MinnesotaGO

A Collaborative Vision for Transportation

State Aviation System Plan

MINNESOTA DEPARTMENT OF TRANSPORTATION

LAST UPDATE JULY 2013

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Chapter 3

FORECAST

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FORECAST

This chapter summarizes the aviation forecast prepared for the Minnesota SASP and presents the primary factors that affect aviation activity and based aircraft numbers at system airports. This forecast is used throughout the Plan to identify where aviation activity is occurring today and where activity is expected to occur over the next twenty years. These forecast activity levels are also used to identify needs at individual airports as well as understand trends in the airline, business, cargo, and military sectors.

This forecast is demand driven and was developed using a Federal Aviation Administration approved system planning methodology. It considers the aviation system on a broad, statewide level and uses forecasted socio-economic factors, outlined in subsequent sections of this chapter, to determine demand at individual airports. This methodology is ideal for system planning because it is applied to all airports uniformly regardless of site constraints. It is acknowledged that certain difficult to predict events may take place (e.g. results of elections, changes to environmental regulations) that may alter aviation demand at one or many airports. However, in general while demand may increase or decrease at an individual airport, total demand across the system remains fairly constant.

Forecasts of the four largest categories of aircraft activity were prepared. They are: general aviation (GA), airline service, cargo service, and military operations (see **Table 3-1**). The remainder of this chapter presents a summary of the comprehensive forecast developed for the Plan. The complete forecast technical report is found in **Appendix C: Forecast Technical Report**, including individual airport forecasts.

Table 3-1: Major Aircraft Activities

GENERAL AVIATION	AIRLINE SERVICE	CARGO SERVICE	MILITARY OPERATIONS
Aircraft Operations	Aircraft Operations	Aircraft Operations	Aircraft Operations
Operations Type	Passenger Enplanements	Cargo Volume	
Based Aircraft			
Peak Hour Demand			

Forecast Planning Periods

This Plan's forecast is based on a twenty-year planning horizon which is subdivided into three periods for analysis purposes (see **Figure 3-1**) - short-term (2011 to 2015), mid-term (2016 to 2020), and long-term (2021 to 2030).

Presenting forecast information in three time periods should help develop an understanding of the needs of the system on a macro level. Five year increments for the short-term and mid-term periods provide a level of detail sufficient to identify where changes can be expected in coming years; the subsequent ten year period provides a less precise view of where the system could be headed beyond the immediate future. In subsequent sections of this Plan, information is presented within these timeframes.

Figure 3-1: Forecast Timeframes

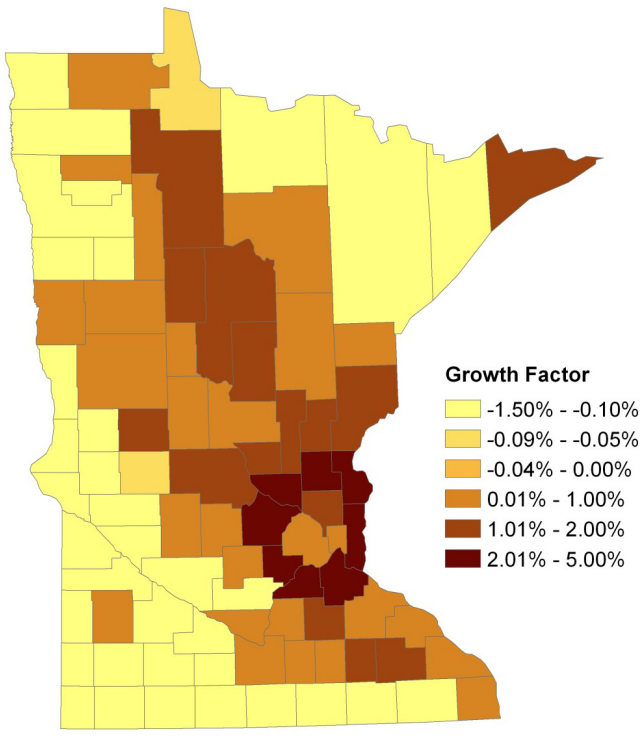
Aviation activity is expected to grow in Minnesota over the next twenty years, but not as rapidly as forecast in previous plans due to recent considerable changes in the aviation industry and national economy. The airline service and cargo service industries are currently experiencing business focused changes, resulting in companies doing more with less. Airlines are using larger aircraft and putting more passengers on each departing flight, while cargo companies are consolidating networks to accommodate more tonnage with fewer flights.

The data summarized in this chapter and in **Appendix C: Forecast Technical Report** are clear indicators that the aviation industry is still growing. The data are used in the following chapters to determine the infrastructure that will be necessary to maintain the state's aviation system while meeting the future demands of the aviation industry and the people of the Minnesota.

