



T·O ENGINEERS

BEAR LAKE COUNTY AIRPORT MASTER PLAN

AVIATION ACTIVITY FORECAST *DRAFT*



3.0 AVIATION ACTIVITY FORECAST

This chapter discusses the findings and methodologies used to project aviation demand at Bear Lake County Airport. The forecasts developed in the airport master plan provide a framework to guide the analysis for future development needs and alternatives. It should be recognized that there are always short and long-term fluctuations, which cannot be anticipated, in an airport's activity due to a variety of factors.

Projections of aviation activity for the airport were prepared for the 20-year planning horizon, including near-term (2014-2019), mid-term (2020-2024), and long-term (2025-2034) timeframes. These projections are generally unconstrained and assume the airport will be able to develop the various facilities necessary to accommodate based aircraft and future operations. The projections of aviation demand developed for Bear Lake County Airport are documented in the following sections:

- ✦ Historic Aviation Activity
- ✦ Trends/Issues Influencing Future Growth
- ✦ Projections of Aviation Demand
 - Forecasting Methodologies
 - Based Aircraft Projections
 - Aircraft Local Operations Projections
 - Aircraft Itinerant Operations Projections
 - Aircraft Total Operations Projections
- ✦ Peaking Characteristics
- ✦ Critical Aircraft
- ✦ Summary

3.1 HISTORIC AVIATION ACTIVITY

Historic activity data for the airport provides the baseline from which future activity can be projected. Historic aviation activity and aviation activity projections at the airport are based on FAA 5010 Master Records and available FAA Terminal Area Forecasts (FAA TAF) data.

While historic trends are not always reflective of future periods, historic data does provide insight into how local, regional, and national demographic and aviation-related trends may be tied to the Airport.

Aviation activity is measured in operations where an operation is defined as either a takeoff or a landing. Historic aircraft operations data for Bear Lake County Airport are summarized in **Table 3-1**.

TABLE 3-1 – HISTORIC AIRCRAFT OPERATIONS AND BASED AIRCRAFT

Year	Itinerant Operations			Local Operations			TOTAL ALL OPS	Based Aircraft	
	Air Taxi	General Aviation	Military	Total	General Aviation	Military			Total
2004	0	7,678	0	7,678	1,049	0	1,049	8,727	5
2005	0	8,159	0	8,159	1,133	0	1,133	9,292	5
2006	0	8,502	0	8,502	1,189	0	1,189	9,691	5
2007	0	8,859	0	8,859	1,248	0	1,248	10,107	9
2008	0	2,000	0	2,000	400	0	400	2,400	6
2009	0	2,000	0	2,000	400	0	400	2,400	5
2010	0	2,000	0	2,000	400	0	400	2,400	4
2011	0	2,000	0	2,000	400	0	400	2,400	4
2012	0	2,000	0	2,000	400	0	400	2,400	5
2013	0	2,083	0	2,083	420	0	420	2,503	6
2014	0	2,170	0	2,170	441	0	441	2,611	6

Source: FAA 5010 Master Records, FAA TAF and Airport Records

- ✧ Total Operations: As shown, according to the FAA TAF and FAA 5010 records, total annual operations have declined over the last 10 years, down 70% overall or a compound annual growth rate (CAGR) of -11.4% between 2004 and 2014. This decline in general aviation activity at Bear Lake County Airport is consistent with national trends.
- ✧ Air Taxi Operations: There were no air taxi operations at Bear Lake County Airport over the last 10 years.
- ✧ General Aviation Operations: Total general aviation operations (both local and itinerant) have declined over the last 10 years. Operations peaked in 2007 at 10,107 annual operations. In 2008, general aviation operations dropped to 2,400 per year and have remained of the same order of magnitude since 2008. This decline is not unique to Bear Lake County Airport and is reflective of the decline in general aviation activity across the nation due to economic weakness during the recession coupled with high fuel prices.
- ✧ Military Operations: Bear Lake County Airport might have accommodated minimal amount of military operations; however, the FAA TAF indicates no military operations at the airport since 1993.
- ✧ Based Aircraft: Historically, the number of aircraft based at Bear Lake County Airport has greatly fluctuated over the last 20 years. In 1997, only 2 aircraft were based at the airport, while 9 aircraft were based at the airport in 2007. In 2014, 6 aircraft were based at Bear Lake County Airport, all single-engine aircraft.

- ✦ Fleet Mix. Airport records maintained by the Airport's Manager and IFR records provided by GCR were obtained and reviewed. Both the activity logs kept at the airport and the IFR records were used to identify the type of traffic and type of users at Bear Lake County Airport. Although these records do not include all the operations, they allow a better grasp of the nature of the traffic at the airport. The traffic at Bear Lake County Airport ranges from small single-engine piston aircraft, such as Cessna 172 or 182, which represent the bulk of the traffic, to larger turboprop and jet aircraft, including Citation CJ3 (C525) and Pilatus PC-12, which occasionally use the airport. An airport users' survey developed as part of this Airport Master Plan indicates occasional use by Beech King Air and Super King Air (B-100 and B-200). In addition, airport records indicated that in 2014 Bear Lake County airport was occasionally used by Piper Meridian, TBM as well as Citation CJ4. **Figures 3-1** depicts the variety of aircraft using Bear Lake County Airport.

FIGURE 3-1 – FLEET MIX



3.2 TRENDS/ISSUES WITH THE POTENTIAL TO INFLUENCE FUTURE AIRPORT GROWTH

There are several factors, independent of airport activity, which may influence aviation activity. It is worthwhile to review outside influences to determine how they may impact future growth. These factors include regional demographics and outlook, national aviation trends, and local factors.

3.2.1 REGIONAL DEMOGRAPHICS

Socioeconomic characteristics are collected during the airport planning process and examined to derive an understanding of the dynamics of historic and projected growth within the geographic area served by an airport. This information is then typically used as one tool to forecast aviation demand. The types of socioeconomic data that are presented include population, employment, and per capita personal income.

The airport serves Bear Lake County in southeastern Idaho and Rich County in northeast Utah. Bear Lake County is comprised of several towns including Paris, Montpelier, Bloomington, St. Charles, and Georgetown. The towns in Rich County include: Randolph, Garden City, Garden, Laketown and Woodruff. A summary of historic and projected socioeconomic trends for Bear Lake County and Rich County is presented below.

Bear Lake County's Population

Between 1982 and 1990, the population of Bear Lake County declined 17% from 7,385 to 6,082. In the 1990s, the population increased slightly from 6,082 to 6,424 in 2000, fueled by development of affordable recreational homes near Bear Lake. However, in the 2000s, the population started decreasing again to a low of 5,907 in 2012. The local communities in the county work to promote tourism, create jobs and retain young people in the area.

Tourism and recreational activities are important sources for economic activity within the county. The last five years have seen an increase in the number of building permits delivered for large high-priced vacation homes in the southeast part of the County, near Bear Lake. (Source: U.S. Census Bureau, Idaho Department of Labor and Bear Lake County Building Official)

Bear Lake County's Employment

According to the Idaho Department of Labor, Bear Lake County's labor market has been tight during the last 10 years, providing jobs for most individuals who wanted to live in the county. The civilian labor force increased 13 percent between 2003 and 2013; from 2,887 in 2003, with an unemployment rate of 5.3 percent to 3,321 in 2013, with an unemployment rate of 4.4 percent.

The unemployment rate peaked in 2010 at 6.2 percent and has been slowly declining over the last three years. In 2012, the unemployment rate in Bear Lake County was 4.7 percent; comparatively, the unemployment rates for Idaho and the U.S. were 7.3 percent and 8.1 percent, respectively. In May 2014, the unemployment rate was 3.1 percent.

