Chapter Two AERONAUTICAL ACTIVITY FORECAST

Aviation demand forecasts help to determine the size and timing of needed airport improvements. This chapter indicates the types and levels of aviation activity expected at the Grants Pass Airport (Airport) during a 20-year forecast period. Projections of aviation activity for the Airport were prepared for the near-term (2014), mid-term (2019) and long-term (2029) timeframes. These projections are generally unconstrained and assume the Josephine County Department of Airports (County) will be able to develop the various facilities necessary to accommodate based aircraft and future operations. The methodology followed is from *Forecasting Aviation Activity by Airport* (GRA, Incorporated, 2001, July), which is the Federal Aviation Administration's (FAA) recommended guidance for airport forecasting.

The primary objective of a forecasting effort is to define the magnitude of change in aviation activity that can be expected over time. Because of the cyclical nature of the economy, it is virtually impossible to predict with certainty year-to-year fluctuations in activity, especially when looking 20 years into the future. However, trends can be identified and used to study long-term growth potential. While a single line is often used to express the anticipated growth, it is important to remember that actual growth may fluctuate above and below this line. Forecasts serve only as guidelines and planning must remain flexible to respond to unforeseen aviation facility needs and the economic/external conditions giving rise to those needs.

The Airport will likely continue to serve the type of aircraft it has historically served—small (maximum gross takeoff weight of 12,500 pounds), mostly single engine piston aircraft. The current Airport Reference Code for the Airport is B-II, exemplified by the Beech King Air

aircraft. However, larger, faster and heavier aircraft originating at or destined for the Airport, specifically the Paradise Ranch Resort, may increase operations in the future.

Forecasts for the following aviation activity parameters are presented in this chapter:

- Based Aircraft, including fleet mix: The number and type of based aircraft help determine the future aircraft hangar, tiedown apron and auto parking facility requirements.

- Aircraft Operations, including annual, peak, local vs. itinerant and fleet mix: This information helps in analyzing runway capacity and determining runway, taxiway and navigation aid requirements. The critical aircraft is derived from the fleet mix. The critical aircraft and its airport reference code determine many airfield design requirements, such as runway length, pavement strength, runway and taxiway width, and safety clearances needed for the runway and taxiways. The aircraft operations forecast provides some of the input for the computer modeling that estimates future aircraft noise exposure. An operation is counted as an aircraft either landing or taking off (*i.e.*, an aircraft landing then taking off counts as two operations).

Prior to projecting future activity at the Airport, national and regional aviation trends and forecasts were reviewed. Socioeconomic trends in the southern Oregon area were also analyzed to identify how they might affect aviation demand at the Airport.

NATIONAL AVIATION TRENDS AND FORECASTS

In the 1990s, general aviation (GA) in the United States of America was growing, due not only to an expanding economy, but also to the General Aviation Revitalization Act (GARA) of 1994. GARA set an 18-year limit on the liability of GA aircraft and component manufacturers, spurring production of single engine piston aircraft. This aircraft type has accounted for the majority of the nation's GA activity.

The terrorist attacks of 9/11 dampened GA activity with their effect on the national economy and the imposition of new aviation security restrictions. While the piston aircraft component of GA suffered in the aftermath of 9/11, the business, or corporate, segment of GA has grown. This growth is partly due to security measures implemented at commercial service airports and the increased personal travel times that have resulted. Business aircraft usage provides employee timesavings, increased enroute productivity, minimized time away from home, enhanced industrial security, enhanced personal safety and management control over scheduling.

Many of the nation's employers who use GA are members of the National Business Aircraft Association (NBAA). The NBAA's *Business Aviation Fact Book 2004* indicates that approximately 75 percent of all Fortune 500 businesses operate GA aircraft and 92 of the Fortune 100 companies operate GA aircraft. Business use of GA aircraft ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. General aviation aircraft use allows employers to transport personnel and air cargo more efficiently than commercial passenger flights. Businesses often use GA aircraft to link multiple office locations or to reach existing and potential customers. Business aircraft

use by smaller companies has escalated as various chartering, leasing, time-sharing, fractional ownership, interchange agreements, partnerships and management contracts have emerged. Fractional ownership arrangements have experienced rapid growth. NBAA estimated that 2,591 companies used fractional ownership arrangements in 1999; by 2004 that number had grown to 6,217 companies, more than doubling over the five year period. The fixed base operators at the Airport report that NetJets, Flight Options, Citation Shares and Flex Jets fractional ownership companies use that airport.

FAA Aerospace Forecasts Fiscal Years 2009-2025 describes aviation trends and forecasts growth in GA aircraft, hours flown and pilots. Active GA pilots are projected to increase to 509,900 in 2025, which is a 0.5% annual increase over the forecast period. Additionally, the number of GA hours flown is expected to increase by 1.8% annually over the same period. Overall, the GA fleet is projected to increase by 1.0% annually over the forecast period, with the greatest increase coming from the turbine-powered fleet (fixed wing and rotorcraft).

Fractional, corporate and on-demand charter flights offer an alternative to traditional commercial air travel. The business/corporate side of GA is expected to continue growing faster than personal/sport use, resulting from corporate safety/security concerns and increase flight delays at many commercial airports. The steady growth of the turboprop and turbojet fleet is an example of the demand expected in this sector of GA.

