

Aviation Forecasts



2.0 OVERVIEW

This chapter contains aviation activity forecasts for Spokane International Airport over a 20-year planning horizon. Aviation demand forecasts are an important step in the master planning process. Ultimately, they form the basis for future demand-driven improvements at the Airport, they provide data from which to estimate future off airport impacts such as noise and traffic, and they are often incorporated by reference into other studies and policy decisions. This chapter, which presents aviation activity forecasts through 2030, is organized as follows:

1. Overview
2. Forecasting Approach
3. Airline Passenger Forecasts
4. Airline Operations Forecasts
5. Enplaned/Deplaned Cargo and Mail Forecasts
6. All Cargo Operations Forecasts
7. Based Aircraft Forecasts
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12. Peak Passenger Activity and Operations Forecasts
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The Federal Aviation Administration's (FAA) **National Plan of Integrated Airport Systems** (NPIAS) categorizes Spokane International Airport as a "Primary Small Hub Airport." The NPIAS defines a Primary Small Hub Airport as a commercial service airport that enplanes 0.05 percent to 0.25 percent of total US Passengers enplanements. The 2011-2015 NPIAS reported that there are 72 small hub airports that together account for 8% of all enplanements nationwide. The NPIAS identifies existing and proposed airports that are significant to the national air transportation system. It contains estimates of costs of airport development projects eligible for federal aid that are needed to meet aviation demand over the next five years.

Projections of short-, intermediate-, and long-term activity at the Airport that are based on 5-, 10-, and 20-year milestones (2015, 2020, and 2030) are presented in **Table 2-1**.

Table 2-1. Summary Forecast of Aviation Activity					
	2010 (Actual)	2015 (Projected)	2020 (Projected)	2025 (Projected)	2030 (Projected)
Enplanements	1,592,126	1,820,148	2,177,846	2,606,377	3,119,876
Commercial Operations	52,544	56,882	65,647	75,931	98,647
General Aviation Operations	24,958	26,553	28,200	29,875	31,562
Military Operations	1,618	1,618	1,618	1,618	1,618
Total Operations	79,120	85,053	95,464	107,323	120,827
Total Freight	47,686	52,157	58,071	64,744	71,744
Based Aircraft	78	83	88	93	99
<i>Note: Total Freight in pounds</i> <i>Sources: Historical Enplanements & Freight - Airport Records</i> <i>Historical Operations - Air Traffic Activity Study (ATADS)</i> <i>Historical Based Aircraft Data - FAA Terminal Area Forecast Records</i> <i>Projections - Mead & Hunt, Inc.</i>					

2.1 FORECASTING APPROACH

Several methods have been applied in the development of the forecasts presented in the following sections. Projections of aviation demand incorporate local and national industry trends in assessing current and future demand. Therefore, socio-economic factors such as local population and income, and employment are also analyzed for the effect they may have had on historical and future levels of activity. The comparison of relationships among these various indicators provides the initial step in the development of realistic forecasts of aviation demand. Methodologies used to develop forecasts described in this section include:

- Time-series methodologies
- Market share methodologies
- Socio-economic methodologies

2.1.1 Time Series Methodologies

Historical trend lines and linear extrapolation are widely used methods of forecasting. These techniques utilize time-series types of data and are most useful for a pattern of demand that demonstrates a historical relationship with time. Linear extrapolation establishes a linear trend by fitting a straight line using the least squares method to known historical data. Historical trend lines used in this chapter examine historical compounded annual growth rates (CAGR) and extrapolate future data values by assuming a similar compounded annual growth rate for the future.

2.1.2 Market Share Methodology

Market share, ratio, or top-down models compare local levels of activity with a larger entity. Such methodologies imply that the proportion of activity that can be assigned to the local level is a regular and predictable quantity. This method has been used extensively in the aviation industry to develop forecasts for the local level. It is most commonly used to determine the share of total national traffic activity that will be captured by a particular region or airport. Historical data is examined to determine the ratio of local airport traffic to total national traffic. The FAA develops national forecasts annually in its FAA Aerospace Forecasts document. This data source is compared with historical levels of activity reported by Spokane International Airport.

2.1.3 Socioeconomic Methodologies

Though trend line extrapolation and market share analysis may provide mathematical and formulaic justification for demand projections, there are many factors beyond historical levels of activity that may identify trends in aviation and impact on aviation demand locally. Socio-economic or correlation analysis examines the direct relationship between two or more sets of historical data. Local conditions that are examined in this chapter include population, per capita income, and total retail sales. Based upon the observed and projected correlation between historical aviation activity and the socio-economic data sets, future aviation activity projections are developed.

2.2 AIRLINE PASSENGER FORECASTS

Enplanements are defined as the activity of passengers boarding commercial service aircraft that depart an airport. Enplanements include passengers on scheduled commercial service aircraft or un-scheduled charter aircraft but not the airline crew.

Passenger enplanement data is provided to Airport management by commercial passenger service carriers, who maintain data as they transport people to and from the facility. The FAA has estimated figures on file called Terminal Area Forecasts (TAF) that are compared with the projections developed for this Master Plan.

Forecasts that are developed for airport master plans and/or federal grants must be approved by the FAA. It is the FAA's policy, listed in AC 150/5070-6B, Airport Master Plans, that FAA approval of forecasts at non-hub airports with commercial service should be consistent with the TAF. Master plan forecasts for operations, based aircraft, and enplanements are considered to be consistent with the TAF if they meet the following criteria:

- a) Forecasts differ by less than 10 percent in the five-year forecast and 15 percent in the 10-year or 20-year period, or
- b) Forecasts do not affect the timing or scale of an airport project, or
- c) Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, Field Formulation of the National Plan of Integrated Airport Systems.

This section examines data that pertains to passenger enplanements and describes enplanement projections in the following subsections:

- Enplanement history
- FAA TAF enplanement data and projections
- Method comparison and preferred projection methodology

Other forecasts have been examined and incorporated as part of this Master Plan Update such as the FAA Terminal Aerospace Forecasts and the Long-Term Transportation Study (LATs) conducted by the State Of Washington.

2.2.1 Enplanement History

Between 2000 and 2010, passenger enplanements at Spokane International Airport have fluctuated (see **Table 2-2**). Within this timeframe, annual passenger enplanements have increased slightly from 1,530,884 to 1,592,126 a Compounded Annual Growth Rate (CAGR) of 0.39 percent.

2.2.2 Federal Aviation Administration Forecast

The FAA records passenger enplanements for all commercial service airports and releases its Terminal Area Forecasts (TAF) annually. It should be noted that annual data are based on the fiscal year rather than the calendar year, so historical figures differ slightly from the Airport’s records. The FAA’s historical records and projections of passenger enplanements are shown in **Table 2-3**.

Year	Passenger Enplanements
2000	1,530,884
2001	1,441,356
2002	1,375,500
2003	1,395,268
2004	1,531,927
2005	1,600,258
2006	1,612,457
2007	1,739,883
2008	1,715,773
2009	1,527,955
2010	1,592,126
<i>CAGR 2000-2010</i>	<i>0.39%</i>
<i>Notes: CAGR=Compounded Annual Growth Rate Source: Airport Records</i>	

As shown in Table 2-3, the FAA projects strong, steady growth in passenger enplanements at Spokane International Airport through 2030. The TAF predicts 1,820,148 passenger enplanements in 2015, 2,177,846 in 2020, 2,606,377 in 2025, and 3,119,876 in 2030, a CAGR of 3.42 percent.

2.2.3 Method Comparison and Preferred Projection Methodology

In all, six methodologies were employed to develop projections of passenger enplanements. These methodologies are described in the following sections:

Trend Line Methodology

The trend line methodology is based on the assumption that future trends will continue to mimic those of the selected time period and that the factors that affect those trends will continue to influence demand levels in similar fashion. The establishment of a linear trend line with historical data using the least squares methodology typically serves as a baseline projection to which other methodologies are compared.

Table 2-3. FAA Passenger Enplanements Terminal Area Forecast	
Year	Passenger Enplanements
2000	1,533,121
2001	1,469,518
2002	1,337,148
2003	1,362,770
2004	1,474,422
2005	1,565,505
2006	1,597,906
2007	1,689,153
2008	1,740,623
2009	1,492,710
2010	1,524,569
<i>CAGR 2000-2010</i>	<i>-0.06%</i>
2015	1,820,148
2020	2,177,846
2025	2,606,377
2030	3,119,876
<i>CAGR 2010-2030</i>	<i>3.42%</i>
<i>Source: FAA Terminal Area Forecast May, 2011</i>	



Airport records for passenger enplanements are available from 1990 to 2010. During this time period, annual passenger enplanements increased from 808,107 to 1,592,126, a CAGR of 3.45 percent. To project future demand, a linear trend line is established using the least squares methodology and results in 1,967,035 passenger enplanements in 2015, 2,147,556 in 2020, 2,328,077 in 2025, and 2,508,597 in 2030, a CAGR of 2.39 percent (see **Table 2-4**).

Table 2-4. Passenger Enplanement Forecasts – Trend Line Methodology	
Year	Passenger Enplanements
1990	808,107
1991	795,080
1992	926,838
1993	1,167,865
1994	1,345,267
1995	1,492,956
1996	1,629,620
1997	1,519,386
1998	1,472,208
1999	1,519,836
2000	1,530,884
2001	1,441,356
2002	1,375,500
2003	1,395,268
2004	1,531,927
2005	1,600,258
2006	1,612,457
2007	1,739,883
2008	1,715,773
2009	1,527,955
2010	1,592,126
<i>CAGR 1990-2010</i>	<i>3.45%</i>
2015	1,967,035
2020	2,147,556
2025	2,328,077
2030	2,508,597
<i>CAGR 2010-2030</i>	<i>2.30%</i>
<i>Source: Airport Records, Mead and Hunt</i>	

Growth Rate Methodology

The growth rate methodology examines the percent change in activity between two points in time, and assumes that future activity will change at this rate throughout the projection period. As noted previously, there was a 3.45 percent annual increase in passenger activity between 1990 and 2010. This compound annual growth rate is applied through years 2015, 2020, 2025, and 2030 and shown in **Table 2-5**.

As shown in **Table 2-5**, the growth rate methodology projects 1,872,678 passenger enplanements in 2015, 2,218,658 in 2020, 2,628,557 in 2025, and 3,114,186 in 2030.