Employment in Southeastern Idaho (Bannock, Bear Lake, Bingham, Caribou, Franklin, Oneida and Power counties) is projected to grow at a CAGR of 1.35 percent between 2010 and 2020. The largest growth is anticipated in the healthcare and service industries. (Source: Idaho Regional Economic Analysis Project, U.S. Bureau of Economic Analysis, Idaho Department of Labor)

Bear Lake County's Per Capita Income

In 2012, the per capita personal income (PCPI) of Bear Lake County was \$33,161. The PCPI has grown over the last 22 years (1990 - 2012) with a CAGR of 5.07 percent. The PCPI growth for Bear Lake County has outpaced that of Idaho (3.57 percent CAGR) and of the U.S. (3.72 percent CAGR). However, the level of the PCPI in Bear Lake County remains lower than that of Idaho and the United States (respectively \$34,481 and \$43,735 in 2012). (Source: Idaho Regional Economic Analysis Project, U.S. Bureau of Economic Analysis)

Bear Lake County's Industry Mix

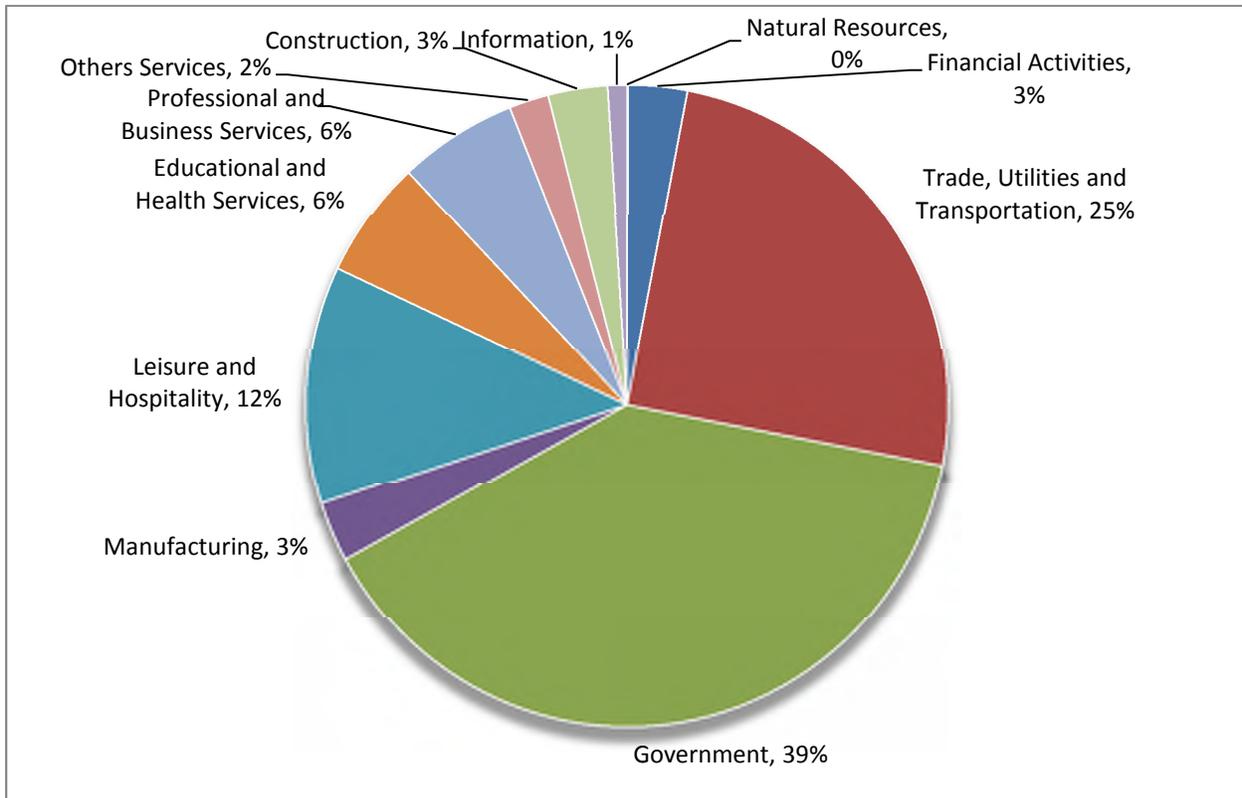
The largest nonfarm industries in Bear Lake County are government, leisure and hospitality and trade. In 2012, government accounted for 20.9 percent of total employment in Bear Lake County, agriculture accounted for 14.9 percent, retail trade for 12.1 percent and accommodation and food services for 6.7 percent.

Government, agriculture, retail trade and accommodation as well as food services provide the foundation for the local economy. Additional economic contributors include real estate, rental and leasing, health care and social assistance, other services, finance and insurance, manufacturing and arts entertainment and recreation.

In 2012, a quarter of the nonfarm jobs in the Bear Lake County were in the trade, utilities, and transportation industries. The government sector accounted for 39 percent of the nonfarm jobs in the county and leisure and hospitality jobs accounted for 12 percent of the county jobs. In addition, Educational and Health Services and Professional and Business Services sectors both accounted for 6 percent of the nonfarm jobs. **Figure 3-2** displays the repartition of the nonfarm payroll jobs in Bear Lake County in 2012

Further, Montpelier is home to the Oregon-California Trail interpretive Center while the Bear Lake National Wildlife Refuge is located near the north end of Bear Lake in the southern portion of the County. Both serve as primary tourists attractants, helping to benefit the local economy. (Source: Idaho Department of Labor)

FIGURE 3-2 – NONFARM PAYROLL JOBS



Source: T-O Engineers, Inc., Idaho Department of Labor

Rich County, UT

As previously mentioned in the Inventory chapter, Rich County, UT, borders Bear Lake County to the south and is in the immediate vicinity of the airport. Bear Lake and the surrounding areas are a popular tourist destination during the summer months. Several marinas, beaches and the tourist towns of Garden City and Laketown are located in Rich County. Therefore, developments in the northern portions of Rich County have potential impacts on demand at the airport. Garden City is located on the shores of Bear Lake, approximately 41 minutes from Bear Lake County Airport. It is a popular summer resort destination. Recreation in the Bear Lake area is an important resource for both Rich County and the Bear Lake Valley.

The population of Rich County sharply declined from 2,350 in 1982 to a low of 1,721 in 1991. In the 1990s, the population started slightly increasing and has been on an upward trend since 2000 reaching a population of 2,255 in 2012. (Source: Utah Department of Workforce)

In Rich County, the overall labor force remained constant between 2003 and 2013 with an unemployment rate of 4.0 percent in 2003 and 3.5 percent in 2013. The unemployment rate peaked in 2010 at 5.9 percent and has been declining over the last three years. In 2012, the unemployment rate in Rich County and in Utah was respectively 4 percent and 5.4 percent. (Source: Utah Department of Workforce)

3.2.2 NATIONAL AVIATION TRENDS

Historic and anticipated trends related to general aviation will be important considerations in developing forecasts of demand for Bear Lake County Airport. National trends can provide insight into the potential future of aviation activity and anticipated facility needs. The aviation industry has experienced significant changes over the last 30 years. This section will briefly discuss the tendencies and factors that have influenced those trends in the U.S.

National General Aviation Industry Trends

At the national level, fluctuating trends regarding general aviation usage and economic upturns/downturns resulting from the nation's business cycle have impacted general aviation demand. Slow economic recovery and economic uncertainties will continue to impact demand for general aviation at many airports throughout the U.S., including Bear Lake County Airport, over the next several years.

- ✦ General Aviation Fleet Changes: While single-engine piston aircraft still account for the majority (61%) of the U.S. general aviation aircraft fleet in 2013, the national historic trends indicate that multi-engine turboprop and business jet fleets grew at a faster rate than the single-engine piston fleet. The most active growth in the fleet size has been in turbine aircraft and rotorcraft. According to the *FAA General Aviation and Air Taxi Activity Surveys*, as a result of the recent recession, the U.S. general aviation aircraft fleet has declined 4.7% from 231,606 aircraft in 2007 to an estimated 202,875 in 2013. General aviation industry began to show signs of recovery in 2012 and 2013, especially with strong growth in turbine aircraft (both rotorcraft and turbo jet) deliveries.
- ✦ Active Pilots: There were over 599,000 active pilots in the United States at the end of 2013. An active pilot is a person with a pilot certificate and a valid medical certificate. There was a -0.3% CAGR in pilot population between 2000 and 2013. Recreational and private pilot certificates accounted for the largest declines.
- ✦ General Aviation Operations: According to FAA air traffic activity, between 2000 and 2013, general aviation operations experienced a -3.3% CAGR. In 2013, there were approximately 25.8 million general aviation operations at 514 towered airports, 55% of which were itinerant operations. General aviation operations at combined FAA and contract towers were down 1.2% between 2012 and 2013.

