4-38 (continued)**
**Station-to-Station Ridership in 2025**

| *City Pair* | *Number of Riders* |
|---|---|
| ***Chicago-Cleveland*** | |
| Chicago-Gary Airport | 971,635 |
| Gary Airport-Plymouth | 979,560 |
| Plymouth-Warsaw | 928,853 |
| Warsaw-Ft. Wayne | 900,611 |
| Ft. Wayne-Defiance | 727,361 |
| Defiance-Toledo | 679,888 |
| Toledo-Sandusky | 425,048 |
| Sandusky-Elyria | 385,152 |
| Elyria-Cleveland | 326,676 |
| ***Chicago-Detroit*** | |
| Chicago-Gary Airport | 2,086,818 |
| Gary Airport-Michigan City | 2,025,731 |
| Michigan City-Niles | 1,991,194 |
| Niles-Dowagiac | 1,991,317 |
| Dowagiac-Kalamazoo | 1,976,870 |
| Kalamazoo-Battle Creek | 1,673,988 |
| Battle Creek-Albion | 1,118,142 |
| Albion-Jackson | 1,101,538 |
| Jackson-Ann Arbor | 1,028,678 |
| Ann Arbor-Dearborn | 802,942 |
| Dearborn-Detroit | 564,955 |
| Detroit-Royal Oak | 236,306 |
| Royal Oak-Birmingham | 118,707 |
| Birmingham-Pontiac | 95,305 |
| ***Battle Creek-Port Huron*** | |
| Battle Creek-East Lansing | 485,987 |
| East Lansing-Durand | 315,279 |
| Durand-Flint | 296,878 |
| Flint-Lapeer | 83,649 |
| Lapeer-Port Huron | 50,390 |
| ***Kalamazoo-Grand Rapids*** | |
| Kalamazoo-Plainwell | 437,281 |
| Plainwell-Grand Rapids | 403,066 |
| Grand Rapids-Holland | 112,494 |

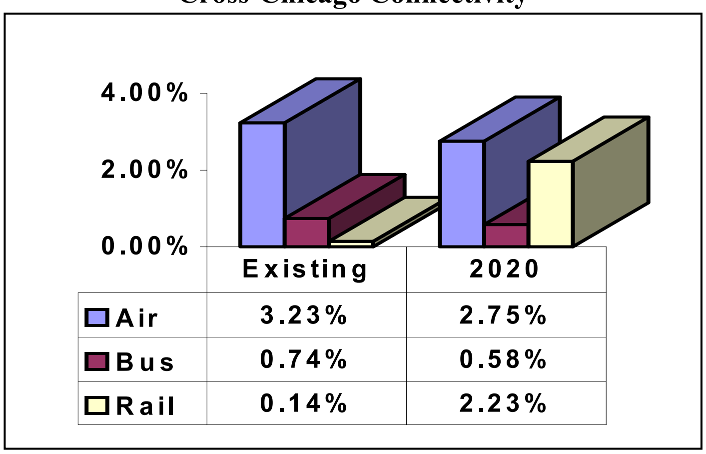
**Exhibit 4-38 (continued)**
**Station-to-Station Ridership in 2025**

| *City Pair* | *Number of Riders* |
|---|---|
| ***Chicago-Carbondale*** | |
| Chicago-Homewood | 608,385 |
| Homewood-Kankakee | 503,138 |
| Kankakee-Rantoul | 430,705 |
| Rantoul-Champaign/Urbana | 410,270 |
| Champaign/Urbana - Mattoon | 267,957 |
| Mattoon-Effingham | 231,879 |
| Effingham-Centralia | 210,705 |
| Centralia-Du Quoin | 202,655 |
| Du Quoin-Carbondale | 198,639 |

***Cross-Chicago***

A cross-Chicago connection is an important factor associated with the MWRRS ridership and revenue. As shown in Exhibit 4-39, most MWRRS cross-Chicago ridership is diverted from the auto and air modes, with a relatively small impact on bus traffic. The effect of improved Chicago connectivity is to raise the level of Chicago connecting trips to an airline-comparable level. Since airline trips are limited here to only those within the MWRRS service area, the overall reduction in competing air traffic is negligible. Bus traffic is not significantly affected since it consists mainly of a small number of non-business trips.

**Exhibit 4-39**
**Cross-Chicago Connectivity**

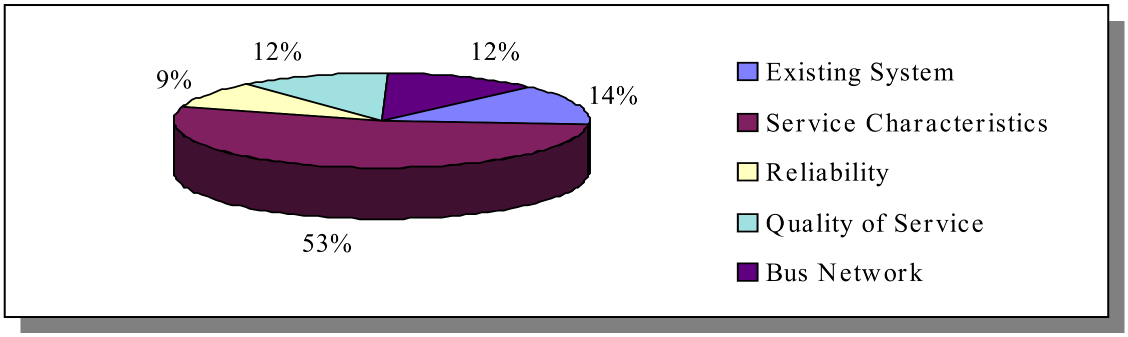



## *4.11 Revenue Projections*

The MWRRS seeks to provide a modern transportation system that would be comparable to air travel, with modern stations, new train equipment and a high level of on-board and station amenities. This type of service will greatly improve the image of passenger rail travel in the