A component of the growth in the business/corporate sector is the growing market for the new, relatively inexpensive (between $1 and $2 million) microjets. These microjets, also called very light jets (VLJs), were thought to revolutionize the aviation industry by supporting true "air taxi" service. However, recent events, such as the bankruptcy of Eclipse and the collapse of DayJet[1], have lowered industry expectations of the aircraft's induction into the GA fleet. As such, the FAA has decreased the forecast for the VLJs to 4,875 aircraft by 2025, which is only 1.7% of the total GA fleet.

The FAA projects high growth for the new category of Sport Aircraft (5.0% annually through 2025). In 2005, the Sport Pilot Rule was issued, requiring a driver's license rather than a medical certificate, a factor that may draw older pilots back into aviation.

Overall, rotorcraft (helicopters) and fixed-wing turbine aircraft are projected to increase at higher rates than fixed-wing piston aircraft. Increased utilization of aircraft is projected for the future, resulting in higher growth rates for hours flown than for the number of aircraft. **Table 2A** presents the FAA's forecast growth rates for GA aircraft and hours flown.

[1] DayJet was an air taxi operator formed in 2002 in Florida that launched a "per-seat, on-demand" jet service throughout the southeastern U.S. using a fleet of Eclipse 500 VLJ aircraft.

Table 2A. FAA General Aviation Forecasts, Average Annual Growth Rates through 2025

Aircraft Category	Aircraft	Hours Flown
Total GA	1.0%	1.8%
National Piston Growth Rate	0.1%	0.4%
National Turbine Growth Rate	3.2%	3.6%
Total Piston Fixed Wing	0.0%	0.2%
Single Engine	0.1%	0.5%
Multi-engine	-1.0%	-1.5%
Total Turbine Fixed Wing	3.5%	3.9%
Turboprop	1.4%	1.3%
Turbojet	4.8%	5.2%
Total Rotorcraft	3.0%	2.9%
Piston	3.9%	3.9%
Turbine	2.5%	2.6%
Experimental	2.2%	2.5%
Sport Aircraft	5.0%	7.1%

Note: Average annual growth rates are for the period 2008 through 2025.
Source: FAA Aerospace Forecasts Fiscal Years 2009-2025, Tables 27 and 28.

REGIONAL AVIATION TRENDS AND FORECASTS

While broad industry trends influence aviation activity at individual airports, regional and local factors may have a greater influence.

The Oregon Aviation Plan (OAP)[2] describes the following trends that would fuel aviation demand:

- Continued migration into the state – new residents will depend on air transportation to maintain ties with family and friends.

- Continued increases in socioeconomic indicators, such as total employment, per capita income and retail sales.

Statewide, GA operations have been projected to grow at an average annual growth rate of 1.6%, with based aircraft expected to increase at an annual rate of 1.2%. At the Grants Pass Airport, the OAP forecasts a 0.84% annual growth for based aircraft and 0.83% annual increase for aircraft operations.

The Rogue Valley International Airport, located in Medford, is the closest publicly owned airport to Grants Pass, located 24 nautical miles away in Jackson County. The Rogue Valley International Airport Master Plan Update[3] projected a forecast of 1.34% annual growth in GA aircraft operations (51,523 in 1998 to 69,000 in 2020). It also reports a 0.98% annual increase in

[2] Oregon Department of Aviation. (2008, February). *Oregon Aviation Plan*
[3] Coffman Associates, Inc. (2001, February).

GA based aircraft (from 150 in 1999 to 184 in 2020). Over the forecast period, aircraft operations were forecasted using a ratio of operations per based aircraft, which rose from 340 to 375. Local and itinerant operations were projected to be split 50/50.

Pacific Aviation Northwest, the fixed base operator (FBO) at the Airport offers aircraft maintenance, flight training and aircraft management. Their fleet of owned and managed aircraft includes piston and turbine single- and multi-engine aircraft. Despite the slowing economic trends, the FBO reports increases in operations and active flight students. On the corporate side, they report an average of eight operations per week, with no seasonal fluctuations. Two of their corporate clients have been forced to base their aircraft at the Rogue Valley International Airport, due to inadequate runway length and weather reporting at Grants Pass. They report an average of 90 to 100 training flights per month, each accounting for approximately six aircraft operations, which equates to approximately 1,100 operations per month. For flight training, the busiest months occur in the late spring through late fall. Flight training declines in the winter due to the weather. **Table 2B**, which lists three years of fuel sales at the Airport since November 2005, supports these trends. Overall, total fuel sales are increasing, along with the percentage of jet fuel sales.

Paradise Ranch, a destination resort golfing community, is being developed adjacent to the Airport. The resort encompasses 320 acres, with lots for 200 single-family home sites, and is planned to open the summer of 2009. Paradise Ranch is working with airport management to allow access to the Airport, which will allow people to fly to the Airport and go directly to the golf course or to their home. All aviation facilities, like parking apron and hangars, would be located on airport property, so no through the fence agreements would be required. Paradise Ranch has received letters of support from potential clients that states their interest in basing and/or operating their private aircraft at the Airport for such uses. Based on interest from clients, Paradise Ranch will be constructing a parking apron and large aircraft hangar at the Airport. It is expected during the peak summer season that Paradise Ranch alone will generate 10 to 15 operations per day at the airport. It is also anticipated that around 10 aircraft will be based at the Airport in the immediate future. The types of aircraft potentially basing and/or operating at the Airport because of Paradise Ranch are Challenger 300, Gulfstream 550 and 600, Falcon 900EX and 700, Lear 35 and 45, and King Air models.