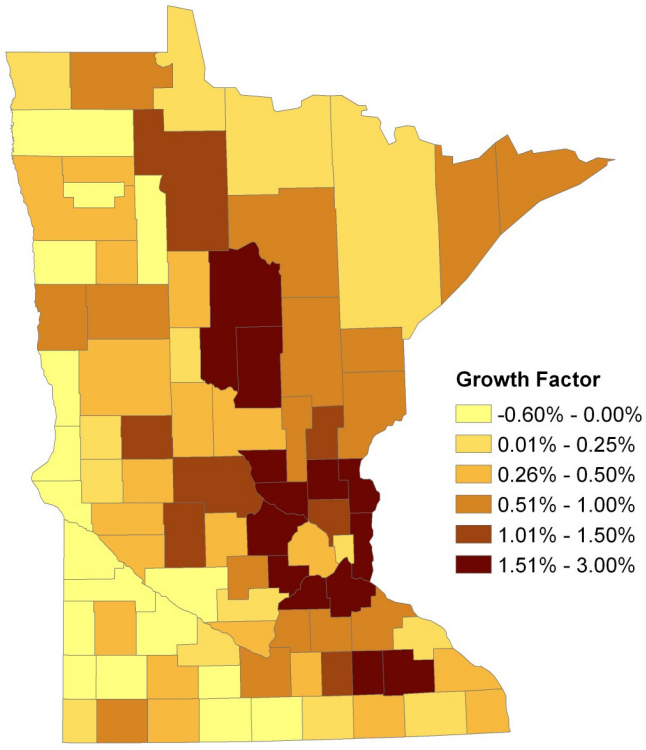
General Population Trends

The Minnesota State Demographer's Office predicts an average annual population growth rate from 2011 to 2030 of approximately 0.96 percent. Since the Demographer's Office only produces forecasts on population and labor force, other key socio-economic parameters such as total income, per capita income and employment were obtained from the Woods & Poole's Complete Economic and Demographic Data Source (CEDDS) database,[2] the Bureau of Economic Analysis (BEA),[3] and the Bureau of Transportation Statistics (BTS). Minnesota's population growth has trailed the U.S. overall pace from 1970 to 2010; U.S. population grew 1.05 percent annually whereas the state grew 0.83 percent each year. Based on the Woods & Poole CEDDS, the U.S. population increase will slow to an annual rate of 0.94 percent while the state will accelerate to 0.96 percent. **Figure 3-2** shows both historical and forecasted population growth.

Figure 3-2: Population Growth



Historical (1970-2010)



Forecast (2011-2030)

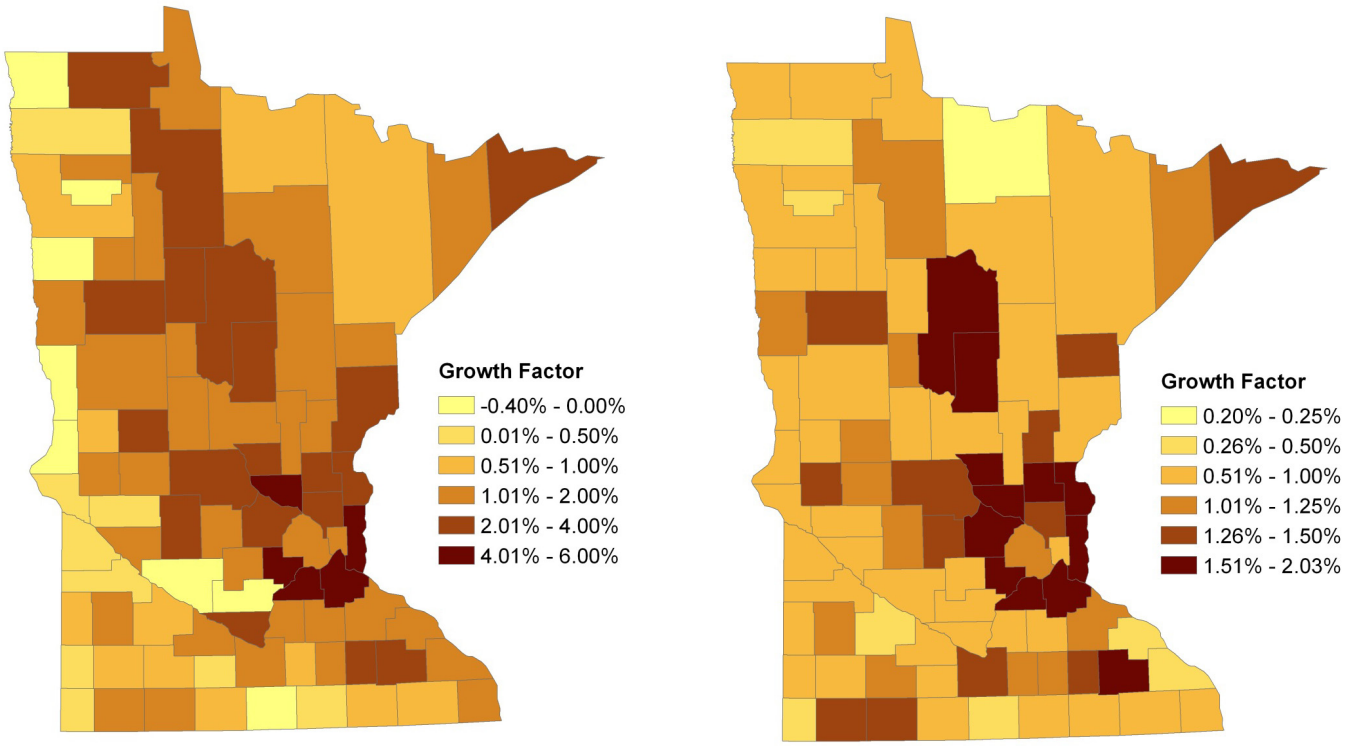
Note: Forecasted numbers rounded
Source: BTS T100 Data & HNTB Analysis

2 The Complete Economic and Demographic Data Source (CEDDS). http://www.woodsandpoole.com/, Woods & Poole. 2011.

3 GDP and Personal Income, Regional Data. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2. U.S. Department of Commerce, Bureau of Economic Analysis. Accessed July 2011.

Historically, Minnesota has enjoyed a higher employment growth rate than the U.S. average (1.84 percent annually compared with U.S. average of 1.63 percent from 1970 to 2010). This trend is expected to continue according to Woods & Poole, whose forecasts estimate the state employment growth rate to be slightly higher than average. **Figure 3-3** shows both historical and forecasted employment growth.