Market Share Methodology (1)

Market share methodology compares activity levels at an airport to a larger geographical region as a whole over a given length of time. For the purposes of this Master Plan, two market share methodology forecasts have been developed that compare activity at Spokane International Airport with total U.S. domestic enplanements. U.S. enplanement data are available dating to 1994. The first market share methodology applies the Airport's market share in 2010 (0.2506 percent) to projections of total U.S. domestic enplanement projections described in the FAA Aerospace Forecasts 2011-2031 (see **Table 2-6**).

Table 2-5. Passenger Enplanement Forecasts - Growth Rate Methodology

Year	Passenger Enplanements	Growth Rate
1990	808,107	
1991	795,080	-1.61%
1992	926,838	16.57%
1993	1,167,865	26.01%
1994	1,345,267	15.19%
1995	1,492,956	10.98%
1996	1,629,620	9.15%
1997	1,519,386	-6.76%
1998	1,472,208	-3.11%
1999	1,519,836	3.24%
2000	1,530,884	0.73%
2001	1,441,356	-5.85%
2002	1,375,500	-4.57%
2003	1,395,268	1.44%
2004	1,531,927	9.79%
2005	1,600,258	4.46%
2006	1,612,457	0.76%
2007	1,739,883	7.90%
2008	1,715,773	-1.39%
2009	1,527,955	-10.95%
2010	1,592,126	4.20%
<i>CAGR (1990-2010)</i>	<i>3.45%</i>	
2015	1,872,678	3.45%
2020	2,218,658	3.45%
2025	2,628,557	3.45%
2030	3,114,186	3.45%
<i>CAGR (2010-2030)</i>	<i>3.41%</i>	

Source: Airport Records, Mead and Hunt

Table 2-6. Passenger Enplanement Forecasts – Market Share Methodology (1)			
Year	Passenger Enplanements	Total U.S. Domestic Enplanements (Millions)	GEG Market Share
1994	1,345,267	511.3	0.2631%
1995	1,492,956	531.1	0.2811%
1996	1,629,620	558.1	0.2920%
1997	1,519,386	578.3	0.2627%
1998	1,472,208	589.3	0.2498%
1999	1,519,836	610.9	0.2488%
2000	1,530,884	641.2	0.2388%
2001	1,441,356	625.8	0.2303%
2002	1,375,500	575.1	0.2392%
2003	1,395,268	587.8	0.2374%
2004	1,531,927	628.5	0.2437%
2005	1,600,258	669.5	0.2390%
2006	1,612,457	668.4	0.2412%
2007	1,739,883	690.1	0.2521%
2008	1,715,773	680.7	0.2521%
2009	1,527,955	630.8	0.2422%
2010	1,592,126	635.3	0.2506%
<i>Average (1994-2010)</i>			<i>0.2508%</i>
2015	1,885,841	752.5	0.2506%
2020	2,171,035	866.3	0.2506%
2025	2,420,894	966.0	0.2506%
2030	2,650,703	1,057.7	0.2506%
<i>CAGR (2010-2030)</i>	<i>2.58%</i>	<i>2.58%</i>	<i>0.2506%</i>
<i>Source: Airport Records, FAA Aerospace Forecasts 2011-2031, Mead and Hunt.</i>			

As shown in Table 2-6, the first market share methodology projects 1,885,841 passenger enplanements in 2015, 2,171,035 in 2020, 2,420,894 in 2025 and 2,650,703 in 2030, a CAGR of 2.58 percent.

Market Share Methodology (2)

Between 1994 and 2010, Spokane International Airport’s market share of total U.S. domestic passenger enplanements has ranged from 0.2303 percent to 0.2920 percent, with an average 0.2508 percent. The second market share methodology compares the average U.S. market share that the Airport experienced during that timeframe to total U.S. passenger enplanement projections (see **Table 2-7**).

Table 2-7. Passenger Enplanement Forecasts – Market Share Methodology (2)

Year	Passenger Enplanements	Total U.S. Domestic Enplanements (Millions)	GEG Market Share
1994	1,345,267	511.3	0.2631%
1995	1,492,956	531.1	0.2811%
1996	1,629,620	558.1	0.2920%
1997	1,519,386	578.3	0.2627%
1998	1,472,208	589.3	0.2498%
1999	1,519,836	610.9	0.2488%
2000	1,530,884	641.2	0.2388%
2001	1,441,356	625.8	0.2303%
2002	1,375,500	575.1	0.2392%
2003	1,395,268	587.8	0.2374%
2004	1,531,927	628.5	0.2437%
2005	1,600,258	669.5	0.2390%
2006	1,612,457	668.4	0.2412%
2007	1,739,883	690.1	0.2521%
2008	1,715,773	681.3	0.2519%
2009	1,527,955	631.3	0.2420%
2010	1,592,126	635.3	0.2506%
<i>Average (1994-2010)</i>			<i>0.2508%</i>
2015	1,887,533	752.5	0.2508%
2020	2,172,983	866.3	0.2508%
2025	2,423,066	966.0	0.2508%
2030	2,653,082	1,057.7	0.2508%
<i>CAGR (2010-2030)</i>	<i>2.59%</i>	<i>2.58%</i>	<i>0.2508%</i>

Source: Airport Records, Terminal Aerospace Forecasts 2010-2030, Mead and Hunt.

As shown in Table 2-7, the second market share methodology projects 1,887,533 passenger enplanements in 2015, 2,172,983 in 2020, 2,423,066 in 2025 and 2,653,082 in 2030, a CAGR of 2.59 percent.

Socioeconomic Methodology – Population Variable

Local population can be a strong indicator of commercial aviation demand, particularly at small hub and non-hub airports. The socioeconomic population variable methodology compares historical population figures to passenger enplanements. Between 2000 and 2010, the population of Spokane County increased from 427,083 to 474,627 a CAGR of 1.26 percent. Passenger enplanements increased by a CAGR of 0.39 percent during that timeframe. The average number of annual per capita enplanements from 2000-2010 was 3.493. This figure is applied to population projections provided by Woods and Poole and projects 1,764,119 passenger enplanements in 2015, 1,873,543 in 2020, 1,984,832 in 2025, and 2,096,938 in 2030, a CAGR of 1.39 percent (see **Table 2-8**).

Table 2-8. Passenger Enplanement Forecasts – Socioeconomic Methodology-Population Variable			
Year	Passenger Enplanements	Spokane County Population	Enplanements Per Capita
2000	1,530,884	418,806	3.655
2001	1,441,356	422,780	3.409
2002	1,375,500	427,083	3.221
2003	1,395,268	430,991	3.237
2004	1,531,927	435,225	3.520
2005	1,600,258	440,431	3.633
2006	1,612,457	446,932	3.608
2007	1,739,883	456,004	3.815
2008	1,715,773	462,677	3.708
2009	1,527,955	468,635	3.260
2010	1,592,126	474,627	3.354
<i>Average (2000-2010)</i>			3.493
2015	1,764,119	505,051	3.493
2020	1,873,543	536,378	3.493
2025	1,984,832	568,239	3.493
2030	2,096,938	600,334	3.493
<i>CAGR (2010-2030)</i>	1.39%	1.18%	

Source: Airport Records, Woods & Poole, Inc. Mead and Hunt.

Socioeconomic Methodology – Income Variable

Another socioeconomic factor that was examined was local income. Local economic conditions can impact levels of passenger activity. It is assumed that one’s propensity toward air travel can be partially linked with available income. Between 2000 and 2010, per capita income in Spokane County has increased from \$11,804 to \$14,120, a CAGR of 1.81 percent. Enplanements per \$1 of income have fluctuated during this time period, therefore, the 2000-2010 average of 122.163 passenger enplanements per \$1 of income is applied to income projections supplied by Woods & Poole Economics, Inc. This methodology projects 1,940,354 passenger enplanements in 2015, 2,183,984 in 2020, 2,458,364 in 2025, and 2,765,747 in 2030, a CAGR of 2.80 percent (see **Table 2-9**).

It should be noted that income figures are presented in 2004 dollars. These are “constant” dollars and are used to measure the “real” change in earnings and income when inflation is taken into account.

Table 2-9. Passenger Enplanement Forecasts – Socioeconomic Methodology-Income Variable

Year	Passenger Enplanements	Spokane County Per Capita Income (\$2004)	Enplanements Per \$1 Income
2000	1,530,884	\$11,804	129.687
2001	1,441,356	\$11,765	122.508
2002	1,375,500	\$11,844	116.136
2003	1,395,268	\$11,956	116.704
2004	1,531,927	\$12,184	125.737
2005	1,600,258	\$12,323	129.864
2006	1,612,457	\$12,904	124.956
2007	1,739,883	\$13,451	129.353
2008	1,715,773	\$13,662	125.584
2009	1,527,955	\$13,827	110.508
2010	1,592,126	\$14,120	112.756
<i>Average (2000-2010)</i>			<i>123.104</i>
2015	1,940,354	\$15,883	122.163
2020	2,183,984	\$17,878	122.163
2025	2,458,364	\$20,124	122.163
2030	2,765,747	\$22,640	122.163
CAGR (2010-2030)	2.80%	2.39%	


Source: Airport Records, Woods & Poole, Inc. Mead and Hunt.