National Projections of Demand

On an annual basis, the FAA publishes aerospace forecasts that summarize anticipated trends in all components of aviation activity. Each published forecast revisits previous aerospace forecasts and updates them after examining the previous year's trends in aviation and economic activity. Many factors are considered in the FAA's development of aerospace forecasts, some of the most important of which are U.S. and international economic forecast and anticipated trends

in fuel costs. The recent projections found in *FAA Aerospace Forecast Fiscal Years 2014-2034* are summarized below.

- ✦ During the five year period between 2013 and 2018, U.S. economic growth is projected to grow at a CAGR of 2.9%. For the remaining years of the forecast period, real Gross Domestic Product (GDP) growth is assumed to slow to around 2.4% annually.
- ✦ The FAA estimates that the U.S. general aviation aircraft fleet will grow from an estimated 203,000 aircraft in 2013 to 225,700 aircraft in 2034. This is equal to a CAGR of 0.5%. Most of this growth is driven by turbo jet, turboprop, and turbine rotorcraft markets, while the number of piston aircraft is expected to slightly decrease. It is probable that this trend will have an effect on the fleet mix at Bear Lake County Airport. However, it is difficult to quantify precisely the amount of change at the airport.
- ✦ Strong growth is anticipated in the turbine aircraft (turboprop and jets) fleet, estimated to grow at a CAGR of 2.4% between 2013 and 2034.
- ✦ General aviation hours flown will increase at a CAGR of 1.4% between 2013 and 2034.
- ✦ It is anticipated that general aviation aircraft operations will grow at a CAGR of 0.5% through 2034.

3.2.3 LOCAL FACTORS AFFECTING DEMAND

There are other factors unique to Bear Lake County Airport that have the potential to impact the forecasts developed in this chapter.

Proximity to Competing Airports

The proximity to competing airports is one of the key determinants of the demand and size of an airport's service or catchment area. For comparative purposes, only the airports equipped with a paved runway have been included hereafter. Due to the mountainous terrain, there are few airports in southeastern Idaho, northern Utah and southwestern Wyoming that are within close proximity of Bear Lake County Airport. As depicted with **Figure 3-3**, there is no other public-use airport within a 20 miles radius of Bear Lake County Airport. There is only one airport within a 30 miles radius, Cokeville Municipal Airport, which has one based aircraft and approximately 40 operations per year.

As noted in **Table 3-2**, the runway length at Bear Lake County Airport meets or exceeds that presently available at several of the neighboring or competing airports. When total based aircraft among all of the general aviation airports in the area are considered, there are presently 194

general aviation aircraft based in the area, most of them based at Logan-Cache Airport, UT, and Afton, WY.

Nearby airports, including Soda Springs and Preston, show higher numbers of annual operations than Bear Lake County Airport. Bear Lake County Airport board members noted that these activity levels may be high. For comparison purpose, only the data contained in the Form 5010 has been included in the following table. As previously mentioned, it is difficult to understand and quantify the number of operations at non-towered airports.

FIGURE 3-3 – AREA AIRPORTS



TABLE 3-2 – AREA AIRPORTS SUMMARY

Airport	Runway Length*	Based Aircraft**	Annual Operations	Distance from Bear Lake County Airport
Bear Lake County	5,728 feet	6	2,083	-
Cokeville (WY)	3,400 feet	1	40	23.9 miles
Soda Springs (Allen H Tigert)	2,500 feet	6	7,300	30.2 miles
Preston	3,457 feet	1	7,040	30.9 miles
Afton (WY)	7,025 feet	51	8,600	37.1 miles
Logan-Cache (UT)	5,005 feet	119	72,828	41.1 miles
Downey (Hyde Memorial)	3,550 feet	2	1,550	41.1 miles
Kemmerer (WY)	2,671 feet	3	3,000	49.9 miles
Malad City	4,950 feet	5	4,450	57.1 miles
	TOTAL	194	106,891	

* Longest Runway if the airport is equipped with several runways

** Includes Fixed wing aircraft (Single-engine, multi-engine and jet), Helicopters, Gliders and Ultra-Light

Source: FAA 5010 Master Records and T-O Engineers, Inc.

Local Business and Tourism Usage

There are several areas of economic growth in Bear Lake County that also have the potential to increase the usage of Bear Lake County Airport.

Per the Bear Lake Valley Blueprint, which was developed in 2010 to explore growth issues and choices for the Bear Lake region, 61 percent of the houses were secondary residences in 2010 and it was projected that 74 percent of the houses would be secondary residences in 2060. According to discussions with Building Inspectors and Planning and Zoning Officials, the market of large high-priced recreational houses is in expansion near Bear Lake. Both Bear Lake County and Rich County have seen an increase in large and expensive houses in the Bear Lake area over the last five to ten years, and the interest in general aviation to access the area is increasing as a result since it is easier to fly from Salt Lake City than to drive.

Further, realtors in the Bear Lake area confirmed this increase in the number of high-priced houses being built in the Bear Lake Valley. They also indicated that, in the past, most of their clients were not aware of the existence of the airport. However, they mentioned that it was an important asset for the Bear Lake Valley. One realtor indicated that they were meeting guests and residents of the area at the airport eight to twelve times a year. This does not include guests and residents who use the airport and reach their final destination on their own. Propeller aircraft are most common, but jets are occasionally being used. According to the realtor, most of the guests and residents are from Idaho and neighboring states, primarily Utah, and are coming from areas within three hours of the Bear Lake Valley. With the economy picking up, multiple new houses and secondary residences are being built and there is potential for growth at the airport.

In addition, the Bear Lake Valley is becoming a popular tourist destination. The reputation of Bear Lake for its scenic landscapes, recreational and outdoors activities fuels the tourism in the

area. According to the Idaho Department of Labor, the tourism industry may experience increased growth in Bear Lake County as the Bear Lake Scenic Highway and the Oregon-California Trail Interpretive Center attract tourists driving between Salt Lake City, UT and both Jackson Hole, WY and Yellowstone National Park. In addition, according to the Bureau of Economic and Business Research, from the University of Utah, Rich County had a 33.9% leisure and hospitality share of total private jobs in 2013, ranking 8th statewide. In the summers, visitors can boat, fish and swim as well as bike, hike and hunt. Bear Lake hosts a variety of athletic races, as well as the popular Raspberry Days Festival, which increases the interest in the area.

Further, Paris Hills Agricom is investigating the feasibility of opening a phosphate mine near Paris, ID which would significantly boost the economy of the county. According to the Idaho Department of Labor, the Paris Hills Mine could provide a very positive economic impact adding many high wage jobs. This mine could employ approximately 350 employees when reaching full-scale operations and it could increase the demand for air travel at Bear Lake County Airport, with increased corporate travel and additional needs for expedited deliveries.

Lastly, at least two hunting preserves may be operating in the area. It is possible to attribute activity at the airport for at least one of these, which has used the airport in the past to fly clients in the Bear Lake area instead of driving from Salt Lake City Airport. In the future, new hunting services or preserves might be interested in using the airport during the hunting season.

Aerial Firefighting

Due to the access it provides to southeastern Idaho mountains, Bear Lake County Airport has supported aerial firefighting aircraft during the fire season. The magnitude of use is dictated by the severity of the fire season and the proximity of the fire to the airport. The ability of the airport to support aerial firefighting activity is viewed as critical to the overall health and well-being of the community.

Life Flight/Medical Related Activity

Per information provided by multiple Life Flight operators in the area, the relative proximity of Bear Lake County Airport to Pocatello means the airport is in range of Life Flight helicopters which can directly access the local hospital. A Life Flight operator out of Pocatello indicated operating approximately 30 to 50 times a year with helicopters out of the hospital. Another Life Flight operator out of Salt Lake City advised that between March 2014 and August 2014 their helicopters flew 23 times to the local hospital.