Figure 3-3: Employment Growth



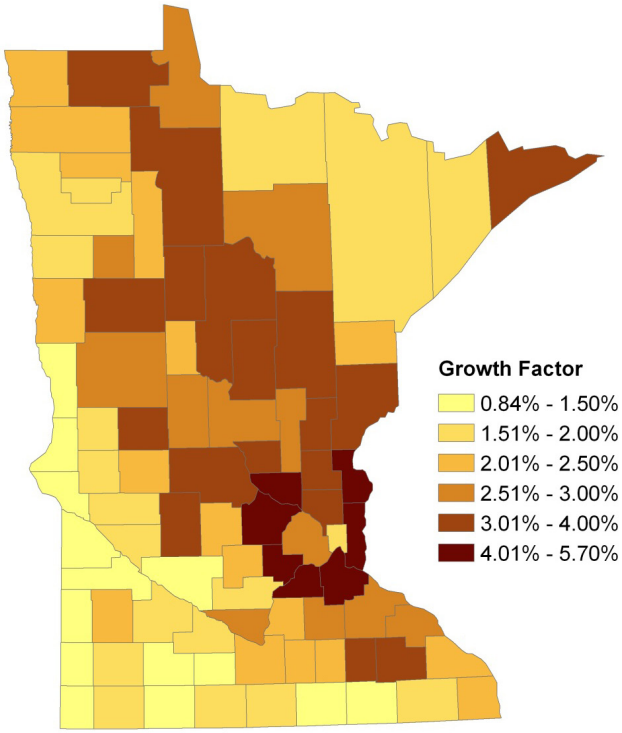
Historical (1970-2010)

Forecast (2011-2030)

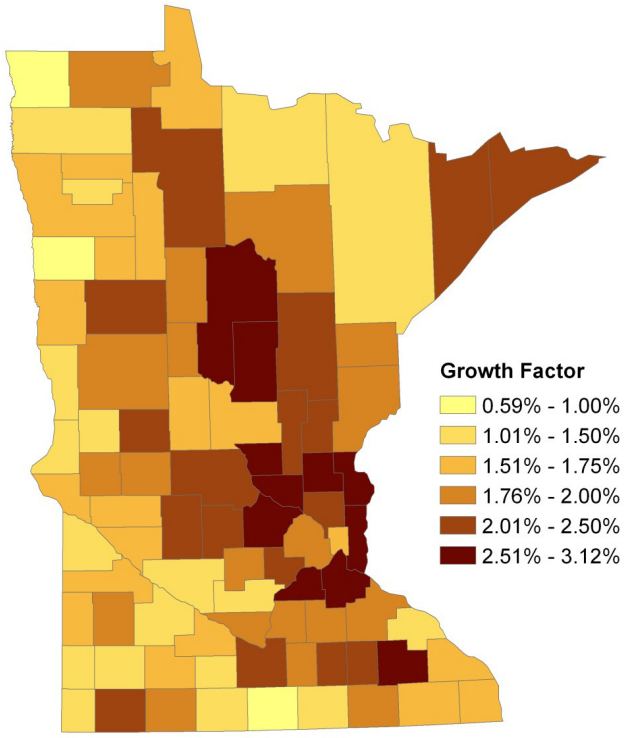
Note: Forecasted numbers rounded
Source: BTS T100 Data & HNTB Analysis

Meanwhile, the state total income growth rate is projected to be slightly lower than the overall U.S. average, consistent with historical trends. From 2011 to 2030, state personal income is expected to grow at an average of 2.18 percent each year according to the Woods & Poole forecasts. For the same period, the state employment figure is projected to increase by an average rate of 1.17 percent annually. **Figure 3-4** shows both historical and forecasted income growth.

Figure 3-4: Income Growth



Historical (1970-2010)



Forecast (2011-2030)

Note: Forecasted numbers rounded
Source: BTS T100 Data & HNTB Analysis

Two areas of Minnesota are projected to experience the fastest development in the state. The first area encompasses suburban counties surrounding the Twin Cities area including Carver, Scott, Dakota, Washington, Chisago, Isanti, Sherburne, and Wright counties. These counties also comprise part of the Minneapolis – St. Paul – Bloomington Metropolitan Statistical Area (MSA). The more urban counties including Hennepin, Anoka and Ramsey are expected to experience more moderate growth. The second growth area consists of the Brainerd Micropolitan Statistical Area including Cass and Crow Wing counties. Thanks to rich natural resources, tourism and low county taxes,[4] these two counties are projected to witness the fastest growth in the outstate area.

Finally, it is also important to note that the Minnesota State Council on Disabilities reports that disabled citizens now comprise 20 percent of the population and demographic trends indicate that this number will continue to increase. As both statewide air travel and disability numbers rise, airports will face growing demand for accessibility for all passengers and employees.