Preferred Projection Methodology

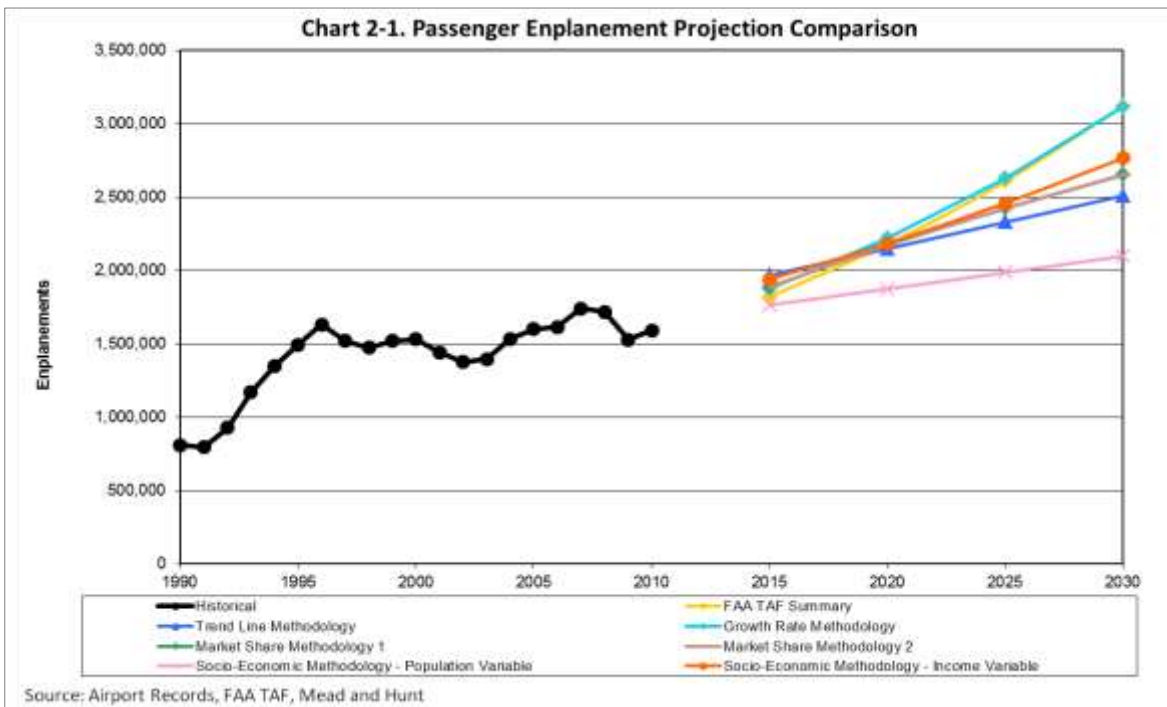
A comparison of projected enplanements using the methodologies described in previous sections is shown in **Table 2-10** and **Chart 2-1**. All of the methodologies anticipate that there will be an increase in passenger demand over the next 30 years.

The FAA develops forecasts based on economic and political factors, as well as local, regional, and national aviation industry trends. Spokane International Airport experienced 1,739,883 passenger enplanements in 2007, an all-time record; but by 2010, enplanements at the Airport decreased by approximately nine percent. Each of the methodologies examined to project levels of passenger activity showed an increase in future enplanements, however, the recent decline in activity largely associated with national economic volatility impacts some of the formulas that are used to develop these forecasts. Many could be considered somewhat conservative when compared with projections of passenger demand developed by the FAA, therefore, the preferred forecast for passenger enplanements is the TAF.

Table 2-10. Passenger Enplanement Forecasts – Projection Comparison and Preferred Methodology

Year	Passenger Enplanements						
2000	1,530,884						
2001	1,441,356						
2002	1,375,500						
2003	1,395,268						
2004	1,531,927						
2005	1,600,258						
2006	1,612,457						
2007	1,739,883						
2008	1,715,773						
2009	1,527,955						
2010	1,592,126						
CAGR (2000-2010)	0.39%						
Year	FAA TAF Summary	Trend Line Methodology	Growth Rate Methodology	Market Share Methodology 1	Market Share Methodology 2	Population Variable	Income Variable
2015	1,820,148	1,967,035	1,872,678	1,885,841	1,887,533	1,764,119	1,940,354
2020	2,177,846	2,147,556	2,218,658	2,171,035	2,172,983	1,873,543	2,183,984
2025	2,606,377	2,328,077	2,628,557	2,420,894	2,423,066	1,984,832	2,458,364
2030	3,119,876	2,508,597	3,114,186	2,650,703	2,653,082	2,096,938	2,765,747
CAGR (2010-2030)	3.42%	2.30%	3.41%	2.58%	2.59%	1.39%	2.80%

Source: Airport Records, Terminal Aerospace Forecasts 2010-2030, Woods & Poole, Inc. Mead and Hunt.



2.3 AIRCRAFT OPERATIONS FORECASTS

The following sections describe projections of aircraft operations. As with passenger enplanements, several factors are taken into account when assessing demand in both commercial and non-commercial operations. Forecasts have been developed for the following categories:

- Air Carrier Fleet Mix
- Commercial Operations
- General Aviation Operations
- Air Cargo Fleet Mix
- Air Cargo Operations
- Military Operations

2.3.1 Air Carrier Fleet Mix

National trends in aviation demand have been volatile in recent years. The events that occurred on 9/11/2001 had a significant impact on collective national travel behavior, and the economic recession that began in 2008 has resulted in fewer passenger enplanements at several airports in the U.S. With recent increases in aircraft operating costs, airlines have been forced to maximize fleet efficiency in order to remain profitable, if not sustainable.

In many markets, air carriers are reducing or retiring less fuel efficient aircraft with regional and larger jets that have more seats and lower operational costs per passenger. This trend is evident at Spokane International Airport as the average number of seats per commercial departure has increased from 96.7 in 2006 to 100.6 in 2010.

Table 2-11 presents the historical and projected scheduled passenger fleet. As shown in Table 2-11, commercial aircraft equipped with 40 or fewer seats have seen the proportion of annual operations decline from 14.2 percent to 5.1 percent during this time, while aircraft equipped with 61-99 seats have seen an increase of 29.9 percent to 40.5 percent. It is anticipated that smaller passenger aircraft use at the Airport will continue to decline throughout the projection period, resulting in a corresponding increase in larger aircraft, particularly in aircraft equipped with 100 or more seats.

Table 2-11. Scheduled Passenger Departures and Fleet Mix Projections

Seat Range	Typical Aircraft	Historical - Departures					Projected Departures			
		2006	2007	2008	2009	2010	2015	2020	2025	2030
Less than 40	Saab 340, 328Jet, ERJ 135, Beech 1900, EMB 120, DHC-8	3,063 14.2%	1,683 7.0%	1,331 5.6%	1,068 5.5%	1,078 5.1%	1,068 4.7%	954 3.6%	928 3.0%	903 2.5%
40-60	CRJ 200, ERJ145	1,567 7.3%	3,223 13.4%	2,960 12.5%	1,450 7.4%	1,721 8.2%	1,591 7.0%	1,564 5.9%	1,299 4.2%	903 2.5%
61-99	Avro RJ, CRJ 700, CRJ 900, EMB 170, EMB 175	6,436 29.9%	7,979 33.1%	8,343 35.1%	7,440 38.1%	8,510 40.5%	9,093 40.0%	10,603 40.0%	12,310 39.8%	14,299 39.6%
100-130	B717, DC9, EMB 190, EMB 170, A 319	1,312 6.1%	875 3.6%	1,336 5.6%	1,269 6.5%	1,124 5.3%	1,250 5.5%	1,617 6.1%	2,227 7.2%	2,889 8.0%
131-150	A 320, MD 80, B737-5	8,428 39.1%	9,268 38.5%	8,750 36.8%	7,324 37.5%	7,469 35.5%	8,365 36.8%	10,073 38.0%	12,093 39.1%	14,588 40.4%
150 or more	B 737-8, B737-9, B757	746 3.5%	1,072 4.4%	1,046 4.4%	966 4.9%	1,125 5.4%	1,364 6.0%	1,696 6.4%	2,072 6.7%	2,528 7.0%
Total Scheduled Passenger Departures		21,561	24,100	23,766	19,517	21,027	22,732	26,507	30,929	36,110

Source: Historical Scheduled Departures and Average Seat Data – apgData, Mead and Hunt.

2.3.2 Commercial Operations Projections

Commercial operations can be either scheduled or un-scheduled. Typically, un-scheduled commercial flights are chartered flights or air taxi flights. In recent years, the proportion of un-scheduled operations at Spokane International Airport has decreased.

Scheduled Commercial Passenger Operations Projections

As mentioned previously, airlines are trending toward using larger, more fuel efficient aircraft. In many markets, the use of larger aircraft is reducing the frequency of particular routes. Because of increasing fuel and operational costs, air carriers must maintain higher passenger load factors to remain profitable. Projections of scheduled commercial operations are based on enplanement projections described in Section 2.3. At Spokane International Airport, the average number of seats per aircraft departure is anticipated to increase from 100.6 in 2010, to 102.0 in 2015, 104.0 in 2020, 106.0 in 2025, and 108.0 in 2030. Passenger load factor is also anticipated to increase throughout the projection period, from 75.3 percent in 2010 to 78.5 percent in 2015, 79.0 percent in 2020, 79.5 percent in 2025, and 80.0 percent in 2030.

To calculate future scheduled commercial operations, the average number of seats per departure at the Airport is multiplied by the passenger load factor. Projected passenger enplanements are divided by this figure to obtain scheduled commercial passenger departures. It is assumed that the number of annual commercial departures and arrivals will be the same; therefore departures are multiplied by two to calculate projected scheduled commercial operations (see **Table 2-12**). As shown, 45,464 scheduled commercial operations are projected in 2015, 53,015 in 2020, 61,858 in 2025, and 72,219 in 2030, a CAGR of 2.74 percent.

Table 2-12. Scheduled Commercial Operations

Year	Enplanements	Scheduled Passenger Departures	Average Seats per Departure	Passenger Load Factor	Scheduled Commercial Operations
2006	1,612,457	21,561	96.7	77.4%	43,122
2007	1,739,883	24,100	97.3	74.2%	48,200
2008	1,715,773	23,766	97.9	73.8%	47,532
2009	1,527,955	19,517	101.2	77.3%	39,034
2010	1,592,126	21,027	100.6	75.3%	42,054
<i>CAGR (2006-2010)</i>	<i>-0.32%</i>	<i>-0.63%</i>			<i>-0.63%</i>
2015	1,820,148	22,732	102.0	78.5%	45,464
2020	2,177,846	26,507	104.0	79.0%	53,015
2025	2,606,377	30,929	106.0	79.5%	61,858
2030	3,119,876	36,110	108.0	80.0%	72,219
<i>CAGR (2010-2030)</i>	<i>3.42%</i>	<i>2.74%</i>			<i>2.74%</i>
<i>Sources: Historical Enplanements - Airport Records Historical Scheduled Air Carrier Dep's and Avg Seat Data-OAG Airline Schedules form apgDat (Oct 2010) Projections - Mead & Hunt, Inc.</i>					

Unscheduled Commercial Passenger Operations Projections

Unscheduled flights typically fall into the charter or air taxi category. The overall proportion of nonscheduled operations at Spokane International Airport has declined from 9.3 percent in 2006 to 2.2 percent in 2010. Although the number of annual un-scheduled operations is anticipated to increase throughout the projection period, the proportion of total operations is expected to continue to decline.