Table 2B. Historical Fuel Sales

	2005/2006 Fuel Sales (Avgas and Jet Fuel)	2006/2007 Fuel Sales (Avgas and Jet Fuel)	2007/2008 Fuel Sales (Avgas and Jet Fuel)
November	2,909	2,350	3,244
December	1,377	4,613	3,135
January	3,080	3,876	2,820
February	4,105	3,231	3,278
March	3,382	5,330	5,001
April	4,517	4,722	4,739
May	8,883	6,928	8,932
June	9,700	9,375	11,107
July	13,067	12,934	9,084
August	10,874	8,126	16,048
September	14,812	11,541	11,409
October	7,614	5,810	6,635
12-Month Total	84,320	78,836	85,432
Percent Jet Fuel	31%	31%	39%
Percent Avgas	69%	69%	61%

Source: Josephine County, 2009.

REGIONAL SOCIOECONOMIC TRENDS AND FORECASTS

Aviation activity at an airport is usually tied closely to the local and regional economy. As population around the airport grows, airport activity grows. Aviation activity has also traditionally been linked to employment and income factors because of the discretionary nature of personal and business travel as well as the recreational nature of some GA activity.

The Airport is located in Josephine County, but has a 30-minute service area that extends into two other counties (Douglas and Jackson). **Table 2C** presents historical and projected populations for the three-county area. This table also presents average annual growth rates for population.

Jackson County has been growing and is projected to grow faster than the three-county area as a whole. However, Josephine County is projected to grow at a slightly higher rate than Douglas County.

Table 2C depicts how the population in the three-county area has shifted and will shift in the future. Josephine County accounted for 18% of the three-county population in 1970, but its share is projected to grow to 21% by 2030.

Table 2C. Historical and Projected Populations

Year	Douglas County	Jackson County	Josephine County	Total
Historical				
1970	71,743	94,533	35,746	202,022
1980	93,748	132,456	58,855	285,059
1990	94,649	146,389	62,649	303,687
2000	100,399	181,269	75,726	357,394
Projected				
2010	106,379	208,370	84,186	398,935
2020	117,632	238,865	94,385	450,882
2030	129,062	268,385	105,552	502,999
Average Annual Growth Rates				
Historical				
1970 - 1980	2.71%	3.43%	5.11%	3.50%
1980 - 1990	0.10%	1.01%	0.63%	0.64%
1990 - 2000	0.59%	2.16%	1.91%	1.64%
Projected				
2000 - 2010	0.58%	1.40%	1.06%	1.11%
2010 - 2020	1.01%	1.38%	1.15%	1.23%
2020 - 2030	0.93%	1.17%	1.12%	1.10%

Source: Historical Population Data - US Census Bureau; Projected Population Data - Office of Economic Analysis, Department of Administrative Services, State of Oregon, April 2009

Higher income usually correlates with GA activity, but Josephine County may be an exception. In the three-county region, Jackson County has the highest per capita personal income, with Douglas County the second highest, as shown in **Table 2D**. Although per capita income in Josephine County is the lowest in the three-county region, it has been increasing at an annual rate almost equal to Jackson County. Annual growth of per capita personal income in Josephine County has increased at the same rate as the state of Oregon.

Table 2D. Per Capita Personal Income History, Three Counties, OR and the U.S.

County	1980	1990	2000	Annual Growth 1980-2000
Douglas County	$9,042	$15,056	$22,662	4.7%
Jackson County	$8,896	$16,469	$24,924	5.3%
Josephine County	$7,815	$14,624	$21,445	5.2%
State of Oregon	$10,113	$18,010	$28,097	5.2%
U.S.	$10,114	$19,477	$29,845	5.6%

Source: US Bureau of Economic Analysis, 2009

In spite of Josephine County's relatively low per capita income, the proportion of County residents who own aircraft is relatively high. **Table 2E** shows that Jackson County residents have the highest propensity to own aircraft in the three-county area. A higher proportion of residents in the three-county area own aircraft than in the state. Low-density development and

the proximity of outdoor recreation opportunities may all contribute to the popularity of general aviation in the three-county area.

Table 2E. Comparison of Population and Aircraft Registration

Area	Population	Registered Aircraft	Registered Aircraft per 1,000 Population
Douglas County	105,240	293	2.8
Jackson County	205,305	770	3.8
Josephine County	83,290	285	3.4
Three-County Totals	393,835	1,348	3.4
State of Oregon Totals	3,791,075	9,521	2.5

Source: Population as of July 1, 2008, estimated by Portland State University's Population Research Center. Registered aircraft data from FAA Civil Aviation Registry, March 30, 2009.

As with income, employment levels in the three-county area do not appear to correlate strongly with aircraft ownership. In recent years, unemployment in Oregon has been higher than the U.S. as a whole. In March 2009, Oregon's unemployment rate[4] was 12.1%, compared to 8.5% for the U.S. The unemployment rate in the three-county area averaged 15.5%. Unemployment in Josephine County was 15.8%, indicating the relative instability of its economy. For the last 20 years or so, Oregon has been moving from a resource-based economy to a more mixed manufacturing and marketing economy, with an emphasis on high technology. The high-tech sector has grown in the Portland metro area, while rural parts of the state have been less successful at changing to a new economy.[5] Some areas of the three-county area reflect a typical trend of many small communities whose economic base has been shifting from the timber industry.