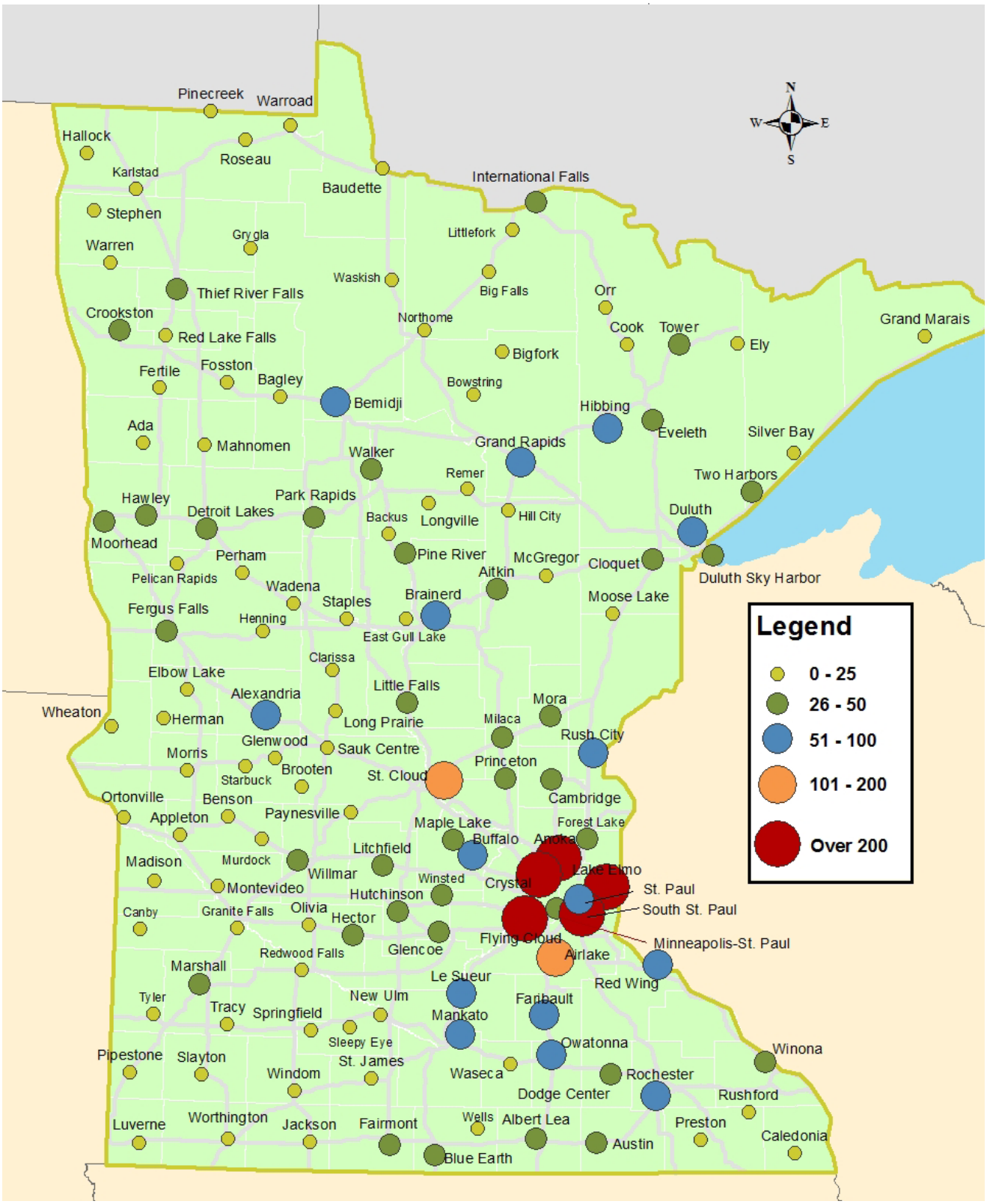
[4] Cass County Economic Development Corporation. http://www.casscountyedc.com/. Accessed September 2011.

Base Year Aviation Activity Levels

The aviation industry has undergone significant changes over the past few years. Between December of 2007 and June of 2009, the United States experienced one of the most severe recessions in recent history resulting in substantially reduced levels of aviation activity. Furthermore, a spike in oil prices in the summer of 2008 applied pressure on airline operating costs which among other outcomes, resulted in major airline mergers. In addition to these industry wide changes, the general economic indicators used by the FAA to forecast aviation activity are at markedly different levels than in previous forecasts.