Both operators advised that their fixed wing aircraft flew approximately 3 times a year to the airport, but were severely restricted by the lack of instrument procedures. The isolated location of the Bear Lake County area requires some fixed wing Life Flight activity throughout the year. However, the lack of instrument approach procedures and fog issues at the airport is currently a pivotal factor in Life Flight operations.

Although Bear Lake County Airport is currently utilized infrequently by Life Flight operators, there is a need for fixed wing aircraft at the airport to transport passengers or doctors, especially during the winter months. Life Flight operators noted that medical evacuation or transports that could have been conducted by aircraft were often conducted by ground transportation due to the lack of instrument approach procedures. A rough estimate of this type of activity was provided by a Life Flight operator who estimated that as many as 100 ground operations per year could be conducted to transfer patients to Salt Lake City or Pocatello.

Life Flight operators contacted as part of this Airport Master Plan operate Pilatus PC-12, Beech King Air 200, and Beech 90 aircraft.

Flight Schools

According to discussions with the airport's manager and users of the airport, Bear Lake County Airport has seen an increased growth in the number of flight schools using the airport for flight training operations. Repeated attempts to talk to Flight Schools were unsuccessful. However, available information indicates training activities primarily originate from the greater Salt Lake City Area. Records indicate single engine aircraft are the most common training aircraft that use the airport.

As previously mentioned, the FAA estimates that the number of turbo jet and turbo prop aircraft is expected to grow during the next 20 years, while the number of piston aircraft is expected to slightly decrease. It is probable that this trend will have an effect on the fleet mix at Bear Lake County Airport and on the aircraft used by the flight schools. However, it is likely that the flight schools will continue using single-engine aircraft during initial training. In addition, it is difficult to quantify precisely the amount of change at the airport. Traffic and aircraft types using Bear Lake County Airport should continue to be monitored to track and identify changing patterns and fleet mix.

Summary of local factors

The use of Bear Lake County Airport for business, tourism, aerial firefighting, and Life Flight operations is considered to be an important function of the airport over the planning horizon.

While it is not anticipated that the various aircraft associated with these activities will approach the threshold to consider changes to the identified critical aircraft at the airport, these activities represent both opportunities and challenges. Future activity at the airport should be based on a *quality versus quantity* basis in terms of accommodating future demand and the development of new improvements. Although, the activities previously described have the potential to increase at Bear Lake County, it is difficult to quantify how these activities will impact future demand. The airport and Bear Lake County need to track shifts in aviation demand and aircraft types as things progress in the future. Recommended facilities and strategies to address potential impacts are considered in later chapters of this report.

3.3 PROJECTIONS OF DEMAND

While the Bear Lake County Airport has experienced a decline in its number of based aircraft and operations since the events of September 11, 2001 and the recent economic recession; it is considered to be unlikely that this pattern will continue over the forecasted period. The airport will most likely experience moderate growth over the next 20-year forecast period, the rate of that growth will be somewhat comparable to others in the region but somewhat dependent on the future facilities and services provided at the airport.

Projections of aviation demand at Bear Lake County Airport for the 20-year planning period are presented here using various methodologies. The results of these different methodologies are compared and a preferred projection of each is selected.

The following assumptions were made in developing the projections of aviation demand at Bear Lake County Airport:

- ✦ The national and local economies will continue to grow through the overall forecast period.
- ✦ Economic disturbances may cause year-to-year traffic variations, but the long term projections will likely be realized.
- ✦ Aviation at Bear Lake County Airport will generally reflect the national aviation industry. The FAA projects growth in all aspects of aviation.
- ✦ Airport facilities will keep pace with and meet the demand for aviation use and a lack of facilities will not limit the number of based aircraft to be accommodated in the future.

3.3.1 FORECASTING METHODOLOGIES

Several forecasting techniques were used to project future aviation demand at Bear Lake County Airport. There are two basic approaches to forecasting: top-down or bottom-up. The top-down approach forecasts aviation demand for the nation or for a region and allocates portions of the total demand to geographic areas, based on historical shares or assumed growth rate. The bottom-up approach consists in forecasting aviation demand for an airport using data for a specific geographic area.

When forecasting aviation demand, it is assumed there is a relationship between historical events and conditions, and that this relationship will continue into the future. The following methods were used to predict future activity levels at Bear Lake County Airport.

Market Share

This method of forecasting is a relatively easy method to use and the required data is often available in the FAA's Terminal Area Forecast (TAF). It assumes a top-down relationship between national, regional and local forecasts and considers that local forecasts are a percentage (market share) of regional or national forecasts. Historical market shares are calculated for a given time period (often a 5- or 10-year period) and used as a basis for projecting future market shares.

Regression Analysis - Trend Analysis

A regression analysis is a type of econometrics analysis, and uses mathematical and statistical tools. The value being estimated or forecasted (here aviation activity) is called the dependent variable, while the value used to prepare the forecast is called the independent variable. A simple regression analysis uses one independent variable, while multiple regression analyses use two or more independent variables.

A regression equation is computed with historical values and is used to project future values. It is possible to use socioeconomic data as independent variables, such as population, per capita income, or employment. It is also possible to use time as the independent variable to perform a Trend Analysis. This method is a basic technique, which can capture economic growth and recession.

Compound Annual Growth Rate

The Compound Annual Growth Rate (CAGR) can be defined as the year-over-year growth rate. It is an imaginary number that describes the rate at which a data series would have grown if it had grown at a steady rate.

It is computed with the following formula:

$$CAGR = -1 + \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\left(\frac{1}{\text{number of years}} \right)}$$

It is possible to forecast future values based on the CAGR of a data series, assuming that the rate will remain the same in the future. As with every forecasting method uncertainties remain.

Summary

These different methodologies can be used in an infinite number of ways, with several distinct variables. Regression analyses can be used with population, employment, personal per capita income, or even a combination of the three as the independent variable. Market share can be computed using a five-year average or a ten-year average and data from the state or from a FAA region. In addition, predictions with the CAGR can be computed using the historic rate for the last 10 years, or the historic rate for the last 20 years, as well as the projected employment growth or the historic Per Capita Personal Income (PCPI) growth.

The following methodologies and variables were used to predict the number of based aircraft and operations at Bear Lake County Airport.

- ✦ Linear Regression
 - With Employment as the independent variable
 - Trend Analysis
- ✦ CAGR
 - Historic Growth (Last 10 years)
 - Historic Growth (Last 20 years)
 - Projected Employment Growth
 - Historic PCPI growth
- ✦ Market Share
 - Northwest Mountain Region (5-year average)
 - Northwest Mountain Region (10-year average)
 - State of Idaho (5-year average)
 - State of Idaho (10-year average)

Not all these methodologies yielded coherent or reasonable results. For instance, some methodologies predicted increases of 800 percent, which is not realistic at Bear Lake County Airport. Therefore, not all the methodologies used during the initial analysis will be presented in the subsequent sections of this report; only the methods leading to coherent and reasonable results will be described in details hereafter.

3.3.2 BASED AIRCRAFT

Based aircraft are those aircraft that are permanently stored at an airport. Estimating the number and type of aircraft expected to be based at Bear Lake County Airport over the next 20 years is crucial to evaluate the need for future facility and infrastructure requirements.

As discussed in the Inventory chapter, the airport's most recent FAA 5010 (05/29/2014) and the FAA National Based Aircraft Inventory Program identify six aircraft based at Bear Lake County Airport (all single-engine aircraft). Six based aircraft will be used as the base year (2014) based aircraft number from which projections are developed.

Based aircraft at Bear Lake County Airport were projected using the methodologies previously described. A summary of the methodologies yielding coherent and reasonable results is below and shown in **Table 3-3** and **Figure 3-4**.

- ✦ Scenario 1: Historic Based Aircraft Growth. This scenario projects based aircraft to increase at an average annual rate of growth of 1.67%, equal to the historic CAGR in based aircraft at Bear Lake County Airport between 2004 and 2014.