Demand for un-scheduled flights can hinge on several factors and can be difficult to project. Between 2006 and 2010, annual un-scheduled operations declined from 5,487 to 1,150. According to the FAA Aerospace Forecasts 2010-2030, the projected annual growth rate of the national general aviation and air taxi fleet is expected to be 0.9 percent. It is assumed that un-scheduled operations at Spokane International Airport will reflect this national trend, therefore, this figure is applied to the 2010 level of 1,150 operations and held constant throughout the projection period (see **Table 2-13**).

Table 2-13. Unscheduled Aircraft Operations			
Year	Total Commercial Operations	Un-Scheduled Operations	% Unscheduled
2006	58,879	5,487	9.3%
2007	64,206	5,986	9.3%
2008	62,672	5,274	8.4%
2009	51,819	3,477	6.7%
	52,544	1,150	2.2%
<i>CAGR (2006-2009)</i>		<i>-14.1%</i>	
2015	51,774	1,203	2.3%
2020	59,960	1,258	2.1%
2025	69,502	1,315	1.9%
2030	80,621	1,376	1.7%
<i>CAGR (2009-2030)</i>	<i>2.16%</i>	<i>0.90%</i>	

Source: Airport Records, Official Airline Guide (OAG), Air Traffic Activity Data System (ATADS), FAA Aerospace Forecasts 2011-2031, Mead and Hunt.

As shown in Table 2-13, unscheduled aircraft operations are expected to increase to 1,203 in 2015, 1,258 in 2020, 1,315 in 2025, and 1,376 in 2030.

2.4 ENPLANED/DEPLANED CARGO

Air cargo is carried by both commercial passenger service carriers and by commercial air cargo service carriers that do not have passenger service. Cargo is typically categorized as either mail or freight. The total tonnage of annual cargo at Spokane International Airport has fluctuated significantly between 1995 and 2010. However, the Airport’s market share compared to total U.S. revenue ton miles has remained fairly consistent (see **Table 2-14**). During that timeframe, the Airport’s market share was 0.00039 percent, which is held constant throughout the projection period. Total U.S. cargo projection data are obtained from the FAA Aerospace Forecast 2011-2031. This methodology projects 52,157 tons of annual cargo in 2015, 58,071 in 2020, 64,623 in 2025, and 71,744 in 2030, a CAGR of 2.06 percent.

Table 2-14. Forecasts of Air Cargo			
Year	Total Air Cargo at GEG (tons)	Total U.S. Air Cargo (revenue ton miles)	GEG Market Share
1995	42,799.7	12,415,700,000	0.00034%
1996	48,516.9	12,781,700,000	0.00038%
1997	54,703.5	13,454,100,000	0.00041%
1998	59,281.5	13,828,100,000	0.00043%
1999	66,563.3	13,974,900,000	0.00048%
2000	67,264.3	14,698,700,000	0.00046%
2001	54,246.7	13,937,900,000	0.00039%
2002	53,274.9	12,967,400,000	0.00041%
2003	54,227.3	14,972,400,000	0.00036%
2004	57,335.9	16,340,900,000	0.00035%
2005	57,622.3	16,089,600,000	0.00036%
2006	57,369.3	15,710,500,000	0.00037%
2007	54,797.6	15,818,000,000	0.00035%
2008	52,076.2	14,410,500,000	0.00036%
2009	46,863.0	11,860,000,000	0.00040%
2010	47,686.3	12,848,000,000	0.00037%
<i>Average Market Share % (1995-2010)</i>			<i>0.00039%</i>
2015	52,157	13,454,000,000	0.00039%
2020	58,071	14,979,600,000	0.00039%
2025	64,623	16,669,800,000	0.00039%
2030	71,744	18,506,500,000	0.00039%
<i>CAGR (2010-2030)</i>	<i>2.06%</i>	<i>2.14%</i>	

Source: Airport Records, FAA Aerospace Forecasts 2011-2031, Mead and Hunt

2.5 CARGO AIRCRAFT FLEET MIX PROJECTIONS

As mentioned in Section 2.5, cargo operations at Spokane International are conducted by both passenger service and commercial cargo operators. In 2010, approximately 73 percent of air cargo operations were conducted by smaller air taxi/commuter aircraft and 27 percent by commercial air carrier aircraft. In 2010, there were 9,340 cargo operations and 47,686 tons of cargo shipped through Spokane International Airport. This equates to 5.03 tons of cargo shipped per operation. Cargo operations by aircraft type are shown in **Table 2-15**. It is assumed that per operation weight of 5.11 tons will remain constant throughout the projection period and that the proportion of operations by aircraft will also remain constant. This figure is applied to projections of total cargo at the Airport described in Section 2.5.

Table 2-15. Scheduled Air Cargo Operations						
Cargo Aircraft	2010		Projected			
	Operations	%	2015	2020	2025	2030
Cessna 208 Caravan	5,907	63.2%	6,461	7,193	8,005	8,887
Beech 18 C-185	459	4.9%	502	559	622	691
ATR42	452	4.8%	494	550	613	680
<i>Air Taxi / Commuter Total</i>	6,818	73.0%	7,457	8,303	9,240	10,258
B757-200	28	0.3%	31	34	38	42
B767-300/300ER	142	1.5%	155	173	192	214
A300	652	7.0%	713	794	884	981
A310	1,698	18.2%	1,857	2,068	2,301	2,555
ATR72	2	0.0%	2	2	3	3
<i>Air Carrier Total</i>	2,522	27.0%	2,758	3,071	3,418	3,794
<i>Grand Total</i>	9,340		10,216	11,374	12,657	14,052
<i>CAGR (2010-2030)</i>						2.06%
Total Cargo (Tons)	47,686		52,157	58,071	64,623	71,744
Tons/Operation	5.11		5.11	5.11	5.11	5.11
<small>Sources: Historical Total Airport Cargo Data - Airport Management, Historical Fleet Mix - OAG Airline Schedules form apgDat, Total U.S. Air Cargo (Revenue Ton Miles) - FAA Aerospace Forecasts FY2011-2031</small>						

As shown, this methodology projects 10,216 cargo operations in 2015, 11,374 in 2020, 12,657 in 2025, and 14,052 in 2030, a CAGR of 2.06 percent.

2.6 BASED AIRCRAFT FORECASTS

There are several factors that affect the number of aircraft at an airport. The overall cost to own and operate an aircraft has increased significantly in recent years, which contributed to a slight decline in the U.S. general aviation fleet since 2007, a trend that has also occurred at Spokane International Airport. Since 1995 the number of based aircraft at the Airport has fluctuated significantly. Because of this, several methodologies were used to develop based aircraft projections.

Trend Line Methodology

The trend line methodology, which assumes that historic trends will continue in the future, projects 105 based aircraft in 2015, 107 in 2020, 109 in 2025, and 111 in 2030, a CAGR of 1.76 percent (see Table 2-16).

Market Share Methodology

Spokane International Airport’s market share of the total U.S. general aviation fleet has fluctuated by more than 65 percent between 1995 and 2010 with 2008 and 2009 experiencing the lowest market annual market shares during that timeframe. Because of this variation, the market share methodology assumes that by 2030, the Airport’s market share will return to its 1995-2010 average of 0.04668 percent (see Table 2-17).

Table 2-16. Based Aircraft Forecasts – Trend Line Methodology

Year	Based Aircraft
1995	85
1996	85
1997	97
1998	97
1999	97
2000	97
2001	117
2002	117
2003	117
2004	107
2005	113
2006	115
2007	110
2008	77
2009	77
2010	78
<i>CAGR (1995-2010)</i>	<i>-0.57</i>
2015	105
2020	107
2025	109
2030	111
<i>CAGR (2010-2030)</i>	<i>1.76%</i>
<i>Source: FAA TAF, Mead and Hunt</i>	

Table 2-17. Based Aircraft Forecasts – Market Share Methodology			
Year	GEG Based Aircraft	Total U.S. Active Aircraft	GEG Market Share
1995	85	188,089	0.04519%
1996	85	191,129	0.04447%
1997	97	192,414	0.05041%
1998	97	204,710	0.04738%
1999	97	206,530	0.04697%
2000	97	217,533	0.04459%
2001	117	211,446	0.05533%
2002	117	211,244	0.05539%
2003	117	209,606	0.05582%
2004	107	219,319	0.04879%
2005	113	224,350	0.05037%
2006	115	221,939	0.05182%
2007	110	231,606	0.04749%
2008	77	228,668	0.03367%
2009	78	223,920	0.03439%
2010	78	224,172	0.03479%
<i>Average (1995-2010)</i>			<i>0.4668%</i>
2015	87	229,140	0.03777%
2020	97	237,795	0.04074%
2025	110	250,560	0.04371%
2030	125	267,055	0.04668%
<i>CAGR (2010-2030)</i>	<i>2.37%</i>	<i>0.88%</i>	

Source: FAA TAF, FAA Aerospace Forecasts 2011-2031, Mead and Hunt.

As shown, the market share methodology projects 87 based aircraft in 2015, 97 in 2020, 110 in 2025 and 125 in 2030, a CAGR of 2.37 percent.

Socioeconomic Methodology – Income Variable

Income can often be a strong indicator of one’s propensity to own an aircraft. The socioeconomic income variable methodology compares historical based aircraft at Spokane International Airport to per capita income in Spokane County. According to data obtained by Woods and Poole, Inc. per capita income in Spokane has increased from \$11,804 in 2000 to \$14,120 in 2010, a CAGR of 1.81 percent. During that timeframe, based aircraft per \$100 income decreased by nearly 50 percent. The 2010 figure of 0.55240 based aircraft per \$100 income is applied to projections of per capita income and shown in **Table 2-18**.