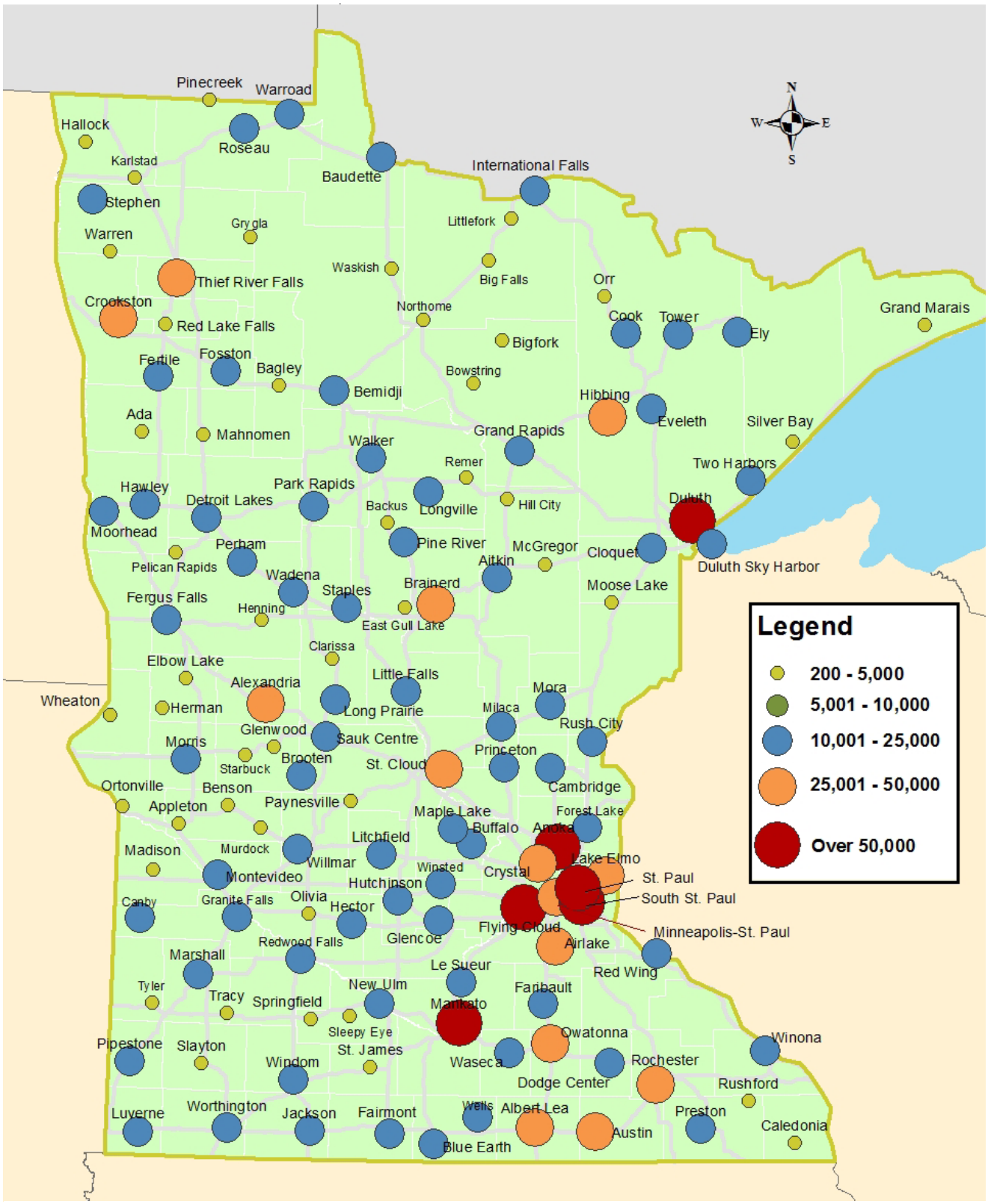
The base year for this forecast is 2010 and the data collected for that year is considered as a baseline. The most important baseline data sets used to develop this forecast are the number of based aircraft at each airport, and the number of annual aircraft operations at the airport. These are depicted for each airport in **Figure 3-5** and **Figure 3-6**. Data was gathered through both the inventory process described in **Chapter 2: Inventory** as well as electronic sources that gather and maintain industry statistics. The various data sources were resolved against each other to establish the baseline aviation activity data that serves as a major foundation of this Plan. Other important baseline data, discussed later in this chapter, are the amount of airline and cargo activity at individual airports.

Figure 3-5: System Airports by the Number of Based Aircraft - Base Year (2010)



Source: MnDOT Office of Aeronautics 2011 Inventory Survey and Airport Database & HNTB Analysis

Figure 3-6: System Airports by the Number of GA Operations- Base Year (2010)



Source: MnDOT Office of Aeronautics 2011 Inventory Survey and Airport Database & HNTB Analysis

General Aviation Relevant Factors

Key factors affecting the state's aviation activity are the economy and the cost of services. The economy determines the size of a potential market and the cost of services determines how much of the potential demand is actually realized. Another important factor affecting aviation activity is competition; which may be from other airports, other transportation modes, or may even be competition from products on which consumers choose to spend their discretionary dollars. Finally, infrastructure providing access both at and around the airport is a factor affecting how an airport is utilized. Two main factors influencing aviation activity in Minnesota that were considered in developing this forecast are state demographic and socioeconomic factors, and fuel prices.

SOCIOECONOMIC CHARACTERISTICS

The socioeconomic characteristics of an airport's service area are usually the most influential factor driving demand. Socioeconomic characteristics used in this forecast include population, employment rate, per capita income, and total income. In general, as these socioeconomic factors deteriorate in an area, demand for aviation activity also deteriorates. The opposite is also true; as these factors increase so does aviation activity.

JET FUEL PRICES

Jet fuel is a significant cost for both General Aviation (GA) and the airline industry. Given the fuel price increases noted earlier in this chapter, jet fuel costs have overtaken personnel expenses as the top cost category for airlines. Jet fuel costs jumped 36.1 percent in 2011 compared with 2010, and have remained the industry's largest expense category at about 35 percent of total operating costs.[5] Twenty-five airlines went bankrupt or ceased operations in the first half of 2008, largely due to fuel costs.[6]

The impact of high fuel prices is more direct for GA users. The GA community paid nearly twice the price per gallon of fuel than the airline industry[7] resulting in significant changes in user behavior to minimize fuel consumption.[8] In April 2012 , jet fuel prices remained above $3.00 per gallon.[9] In general, as fuel prices increase, costs to aviation users increase and aviation activity decreases.

5 U.S. Airlines Post Lower Earnings in 2011 Due to Rising Costs, Airlines for America, http://www.airlines.org/Pages/news_2-28-2012.aspx, accessed Apr 2012

6 More airlines fold as fuel prices soar: International Air Transport Association, http://news.asiaone.com/News/Latest+News/Business/Story/A1Story20080708-75407.html, accessed Apr 2012

7 When Fuel Costs Spike, Everyone in General Aviation Is Impacted, National Business Aviation Association (NBAA), accessed Apr 2012

8 General Aviation Activity Declines, Behaviors Change, National Business Aviation Association (NBAA), http://www.nbaa.org/advocacy/issues/economic-downturn/highfuel-prices.php, accessed Apr 2012.

9 Jet Fuel Price Monitor. http://www.iata.org/whatwedo/economics/fuel_monitor/Pages/index.aspx, IATA Economics, accessed Apr 2012.