- ✧ Scenario 2: Projected Employment Growth. This scenario projects operations to increase at an average annual rate of growth of 1.35%, equal to the projected employment growth developed for southeastern Idaho, as part of the Idaho Regional Economic Analysis Project.
- ✧ Scenario 3: Linear Regression with Employment as the independent variable. This scenario assumes that the growth of based aircraft at Bear Lake County Airport will be projected using a linear regression analysis with employment as the independent variable. The annual growth rate for this scenario is 3.82%.
- ✧ Scenario 4: 10-year average Market Share of Idaho Based Aircraft. During the last ten years, Bear Lake County Airport's share of Idaho's based aircraft fleet as reported in the FAA's Terminal Area Forecasts, was on average 0.20%. This scenario assumes that Bear Lake County Airport will maintain this share of the State of Idaho Based Aircraft and that the Idaho Based Aircraft will grow as predicted in the FAA's Terminal Area Forecasts. The annual growth rate for this scenario is 1.20%.

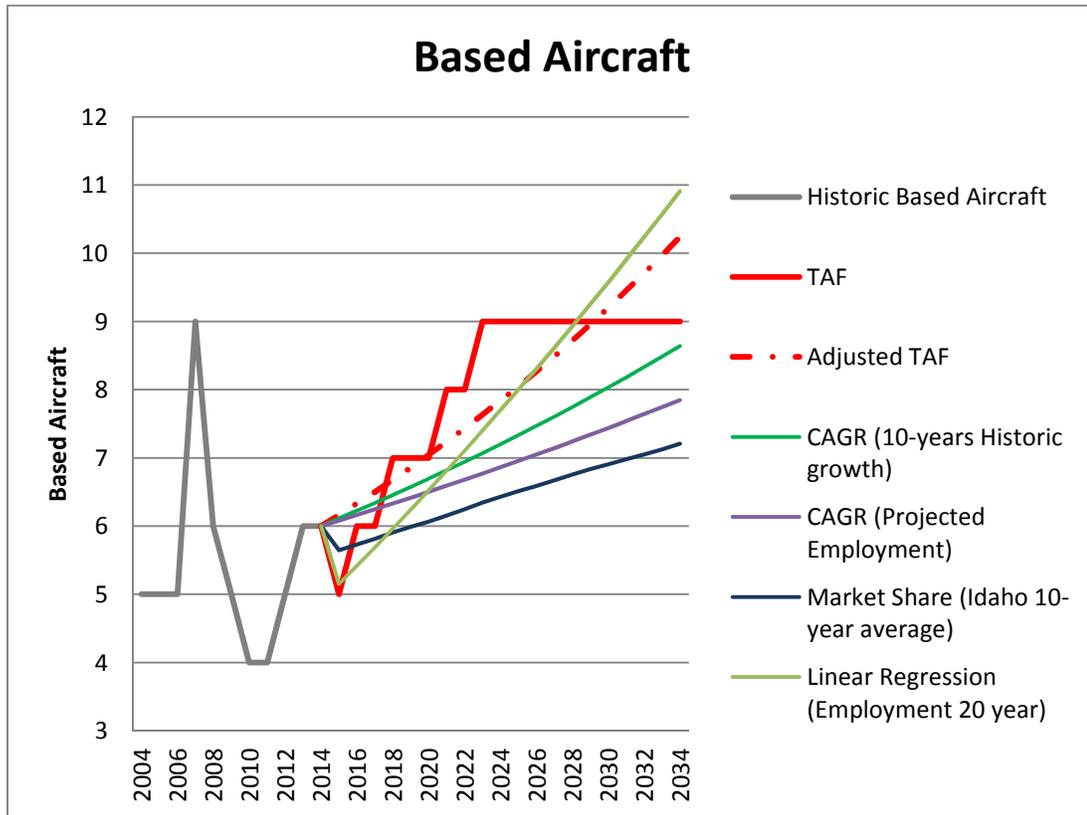
The results of these forecasting methodologies were compared and are listed and depicted in **Table 3-3 and Figure 3-4**. The FAA TAF notes that five aircraft were based at the airport. However, six aircraft are currently based at Bear Lake County Airport. The TAF was adjusted to six based aircraft, utilizing the growth rate published in the TAF.

TABLE 3-3 BASED AIRCRAFT PROJECTIONS

Year	Scenario					FAA	FAA
	Scenario 1 Historic Based Aircraft Growth	Scenario 2 Projected Employment Growth	Scenario 3 Linear Regression (Employment)	Scenario 4 Idaho Market Share	Terminal Area Forecast (TAF)	Terminal Area Forecast (TAF)	FAA TAF Adjusted Forecast
2014	6	6	6	6	5	6	6
2019	7	6	6	6	7	7	7
2024	7	7	8	6	9	8	8
2034	9	8	11	7	9	10	10
CAGR	1.84%	1.35%	3.82%	1.20%	2.71%	2.71%	
2019 Variation from Adjusted TAF	-4.15%	-6.43%	-8.95%	-12.67%	2.08%		-
2024 Variation from Adjusted TAF	-8.14%	-12.45%	-1.80%	-18.00%	14.83%		-
2034 Variation from Adjusted TAF	-15.61%	-23.35%	6.59%	-29.62%	-9.71%		-

Source: T-O Engineers, Inc.

FIGURE 3-4 – BASED AIRCRAFT PROJECTIONS



Source: T-O Engineers, Inc.

Note: TAF Adjusted figures reflect adjusting the base year figure from the TAF to match actual data figures. TAF growth rates are then applied to the actual data figure for the duration of the planning period.

The results of the four scenarios examined in this analysis were compared to the FAA’s Terminal Area Forecast (TAF) for Bear Lake County Airport.

Over the first ten years of the planning period, all scenarios are lower than the adjusted TAF projections. Throughout the last ten years of the planning period Scenario 3 is then slightly higher than the adjusted TAF, while all the other scenarios remain lower than the adjusted TAF. Scenario 3, which is a linear regression based on the projected employment growth in Bear Lake County, is the preferred forecast, with a CAGR of 3.82%. Based on this methodology, by the end of the forecast period, 11 aircraft are projected to be based at Bear Lake County Airport. This is 6.59% more than the adjusted TAF projections of based aircraft.

Aviation demand is considered to be a derived demand; one that depends upon the level of business and leisure activity in the economy. The projected employment growth as noted by the State of Idaho points to new jobs and business growth around Bear Lake County which can correlate to anticipated increased future usage and number of based aircraft at the airport. Based on this correlation as well as the consultant’s professional opinion, the linear regression with the employment as the independent variable (Scenario 3) is the preferred forecast for

based aircraft. The preferred based aircraft projection for Bear Lake County Airport is carried forward in the master planning process and is used to examine future airport facility needs.

Fleet Mix

Total based aircraft projected for the airport over the planning period using the preferred based aircraft projection were allocated to four aircraft categories – single-engine, multi-engine and jet, helicopter, and other – to develop a projection of the airport’s based aircraft fleet mix through the planning period. The fleet mix projections developed for Bear Lake County Airport were developed based on the fleet mix percentages exhibited at the airport and in the *FAA Aerospace Forecast, Fiscal Years 2014-2034* projection of active general aviation aircraft.

The preferred based aircraft fleet mix projections are shown in **Table 3-4**. With the anticipated national growth in turbine aircraft through the forecast period, two multi-engine and turbine aircraft are estimated to be based at Bear Lake County Airport by 2034.

Based on the anticipated national growth in turboprop and jet aircraft through the forecast period, there is potential for a based jet aircraft at Bear Lake County Airport. As previously mentioned, the market of large high-priced recreational houses is in expansion and the interest in using the airport to access the area is increasing as a result.

Out of the predicted multi-engine and turbine aircraft, one or several may be jet aircraft, depending on the leisure and recreational development in the county and on the evolution of the demand at the airport.

TABLE 3-4 – PROJECTED BASED AIRCRAFT FLEET MIX

Aircraft Type	2014	2019	2024	2034	CAGR 2014-34
Single-Engine	6	6	7	9	2.05%
Multi-Engine and jet	0	0	1	2	-
Helicopter	0	0	0	0	-
Other	0	0	0	0	-
Total	6	6	8	11	3.82%

Source: T-O Engineers, Inc.