Midwest region and increase passenger confidence in the usefulness and value of the rail mode. To understand the importance of the different elements of the MWRRS service strategy, each element was assessed for its contribution to total revenue. As shown in Exhibit 4-40, 12 percent of the trips are due to the quality of the service, (*i.e.*, comfort, convenience and attractiveness of the system) and 9 percent is due to the reliability of the service.

**Exhibit 4-40**
**Impact of Service Attributes on Moderate Scenario Revenue Forecasts**




The projections for system and corridor-level revenues from passenger fares are presented in Exhibit 4-41.

**Exhibit 4-41**
**Base System and Air Connect Revenues for Full MWRRS Operation in 2025**

| *Corridor* | *Ticket Revenue (millions of 2002$)* | | | |
|---|---|---|---|---|
| | *Base* | *Air Connect* | *Total* | *Air Connect Percent of Base* |
| Michigan | 118.10 | 0.92 | 119.02 | 0.78% |
| Cleveland | 59.77 | 0.57 | 60.34 | 0.96% |
| Cincinnati | 55.42 | 0.00 | 55.42 | 0.00% |
| Carbondale | 22.48 | 0.06 | 22.54 | 0.30% |
| St. Louis | 65.70 | 0.06 | 65.76 | 0.10% |
| Kansas City | 41.37 | 0.53 | 41.90 | 1.30% |
| Quincy-Omaha | 54.73 | 0.76 | 55.49 | 1.40% |
| Green Bay-St. Paul | 156.43 | 1.60 | 158.03 | 1.00% |
| **Total** | **574.00** | **4.50** | **578.50** | **---** |

Revenue streams are not static. Each grows at its own pace. Fare and air connect revenues increase with the growth in ridership associated with the changing socioeconomic characteristics of the region. On-board service (OBS) revenue is estimated at 8 percent of base revenue. This is a higher percentage than Amtrak's current OBS sales percentage; however, it reflects an anticipated increase due to the introduction of trolley carts along with Bistro services. Revenue for the express parcel service is based on forecasts of demand for same-day and overnight services, which are increasing much faster than the growth of freight in general. Exhibit 4-42 summarizes the system-wide increase in revenue of each service category over time.

**Exhibit 4-42**
**System Operating Revenues**
**for 2015 and 2025 (Millions of 2002$)**

| *Revenue Source* | *2015* | *2025* |
|---|---|---|
| Base Revenue | $501.27 | $573.97 |
| Air Connect | $3.92 | $4.50 |
| On-Board Services | $40.10 | $45.92 |
| Bus-Feeder | $6.22 | $7.38 |
| **Total Passenger Revenue** | **$551.51** | **$631.77** |
| Net Express Parcel Service | $27.04 | $40.40 |
| **Total Revenue** | **$578.55** | **$672.16** |

***Summary of Findings***

The study findings to date conclude that rail service in the Midwest region can attract new passengers, primarily from the auto and air markets, by providing improved service and facilities. High quality service that is competitive in terms of time, price, frequency and reliability in conjunction with modern, comfortable stations and state-of-the-art equipment will attract new passengers into the rail market. The analysis of branch lines demonstrates that passengers in smaller communities exhibit travel characteristics very similar to those in large communities, but that special populations, such as students, should be considered independently. The air connect analysis quantifies the small yet important niche market that can be developed through good multimodal connections. On-board food service making use of trolley carts along with bistro service can cover its own cost and provide an attractive amenity for passengers. Ancillary services such as express parcel can increase the profitability of the system with a very low incremental cost based on agreements with existing courier and expedited transportation services.

The passenger rail market analysis confirms there is a substantial market for intercity travel between all the cities on the MWRRS network. In many markets, the MWRRS provides a faster and more cost-effective alternative to auto and bus travel. The MWRRS also provides a more cost-effective alternative to air for urban and rural regions that are accessible to the MWRRS rail service. Furthermore, deregulation has made short-distance air travel more expensive and inconvenient due to additional travel time requirements as flights are often routed through major hubs.

The MWRRS forecasts are considered conservative in that they exclude the impact of land use and travel habit changes that may occur as a result of implementing the MWRRS. Prior experience with the implementation of high-quality passenger rail systems suggests that ridership can potentially increase by a further 20 to 30 percent or more because of such changes. For example, firms with operation centers in lower-cost locations may increase their level of trip making and begin using the MWRRS system to move their staff back and forth to their corporate headquarters in major metropolitan areas. Another example is the potential for increased leisure trips, *e.g.,* basketball, football and hockey games and tourist attractions such as casinos, theme parks, museums and other cultural and entertainment facilities.