General Aviation

General Aviation (GA) refers to all flights that are not scheduled airline service, non-scheduled charter service, cargo service or military activities. GA makes up the largest part of aviation activity not only in Minnesota, but in every state. Accordingly, it has a significant presence at every system airport, with the majority of the system airports having only GA activity. Some of the more easily recognizable GA activities around the state include agricultural spraying and seeding, business related transportation, law enforcement, firefighting, aerial surveying and search and rescue. The GA activity forecast includes based aircraft, fleet composition, and operations.

The number of based aircraft was projected using three methodologies: market share analysis, trend line analysis, and application of FAA growth factors. The market share analysis compared the historic number of GA aircraft based at system airports to the total historic number of GA aircraft in the US.

Trend lines developed to forecast future market share were first applied to the FAA's future national GA fleet forecast and then utilized to generate Minnesota's GA based aircraft forecast. The trend line analysis projected the future fleet based directly on the historical trend, without adjustment for market share.

The FAA's Terminal Area Forecasts (TAF) for GA aircraft in the state were used to calculate average annual growth factors. These growth factors were used as the third forecast alternative.

The average of all three forecast methods was selected as the preferred forecast and is utilized in the Plan. The based aircraft forecasts were then allocated to each airport based on its current fleet composition and forecasted total income growth within each airport's catchment area (area used for this analysis from which it was assumed an airport would draw its customers). The number of operations per aircraft type was derived from the FAA General Aviation and Air Taxi Activity (GAATA) surveys. This rate was applied to the based aircraft to estimate operations by each category. **Table 3-2** summarizes the based aircraft and operations forecasts and growth rates established for the GA activity. Additional information and historic data is included in **Appendix C: Forecast Technical Report**.

Table 3-2: GA Based Aircraft and Operations Summary

GA BASED AIRCRAFT AND OPERATIONS		
YEAR	BASED AIRCRAFT	OPERATIONS
2010	5,100	1,743,000
2015	5,500	1,870,000
2020	5,700	1,978,000
2030	6,100	2,388,000
AVERAGE ANNUAL GROWTH RATE		
2010-2015	1.4%	1.4%
2010-2020	1.1%	1.3%
2010-2030	1.0%	1.6%

Note: Forecast numbers rounded
Source: FAA TAF, BTS T100, Woods & Poole, and HNTB Analysis

Based aircraft are forecast in the short-term to grow more quickly, 1.42 percent annually, than in the long–term, 0.94 percent annually. It is also expected that the growth in total GA operations will fluctuate: increasing at 1.42 percent annually in the short-term, slowing down to 1.28 percent annually from 2010 to 2020, and returning to 1.59 percent from 2010 to 2030. As a comparison, the FAA aerospace forecast projects the GA fleet to increase nationally 0.6 percent annually in the mid-term (1.15 percent in Minnesota) and 0.91 percent in the long-term (0.96 percent in Minnesota).

Table 3-3 details the based aircraft forecast by aircraft type. Less advanced aircraft types, including piston and turboprops, are expected to grow at relatively lower rates than more sophisticated jets. Light-sport aircraft represent the fastest growing category, consistent with the FAA's forecast.

Table 3-3: GA Based Aircraft Forecast by Aircraft Type Summary

GA BASED AIRCRAFT AND OPERATIONS							
YEAR	SINGLE-ENGINE PISTON	MULTI-ENGINE PISTON	TURBOPROP	JET	LIGHT-SPORT AIRCRAFT	MILITARY	OTHER
2010	4,100	310	110	170	90	30	230
2015	4,400	320	120	210	120	40	240
2020	4,600	320	120	240	150	40	260
2030	4,900	340	140	290	190	40	270
AVERAGE ANNUAL GROWTH RATE							
2010-2015	1.3%	0.3%	0.4%	4.3%	5.8%	1.7%	1.0%
2010-2020	1.0%	0.4%	0.8%	3.5%	5.3%	1.4%	1.0%
2010-2030	0.8%	0.4%	0.9%	2.6%	3.8%	1.1%	0.8%

Note: Forecast numbers rounded
Source: FAA TAF, Airport Inventory Survey, and HNTB Analysis

Base Year Airline and Cargo Activity Levels

Additional baseline data was collected on the amount of airline and cargo activity at individual airports. Airports that have regularly scheduled airline or cargo service and their associated baseline data are listed in **Table 3-4**. For airline service, baseline data consists of annual enplanements (the number of people who boarded an airplane) and annual aircraft departures (the number of aircraft with passengers that left the airport). For cargo service, baseline data consists of annual tonnage (tons of cargo shipped) and annual cargo operations (the number of cargo specific aircraft leaving the airport).

Table 3-4: Base Year (2010) Passenger and Cargo Activity Level

		PASSENGER[A]		CARGO[B]	
AIRPORT	IDENTIFIER	ENPLANEMENTS	AIRCRAFT DEPARTURES	TONNAGE	ALL-CARGO OPERATIONS
Alexandria	AXN	-	-	32	48
Bemidji	BJI	21,563	1,294	628	743
Brainerd Lakes	BRD	15,583	880	1	4
Duluth[c]	DLH	155,955	4,434	1,626	693
Hibbing	HIB	10,150	1,619	2	-
International Falls	INL	13,924	820	1	-
Minneapolis-St. Paul	MSP	16,267,639	197,255	246,903	13,642
Rochester	RST	124,601	4,315	8,144	547
Thief River Falls	TVF	2,620	626	86	244

Source: (a) FAA TAF, (b) BTS T100, (c) Duluth Airport airline statistics provided by the Duluth Airport Authority