The US Census 2005-07 American Community Survey reports total employment in Josephine County was 32,197. Of these jobs, 74% were in private industry, 14% were self-employed and 11% were in federal, state or local government. The leaders in industry jobs were education services, healthcare and social assistance (6,590); retail trade (5,093); manufacturing (4,217); and construction (3,294).

BASED AIRCRAFT FORECAST

The based aircraft forecast begins by presenting historical numbers of based aircraft. Then, various forecast models prepared for the Airport are analyzed and the preferred forecast for based aircraft and fleet mix through 2029 is presented.

Historical Based Aircraft Data

Table 2F indicates historical numbers of based aircraft from 1980 through 2007, as reported in the FAA's 2008 Terminal Area Forecast. The table shows consistent growth in the total number of based aircraft and in the number of single engine aircraft. Numbers of multi-engine aircraft, helicopters and other aircraft have fluctuated since 1980. While the Terminal Area Forecast is

[4] Seasonally adjusted. Information from Bureau of Labor Statistics, http://www.bls.gov/lau/.
[5] Oregon Bluebook, http://bluebook.state.or.us/facts/economy/economy.htm

valuable as the only source of historical based aircraft numbers from which to discern trends, the numbers listed for recent years are overstated. For example, the Terminal Area Forecast shows 173 based aircraft for 2006, while the FAA Airport Master Record (FAA Form 5010) for September 2006 lists 113 based aircraft (98 single engine, 6 multi-engine, 1 helicopter, and 8 ultralights).

Airport management reports the actual based aircraft number in 2009 is 120, which is the number that this master plan assumes is the most accurate.

Table 2F. Historical Based Aircraft at Grants Pass Airport

Year	Single Engine	Multi-Engine	Heli	Other	Total	Year	Single Engine	Multi-Engine	Heli	Other	Total
1980	63	5	0	0	68	1994	105	13	0	1	119
1981	71	4	1	0	76	1995	105	13	0	1	119
1982	79	3	1	0	83	1996	105	13	0	5	123
1983	79	3	1	0	83	1997	105	13	0	5	123
1984	79	3	4	0	86	1998	105	13	0	5	123
1985	79	4	1	0	84	1999	105	13	0	5	123
1986	79	4	1	0	84	2000	105	13	0	5	123
1987	85	5	1	0	91	2001	105	13	0	5	123
1988	85	5	1	0	91	2002	105	13	0	5	123
1989	85	5	1	1	92	2003	105	13	0	5	123
1990	85	4	1	0	90	2004	120	8	7	8	143
1991	105	13	0	1	119	2005	120	8	7	8	143
1992	105	13	0	1	119	2006*	150	8	7	8	173
1993	105	13	0	1	119	2007	150	8	7	8	173

**Does not match based aircraft from FAA's Airport Master Record (5010 Form) for 2006, which is 113.*
Source: FAA Terminal Area Forecasts, 2008.

Based Aircraft Forecast Through 2029

Six different forecasts or forecasting models were analyzed to provide a range of the possible numbers of based aircraft. The average annual growth rates for these seven models ranged from -0.12% to 1.10%, as shown in **Table 2G**.

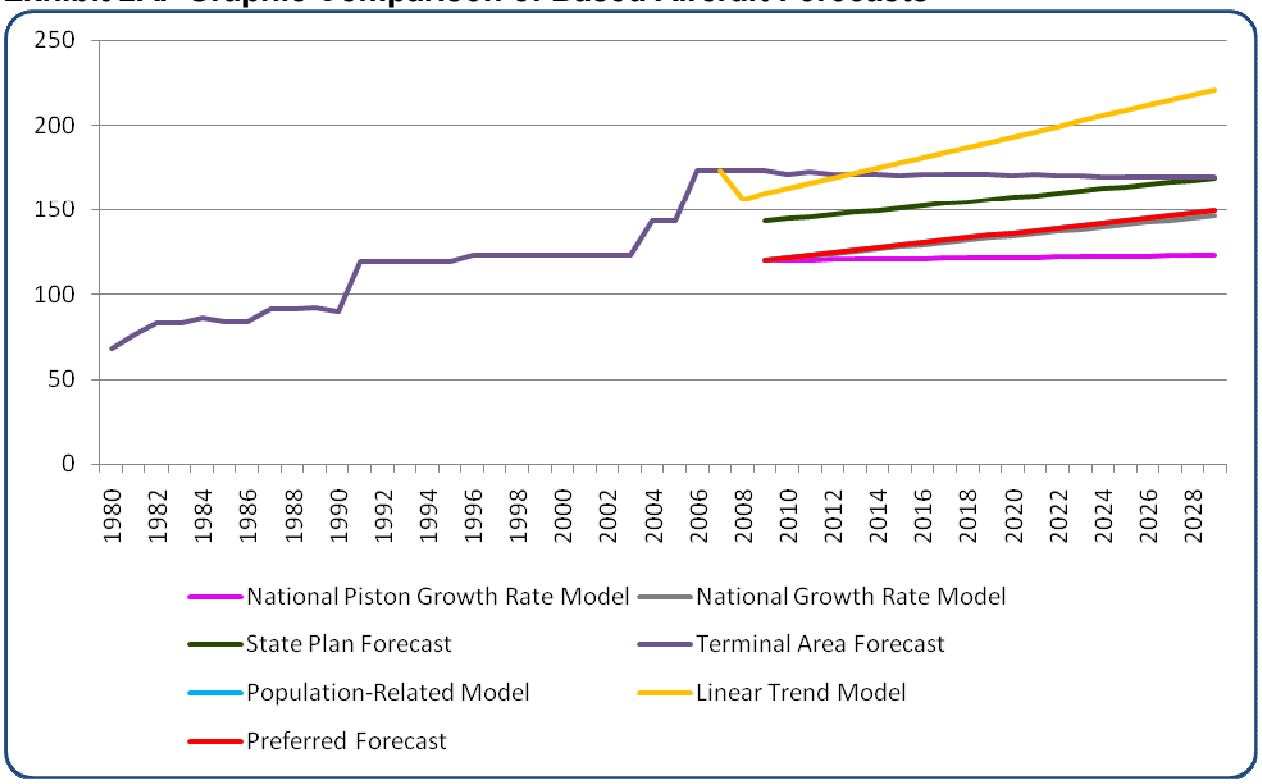
The preferred forecast was chosen by selecting the mode of the six forecasting models, which resulted in an average annual growth rate of 1.10%. Each forecast method is described and evaluated, and the methodology for selecting the preferred forecast is given, in the paragraphs that follow. **Exhibit 2A** graphically compares these forecasts. While the exhibit presents the forecasts as increasing year-by-year according to average growth rates, actual growth will occur in steps, as hangars are constructed and made available for based aircraft.