One of the primary benefits of the MWRRS is the increased linkages and connectivity it provides throughout the region. An important finding is that 2.2 million trips or 14 percent of total rail ridership is generated from through-Chicago connections. Although 14 percent is much less than the 50 percent and 40 percent share of bus and air ridership that makes a connection in Chicago, it is much greater than rail's current share of regional traffic.

Additional detailed information on the demand and revenue forecasts can be found in Appendix A11.

## *4.12 Express Parcel Service*

### *4.12.1 Introduction and Background*

In 1999, the transport of small parcels and other time-sensitive goods generated $55 billion in revenue in the U.S.[10] Of particular note is a sub-category of time-sensitive delivery services called *express parcel traffic*.

The rapid growth in this market may offer an opportunity for the MWRRS to supplement passenger revenues by participating in the movement of these shipments. Such delivery services have been growing 10 percent annually[11] and have become a routine way of transmitting materials by business and personal users. Same-day delivery is estimated to be 5 percent of the total market revenue. The parcel market is growing rapidly – its explosive growth rate was confirmed by direct interviews with both UPS and FedEx officials. Since the market for express parcel delivery continues to double every 6 years, the industry now struggles to develop sufficient capacity to keep pace with the growth.

To be successful in today's express parcel market, a transportation mode must be able to specify a transit time and meet delivery commitments[12]. As shown in Exhibit 4-43, air and highway are the dominant modes for shipping time-sensitive goods within the U.S. However, a recent trend among shippers has shown that the particular mode used to transport these express packages is becoming increasingly unimportant[13]. Therefore, if a rail system could provide similar service to that offered by alternate modes, rail could develop market share in this rapidly expanding market.

[10] Figure is from 1999.
[11] Growth rate calculation is discussed further in "Analysis of National and Regional Express Parcel Growth Rates" elsewhere in this paper.
[12] Cottrill, Ken. "All in Good Time." In *Traffic World*, December 21/28 1998 (pp 51-52).
[13] Kilcarr, Sean S. "Gaining Ground." In *Air Cargo World*, February 1999 (pp 38-42).

**Exhibit 4-43**
**1999 Estimate of the U.S. Domestic Market for Time Sensitive Shipments**

| *Type of Parcels* | *Quantity of Parcels* | *%* |
|---|---|---|
| Air | 1.5 billion | 36.3% |
| Ground Parcel | 2.5 billion | 60.7% |
| Less than Truckload (LTL) | 0.1 billion | 2.9% |
| **Total** | 4.1 billion | 100% |

Source: The Colography Group, Inc.

### *4.12.2 Opportunities and Pitfalls*

The delivery of time-sensitive materials is an intensely competitive business controlled by a handful of large companies with a national and international presence. These companies have local collection, distribution and package-tracking systems in place. They provide line-haul transportation directly through their own planes and trucks or through contracts with other carriers, including railroads.

However, the way in which the large overnight carriers organize their pickups and deliveries is not conducive to the requirements for same-day service, thereby creating a niche opportunity for a new market entrant such as the MWRRS. A courier for an overnight carrier such as FedEx or Airborne may deliver a large number of packages in a morning delivery run. The more that can be delivered on a single trip, the lower the carriers' unit cost. The incentive is to deliver as many packages on a single trip as possible without returning to the terminal.

In contrast, same-day service requires customized pickup and delivery that moves individual packages directly from point-to-point. There is not enough time to go through the usual sorting or *break bulk* operations. Same-day couriers do not adhere to fixed routes. While some couriers concentrate their operations around airports, many other firms specialize in intra-city delivery and will go between any two addresses in the same city, including rail stations. Local courier firms, which are potential business partners to an MWRRS express parcel service, already exist in all of the major MWRRS cities.

Small local courier firms pay lower wages and are more flexible in their utilization of labor than the large national carriers. These flexible firms could perform pickups and deliveries at a lower cost than the large national firms could. A partnership with the MWRRS would give local couriers an additional premium service to offer at little additional cost, since their own local distribution system and infrastructure are already in place. As such, this partnership represents a value-added service to them since it would not likely displace their existing services, but would enhance their volume and revenue. Nonetheless, individualized pickup and package delivery are very labor intensive, comprising up to 70 percent of the cost of providing same-day, door-to-door service.

However, the ability to offer a door-to-door, not just station-to-station, service is vital to competitive success in this market. A centralized call center is needed to serve as a single point of contact for the customer, to proactively manage service delivery, and to ensure consistently high quality. Wholesale marketing based on price discounting is not an effective sales strategy for this type of operation. *Retail* sales directly to end-users would allow a rail-based service to compete on the quality of its service rather than on its price. Parcel service could be provided by the passenger service operators themselves or by a separate entity under an exclusive licensing arrangement that guarantees the MWRRS a fair share of the revenues.