Airline Relevant Factors

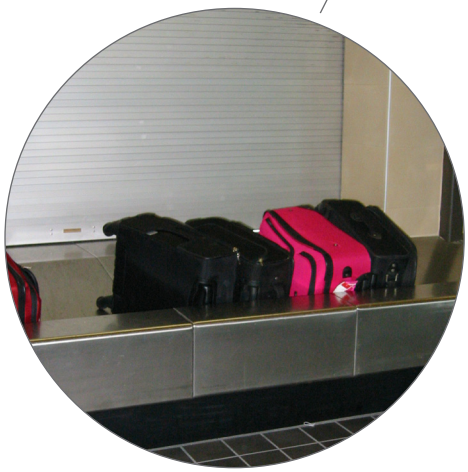
In addition to the socioeconomic characteristics and jet fuel prices discussed earlier, factors that influence airline and cargo activity were considered in developing this forecast and include: air fare, ancillary fees, high speed rail, airline consolidations, and out-of-state airports.

AIR FARES

Over the past twenty years, average one-way domestic fares declined by nearly 100% from 1990 to 2010 , largely as a result of reduced labor costs, increased airline efficiencies, and higher load factors resulting from more people on each plane.[10] Recently, average one-way domestic fares have begun to rebound due to airline consolidation and reduced frequency and routes. Decreases in air fare typically increase the likelihood of people using airlines for transportation. An increase in the cost of air fare may result in passengers looking to other transportation modes (bus, car, and rail) for travel needs, thus decreasing aviation demand.

ANCILLARY FEES

To increase profit, many airlines have added revenue streams such as baggage fees, reservation change fees, seat assignment fees and on-board sale of food and drink. These new ancillary fees substantially benefit the airline's bottom line but also increase out-of-pocket costs for passengers. In the past, ancillary fees were not typically considered by the flying public as part of the cost to travel by air when making the decision to fly, drive, or consider another mode of transportation. Passengers today are increasingly aware of these additional costs and as fees increase, passengers are more likely to consider alternate modes for their travel.



[10] Origin and Destination Survey (OD1A). http://www.transtats.bts.gov/Tables.asp?DB_ID=125. Research and Innovative Technology Administration, Bureau of Transportation Statistics. Accessed May 2011.

OUT-OF-STATE AIRPORTS

There are several out-of-state airports whose service areas include part of Minnesota. As a result, passengers considering travel options may consider these airports in addition to, or in lieu of, a Minnesota airport with airline service. Passengers may choose to fly from a particular airport based on its Level of Service (LOS) or ability to provide customers an easy trip. Some factors affecting LOS include airline fares, frequency of flights, number of non-stop or one stop destinations, reliability, drive time, and parking costs. **Table 3-5** shows the airports which share service areas with Minnesota airports.

Table 3-5: Out-of-State Airports

Iowa	Mason City Municipal
North Dakota	Grand Forks International
	Fargo Hector International
South Dakota	Sioux Falls Regional
	Watertown Regional
Wisconsin	Chippewa Valley Regional (Eau Claire)
	La Crosse Municipal

Based on a service-area analysis conducted for this Plan, it was assumed that only Grand Forks International Airport would divert significant passenger flow from airline service airports in Minnesota. It is assumed that any other significant passenger diversion to a non-Minnesota airport would only occur if there is a significant change in a Minnesota airport's LOS.

AIRLINE CONSOLIDATION

Several major airline consolidations were completed in the last few years. Northwest Airlines merged with Delta Air Lines in 2008 to form the world's largest carrier at the time.[11] In 2010, Continental Airlines merged with United Airlines and are the largest airline in the world today. Two low cost carriers, Southwest Airlines and AirTran Airways, merged in 2010. The system-wide capacity reduction resulting from these mergers coupled with the national economic downturn has resulted in fewer enplanements and operations than previously forecasted at most airline service airports in the state.

[11] Delta Air Lines, Northwest Airlines Combining to Create America's Premier Global Airline, http://news.delta.com/index.php?s=43&item=135. Delta Air Lines News Release., accessed November 2011.

Minnesota is particularly influenced by the Northwest Airlines and Delta Air Lines merger. Northwest Airlines was headquartered in Minnesota and operated an important hub at MSP, one with an extensive in-state, out-of-state and international network. Delta Air Lines continues to be one of the largest private employers in the state of Minnesota and MSP remains a key hub in Delta's network. Delta provides strong domestic and international service from MSP recognizing the region's robust local traffic demand and unique connection opportunities due to its geographical location. Further consolidation within the airline industry is likely and has the potential to change air service patterns and fares.

Airline Passenger Forecast

Future passenger enplanements were forecast using a regression methodology recommended by the FAA.[12] The regression analysis calculates the relationship between passenger enplanements and relevant factors including; population, economic activity, air fares, and jet fuel prices, among other factors. **Table 3-6** presents the passenger enplanement and airline flight departures forecast for the system. Additional information and historic data is included in Appendix C: Forecast Technical Report.