Table 2G. Comparison of Based Aircraft Forecasts

	2014	2019	2029	Average Annual Growth Rate
National Piston Growth Rate Model	121	122	123	0.10%
National Growth Rate Model	127	133	146	1.00%
State Plan Forecast	150	156	169	0.84%
Terminal Area Forecast	171	171	169	-0.12%
Population-Related Model	127	135	149	1.10%
Linear Trend Model	175	190	220	1.10%
Preferred Forecast	**127**	**135**	**149**	**1.10%**

Note: Base year was 2009 with 120 aircraft for most forecasts. Terminal Area Forecast, State Plan Forecast and Linear Trend Model used different base years and different numbers of based aircraft in the base year.
Source: WHPacific, Inc., 2009.

Exhibit 2A. Graphic Comparison of Based Aircraft Forecasts



Note: Base year (2009) number of aircraft is 120 for most models. For Terminal Area Forecast, the forecast for 2009 was 172 aircraft, for the Linear Trend Model it was 173 and for the Oregon Aviation Plan it was 143.
Source: WHPacific, Inc., 2009.

National Piston Growth Rate Model (0.10% Average Annual Growth)

The majority of airplanes based at the Airport now and in the past have been piston-powered. It is reasonable to assume that the based aircraft at the Airport may grow at the rate forecast for piston airplanes nationwide, shown in Table 2A. However, this model does not take into consideration the expected influx of larger, turbine-powered aircraft into the Airport from Paradise Ranch. Additionally, once the weather reporting system and runway length deficiencies

are addressed, some operators may choose to base their aircraft at Grants Pass rather than Medford.

National Growth Rate Model (1.00% Average Annual Growth)

The FAA's projected growth rate for the national GA fleet is shown in Table 2A. It applies to a fleet mix that is mostly single engine piston, similar to the Airport's. The national fleet mix is 63% single engine piston, 8% multi-engine piston, 4% turboprop, 5% turbojet, 4% helicopter, and 16% other aircraft including sport and experimental. One potential problem with this model is that local influences on the number of based aircraft at the Airport are not considered.

State Plan Forecast (0.84% Average Annual Growth)

The forecast for Grants Pass Airport in the Oregon Aviation Plan equates to 0.84% average annual growth. This forecast accounts for local socioeconomic factors, but does not account for the development at Paradise Ranch.

Terminal Area Forecast (-0.12% Average Annual Growth)

The FAA's Terminal Area Forecast for the Airport, prepared in 2008, shows a negative annual growth rate from 2007 (its base year) to 2025 of -0.13%. The Terminal Area Forecast is likely based upon the forecasts prepared in the 1992 Master Plan Update. The reasoning behind the forecast is 17 years old and may need updating. In addition, a decline in based aircraft contradicts the historical trend and anecdotal information about the future.

Population-Related Model (1.10% Average Annual Growth)

The population of Josephine County is projected to grow at an annual rate of 1.11% from 2000 to 2030. Both the population of Josephine County and the number of based aircraft at Grants Pass Airport have been growing since 1980. Based aircraft at the Airport might reasonably be expected to grow at the same rate as the population within its service area.

Linear Trend Model (1.10% Average Annual Growth)

The linear trend model projects a straight-line continuation of the historical trend into the future, using Terminal Area Forecast based aircraft data from 1980 through 2007.

Preferred Forecast (1.10% Average Annual Growth)

The mode of the previous forecasts represents a 1.10% average annual growth rate from 120 based aircraft to 149 aircraft in 2029—a reasonable scenario for planning airport development. The annual growth rate for the linear trend and population-related models were 1.10%, which appear to be more in-line with the conditions at Grants Pass. The other models likely underestimate potential at the Airport.

Consistent with the demand shown, the fleet mix of aircraft will likely change although single engine piston-powered aircraft will still be the predominant aircraft at the Airport. **Table 2H** presents the based aircraft fleet mix forecast. The forecast includes an increase in the number of multi-engine aircraft, and turboprop/turbojet aircraft in the future, which reflects current demand for Paradise Ranch and other business uses. The Airport's ability to accommodate aircraft with wingspans up to 79 feet should be attractive to the owners of multi-engine and turbine aircraft, which tend to be larger than single engine aircraft.