Table 2-18. Based Aircraft Forecasts – Socioeconomic Methodology-Income Variable

Year	Based Aircraft	Spokane County Per Capita Income (\$2004)	Based Aircraft Per \$100 Income
2000	97	\$11,804	0.82173
2001	117	\$11,765	0.99444
2002	117	\$11,844	0.98785
2003	117	\$11,956	0.97862
2004	107	\$12,184	0.87823
2005	113	\$12,323	0.91701
2006	115	\$12,904	0.89118
2007	110	\$13,451	0.81780
2008	77	\$13,662	0.56359
2009	77	\$13,827	0.56413
2010	78	\$14,120	0.55240
<i>Average (2000-2010)</i>			<i>0.84145</i>
2015	88	\$15,883	0.55240
2020	99	\$17,878	0.55240
2025	111	\$20,124	0.55240
2030	125	\$22,640	0.55240
<i>CAGR (2010-2030)</i>	<i>2.39%</i>	<i>2.39%</i>	

Source: FAA TAF, Mead and Hunt. Woods & Poole, Inc.

Socioeconomic Methodology – Population Variable

The socioeconomic population variable methodology compares historical based aircraft at the Airport with the population of Spokane County. Between 2000 and 2010, the population of Spokane County increased from 418,806 to 474,627. During that same timeframe, based aircraft per capita decreased from 0.00023 to 0.00016. The 2010 figure of 0.00016 based aircraft per capita is applied to population projections of Spokane County and shown in **Table 2-19**.

Table 2-19. Based Aircraft Forecasts – Socioeconomic Methodology-Population Variable			
Year	Based Aircraft	Spokane County Population	Based Aircraft Per Capita
2000	97	418,806	0.00023
2001	117	422,780	0.00028
2002	117	427,083	0.00027
2003	117	430,991	0.00027
2004	107	435,225	0.00025
2005	113	440,431	0.00026
2006	115	446,932	0.00026
2007	110	456,004	0.00024
2008	77	462,677	0.00017
2009	77	468,635	0.00016
2010	78	474,627	0.00016
<i>Average (2000-2010)</i>			
2015	83	505,051	0.00016
2020	88	536,378	0.00016
2025	95	568,239	0.00016
2030	99	600,334	0.00016
<i>CAGR (2010-2030)</i>	<i>1.18%</i>	<i>1.18%</i>	

Source: FAA TAF, Mead and Hunt. Woods & Poole, Inc.

As shown, the socioeconomic population variable methodology projects 83 based aircraft in 2015, 88 in 2020, 95 in 2025, and 99 in 2030, a CAGR of 1.18 percent.

Preferred Projection Methodology

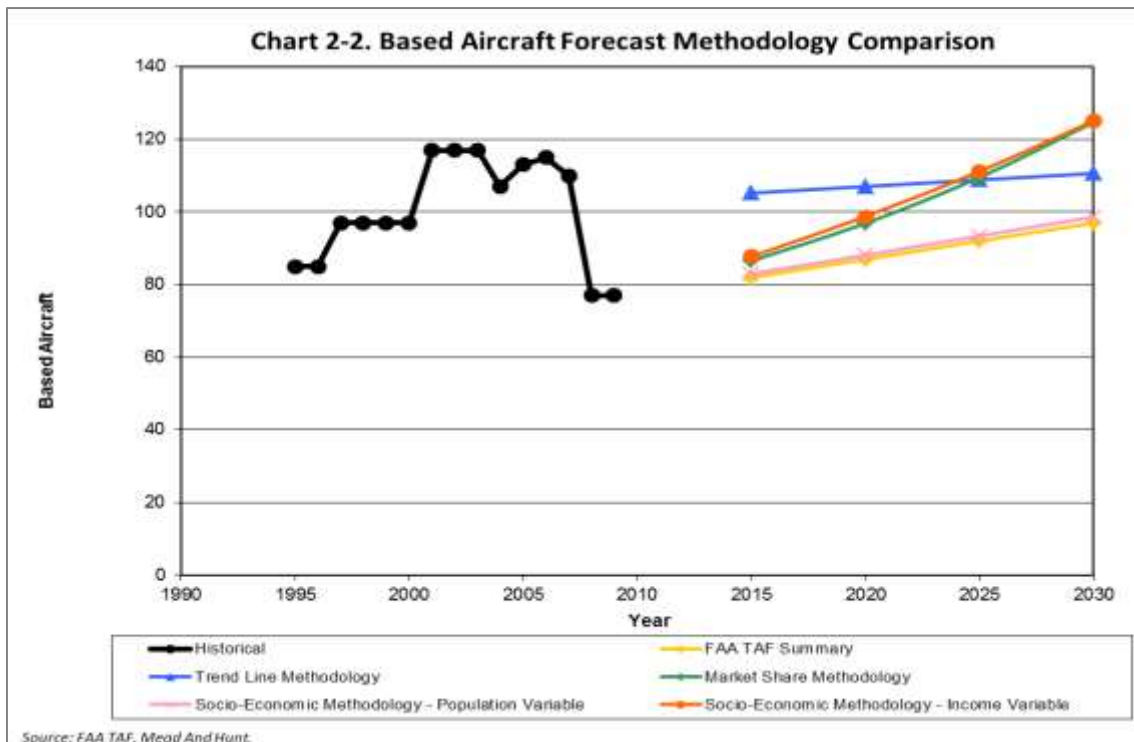
A comparison of projected based aircraft using the methodologies described in previous sections is shown in **Table 2-20** and **Chart 2-2**. All of the methodologies anticipate that there will be an increase in passenger demand over the next 30 years. Between 1995 and 2010 there was significant variation in the number of based aircraft at Spokane International Airport.

In its Terminal Aerospace Forecasts, the FAA projects that the economy will recover and that the total U.S. general aviation fleet will increase by 0.9 percent annually throughout the projection period. Increases in cost of aircraft ownership and operation, combined with the economic downturn that began in 2008 has contributed to a decrease in based aircraft at the airport. Despite this, a slow, steady increase locally is also anticipated. As such, local demand of based aircraft is assumed to be driven by population. Therefore, the socioeconomic population variable methodology is the preferred forecast for based aircraft.

Table 2-20. Based Aircraft Forecasts – Projection Comparison and Preferred Methodology

Year	Based Aircraft	FAA TAF Summary	Trend Line Methodology	Market Share Methodology	Socioeconomic Methodology- Population Variable	Socioeconomic Methodology- Income Variable
1995	85					
1996	85					
1997	97					
1998	97					
1999	97					
2000	97					
2001	117					
2002	117					
2003	117					
2004	107					
2005	113					
2006	115					
2007	110					
2008	77					
2009	77					
2010	78					
CAGR (1995-2010)	-0.57%					
2015		82	105	87	83	88
2020		87	107	97	88	99
2025		92	109	110	93	111
2030		97	111	125	99	125
CAGR (2010-2030)		1.10%	1.76%	2.37%	1.18%	2.39%

Source: FAA TAF, FAA Aerospace Forecasts 2011-2031, Mead and Hunt.



2.7 BASED AIRCRAFT FLEET MIX

Historical based aircraft by type and the projected based aircraft fleet mix at Spokane International Airport is shown in **Table 2-21**. As shown, in 2010 71 percent of the local fleet was comprised of single engine aircraft, 24 percent multi-engine aircraft, and 4 percent jet aircraft. The FAA Aerospace Forecast 2011-2031 projects that jet aircraft will see the most significant growth of any type of aircraft through 2030. This is a trend that is also anticipated to occur locally as jet aircraft are expected to proportionally increase by three percent by 2030. Conversely, single engine aircraft are expected to lose four percent of the local fleet by 2030.

Year	Single Engine		Multi Engine		Jet		Helicopter		Other		
	#	%	#	%	#	%			#	%	Total
1995	49	58%	20	24%	2	2%	3	4%	11	13%	85
1996	49	58%	20	24%	2	2%	3	4%	11	13%	85
1997	62	64%	26	27%	2	2%	2	2%	5	5%	97
1998	62	64%	26	27%	2	2%	2	2%	5	5%	97
1999	62	64%	26	27%	2	2%	2	2%	5	5%	97
2000	62	64%	26	27%	2	2%	2	2%	5	5%	97
2001	77	66%	27	23%	3	3%	3	3%	7	6%	117
2002	77	66%	27	23%	3	3%	3	3%	7	6%	117
2003	77	66%	27	23%	3	3%	3	3%	7	6%	117
2004	67	63%	33	31%	2	2%	3	3%	2	2%	107
2005	69	61%	36	32%	2	2%	3	3%	3	3%	113
2006	73	63%	37	32%	2	2%	3	3%	0	0%	115
2007	68	62%	39	35%	2	2%	1	1%	0	0%	110
2008	54	70%	19	25%	3	4%	1	1%	0	0%	77
2009	54	71%	19	24%	3	4%	1	1%	0	0%	77
2010	55	71%	19	24%	3	4%	1	1%	0	0%	77
<i>Projected</i>											
2015	58	70%	20	24%	4	5%	1	1%	0	0%	83
2020	62	70%	21	24%	4	5%	1	1%	0	0%	88
2025	63	68%	23	25%	6	6%	1	1%	0	0%	93
2030	66	67%	25	25%	7	7%	1	1%	0		99
CAGR (2010-2030)	0.94%		1.31%		4.1%		0.00%		0.00%		1.19%

Source: FAA TAF, FAA Aerospace Forecasts, Mead and Hunt.

2.8 GENERAL AVIATION OPERATIONS FORECASTS

General aviation operations are those which are not categorized as commercial or military. General aviation operations account for approximately 32 percent of all activity at Spokane International Airport. Since 1995, general aviation activity has declined slightly, however, between 2000 and 2010 operations have decreased by nearly 60 percent. Two methodologies were examined in determining projections of general aviation demand.

Operations per Based Aircraft Methodology

As mentioned in Section 2.7, between 2000 and 2010 the number of based aircraft at Spokane International Airport has declined. However, during the same timeframe, the number of general aviation operations has remained relatively consistent (see **Table 2-22**). The average number of annual operations per based aircraft between 2000 and 2010 was 351. This figure is applied to the projected number of based aircraft as described in Section 2.7 and results in 26,553 general aviation operations in 2015, 28,200 in 2020, 29,875 in 2025, and 31,562 in 2030, a CAGR of 1.18 percent.