Rail can compete best in those markets where it has a natural advantage, primarily the central business districts of cities with a MWRRS rail station – in fact, anywhere the rail station is closer to the customer than the airport would be advantageous. Most European rail parcel business originates and terminates within a 15-mile radius of a rail station. Since the cost of providing courier service is largely distance-based, a downtown station provides both a cost and time advantage for using rail to many customers. Shorter distances to the rail station allow faster and cheaper courier service than if packages have to be driven all the way to the airport. Additionally, an MWRRS express parcel service may create new markets for shippers like mail order houses who could offer same-day service to customers at a reasonable cost.

Airlines have long been players in the same-day parcel market; however, airlines by their nature specialize in longer hauls compared to the trip lengths that will be offered by MWRRS. Many smaller MWRRS cities have limited air service. To initiate an air shipment, it may be necessary to drive a package the full distance to the nearest major airport (*e.g.*, Chicago). The need for long courier trips makes same-day delivery cost-prohibitive for many potential users today.

The MWRRS can fill the void left by the decline of regional air service, providing a cost-effective alternative to long courier trips. An MWRRS parcel service could serve many intermediate markets that are not well served by air today. The ability to cost effectively reach these markets would open up new same-day business potential, and not diminish existing business. For the same reasons that many small airports are losing air service, MWRRS parcel service would enjoy a measure of protection from air competition on the short-haul routes served by the MWRRS.

The MWRRS could even complement, rather than compete with, air cargo services by bringing long-haul parcels from outlying areas into the major air shipment hubs. For example, it would be less expensive to ship a parcel from Bloomington, IL to Chicago O'Hare via the MWRRS, than to pay a courier to hand-carry that same package to Chicago. With a MWRRS service, it is envisioned that a highway shuttle would accomplish the last leg of the trip from Union Station to O'Hare. *Air connect* cargo was not included in the MWRRS express parcel forecast, but the potential for developing air cargo feeder traffic should not be neglected.

To summarize, the MWRRS can be attractive to same-day express parcels for exactly the same reasons it is attractive to passengers

- In corridors 300-500 miles in length, rail is faster than auto and just as fast as air. If post 9/11 air security requirements are taken into account, rail is both faster and less expensive than air.
- Rail offers convenient access to downtown and intermediate markets, giving both a cost and speed advantage over air.

- Rail competes with highway and air on speed, reliability and convenience rather than on price.

Because the market requirements for providing express parcel and passenger services are so similar, an express parcel component can be added to MWRRS without fear of degrading passenger service, or introducing conflicting management objectives. To ensure that passenger service is not degraded, the parcel business plan provides dedicated personnel at each station who would handle the loading and unloading of trains. This activity can be accomplished without involving the train crew and within the constraint of the normal station dwell times.

#### *4.12.3 Proposed MWRRS Conceptual Model*

An MWRRS express parcel service could function in two different ways:

- *The system could provide station-to-station service*. An individual would drop off a parcel directly at an MWRRS station, and the receiver of the parcel would pick up the package at the destination stations. Station-to-station service is much less costly than door-to-door service. For example, to move a package from downtown Detroit to downtown Chicago, same-day door-to-door air service costs $175. Airport-to-airport service costs only $65. The downtown location of many MWRRS stations would be convenient to many customers, and could allow many of them to take advantage of lower-cost station-to-station service.
- *The MWRRS operator could enter into partner agreements* with local courier services to provide door-to-door pickup and delivery services. Rail stations' downtown locations would provide a competitive advantage in the cost of courier service in central business districts. Local couriers may be a valuable source of marketing leads, but cannot be relied upon to market or sell an intercity express parcel service for the MWRRS. The MWRRS needs to control its own sales and marketing function; couriers would be relied upon solely for package pickup and delivery.

For example, couriers bring nearly all the business to and from Eurostar's *Esprit* package service. They bring 60 percent of packages to the Swedish firm *Expressgods*. While UPS does ship a few packages, UPS regards *Expressgods*' service as too expensive for regular use. Accordingly, financial projections are based on providing door-to-door retail service. However, if customers choose station-to-station service instead, the parcel operator saves both courier and call-center costs. These savings can be passed through to the customer with no net effect on the bottom-line profitability of the MWRRS parcel service.

The MWRRS business plan is revenue neutral with regard to the choice of door-to-door versus station-to-station service. Because door-to-door service requires more investment, competitive airline pricing suggests that station-to-station service may be more profitable. Door-to-door service would be provided as a necessary accommodation to customer needs rather than as a profit center in itself. For example, if couriers absorb 70 percent of the $175 cost of Detroit-Chicago door-to-door service, that leaves only $53 for the airline, compared to $65 they charge for airport-to-airport service.

Therefore, the MWRRS analysis was based on the conservative assumption of a door-to-door pricing structure, with courier costs immediately absorbing 70 percent of the revenue. Any shift towards station-to-station shipping should only increase the profitability of MWRRS parcel service.

With regard to the offering of corporate accounts, the MWRRS express parcel business plan assumes same-day packages are picked up and delivered individually. Customers who make routine use of same-day service may gain some economies of scale by tendering multiple packages at the same time, which immediately reduces the cost of the courier's service. By scheduling pickups and deliveries on a regular basis, call center costs can be reduced. Accordingly, we believe corporate account arrangements should be revenue neutral since a significant cost savings is possible to offset any price reductions.