Table 2H. Preferred Based Aircraft Fleet Mix Forecast

Year	Single Engine	Multi-engine (Piston & Turboprop)	Turbojet	Helicopter	Total
2009	112	5	1	2	120
2014	116	5	3	3	127
2019	122	5	5	3	135
2029	130	6	7	4	149

Source: WHPacific, Inc., 2009.

AIRCRAFT OPERATIONS FORECAST

This section begins with a review of historical trends in aircraft operations. Previous aircraft operations forecasts are reviewed and the preferred aircraft operations forecast is explained and presented. Other forecast information presented in this section includes operations fleet mix, critical aircraft and Airport Reference Code, local vs. itinerant operations, and peak activity.

Historical Aircraft Operations Data

Table 2I presents the history of annual aircraft operations according to the FAA's Terminal Area Forecast. Operations are divided into two basic categories: itinerant and local. Local operations are defined as touch-and-go, or training operations, as well as any other operations that stay within 20 miles of the Airport. All other operations are categorized as itinerant. Another distinction for aircraft operations at the Airport is that they occur in either GA or air taxi aircraft. Air taxi aircraft operations are chartered, for-hire, passenger-carrying commercial flights. The data in Table 2J does not correlate with the increase of fuel sales, as it shows a decline in airport operations since 1990.

Table 2I. Historical Aircraft Operations

Year	Local	Itinerant	Total Airport Ops	Year	Local	Itinerant	Total Airport Ops
1990	8,000	20,100	28,100	1999	9,470	14,470	23,940
1991	8,500	17,600	26,100	2000	9,541	14,573	24,114
1992	8,500	17,600	26,100	2001	9,422	14,393	23,815
1993	8,500	17,600	26,100	2002	9,494	14,496	23,990
1994	8,500	17,600	26,100	2003	9,566	14,600	24,166
1995	8,500	17,600	26,100	2004	9,638	14,703	24,341
1996	9,200	14,100	23,300	2005	9,710	14,806	24,516
1997	9,328	14,266	23,594	2006	9,778	14,904	24,682
1998	9,398	14,367	23,765	2007	9,868	15,037	24,905

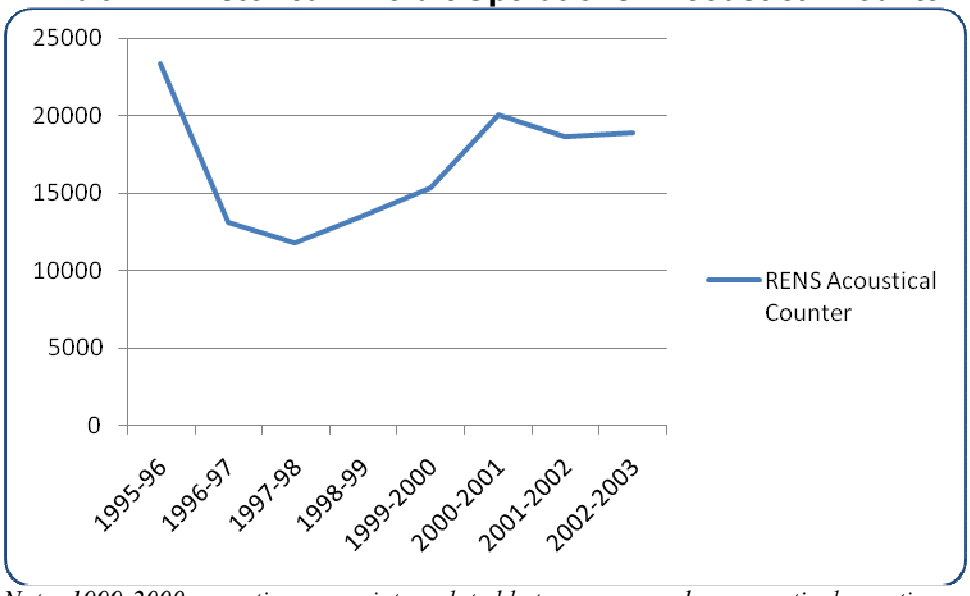
Source: Terminal Area Forecasts, FAA, 2008.

The Oregon Department of Aviation periodically places an acoustical counter, which records the sound of aircraft takeoffs, at non-towered airports around the state. Annual aircraft operations are then estimated based on the sampling. Occasionally the counter records sounds other than aircraft or fails to record an aircraft operation. In addition, the sample period may not reflect

average activity, leading to a faulty estimation of annual operations. Nevertheless, the acoustical counter records help understand the level and trends of aircraft operations. Counter records for the Airport, shown in **Exhibit 2B**, indicate that operations reduced from around 23,000 in 1995 to about 19,000 in 1995. They dropped down to approximately 11,000 in 1997. Since 1997, operations have risen steadily until 2001 and then flattens out through 2003.

The acoustical counter records in Exhibit 2B do not match the Terminal Area Forecast operations in Table 2I. For example, Exhibit 2B shows operations derived from the acoustical counter decreased by over 50% between 1995 and 1996, where the Terminal Area Forecast reports only a modest drop in operations. Unfortunately, the most recent acoustical counter information is from the 2002-03 reporting cycle.

Exhibit 2B. Historical Aircraft Operations - Acoustical Counter Records



Note: 1999-2000 operations were interpolated between years when acoustical counting occurred.
Source: ODA RENS Aircraft Activity Counter Program.