Table 2-22. General Aviation Operations Forecasts – Operations Per Based Aircraft Methodology			
Year	Based Aircraft	GA Operations	Operations Per Based Aircraft
2000	97	43,547	449
2001	117	43,748	374
2002	117	43,044	368
2003	117	39,808	340
2004	107	32,195	301
2005	113	36,200	320
2006	115	34,806	303
2007	110	35,961	327
2008	77	30,521	396
2009	77	27,544	358
2010	78	24,958	320
<i>Average (2000-2010)</i>			351
2015	83	26,553	351
2020	88	28,200	351
2025	93	29,875	351
2030	99	31,562	351
<i>CAGR (2010-2030)</i>	<i>1.18%</i>	<i>1.18%</i>	

Source: Airport Records, FAA TAF, Mead and Hunt.

Market Share Methodology

Between 2000 and 2009, Spokane International Airport’s market share of total U.S. general aviation operations has declined by approximately 11 percent. Although local general aviation operations have remained relatively steady during this timeframe, itinerant operations have declined significantly. Because of this decline, the Airport’s 2009 market share of 0.939 percent is applied to total the number of projected total U.S. general aviation operations described in the FAA Terminal Aerospace Forecasts 2011-2031 and shown in **Table 2-23**.

Table 2-23. General Aviation Operations Forecasts – Market Share Methodology			
Year	GEG GA Operations	Total U.S. Operations	Market Share
2000	43,547	39,878,536	0.1092%
2001	43,748	37,626,472	0.1163%
2002	43,044	37,652,701	0.1143%
2003	39,808	35,524,020	0.1121%
2004	32,195	34,967,730	0.0921%
2005	36,200	34,146,832	0.1060%
2006	34,806	33,072,516	0.1052%
2007	35,961	33,131,959	0.1085%
2008	30,521	31,573,800	0.0967%
2009	27,544	27,999,600	0.0984%
2010	24,958	26,571,400	0.0939%
<i>Average (2000-2010)</i>			<i>0.1048%</i>
2015	25,375	27,015,000	0.0939%
2020	26,957	28,699,500	0.0939%
2025	28,662	30,515,100	0.0939%
2030	30,501	32,473,100	0.0939%
<i>CAGR (2010-2030)</i>	<i>1.01%</i>	<i>1.01%</i>	
<i>Source: Airport Records, FAA Aerospace Forecast 2011-2031, Mead and Hunt.</i>			

As shown, the market share methodology projects 25,375 general aviation operations in 2015, 26,957 in 2020, 28,662 in 2025, and 30,501 in 2030, a CAGR of 1.01 percent.

Preferred Projection Methodology

General aviation activity can be affected by many variables, and the number of aircraft operations both at Spokane International Airport and in the U.S. have declined in recent years. The Airport's market share of total U.S. general aviation operations declined by approximately 10 percent between 2000 and 2010. During that same period, the number of operations per based aircraft remained relatively consistent. Therefore, the operations per based aircraft methodology is the preferred methodology (as presented in **Table 2-24**).

Table 2-24. General Aviation Operations Forecasts – Projection Comparison and Preferred Methodology				
Year	GA Operations	FAA TAF Summary	Operations Per Based Aircraft Methodology	Market Share Methodology
1995	28,248			
1996	27,959			
1997	33,571			
1998	36,672			
1999	41,114			
2000	43,547			
2001	43,748			
2002	43,044			
2003	39,808			
2004	32,195			
2005	36,200			
2006	34,806			
2007	35,961			
2008	30,521			
2009	27,544			
2010	24,958			
<i>CAGR (1995-2010)</i>	<i>-0.82%</i>			
2015		25,318	26,553	25,375
2020		26,707	28,200	26,957
2025		28,181	29,875	28,662
2030		29,747	31,562	30,501
<i>CAGR (2010-2030)</i>		<i>0.88%</i>	<i>1.18%</i>	<i>1.01%</i>
<i>Source: Airport Records, FAA TAF, FAA Aerospace Forecasts 2011-2031, Mead and Hunt.</i>				

2.9 INSTRUMENT OPERATIONS FORECASTS

Typically, instrument operations are conducted by commercial aircraft and by aircraft operating during periods of inclement weather. Between 2000 and 2010, instrument operations at Spokane International Airport increased from 67 percent of total operations to 75 percent. The 2010 figure is applied to the total number of projected operations and results in 63,642 instrument operations in 2015, 71,433 in 2020, 80,307 in 2025, and 90,411 in 2030, a CAGR of 2.14 percent (see **Table 2-25**).

Table 2-25. Instrument Operations Projections					
Year	Total Operations	Instrument Operations		Visual Operations	
		Operations	%	Operations	%
2000	117,759	78,527	67%	39,232	33%
2001	110,314	74,186	67%	36,128	33%
2002	108,029	68,990	64%	39,039	36%
2003	106,100	68,427	64%	37,673	36%
2004	99,034	67,182	68%	31,852	32%
2005	99,801	67,402	68%	32,399	32%
2006	95,628	66,022	69%	29,606	31%
2007	101,323	70,581	70%	30,742	30%
2008	95,190	68,768	72%	26,422	28%
2009	81,580	56,923	70%	24,657	30%
2010	79,120	59,203	75%	19,917	25%
<i>CAGR (2000-2010)</i>	<i>-3.90%</i>	<i>-6.65%</i>		<i>-16.28%</i>	
2015	85,053	63,642	75%	21,410	25%
2020	95,464	71,433	75%	24,031	25%
2025	107,323	80,307	75%	27,017	25%
2030	120,827	90,411	75%	30,416	25%
<i>CAGR (2010-2030)</i>	<i>2.14%</i>	<i>2.14%</i>		<i>2.14%</i>	

Source: Air Traffic Activity Data System, (ATADS), Mead and Hunt.

2.10 LOCAL/ITINERANT OPERATIONS FORECASTS

Between 2000 and 2010, itinerant general aviation operations have comprised approximately 57 percent of total operations at Spokane International Airport, while local operations have accounted for approximately 43 percent of total operations. It is anticipated that this split will remain constant throughout the projection period. A summary of projected local and itinerant general aviation operations is shown in **Table 2-26**.

Table 2-26. Local/Itinerant Operations Forecasts					
Year	Total GA Operations	Itinerant GA		Local GA	
		Operations	%	Operations	%
2000	43,547	27,628	63%	15,919	37%
2001	43,748	28,099	64%	15,649	36%
2002	43,044	24,579	57%	18,465	43%
2003	39,808	23,932	60%	15,876	40%
2004	32,195	19,838	62%	12,357	38%
2005	36,200	18,546	51%	17,654	49%
2006	34,806	19,132	55%	15,674	45%
2007	35,961	18,576	52%	17,385	48%
2008	30,521	16,296	53%	14,225	47%
2009	27,544	14,029	51%	13,515	49%
2010	24,958	14,121	57%	10,837	43%
<i>Average (2000-2010)</i>			57%		43%
2015	26,553	15,093	57%	11,459	43%
2020	28,200	16,029	57%	12,170	43%
2025	29,875	16,982	57%	12,893	43%
2030	31,562	17,941	57%	13,621	43%
<i>CAGR (2010-2030)</i>	1.18%	1.20%		1.15%	

Source: Air Traffic Activity Data System, (ATADS), Mead and Hunt.

2.11 MILITARY OPERATIONS FORECASTS

Historically, military operations have comprised approximately two percent of total operations at Spokane International Airport. It should be noted that Fairchild Air Force Base is located approximately four miles from the Airport. Between 2000 and 2010, the number of annual military operations remained fairly consistent between 1,156 and 2,529. Military operations are driven more by policy decisions than by economic conditions, therefore military operations have been projected to remain consistent at their 2010 levels (see **Table 2-27**). As Shown the number of military operations at the Airport will remain flat throughout the projection period.

Year	Total Military Operations	Itinerant		Local	
		Operations	%	Operations	%
2000	2,529	1,382	55%	1,147	45%
2001	1,966	1,289	66%	677	34%
2002	1,512	943	62%	569	38%
2003	1,868	1,120	60%	748	40%
2004	1,254	641	51%	613	49%
2005	1,567	1,123	72%	444	28%
2006	1,943	979	50%	964	50%
2007	1,156	578	50%	578	50%
2008	1,997	745	37%	1,252	63%
2009	2,217	708	32%	1,509	68%
2010	1,618	1,234	76%	384	24%
<i>CAGR (2000-2010)</i>					
2015	1,618	1,234	76%	384	24%
2020	1,618	1,234	76%	384	24%
2025	1,618	1,234	76%	384	24%
2030	1,618	1,234	76%	384	24%
<i>CAGR (2010-2030)</i>	<i>0.00%</i>	<i>0.00%</i>		<i>0.00%</i>	

Source: Air Traffic Activity Data System, (ATADS), Mead and Hunt.

2.12 PEAK PASSENGER ACTIVITY AND OPERATIONS FORECASTS

Planning for facilities and equipment requirements is often based on peak periods of passenger and aircraft activity. This section identifies monthly, daily, and hourly peaking characteristics for passenger and aircraft activity at Spokane International Airport.

2.12.1 Peak Enplanements and Passenger Activity Forecasts

Monthly passenger enplanement data were obtained from the Airport and shown in **Table 2-28**. In 2008, 2009, and 2010, the average percent of passenger enplanements that occurred in peak month accounted for 9.9 percent of total annual enplanements.

Month	2008 Passenger Enplanements	% Annual	2009 Passenger Enplanements	% Annual	2010 Passenger Enplanements	% Annual
JAN	132,319	7.7%	112,666	7.4%	116,290	7.2%
FEB	133,690	7.8%	109,270	7.2%	106,078	6.6%
MAR	156,083	9.1%	134,890	8.8%	133,275	7.9%
APR	137,376	8.0%	113,013	7.4%	115,116	7.8%
MAY	148,245	8.6%	124,316	8.1%	127,405	8.2%
JUN	157,643	9.2%	136,699	8.9%	143,937	9.2%
JUL	168,844	9.8%	146,993	9.6%	156,860	10.1%
AUG	167,866	9.8%	147,241	9.6%	161,923	9.9%
SEP	131,771	7.7%	123,618	8.1%	134,159	8.2%
OCT	134,805	7.9%	126,338	8.3%	135,204	8.3%
NOV	120,974	7.1%	120,198	7.9%	124,059	7.9%
DEC	126,157	7.4%	132,713	8.7%	137,820	8.6%
Totals	1,715,773	100.0%	1,527,955	100.0%	1,592,126	100.0%

Source: Airport Records

It is assumed that peak monthly enplanements and deplanements will be equal, and that peak month enplanements will continue to be 9.9 percent of annual activity. This figure is applied to projections of passenger enplanements described in Section 2 and shown in **Table 2-29**.