The proposed MWRRS same-day delivery service is intended for *time-sensitive* but not *time-critical* shipments. An example of a time-critical movement (which is unlikely for MWRRS) would be the delivery of a replacement part needed to restore a factory assembly line that had shut down – at a cost of thousands of dollars per hour. For such emergencies, a shipper might charter a plane for long distances, or a truck when distances are shorter. FedEx's *Custom Critical* division provides this kind of express freight service – its shipments tend to be larger and heavier than those envisioned for the MWRRS parcel service.

Examples of time-sensitive materials that *could* be candidates for MWRRS same-day service include pharmaceuticals, high-value mail order items, computer parts and discs, auto and machine parts to retail users, letters, legal documents, and cancelled checks.

Greyhound Lines, Inc. already offers shippers a variety of services similar to those envisioned for MWRRS (*i.e.*, an independent service and partnership service). Greyhound's Freight Distribution Division earned roughly $80 million in 1999, which represented approximately 7 percent of Greyhound's revenue for that year[14].

## *4.13 Express Parcel Market Analysis*

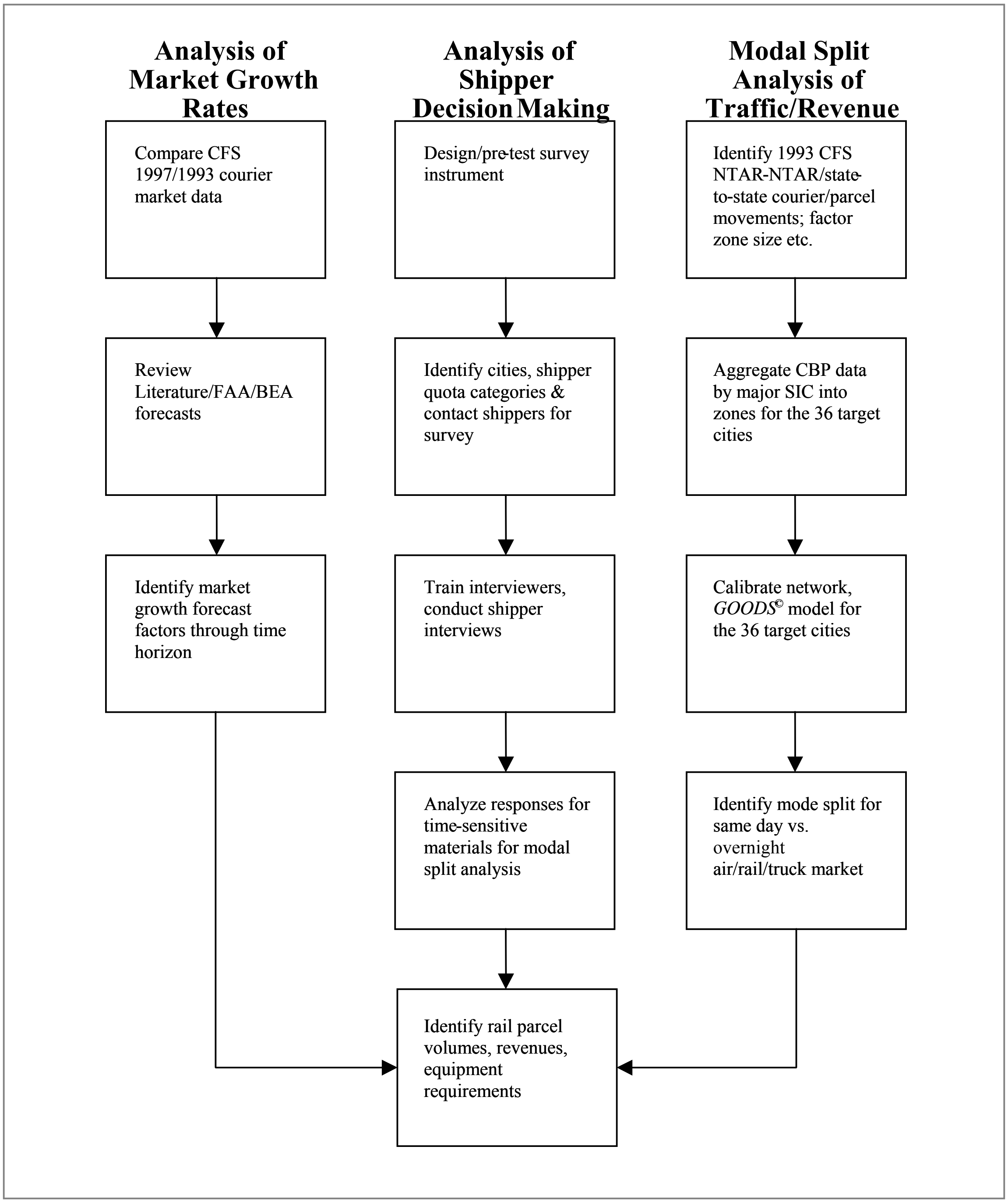
The goal of this market analysis was to thoroughly assess the Midwest express parcel market, in order to provide realistic MWRRS traffic and revenue estimates. A five-step approach was used:

- Interviews with Midwestern shippers to identify the importance of time-sensitive goods movement to business, relative volumes of same-day vs. next-day and second-day shipments, and decision-making criteria
- Interviews with expedited goods movement carriers to identify likely market strategies and potential synergies with local and national couriers and carriers
- Analysis of the growth rates of regional express parcel activity
- Detailed analysis of total parcel movement within the region using the General Optimization of Distribution System© (*GOODS*©) to perform a modal split analysis of base year volume and value of goods
- Identifying the proportion of national time-sensitive goods movement that comprises the same-day market

An overview of the methodology used is depicted in Exhibit 4-44.