3.3.3 AIRCRAFT OPERATIONS

Aircraft operations are divided into two types: local and itinerant. Local operations are classified as operations by aircraft which:

- ✈ Operate in the local traffic pattern or within sight of the airport, or
- ✈ Are known to be departing for or arriving from flights in local practice areas within a 20-mile radius of the airport, or
- ✈ Execute simulated approaches or low passes at the airport.

Itinerant operations are defined as:

- ✧ All other operations other than local.

The current ratio of local to itinerant general aviation is 15 percent local and 85 percent itinerant.

Different factors impact the number of operations at an airport including but not limited to, the total based aircraft, area demographics, activity and policies of neighboring airports, and national trends. These factors were examined and projections were developed for the local operations, itinerant operations as well as for the total number of operations.

Local Operations

A summary of the methodologies used to develop the projected aircraft local operations are below and shown in **Table 3-5** and **Figure 3-5**.

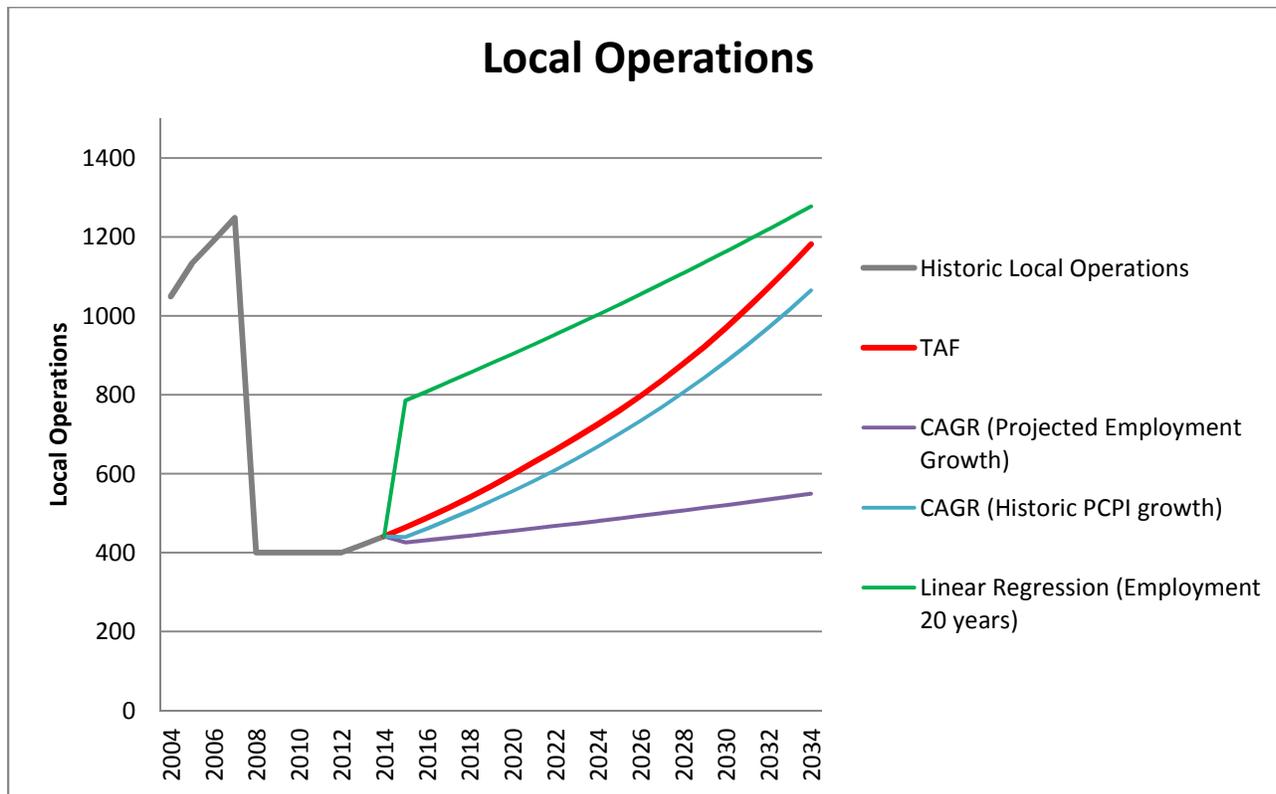
- ✧ Scenario 1: Projected Employment Growth. This scenario projects local operations to increase at a CAGR of 1.35%, equal to the projected employment growth developed for Southeastern Idaho, as part of the Idaho Regional Economic Analysis Project.
- ✧ Scenario 2: Historic Per Capita Personal Income Growth. This scenario projects local operations to increase at a CAGR of 4.76%, equal to the historic CAGR in PCPI in Bear Lake County the last five years.
- ✧ Scenario 3: Linear Regression with Employment as the independent variable. This scenario assumes that the growth of local operations at Bear Lake County Airport will be projected using a linear regression analysis with employment as the independent variable. The annual growth rate for this scenario is 2.46%.

TABLE 3-5 – GENERAL AVIATION LOCAL OPERATIONS PROJECTIONS

Year	Scenario 1 Projected Employment Growth	Scenario 2 Historic PCPI Growth	Scenario 3 Linear Regression (Employment)	FAA Terminal Area Forecast (TAF)
2014	441	441	441	441
2019	449	530	879	568
2024	480	669	1,003	725
2034	549	1,065	1,277	1,181
CAGR	1.35%	4.76%	2.46%	4.78%
2019 Variation from TAF	-20.92%	-6.7%	54.69%	-
2024 Variation from TAF	-33.75%	-7.8%	38.30%	-
2034 Variation from TAF	-53.49%	-9.9%	8.15%	-

Source: T-O Engineers, Inc.

FIGURE 3-5 – GENERAL AVIATION LOCAL OPERATIONS PROJECTIONS



Source: T-O Engineers, Inc.

The results of the three scenarios examined in this analysis were compared to the FAA’s TAF for Bear Lake County Airport. Scenario 2 (Historic PCPI growth) was chosen as the preferred general aviation local operations projection, with a CAGR of 4.76%. Based on this methodology, 1,065 local operations are projected at Bear Lake County Airport, by the end of the forecast period. This is 9.9% less than the TAF projection of local operations.

Aviation demand is considered to be a derived demand; one that depends upon the level of business and leisure activity in the economy. General aviation activity is highly dependent on the economy and personal income, as it is one of the first costs to be cut during times of economic hardships.

The historic per capita personal income growth points to increased income around Bear Lake County which can correlate to increased future usage and an increase in the number of local operations at the airport. Based on this correlation as well as the consultant’s professional opinion, the historic PCPI Growth rate methodology (Scenario 2) is the preferred forecast for general aviation local operations. In addition, based on airport users’ survey developed as part of this Airport Master Plan, most of the users who answered the survey were itinerant. Therefore, most of the growth in the total number of operations is expected to be driven by itinerant operations.

Itinerant Operations

A summary of the methodologies used to develop the aircraft itinerant operations are below and shown in **Table 3-6** and **Figure 3-6**.