Year	Projected Annual Enplanements	Peak Month % Total	Peak Month		
			Enplanements	Deplanements	Total Activity
2015	1,820,148	9.9%	179,876	179,876	359,751
2020	2,177,846	9.9%	215,225	215,225	430,450
2025	2,606,377	9.9%	257,574	257,574	515,149
2030	3,119,876	9.9%	308,321	308,321	616,642

Source: Airport Records, Mead and Hunt.

As shown, the peak month of passenger activity (enplanements plus deplanements) is expected to reach 359,751 in 2015, 430,450 in 2020 515,149 in 2025, and 616,642 in 2030.

2.12.2 Peak Daily Passenger Activity Forecasts

It should be noted that planning for facility and equipment requirements is based on the probable demand that may occur over time. Therefore, if planning is contingent on the absolute busiest periods of activity, it can lead to overestimation, overspending, and inefficiencies. Daily peak activity figures are based on a typical weekday during the peak month.

The average weekday during the peak month for passenger activity typically sees 64 commercial departures and 64 arrivals. These account for approximately 14.9 percent of available weekly seats either departing or arriving at the Airport (see **Table 2-30**).

Day	Departures	Departing Seats	% Weekly Total	Arrivals	Arriving Seats	% Weekly Total
Mon	64	6,521	14.93%	64	6,521	14.92%
Tue	64	6,501	14.88%	64	6,519	14.92%
Wed	64	6,482	14.84%	64	6,464	14.79%
Thu	64	6,501	14.88%	64	6,501	14.88%
Fri	64	6,464	14.80%	64	6,464	14.79%
Sat	51	5,182	11.86%	52	5,270	12.06%
Sun	61	6,030	13.80%	54	5,960	13.64%
<i>Total</i>	<i>432</i>	<i>43,681</i>		<i>426</i>	<i>43,699</i>	

Sources: Official Airline Guide (OAG) August, 2010 Schedule, Mead and Hunt.

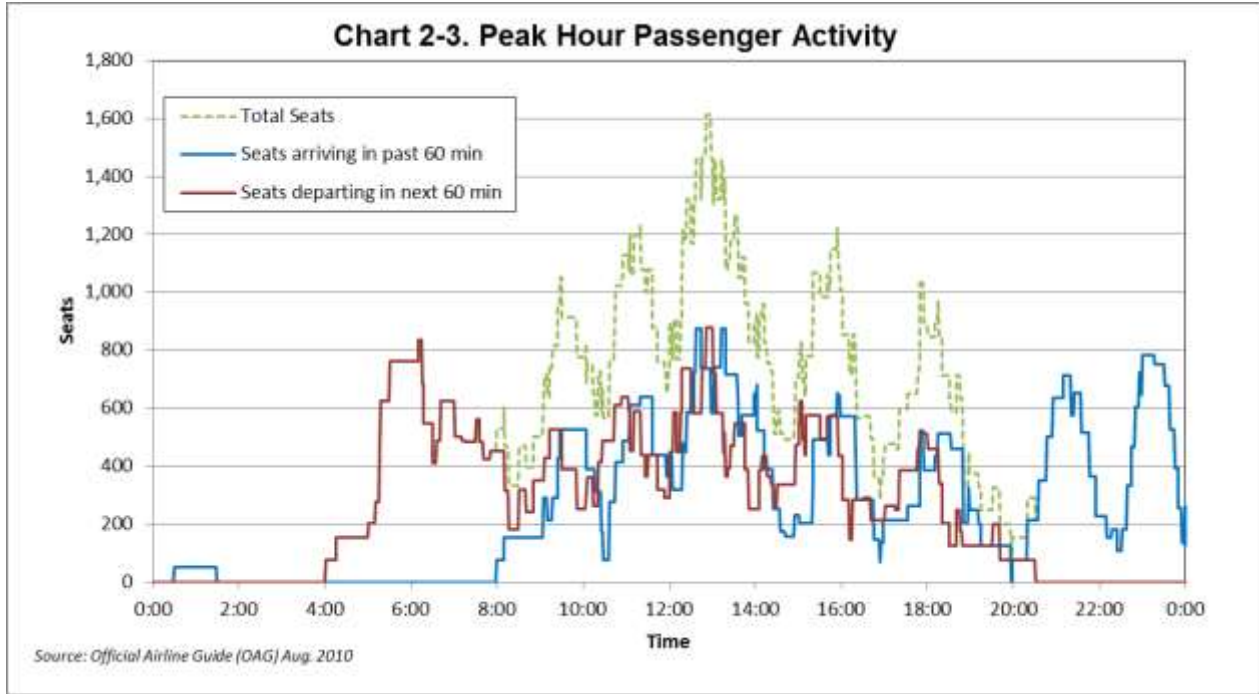
It is assumed that the average peak month is 31 days long (4.4 weeks). Peak month enplanements/deplanements are divided by the average number of weeks in the peak month to determine the average number of weekly passenger enplanements/deplanements that occur in the peak month. This figure is divided by the percent of weekly activity that occurs on a typical weekday and results in the average number of daily enplanements/deplanements that occurs in the peak month (see **Table 2-31**).

Year	Peak Month Enpl/Depl	Weeks in Peak Month	Average Weekly Enpl/Depl	% of Weekly Activity on Typical Weekday		Average Weekday Passengers		
				Enplaning	Deplaning	Enplanements	Deplanements	Total
2010	161,923	4.4	36,801	14.88%	14.87%	5,477	5,475	10,952
2015	179,876	4.4	40,881	14.88%	14.87%	6,084	6,082	12,166
2020	215,225	4.4	48,599	14.88%	14.87%	7,233	7,230	14,463
2025	257,574	4.4	58,162	14.88%	14.87%	8,656	8,653	17,309
2030	308,321	4.4	69,621	14.88%	14.87%	10,362	10,357	20,719

Sources: Airport Records, Official Airline Guide (OAG) August, 2010 Schedule, Mead and Hunt.

2.12.3 Peak Hourly Passenger Activity Forecasts

The number of hourly arriving and departing seats during a typical weekday in the peak month is shown in **Chart 2-3**.



Typically, peak hourly departing seats occurs between 1:00pm and 2:00pm, peak hourly arriving seats occurs between 12:15pm and 1:15pm, and peak total arriving and departing seats occurs between approximately 12:50pm and 2:00pm (see **Table 2-32**).

Table 2-32. Peak Hour Seats			
Time of Day	# of Seats	Total Daily Seats	% of Daily Seats in Peak Hour
Peak Hour Departing Seats (Enplanements)			
13:00 to 14:00	878	6,482	13.5%
Peak Hour Arriving Seats (Deplanements)			
12:15 to 13:15	875	6,464	13.5%
Peak Total Passengers			
12:50 to 13:00	1,614	12,946	12.5%

Sources: Official Airline Guide (OAG) August, 2010 Schedule, Mead and Hunt.

The percentage of daily seats during peak hour is applied to the average daily passenger figures described in Section 2.1.12, and shown in **Table 2-33**.

Table 2-33. Peak Hour Passenger Activity					
Year	Average Day Passengers		Peak Hour Passengers		
	Enplanements	Deplanements	Enplanements	Deplanements	Total Passengers
			13.5%	13.5%	12.5%
2010	5,477	5,475	742	741	1,365
2015	6,084	6,082	824	823	1,517
2020	7,233	7,230	980	979	1,803
2025	8,656	8,653	1,172	1,171	2,158
2030	10,362	10,357	1,403	1,402	2,583

Sources: Airport Records, Official Airline Guide (OAG) August, 2010 Schedule, Mead and Hunt.

2.12.4 Passenger Activity Peaking Characteristics Summary

A summary of peaking characteristics described in the previous sections is described in **Table 2-34**.

Table 2-34. Peaking Characteristics Summary				
Year	Peak Factor	Enplanements	Deplanements	Total Passenger Activity
2010	Actual			
	Annual	1,592,126	1,592,126	3,184,252
	Peak Month	161,923	161,923	323,846
	Peak Month Avg. Weekday	5,477	5,475	10,952
	Peak Hour Avg. Weekday	742	741	1,483
2015	Projected			
	Annual	1,820,148	1,820,148	3,640,296
	Peak Month	179,876	179,876	359,751
	Peak Month Avg. Weekday	6,084	6,082	12,166
	Peak Hour Avg. Weekday	824	823	1,647
2020	Projected			
	Annual	2,177,846	2,177,846	4,355,692
	Peak Month	215,225	215,225	430,450
	Peak Month Avg. Weekday	7,233	7,230	14,463
	Peak Hour Avg. Weekday	980	979	1,958
2025	Projected			
	Annual	2,606,377	2,606,377	5,212,754
	Peak Month	257,574	257,574	515,149
	Peak Month Avg. Weekday	8,656	8,653	17,309
	Peak Hour Avg. Weekday	1,172	1,171	2,344
2030	Projected			
	Annual	3,119,876	3,119,876	6,239,752
	Peak Month	308,321	308,321	616,642
	Peak Month Avg. Weekday	10,362	10,357	20,719
	Peak Hour Avg. Weekday	1,403	1,402	2,806

Sources: Airport Records, Official Airline Guide (OAG) August, 2010 Schedule, Mead and Hunt.

2.12.5 Peak Operations Forecasts

Historical monthly operations are shown in **Table 2-35**. In 2008 and 2009, the peak month accounted for an average of approximately 9.7 percent of total operations at Spokane International Airport.