[14] Allen, Margaret. "Greyhound Hopes to Team with Package Delivery Company." In *Dallas Business Journal*, January 14, 2000.

## Exhibit 4-44
## Express Parcel Analysis Methodology




**List of acronyms used in the above exhibit:**

| | | |
|---|---|---|
| CFS | = | Commodity Flow Survey |
| NTAR | = | National Transportation Analysis Region |
| FAA | = | Federal Aviation Administration |
| BEA | = | Bureau of Economic Analysis |
| SIC | = | Standard Industrial Classification |
| CBP | = | County Business Pattern |

### *4.13.1 Interviews with Shippers in the Midwest Region*

Interviews were conducted with shippers to identify the importance of time-sensitive goods movements, relative volumes of same-day vs. next-day and second-day shipments and decision-making criteria. Eighty-eight interviews were completed representing manufacturing, service and wholesale/retail sectors. These businesses account for about 200,000 annual shipments. The survey questions asked are given in the September 2000 Project Notebook.

Interviewees indicated considerable interest in the concept of an express parcel service on the MWRRS and provided statistical information for determining demand. An important finding of the survey is that same-day shipments represent about 5 percent of total time-sensitive shipments.

This finding excludes the anomaly of the Federal Reserve Bank of Chicago's check-processing center (known as the Clearinghouse). The volume this single customer generates, all of which is handled on a same-day basis, represents 1,000 inbound and 500 to 600 outbound shipments per week, ranging in weight from 1 to 100 pounds. If the Federal Reserve Bank had been included in the survey, the same-day portion of the total expedited parcel market would increase to 45 percent. The business plan did not assume that the MWRRS captured any of the Clearinghouse's business.

### *4.13.2 Interviews with Expedited Goods Movement Carriers*

Interviews with expedited goods movement carriers identified likely market strategies and potential synergies with local and national carriers. A telephone survey of fifteen expedited service providers was conducted to determine their thoughts on how their company could potentially interface with the MWRRS. Additionally, direct meetings were held with officials from both FedEx and UPS. Overall, there was strong support for the concept of a MWRRS express parcel service.

Since 1999, there has been an increase in the electronic transmission of documents. However, cyber-security on the Internet is still perceived as a problem, which is driving a portion of the demand for same-day courier services. There are many circumstances where a paper document is still preferred or required, as in the delivery of business proposals. Interviews with FedEx in 2003 confirmed that the express parcel market is continuing to grow at 10 percent per year, in spite of Internet use and the current recession.

***Market Opportunities***

Through interviews with carriers, it was made clear that many saw the MWRRS service as a possible substitute for same-day air but not as a substitute for next-day truck movements. Reliability was seen as a key issue, as was the time required for getting the shipments to the express courier upon arrival at the station. A major problem with using an air service is the time required to get the shipment from the air carrier at its destination. Infrequent departures and high airline pricing were other issues. Recently, security concerns have hampered some air carriers. Lastly, the carriers determined that the MWRRS level of scheduled service is more than sufficient to attract users.

### *Pricing*

Respondents believe that line-haul costs would need to be about 75 percent of air costs to break into the station-to-station parcel market. Carriers indicated that their local pick-up and delivery networks represent a significant portion of the cost of operation. For this type of service, the line-haul portion of revenue should represent no more than 40 percent of the total, and possibly less, depending on the distance and other options available. For the MWRRS, a same-day parcel movement price of $50, nearly $15 less than airline prices for airport-to-airport service, appears to meet the need of the market.

### *Location*

Carriers indicated that most express parcel movements originate in suburban areas; therefore, a suburban rail station would be of value in larger cities. However, carriers also indicated there is a niche downtown business market where rail could excel with short pick-up and delivery times to downtown customers. In cities with a population of less than 1 million, a single downtown rail station is clearly satisfactory.

### *4.13.3 Analysis of National and Regional Express Parcel Growth Rates*

A literature review was conducted to assess issues and trends in the express parcel market. Sources included the ENO Foundation, *Air Cargo World*, *Traffic World* and other trade publications, as well as the American Trucking Association. This was supplemented by information directly gathered from courier companies and through user interviews. It was determined that a 10 percent annual growth rate was reasonable through 2010, based on the assumption that overnight shipments have been increasing at more than 10 percent annually and that same-day shipments are perceived as the next growth threshold for time-sensitive shipments. Discussions in 2003 with expedited goods carriers have confirmed the continuance, even in the current recession, of a greater than 10 percent annual growth rate.