Other measures of activity were sought to identify trends in traffic levels at the Airport. The amount of fuel sold usually reflects trends in activity levels, although competitive fuel pricing and average aircraft size are also factors in fuel sales.

Three years of fuel sales show an average annual growth rate of 0.44%, even though the gallons sold declined slightly in the second year. The records show growth in the amount of fuel sold and an increase in the proportion of jet fuel compared to aviation gasoline.

Aircraft Operations Forecast Through 2029

The national FAA forecasts presented in Table 2A indicate that GA aircraft usage will increase. While the fleet is projected to grow 1.0% per year, hours flown are projected to grow 1.8% per year. For the piston fleet, the hours flown are projected to grow 0.4% annually, while the number of piston aircraft is projected to grow only 0.1% annually. Similarly, for the turbine fleet, the hours flown are forecasted to grow 3.6% annually, while the turbine aircraft fleet is

expected to grow 3.2% annually. Based upon these differences in growth rates, it would be logical to assume that aircraft operations will grow at a higher rate than based aircraft nationally.

Depending on the source, the Airport's 2006 operations and based aircraft numbers result in an average of 143 to 240 operations per based aircraft (Terminal Area Forecast versus Airport Master Record). The Terminal Area Forecast ratio is a very low ratio of operations to based aircraft, whereas the Airport Master Record is more in-line with FAA planning guidance. The FAA has recommended using 450 operations per based aircraft to estimate operations at very busy reliever airports. Rural/remote airports with little itinerant traffic should have about 250 operations per based aircraft.

Comparing the Terminal Area Forecast historical aircraft operations and based aircraft records in Tables 3G and 3J, respectively, the Airport's operations per based aircraft ratio has been as high as 312 (in 1990) and has low as 143 in 2006. In total, the Terminal Area Forecast operations per based aircraft average is 196.

Looking at the seven years of RENS operations counts available between 1995 and 2003, the ratio of operations per based aircraft has been as high as 196, as low as 96, and has averaged 142.

Table 2J presents three forecasts for aircraft operations: Terminal Area Forecast, Linear Trend Forecast and Operations per Based Aircraft Forecast.

The FAA's Terminal Area Forecast projects an average annual growth of 0.82% through 2029 and is the same growth rate as the Oregon Aviation Plan's forecast for the Airport. The Terminal Area Forecast used data from the out-dated Master Plan Update (1992) and is most likely not the most accurate source. Additionally, this model does not correspond with the national trend of increased aircraft utilization, since it would be lower than the based aircraft forecast of 1.10%.

The Linear Trend Forecast projects a straight-line continuation of the historical trend (1990-2007) for each component of aircraft operations, resulting in the following growth rates for the period 2008-2029:

Air taxi	0.00% average annual growth
GA itinerant	-2.33% average annual growth
GA local	0.91% average annual growth
Total operations	-0.67% average annual growth

The Linear Trend Forecast yields negative growth or no growth in all areas except for local GA, because the Terminal Area Forecast historic data shows decline or stagnation in those sectors. It is not representative of current local conditions.

The Operations per Based Aircraft Forecast, which is the preferred operations forecast, uses 250 operations per based aircraft. This ratio is consistent with FAA guidance for rural airports such as Grants Pass. It is considerably higher than the Terminal Area Forecast ratio, because the number of based aircraft is overstated in the Terminal Area Forecast. Airport management and the Airport Master Record estimate the current ratio is around 220 operations

per based aircraft. Paradise Ranch is expected to increase the number of transient aircraft operations, adding up to 15 operations per day during the summer months. Considering Paradise Ranch and the national trend for higher aircraft utilization, it is reasonable to expect the operations per based aircraft ratio at Grants Pass Airport to increase to 250.

To project annual operations in the future, the preferred based aircraft forecast numbers from Table 2G were multiplied by 250.

Table 2J. Comparison of Aircraft Operations Forecasts

Year	Terminal Area Forecast	Linear Trend	Operations per Based Aircraft (Preferred Forecast)
2014	26,413	22,580	31,750
2019	27,528	21,840	33,750
2029	29,800	20,360	37,250
Average Annual Growth	0.82%	-0.67%	1.09%

Source: WHPacific, Inc., 2009. Figures in Terminal Area Forecast column are from Terminal Area Forecast, FAA, 2009.

Table 2K presents the breakdown of the preferred forecast for aircraft operations. Following the table is an explanation of how the breakdown was determined.

Table 2K. Preferred Aircraft Operations Forecast

Year	Air Taxi	GA Itinerant	GA Local	Military Itinerant	Total
2009	320	17,580	12,000	100	30,000
2014	350	19,000	12,300	100	31,750
2019	400	20,250	13,000	100	33,750
2029	500	22,550	14,100	100	37,250

Source: WHPacific, Inc., 2009.

According to the Terminal Area Forecast, air taxi operations have stayed constant, at 300 per year, since 1996. One of the national trends that is expected to affect the Airport is an increase in on-demand air taxi aircraft operations. Air taxi operations at Grants Pass Airport are projected to increase at 2.3% annually, reflecting an increase in charters associated with Paradise Ranch. Despite this growth, air taxi aircraft operations will represent less than 1.3% of total operations in 2029.

The reported split between itinerant and local operations has been roughly 60% itinerant and 40% local for the last ten years. The preferred forecast assumes future GA operations will be similarly divided between itinerant and local.

Military aircraft of varied types, origins and destinations occasionally use the Airport. Lacking any specific information of how military aircraft use might change in the future, the number of military aircraft operations is estimated to remain constant over the forecast period.