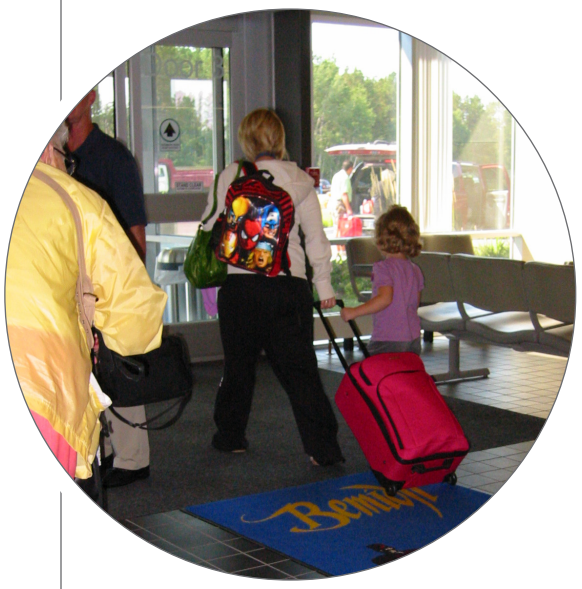


Table 3-6: Passenger Enplanements and Flight Departures Summary

PASSENGER ENPLANEMENTS AND DEPARTURES		
YEAR	PASSENGER ENPLANEMENTS	AIRCRAFT DEPARTURES
2010	16,612,000	210,200
2015	18,498,000	212,500
2020	21,181,000	234,300
2030	27,787,000	276,800
AVERAGE ANNUAL GROWTH RATE		
2010-2015	2.2%	0.1%
2010-2020	2.5%	1.0%
2010-2030	2.6%	1.4%

Note: Forecast numbers rounded
Source: FAA TAF, BTS T100, Woods & Poole, and HNTB Analysis

[12] Forecasting Aviation Activity by Airport, http://www.faa.gov/data_research/aviation_data_statistics/forecasting/media/AF1.doc, FAA, accessed July 2011.

Passenger enplanements are expected to grow at an average annual rate of 2.2 percent in the short term, increase to 2.5 percent in the mid-term, and accelerate to 2.6 percent in the long term. The number of passenger flight departures also increases but at a much slower rate. This is a result of airlines using aircraft more efficiently by reducing the number of empty seats on each flight, as well as increasing aircraft size, making a similar number of seats available with less overall operations. As a comparison, the annual passenger enplanements growth rates forecasted by the latest FAA TAF[13] for these airports are 2.26 percent in the short term, 2.34 percent in the mid-term, and 2.31 percent in the long term.

Cargo Forecast

Air cargo is transported by either all-cargo freighters (aircraft that transport only cargo) or in the belly of passenger aircraft. FedEx and UPS dominate the scheduled all-cargo service market in Minnesota. Air cargo feeders and charter service providers such as Bemidji Aviation, Air Transport International, and Evergreen International, provide cargo service, but operate non-scheduled flights.

Three methodologies were applied to forecast air cargo tonnage. First, the air cargo tonnage handled in the State was modeled as a percent of the national total tonnage. Second, trends in historic cargo volume and future cargo tonnage were forecast, assuming historic trends will continue. Third, the national air cargo growth factors provided in the 2010 FAA Aerospace Forecast[14] were applied to the state system. The total tonnage (determined in the three methodologies) was averaged; the results were used as the preferred cargo forecast. The resulting total air cargo tonnage was allocated to individual airports based on each airport's current market share and projected economic growth.

The number of all-cargo operations was estimated after projecting future all-cargo freight fleet mix (aircraft used) and load factors (amount of cargo per aircraft). Fleet replacement plans and aircraft currently on order were considered for each carrier and each airport. **Table 3-7** summarizes the all-cargo tonnage and operations forecasts.

[13] FAA Terminal Area Forecast (TAF) 2011, http://aspm.faa.gov/main/taf.asp, Federal Aviation Administration, accessed Oct 2011.

[14] FAA Aerospace Forecast Fiscal Year 2010-2030, http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2010-2030/, accessed Jun 2011.

Table 3-7: Total Cargo Tonnage and All-Cargo Operations Summary

ALL-CARGO ANNUAL TONNAGE AND OPERATIONS		
YEAR	TONNAGE	OPERATIONS
2010	236,700	14,800
2015	259,400	14,600
2020	257,300	14,400
2030	253,700	14,300
AVERAGE ANNUAL GROWTH RATE		
2010-2015	1.9%	-0.3%
2010-2020	0.8%	-0.2%
2010-2030	0.4%	-0.2%

Note: Forecast numbers rounded
Source: FAA TAF, BTS T100, Woods & Poole, and HNTB Analysis

Cargo tonnage and operations are forecast to increase at MSP while declining at outstate airports. In the short term, cargo tonnage is projected to grow at an annual rate of 1.9 percent. In the mid and long term, annual cargo tonnage growth is expected to be lower, at 0.8 percent and 0.4 percent respectively. All-cargo aircraft operation numbers are expected to decrease slightly as cargo airlines upgrade to larger freighters.

Military Operations

Military operations in Minnesota declined from approximately 30,000 operations in 1991 to 19,000 in 2010. The FAA TAF forecasts near constant military operations from 2010 to 2030. An alternative forecast developed for this plan assumes the decreasing trend continues into the future. The average of the two forecasts was chosen as the preferred forecast for future military operations and resulted in an estimated decline of one percent annually. **Table 3-8** summarizes the military forecasts.

Table 3-8: Military Operations Summary

MILITARY OPERATIONS	
YEAR	OPERATIONS
2010	19,200
2015	18,300
2020	17,400
2030	15,800
AVERAGE ANNUAL GROWTH RATE	
2010-2015	-0.9%
2010-2020	-1.0%
2010-2030	-1.0%

Note: Forecast numbers rounded
Source: FAA TAF, BTS T100, Woods & Poole, and HNTB Analysis

Peak Hour Operations

For towered airports, peak hour estimates were derived from hourly operations distributions provided by the FAA Distributed OPSNET database.[15] At non-towered airports, a relationship between peak hour and annual operations was used to estimate peak hour operations. A detailed discussion of the methodology is included in **Appendix C: Forecast Technical Report**.

[15] The Operations Network, https://aspm.faa.gov/opsnet/sys/Default.asp, Federal Aviation Administration, accessed Jun 2011