### *4.13.4* **GOODS©** *Analysis of Same-Day Parcel Movement Potential*

*GOODS©* (General Optimization of Distribution Systems) is a modeling framework designed to support the analysis of parcel traffic flows at the regional level. *GOODS©* is structured on two principal models: Total Demand Model and Hierarchical Modal Split Model.

To determine what portion of the national parcel is accessible to the MWRRS, the 1993 Commodity Flow Survey (CFS) data were used. The Bureau of Transportation Statistics, a division of the U.S. Department of Transportation, administers the CFS. The survey consists of a sample of 200,000 domestic establishments (randomly selected from roughly 800,000) engaged in mining, manufacturing, wholesale, auxiliary establishments (warehouses) and selected establishments in retail and service. The database offers detailed information concerning the origin and destination of the shipment (*i.e.*, zip code), the 5-digit Standard Classification of Transported Goods (SCTG) code, weight, value and mode(s) of transport.

The 1993 CFS was the most up-to-date information available at the time of the analysis. CFS data was used to estimate the underlying origin-destination demand pattern, not to determine the overall size of the market. Clearly not all parcel shipments included in the CFS can be considered candidates for the MWRRS same-day parcel service. Because of this, the data was segmented in order to identify the components of the parcel market that could be considered for MWRRS same-day parcel service.

The first step was to segment the market on a geographical and commodity basis. CFS data reports the shipment origin and destination based on the National Transportation Analysis Region, or NTAR. Only Midwest region NTARs served by the MWRRS (in which nearly one-fourth of the entire U.S. population lives) were considered part of the MWRRS market. The 17 NTARs in the MWRRS market area include:

- Cleveland
- Cincinnati
- Columbus
- Toledo
- Detroit
- Grand Rapids
- Lansing/Kalamazoo
- Fort Wayne
- Indianapolis/Champaign
- Chicago
- Milwaukee/Madison
- Appleton/Green Bay
- Minneapolis/St. Paul
- Des Moines/Cedar Rapids
- Kansas City, MO
- Springfield, MO
- St. Louis/Quincy/Springfield, IL

Five filters were then applied to the CFS origin-destination data to estimate the parcel traffic that might be accessible to the MWRRS:

- Traffic to, from or between non-MWRRS NTARs was excluded. This filter excludes most air-competitive, long haul traffic that the MWRRS might nonetheless handle in a feeder air connect service.
- Parcel movements whose origin and destination were within the same NTAR were eliminated as potential candidates for the MWRRS express parcel service; local couriers would dominate in this market segment.
- NTAR city pairs that are too far apart to allow for same-day service on the MWRRS were excluded, (*e.g.*, Cleveland to Omaha with a travel time of 10 hours) whereas NTAR pairs 3-4 hours apart were considered excellent candidates.
- The analysis compared MWRRS station locations with NTARs to determine the area in which express parcel service may be feasible (*i.e.*, some NTARs are geographically very large). Since not all parts of the region could be reached in time for the same-day service, a "shrinkage" factor was applied to each NTAR pair based on the zone size, distance between city pairs, population density and limited access from some parts of each NTAR to the MWRRS.
- Unsuitable types of goods not appropriate for transport on the MWRRS were eliminated. Excluded commodities include mining, construction, agriculture, forestry and fishing, and chemicals. The major commodity groups allowed to remain in the sample include light manufacturing, heavy manufacturing, food and beverage, wholesale, retail, and finance, insurance, real estate services and public administration.

Geographic and commodity filters, when applied to the CFS data, eliminated 88.58 percent of the market from further consideration, such that only 11.42 percent of U.S. parcel movements were identified as suitable for a MWRRS service.

The CFS gives the total value of goods carried in the parcel market, not the amount of freight revenue earned through transport of those goods. As previously noted, the U.S. market for time-sensitive freight was estimated at $55 billion for 1999. The total amount of parcel revenues potentially available to the MWRRS is equal to 11.42 percent of $55 billion, or $6.3 billion. This was considered reasonable given the 25 percent population share of the Midwest region.

However, as discovered in the stated preference survey, only 5 percent of the total market for express parcel service is for same-day service. The total size of the 1999 MWRRS express parcel market was therefore estimated at $314 million in 1999 dollars.

Given this market demand, a modal split model was used to estimate what percentage of shippers would benefit from this improved mode of travel, and therefore might utilize this mode. Because air service is weak in many MWRRS intermediate markets, much of the market potential for same-day service remains unexploited today. In major markets where MWRRS must compete with air, the modal split model took into account the characteristics of the different modes along with the stated preferences of customers.

Considering line-haul and access/egress travel times and the costs of various alternatives, *GOODS®* estimated that MWRRS passenger service could attain an 18.5 percent share of the MWRRS-accessible market or an annual revenue of $58.1 million in 1999 dollars[15].