Operations Fleet Mix

Because of transient aircraft traffic, the fleet mix for aircraft operations is not the same as the fleet mix for based aircraft. For example, while there are some turbine-powered aircraft based at the Airport, most chartered flights are turbine-powered and would increase that fleet's operations at the Airport.

Some of the estimated air taxi operations are by air ambulances and others are chartered for business or recreation purposes. Generally, air taxi aircraft are larger and faster than single engine piston aircraft. The Airport's FBO currently operates the Piper Cheyenne, Beechcraft King Air, Piper Jetprop and Socato TBM aircraft for their corporate flights.

Table 2L presents the estimated current (2009) and projected future operations fleet mix. The current fleet mix was estimated from surveys and interviews with Airport users. Table 2M indicates that current operations include single and multi-engine piston aircraft, turboprops, turbojets and helicopters. In the future, it is projected that air taxi and GA aircraft using the Airport will include more turboprops, such as the King Air models, and even some turbojet aircraft, such as the Cessna Citation and Learjet.

Table 2L. Preferred Operations Fleet Mix Forecast

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Helicopter
2009	95.30%	1.25%	1.50%	0.70%	1.15%
2014	94.65%	1.30%	1.75%	1.15%	1.25%
2019	93.35%	1.50%	1.90%	1.50%	1.75%
2029	91.90%	1.75%	2.15%	2.25%	1.95%

Source: WHPacific, Inc., 2009.

Critical Aircraft and Airport Reference Code

Based upon the estimated operations fleet mix in Table 2M for 2009, there are over 1,000 annual operations in multi-engine piston (375), turboprop aircraft (450) and turbojet aircraft (210) now. By 2029, the annual number of operations by multi-engine piston, turboprop and turbojet aircraft is projected to reach 2,291 (6.15% of 37,250). For existing and future conditions, the Beech King Air represents the critical design aircraft – Airport Reference Code B-II and 12,500 pounds maximum takeoff weight.

Peak Demand Forecast

As airport activity often fluctuates from month to month, day to day, and hour to hour, airfield and landside facilities are traditionally designed to accommodate reasonable peak levels of use. Interviews with Airport users have resulted in some consensus about the peaks and valleys of airport use. The Airport is busier in the summer than in the winter, and it is busier on the weekends than during the week.

In preparing the peak demand forecast, it was useful to review the fuel sales reported in Table 2J. Monthly peak activity characteristics are evident from total gallons of fuel sold. The peaking

characteristics reported for the Rogue Valley International Airport were also reviewed. The general aviation based aircraft fleet mix and the type of activities that occur at Medford are also somewhat similar to those at Grants Pass.

The peaking characteristics at Rogue Valley International Airport (Medford) were:

- An estimated 13% of annual operations are projected to occur during the peak summer month (August).
- The design day operations are the peak month operations divided by 31 days. Busy day operations are 1.25 times the design day activity.
- The peak hour is estimated to be 15% of the design day.

Fuel sales at the Grants Pass Airport were consistently higher in the late spring and summer periods, with July through September typically peaking. This corresponds with the stated peak month for the Rogue Valley International Airport.

For the Grants Pass Airport, an estimated 13% of annual operations are projected to occur during the peak summer month. Design day operations are the peak month operations divided by 31 days and peak hour is 20% of the design day. The 20% of design day peak hour is higher than the peak hour for Medford, but since airfield lighting is limited at Grants Pass, it is expected more operations will occur during the daylight hours.

Table 2M presents the operations forecasts resulting from peak demand factors described above.

Table 2M. Preferred Peak Operations Forecast

	2009	2014	2019	2029
Annual Operations	30,000	31,750	33,750	37,250
Peak Month	3,900	4,128	4,388	4,843
Design Day	126	133	142	156
Peak Hour	25	27	28	31

Source: WHPacific, Inc., 2009.

SUMMARY OF FORECASTS

The long-term growth of the Airport will be influenced by national and regional trends outlined within this chapter. The elements of the aeronautical activity forecast for the Airport are summarized in **Table 2N**.

With this forecast data, the next step in the master planning process is to calculate the ability of existing facilities to meet the forecasted demand. Additionally, the next chapter will identify needed enhancements of airside and/or landside facilities to accommodate forecasted demand.

Table 2N. Summary of Preferred Airport Aeronautical Activity Forecasts

Forecast Element	2009	2014	2019	2029
BASED AIRCRAFT				
Single Engine Piston	112	116	122	130
Multi-engine (Piston & Turboprop)	5	5	5	6
Turbojet	1	3	5	9
Helicopter	2	3	3	4
Total	120	127	135	149
AIRCRAFT OPERATIONS				
Air Taxi	320	350	400	500
GA Itinerant	17,580	19,000	20,250	22,550
GA Local	12,000	12,300	13,000	14,100
Military Itinerant	100	100	100	100
Total	30,000	31,750	33,750	37,250
OPERATIONS FLEET MIX				
Single Engine Piston	28,590	30,051	31,506	34,233
Multi-engine Piston	375	413	506	652
Turboprop	450	556	641	801
Turbojet	210	365	506	838
Helicopters	345	397	591	726
Total	30,000	31,750	33,750	37,250
PEAK DEMAND (OPERATIONS)				
Peak Month	3,900	4,128	4,388	4,843
Average Day/Peak Month	126	133	142	156
Peak Hour	25	27	28	31