Table 2-35. Historical Peak Month Aircraft Operations						
Month	2008 Aircraft Operations	% Annual	2009 Aircraft Operations	% Annual	2010 Aircraft Operations	% Annual
Jan	7,262	7.7%	6,007	7.4%	5,840	7.2%
Feb	7,399	7.8%	5,687	7.0%	5,489	6.7%
Mar	7,880	8.3%	7,078	8.7%	6,491	8.0%
Apr	8,662	9.1%	7,671	9.4%	6,388	7.8%
May	9,069	9.6%	7,526	9.2%	7,087	8.7%
Jun	9,366	9.9%	7,450	9.2%	7,086	8.7%
Jul	9,460	10.0%	7,246	8.9%	7,405	9.1%
Aug	8,207	8.7%	6,831	8.4%	7,284	8.9%
Sep	7,640	8.1%	7,144	8.8%	7,402	9.1%
Oct	8,231	8.7%	6,914	8.5%	7,130	8.8%
Nov	5,888	6.2%	5,674	7.0%	5,555	6.8%
Dec	5,647	6.0%	6,169	7.6%	5,963	7.3%
<i>Totals</i>	<i>94,711</i>	<i>100.0%</i>	<i>81,397</i>	<i>100.0%</i>	<i>79,120</i>	<i>7.2%</i>

Source: Air Traffic Activity Data System, (ATADS), Mead and Hunt.

To project peak month operations, the 9.59 percent 2008-2010 peak month average of total operations is applied to annual operations projections described in previous sections of this document. That figure is divided by the number of days in the peak month, 31, to determine the average number of daily operations in peak month. July was the peak month for aircraft operations in 2010, which was primarily fueled by an increase in general aviation and military operations compared with other months. The FAA Enhanced Traffic Management System Counts (ETMSC) database notes that the average number of aircraft operations in the peak hour for each individual day in July was 10.98 percent of the total daily operations. This figure is applied to the average number of projected daily operations in peak month to project peak hour operations (see **Table 2-36**).

Table 2-36. Peak Aircraft Operations Forecasts						
Year	Annual Operations	Peak Month %	Peak Month Operations	Peak Month Avg. Day Operations	Peak Hour %	Peak Hour Operations
2015	85,053	9.59%	8,157	263	10.98%	29
2020	95,464	9.59%	9,156	295	10.98%	32
2025	107,323	9.59%	10,293	332	10.98%	36
2030	120,827	9.59%	11,588	374	10.98%	41
<i>CAGR (2009-2030)</i>	<i>2.04%</i>		<i>2.26%</i>	<i>2.10%</i>		<i>1.82%</i>

Sources: Airport Records, Official Airline Guide (OAG) August, 2010 Schedule, FAA Enhanced Traffic Management Systems Counts (ETMSC), Mead and Hunt.

2.13 FORECAST SUMMARY AND FAA TAF COMPARISON

Passenger and aircraft activity at the Spokane International Airport has fluctuated in recent history. This is not an uncommon theme at many U.S. airports as economic uncertainty and increased travel costs have impacted travel behavior. Despite rapid increases in fuel cost, airline bankruptcies, system-wide route restructuring, and aircraft fleet overhauls, the forecasts developed for this Master Plan Update suggest positive growth in passenger enplanements, the number of based aircraft, and total aircraft operations at the Airport over the next 20 years.

The FAA templates for summarizing and documenting airport planning forecasts and for comparing projections with the FAA TAF Forecasts are presented in **Tables 2-37** and **Table 2-38**.

Table 2-37. FAA Template for Summarizing and Documenting Airport Planning Forecasts

A. Forecast Levels and Growth Rates									
	Specify base year: 2009					Average CAGR			
	2010	2015	2020	2025	2030	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.
	Base Yr. Level	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.				
Passenger Enplanements									
TOTAL Air Carrier & Commuter	1,592,126	1,820,148	2,177,846	2,606,377	3,119,876	2.3%	2.9%	3.1%	3.3%
Operations									
<u>Itinerant</u>									
Air carrier	38,976	45,464	53,015	61,858	72,219	2.6%	2.8%	2.9%	3.0%
Commuter/air taxi	13,568	11,418	12,632	13,973	15,428	-2.8%	-0.6%	0.2%	0.6%
Total Commercial Operations	52,544	56,882	65,647	75,831	87,647	1.3%	2.0%	2.3%	2.5%
General aviation	14,121	15,093	16,029	16,982	17,941	1.1%	1.2%	1.2%	1.1%
Military	1,234	1,234	1,234	1,234	1,234	0.0%	0.0%	0.0%	0.0%
<u>Local</u>									
General aviation	10,837	11,459	12,170	12,893	13,621	0.9%	1.1%	1.1%	1.1%
Military	384	384	384	384	384	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	79,120	85,053	95,464	107,323	120,827	1.2%	1.7%	1.9%	2.0%
Instrument Operations	59,203	63,642	71,433	80,307	90,411	1.2%	1.7%	1.9%	2.0%
Peak Hour Operations	28	29	32	36	41	0.5%	1.3%	1.6%	1.8%
Cargo/mail (enplaned+deplaned tons)	47,686	52,157	58,071	64,623	71,744	1.5%	1.8%	1.9%	2.0%
Based Aircraft									
Single Engine (Nonjet)	55	58	62	63	66	0.9%	1.0%	0.9%	0.9%
Multi Engine (Nonjet)	19	20	21	23	25	0.8%	1.0%	1.3%	1.2%
Jet Engine	3	4	4	6	7	5.6%	3.6%	4.0%	4.0%
Helicopter	1	1	1	1	1	0.0%	0.0%	0.0%	0.0%
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL	78	83	88	93	99	1.0%	1.1%	1.1%	1.1%
B. Operational Factors									
	Base Yr. Level	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.				
Average aircraft size (seats)									
Air carrier & Commuter	100.6	102.0	104.0	106.0	108.0				
Average enplaning load factor									
Air carrier & Commuter	75.3%	78.5%	79.0%	79.5%	80.0%				
GA operations per based aircraft	320	320	320	320	320				
CAGR = Compound Annual Growth Rate									

Table 2-38. FAA Template for Comparing Airport Planning and TAF Forecasts

	<u>Year</u>	<u>Airport Forecast</u>	<u>TAF</u>	<u>AF/TAF (% Difference)</u>
Passenger Enplanements				
Base Yr. Level	2010	1,592,126	1,524,569	4.4%
Base Yr. + 5yr.	2015	1,820,148	1,820,148	0.0%
Base Yr. + 10yrs.	2020	2,177,846	2,177,846	0.0%
Base Yr. + 15yrs.	2025	2,606,377	2,606,377	0.0%
Base Yr. + 20yrs.	2030	3,119,876	3,119,876	0.0%
Commercial Operations				
Base Yr. Level	2010	52,544	52,078	0.9%
Base Yr. + 5yr.	2015	56,882	59,618	-4.6%
Base Yr. + 10yrs.	2020	65,647	67,568	-2.8%
Base Yr. + 15yrs.	2025	75,831	76,588	-1.0%
Base Yr. + 20yrs.	2030	87,647	86,834	0.9%
Total Operations				
Base Yr. Level	2010	79,120	79,229	-0.1%
Base Yr. + 5yr.	2015	85,053	86,405	-1.6%
Base Yr. + 10yrs.	2020	95,464	95,744	-0.3%
Base Yr. + 15yrs.	2025	107,323	106,238	1.0%
Base Yr. + 20yrs.	2030	120,827	118,050	2.4%

**NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).
 Airport Forecast is on a calendar year basis.**

2.14 50-YEAR FORECAST

The 50-year forecast of projected demand takes the preferred forecasts and projects them out to 2050 using the straight-line growth methodology. There are several assumptions going in to the 50-year forecasts including how GEG will have the facilities in place to meet the expected demand, and that market conditions will not impact the demand for air travel in a substantially different way than they do today. The 50-year forecast is presented in **Table 2-39**.

Table 2-39. Summary Forecast of Aviation Activity - 50 Year Forecast						
	2010 (Actual)	2015 (Projected)	2020 (Projected)	2025 (Projected)	2030 (Projected)	2050 (Projected)
Enplanements	1,592,126	1,820,148	2,177,846	2,606,377	3,119,876	8,558,097
Commercial Operations	52,544	56,882	65,647	75,931	98,647	253,761
General Aviation Operations	24,958	26,553	28,200	29,875	31,562	44,885
Military Operations	1,618	1,618	1,618	1,618	1,618	1,618
Total Operations	79,120	85,053	95,464	107,323	120,827	300,264
Total Freight	47,686	52,157	58,071	64,744	71,744	132,397
Based Aircraft	78	83	88	93	99	142
<i>Note: Total Freight in pounds</i>						
<i>Sources: Historical Enplanements & Freight - Airport Records</i>						
1. <i>Historical Operations - Air Traffic Activity Study (ATADS)</i>						
2. <i>Historical Based Aircraft Data - FAA Terminal Area Forecast Records</i>						
3. <i>Projections - Mead & Hunt, Inc.</i>						

Methodology for evaluating airfield capacity and delay is discussed in **Chapter 3**. The existing airfield at GEG has an annual service volume of 215,000 operations. AC 150/5060-5 shows that the ultimate configuration of GEG with two parallel runways (or two parallel with a crosswind) will have an airfield capacity of 305,000 operations, assuming that the fleet mix remains similar. The 50-year projection – which forecasts for unconstrained growth (not impacted by other influences such as gate space, passenger demand, and airline business decisions/aircraft choice) anticipates 300,264 operations in 2050. This will put GEG at near capacity, but not over capacity.

50-year forecast projections should be viewed with caution as there are so many unknowns that can influence actual demand. Navigation technologies, such as required navigation performance, can reduce separation minimums and increase capacity. The FAA's NextGen initiative includes a shift away from ground-based radio technologies and transitions aircraft navigation technologies to GPS satellites. This shift is expected to improve airport capacity as pilots and controllers operate with improved situational awareness.

It is likely that the ultimate airport configuration, combined with improved navigation technologies, will increase GEG's capacity beyond what is indicated in AC 150/5060-5. This AC was written in 1983 and is in the process of being updated. Considering the risks associated with the accuracy of 50-year year projections and the many unknowns about technologies and socioeconomic conditions in the future, and that the 50-year projection places GEG close to ASV with the ultimate airfield configuration, it would be prudent to assume that GEG will likely be able to accommodate the 50-year demand using the ultimate runway configuration.

The 50-year forecast demonstrates that the ultimate airfield configuration will provide sufficient capacity for aviation growth at GEG. It is not expected that additional property will be needed to enhance airfield capacity. Property releases that do not impacted planned pavement, NAVAID, and building development will likely not reduce future capacity at GEG.