Express parcel operators indicated that local courier services would consume 70 percent of origin-destination revenue, or $117 per package. At taxicab rates, $117 would be sufficient to cover the cost of a 70-mile delivery, giving a 35-mile range around both origin and destination rail stations. However, since most packages originate and terminate within a 15-mile radius, courier cost will most likely be less. The business plan conservatively assumes that MWRRS passes courier cost savings back to customers, keeping only $50 for itself. By comparison, the line-haul air price (Chicago to Detroit) is $65 per shipment.

Of the $58.1 million in door-to-door revenue, the MWRRS is expected to retain only about 30 percent of the total, or $17.4 million (based on in 1999 shipping volumes) with the remaining 70 percent going to pickup and delivery couriers. These calculations are summarized in Exhibit 4-45.

[15] The General Optimization of Distribution Systems (*GOODS®*) freight demand model was designed to support the analysis of freight traffic flows at the regional or urban level. The model uses a generalized cost approach to distribute shipments among the various modes. The model uses a nested logit structure, calibrated to model intercity modal choices available in a given study area. It predicts shippers' decisions based on the assumption that the shippers will act in a manner that minimizes their costs.

**Exhibit 4-45**
**1999 MWRRS Market for Express Parcel Service**

| | *CFS 1993 Parcel Value (Millions)* | *Time-Sensitive Carrier Revenue (Millions)* | *Percent of Total* |
|---|---|---|---|
| Total U.S. Market | $563,603 | $55,000 | 100.00% |
| Geographic Distribution: MWRRS-Accessible Origin and Destination | $64,352 | $6,281 | 11.42% |
| 5% of Time-Sensitive is Same-Day | - | $314 | 0.571% |
| 18.5% Forecasted Share of MWRRS-accessible Traffic | - | $58.1 | 0.106% |
| 30% MWRRS Revenue split with Couriers | - | $17.4 | 0.0316% |

*Source: 1993 Commodity Flow Survey from U.S. Department of Transportation, Shipper and Carrier Interviews in 1999.*

## *4.14 Forecasts*

Growth rates were applied to the 1999 revenues to forecast the future growth of the system. During the analysis, it was assumed that current double-digit growth rates of the parcel market would gradually slow. The growth rates used in the forecast years of 2010, 2020 and 2030 are 10 percent, 8 percent and 6 percent, respectively. By applying these growth rates, 1999 base year revenue would grows to $49.6 million in 2010, $107.2 million in 2020, $191.9 million in 2030 and $343.7 million in 2040, as seen in Exhibit 4-46.

**Exhibit 4-46**
**Forecasted Revenue for MWRRS Express Parcel Service**

| | *Revenue (Millions)* | *Comment* |
|---|---|---|
| Control Year 1999 | $17.4 | |
| Growth to 2010 | $49.6 | Growth Rate from 1999 – 2010 = 10% |
| Growth to 2020 | $107.2 | Growth Rate from 2010 – 2020 = 8% |
| Growth to 2030 | $191.9 | Growth Rate from 2020 – 2030 = 6% |
| Growth to 2040 | $343.7 | Growth Rate from 2030 – 2040 = 6% |

### *4.14.1 Discussion of Results*

This study suggests that there is high revenue potential for a same-day MWRRS parcel service. Next-day and other express parcel services could add even more revenue. The key to a successful express parcel service will be not only to allow direct station-to-station movements by individuals and businesses, but also to provide door-to-door service through partnership agreements with courier services.

The analysis indicates that the MWRRS can carry express parcels profitably and add significant revenues to the rail system, while capturing no more than a 0.106 percent share of the U.S.

market for express parcels, even though 25 percent of the U.S. population lives within the MWRRS service area. Projected package counts are given in Exhibit 4-47.

**Exhibit 4-47**
**Projected Daily MWRRS Package Counts in 2014**

| *NTAR Zone* | *Shipped* | *Received* | *Transfer* | *Total Pkgs* |
|---|---|---|---|---|
| Chicago-Peoria, IL-Davenport, IA | 1,247 | 2,008 | 1,001 | 4,256 |
| Milwaukee-Madison, WI-Dubuque, IA | 552 | 603 | 173 | 1,327 |
| St Louis-Springfield, IL | 562 | 210 | 0 | 772 |
| Detroit, MI | 424 | 340 | 0 | 764 |
| Cleveland-Youngstown, OH | 388 | 295 | 0 | 683 |
| Indianapolis, IN- Champaign, IL | 350 | 329 | 0 | 679 |
| Minneapolis/St Paul, La Crosse, WI | 325 | 347 | 0 | 672 |
| Kansas City, MO- Topeka, KS | 148 | 261 | 0 | 409 |
| Fort Wayne-South Bend, IN | 205 | 201 | 0 | 406 |
| Appleton-Green Bay-Wausau, WI | 262 | 84 | 0 | 346 |
| Grand Rapids-Saginaw, MI | 222 | 112 | 0 | 334 |
| Cincinnati, OH | 146 | 138 | 0 | 284 |
| Lansing-Kalamazoo, MI | 164 | 116 | 0 | 279 |
| Toledo, OH | 93 | 59 | 114 | 266 |
| Des Moines-Cedar Rapids-Waterloo, IA | 120 | 105 | 0 | 225 |
| **Total Volume Forecast** | **5,208** | **5,208** | **1,288** | **11,702** |