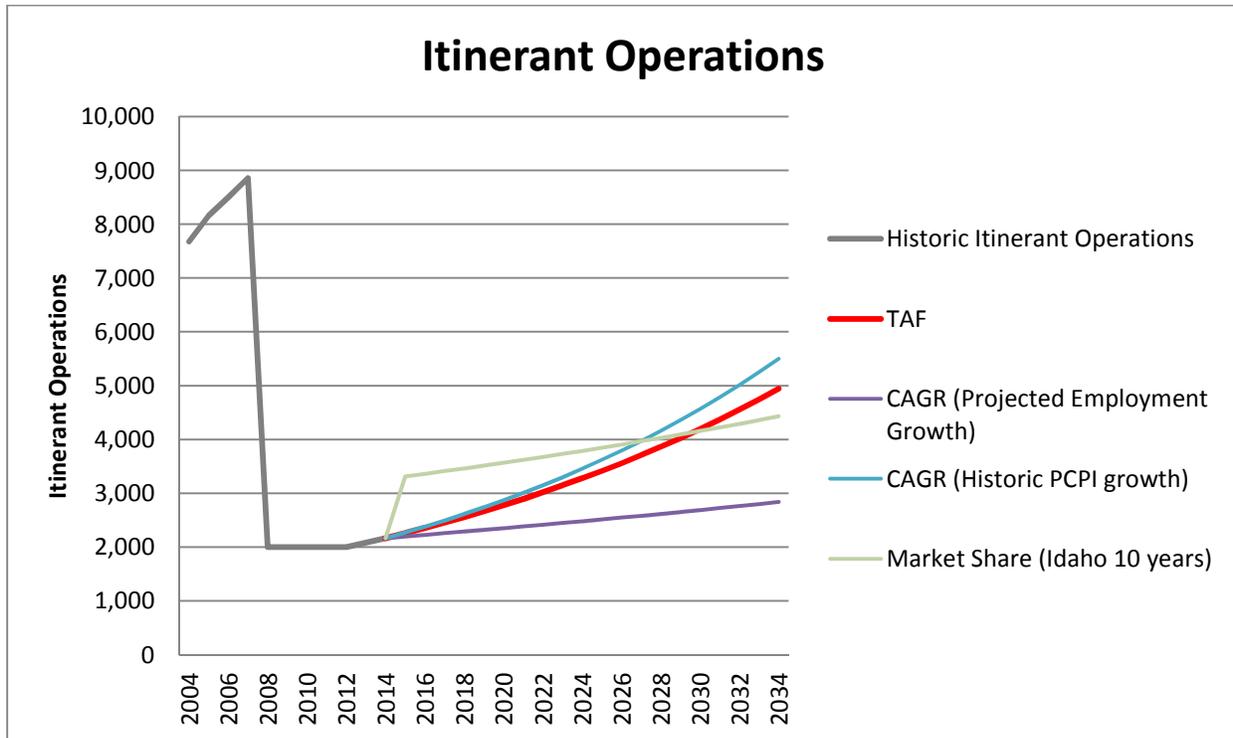
- ✦ Scenario 1: Projected Employment Growth. This scenario projects itinerant operations to increase at a CAGR of 1.35%, equal to the projected employment growth developed for Southeastern Idaho, as part of the Idaho Regional Economic Analysis Project.
- ✦ Scenario 2: Historic Per Capita Personal Income Growth. This scenario projects itinerant operations to increase at a CAGR of 4.76%, equal to the historic CAGR in PCPI in Bear Lake County the last five years.
- ✦ Scenario 3: 10-year average of Market Share of Idaho Itinerant Operations. During the last ten years, Bear Lake County Airport's share of Idaho's general aviation itinerant operations as reported in the FAA's Terminal Area Forecasts was 0.65%. This scenario assumes that Bear Lake County Airport will maintain this share of the State of Idaho Itinerant Operations and that the Idaho Itinerant Operations will grow as predicted in the FAA's Terminal Area Forecasts. The annual growth rate for this scenario is 1.46%.

TABLE 3-6 – GENERAL AVIATION ITINERANT OPERATIONS PROJECTIONS

Year	Scenario 1 Projected Employment Growth	Scenario 2 Historic PCPI Growth	Scenario 3 Idaho Market Share	FAA Terminal Area Forecast (TAF)
2014	2,170	2,170	2,170	2,170
2019	2,321	2,738	3,516	2,667
2024	2,482	3,455	3,789	3,278
2034	2,838	5,500	4,429	4,943
CAGR	1.35%	4.76%	1.46%	3.99%
2019 Variation from TAF	-12.99%	2.66%	32.82%	-
2024 Variation from TAF	-24.29%	5.39%	15.60%	-
2034 Variation from TAF	-42.58%	11.27%	-10.4%	-

Source: T-O Engineers, Inc.

FIGURE 3-6 – GENERAL AVIATION ITINERANT OPERATIONS PROJECTIONS



Source: T-O Engineers, Inc.

The results of the three scenarios examined in this analysis were compared to the FAA’s TAF for Bear Lake County Airport. Scenario 2 (Historic PCPI growth) was chosen as the preferred general aviation itinerant operations projection, with a CAGR of 4.76%. Based on this methodology, by the end of the forecast period, 5,500 itinerant operations are projected at Bear Lake County Airport. This is 11.3% more than the TAF projections of itinerant operations.

As previously mentioned, aviation demand is considered to be a derived demand and depends upon the level of business and leisure activity in the economy. General aviation activity is highly dependent on the economy and personal income, as it is one of the first costs to be cut during times of economic hardships.

The historic per capita personal income growth points to increased income and revenue around Bear Lake County which can correlate to increased future usage of the airport not only for business and tourism, but also aerial firefighting, and Life Flight operations as discussed above. Based on this correlation as well as the consultant’s professional opinion, the historic PCPI Growth rate methodology (Scenario 2) is the preferred forecast for general aviation itinerant operations.

In addition to PCPI growth, improved instrument approach capabilities also have the potential to increase the use of the airport and the number of itinerant operations. At this time, we are unable to quantify these potential impacts. However, the airport will continue to monitor this

potential increase in traffic if/when improved instrument approach capabilities have been developed for the airport.

Total Operations

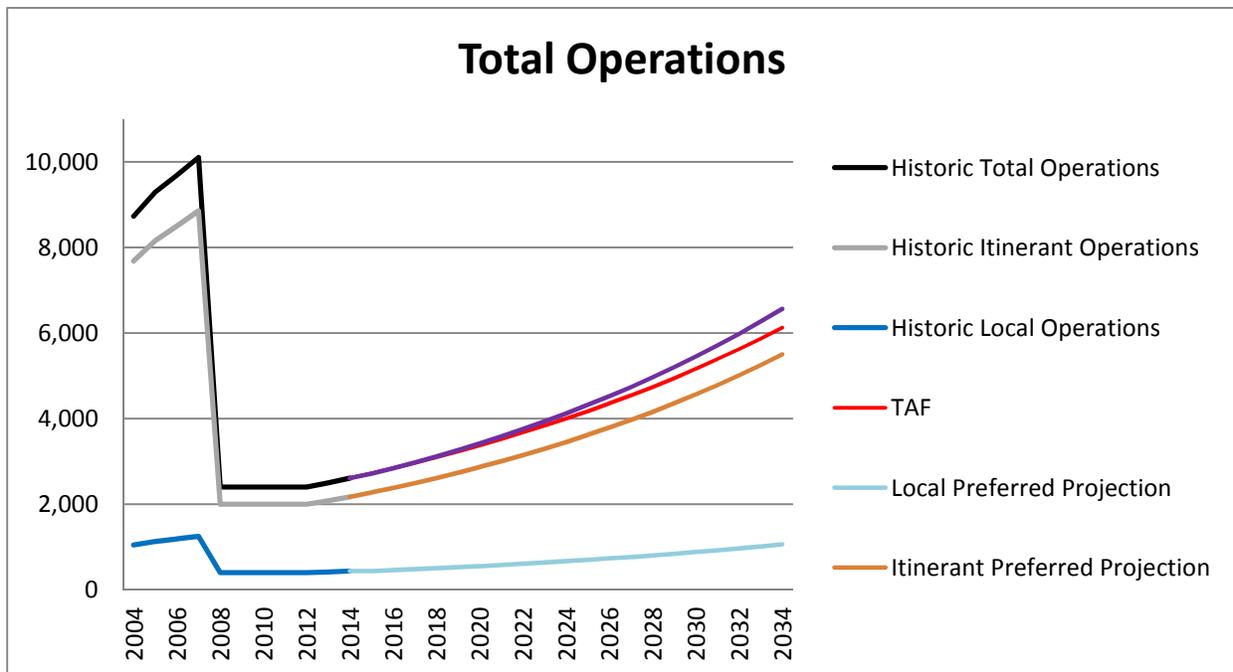
Total aircraft operations projections were derived by combining the local and itinerant operations preferred forecasts. The total aircraft operations were also compared to the FAA TAF, as shown in **Table 3-7** and **Figure 3-7**.

TABLE 3-7 – GENERAL AVIATION TOTAL OPERATIONS PROJECTIONS

Year	Local Operations Preferred Forecast	Itinerant Operations Preferred Forecast	Total Operations Projections	FAA Terminal Area Forecast (TAF)
2014	441	2,170	2,611	2,611
2019	530	2,738	3,268	3,235
2024	669	3,455	4,123	4,003
2034	1,065	5,550	6,565	6,124
CAGR	4.76%	4.76%	4.76%	4.13%
2019 Variation from TAF	-6.7%	2.66%	1.02%	-
2024 Variation from TAF	-7.8%	5.39%	3.01%	-
2034 Variation from TAF	-9.9%	11.3%	7.19%	-

Source: T-O Engineers, Inc.

FIGURE 3-7 – GENERAL AVIATION TOTAL OPERATIONS PROJECTIONS



Source: T-O Engineers, Inc.

This methodology results in an annual growth rate of 4.76%, which is slightly higher than the TAF's annual growth rate of 4.35%. Based on this methodology, 6,565 general aviation operations are projected to occur at Bear Lake County Airport, by the end of the forecast period. This is 7.19% more than the adjusted TAF projections of total operations in 2034. The preferred general aviation operations projection for Bear Lake County Airport is carried forward in the master planning process and is used to examine future airport facility needs.

3.3.4 PEAKING ANALYSIS

Another primary consideration for facility planning at airports relates to peak hour, also referred to as design level activity. This operational characteristic is decisive because some facilities should be sized to accommodate the peaks in activity, for example, the aircraft apron or terminal areas.

In calculating the number of general aviation operations occurring during the peak hour, it was assumed that the peak day was 20 percent higher than the average day and that the peak hour was 20 percent of the peak day operations. **Table 3-8** presents peak factors for the 20-year planning period.

TABLE 3-8 – OPERATIONS FORECASTS – PEAKING FACTORS

Year	Total Annual Operations	Average Daily Total	Peak Day	Peak Hour
2014	2,611	7	9	2
2019	3,268	9	11	2
2024	4,123	11	14	3
2034	6,565	18	22	4

Source: T-O Engineers, Inc.

3.3.5 ANNUAL INSTRUMENT APPROACH OPERATIONS

Forecasts of annual instrument approaches are used by the FAA in evaluating an airport's requirements for navigational aid facilities. The FAA defines an instrument approach as an approach to an airport with the intent to land an aircraft in accordance with an instrument flight rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

Currently, Bear Lake County Airport does not have an instrument approach. Analysis on the ability of the airport to obtain approach capabilities over the 20 year planning horizon is included in later chapters. Because no instrument approaches currently exist, no forecast has been developed for annual instrument approaches.

While the airport has no instrument approach, based on available GCR data, nearly 200 IFR flight plans to and from the airport have been filed over the last several years. This data

indicates that pilots are filing instrument flight plans to get close to the airport and then canceling when they are within close proximity as well as when departing from the airport. Examples of users reported within the FAA data include, recreational/individual fliers, flight training, state law enforcement, and development corporations.

However, when the IFR flight plan is cancelled in flight before reaching Bear Lake County Airport it does not appear in the database. Therefore, when the flights are terminated at other airports with instrument approaches because of bad weather conditions at Bear Lake County Airport, they do not appear. Although this data does not provide a full understanding of IFR operations at the airport, it shows there is demand for an instrument procedure at the airport. Airport user surveys developed as part of this Airport Master Plan indicate the lack of instrument approaches is an issue for several of the users of the airport. Eleven out of fourteen users who answered the survey indicated the lack of instrument approach was an important shortcoming of Bear Lake County Airport and they considered an instrument approach as an essential improvement for the airport to provide.

3.3.6 CRITICAL AIRCRAFT

The development of airport facilities is impacted by both the demand for those facilities and the type of aircraft expected to make use of those facilities. Generally, airport infrastructure components are designed to accommodate the most demanding aircraft which will utilize the facilities on a regular basis, also referred to as the critical aircraft. The factors used to determine an airport's critical aircraft are the approach speed and wing span of the most demanding class of aircraft anticipated to perform at least 500 annual operations at the airport during the 20 year planning period.

The existing ARC for Bear Lake County Airport is B-I Small. Common aircraft using the airport today include piston-driven single and twin engine aircraft as well as small turbo-prop and jet aircraft including the Beech/Raytheon King Air, Pilatus PC-12 and Cessna Citation aircraft. Based on available operating data at the airport and discussions with airport management, it appears aircraft 12,500 lbs or less (small aircraft) are the primary aircraft type operating at the airport.

As described in section 3.2.3, larger corporate aircraft do utilize the airport multiple times throughout the year; however discussions with both aircraft operators and airport management indicate this activity is not occurring on a "regular basis" (more than 500 annual operations) as defined by the FAA. A liberal estimate of this type of activity is likely around 100 annual operations. Based on the analysis completed as part of this forecasting effort, no solid data exists that would indicate increased demand of larger aircraft over the 500 annual operations threshold during the forecast period.

Based on information obtained by the consultant and conversations with users and airport management, including input from airport management, the Piper Malibu PA-46 was selected as the critical aircraft. This aircraft is based at the airport and is regularly flown. This PA-46, along with two Cessna 182 aircraft currently based at the airport, account for approximately 40 percent of the total operations at Bear Lake County Airport based on activity records collected during this planning study.

In general, the characteristics of the PA-46 are representative of single-engine aircraft that currently use the airport on a regular basis, and presents similar attributes to the overall fleet using this airport. Based on its regular use of the airport, and the consultant's professional opinion, the Piper Malibu PA-46 was deemed an appropriate aircraft to select as the critical aircraft. **Table 3-9** summarizes the characteristics of the selected critical aircraft.

TABLE 3-9 – CHARACTERISTICS OF DESIGN AIRCRAFT

Approach Speed	78 knots
Wing Span	43.0 feet
Length	28.7 feet
Tail Height	11.3 feet
Maximum Take Off Weight	4,318 lbs
	

Source: PA46 Information Manual and Bear Lake County

Based on the analysis conducted in this forecasting effort, the fleet using the airport today will be similar in the future; small aircraft with use by larger aircraft on an occasional basis.

Prudent and proactive planning dictates that the county protects areas for potential improvements to accommodate larger aircraft where practical. It is not reasonably foreseeable that the airport will accommodate A/B-II aircraft on a regular basis in the short- or mid-term. However, because the airport is not constrained at the moment and has the space to protect for larger standards, long-term proactive planning recommends analyzing the feasibility to meet A/B-II standards, and more specifically separations standards, in the future and beyond the planning period. In addition, a precedent has been established with the partial parallel taxiway built in 2014. The partial parallel taxiway centerline is located 240 feet from the runway centerline, which meets design standards A/B-II.

Because the airport has the space and a precedent has been established, a proactive approach to planning is vital at Bear Lake County Airport. This approach allows protecting areas for future expansion or development.

3.3.7 FORECAST SUMMARY

It is anticipated that Bear Lake County Airport will see some growth in all activity areas during the 20-year planning period. By 2034, approximately 6,565 general aviation operations are projected to occur and 11 aircraft are projected to be based at Bear Lake County Airport. **Table 3-10** summarizes the projections in this chapter.

TABLE 3-10 – SUMMARY OF AVIATION ACTIVITY FORECASTS 2014-2034

Year	Local Operations Preferred Forecast	Itinerant Operations Preferred Forecast	Total Operations Projections	Based Aircraft
2014 - Actual	441	2,170	2,611	6
2019	530	2,738	3,268	6
2024	669	3,455	4,123	8
2034	1,065	5,550	6,565	11
2019 Variation from TAF	-6.7%	2.66%	1.02%	-16.44%
2024 Variation from TAF	-7.8%	5.39%	3.01%	-8.95%
2034 Variation from TAF	-9.9%	11.3%	7.19%	6.59%*

Note: *The 2014 FAA TAF based aircraft were adjusted to match actual data figures reported by the airport manager, the actual TAF growth rate between 2014 and 2034 was then applied to 2014 actual based aircraft for the duration of the planning period. The preferred based aircraft projection is 6.59 % more than the adjusted TAF projection.

Source: T-O Engineers, Inc. and FAA Terminal Area Forecasts