Chapter 4 AVIATION FORECASTS

4.1 Introduction

There are two (2) key elements for determining accurate and representative aviation forecasts for a particular airport: 1) baseline values for based aircraft, aircraft mix, local and itinerant operations, air taxi, and military operations; and 2) realistic expectation for rate of growth of each group. Of these two elements, determining the baseline data is both more critical and more difficult. Baseline aviation activity at the Kalispell City Airport was established from three (3) primary sources of information: 1) On-site data collection including based aircraft reporting, acoustic aircraft counts, and motion sensing photography; 2) the FAA's Terminal Area Forecast (TAF); and 3) responses obtained from a pilot's survey.

4.2 Baseline Data

The primary source of information used to establish baseline operations and aircraft mix at the Kalispell City Airport was on-site data collection. Based aircraft reporting in conjunction with acoustic counts of aircraft operations and motion sensing photography of aircraft were used to establish the baseline data for aircraft operations and fleet mix at Kalispell City Airport. On-site data was then evaluated and compared to the FAA's Terminal Area Forecast (TAF), responses from the pilot's survey, and conversations with the Sponsor and users of the airport.

4.2.1 On-Site Data Collection

4.2.1.1 Based Aircraft Reporting

Since 2007, federally funded airports have been required to report actual N-numbers (registration numbers) of aircraft based at an airport. The FAA maintains the National Based Aircraft Inventory Program which is a database of reported N-numbers for based aircraft and other applicable aircraft and owner information at federally funded airports. The current report dated September 13, 2011 indicates that there are currently 82 based aircraft at Kalispell City Airport, seven (7) of which are seasonally based or based at more than one airport over the course of the year. The database also includes the dates when the aircraft were reported for that airport. This provides another tool for determining newly based aircraft at an airport. Unfortunately, there is no reporting of information for aircraft that are no longer based at that airport. A detailed listing of based aircraft with information on aircraft type, engine, primary use, and owner is included in **Appendix E**. **Table 4-1** summarizes key information obtained from an analysis of the based aircraft reporting.

The data in **Table 4-1** indicates that there were at lease three new aircraft based at Kalispell City Airport each year. It does not tell us, however, what the net gain in aircraft is for each year. Since it is possible, and even likely, that one or more based aircraft were sold or moved, the net gain of based aircraft over the past four years is more likely one or two per year.

TABLE 4-1

Based Aircraft Reporting Summary

Year Added	Single Engine	Multi-Engine	Helicopter	Total
2007	49	3	3	55
2008	5	0	3	8
2009	2	1	0	3
2010	3	0	2	5
2011	11	1	-1	11
Total	70	5	7	82

SOURCE: National Based Aircraft Inventory Program, September 13, 2011

The data in the National Based Aircraft Inventory Program also includes the make and model of each based aircraft. A common acronym used throughout this Master Plan Update is the ARC or Airport Reference Code. The ARC is a coding system used by the FAA to relate airport design criteria to the operational and physical characteristics of the most demanding family of aircraft utilizing an airport. A summary of Airplane Operational Characteristics for the Airport Reference Coding System is provided in Chapter 5, Table 5-1. A summary of based aircraft by type is presented in **Table 4-2**.

- There are currently seventy-two (72) based aircraft which are classified as Approach Category A; and three (3) based aircraft which are classified as Approach Category B.
- Sixty-nine (69) of the based aircraft owners reside in Montana; thirteen (13) reside out-of-state. Of the State residents, thirty-five (35) are from Kalispell and additional thirty-four (34) are spread out through the Flathead Valley; three (3) are in Missoula, and the remaining one (1) in-State aircraft owner resides in Shelby.
- All single engine aircraft at Kalispell City Airport fall into ARC A-I, the most common being Cessna 172's and 182's.
- One Group II aircraft, a Blanik L-13 Glider with a wing span of 53'-2" is based at Kalispell City Airport.

4.2.1.2 Acoustic Counters

An acoustic counter was installed at the Kalispell City Airport on September 21, 2010 and counted aircraft operations for one full year from the date of installation. An acoustic counter monitors sound levels at the airport and records/classifies each sound event by amplitude, duration, and other unique features. This process allows the counter to discriminate between aircraft takeoffs and other sources of sound with accuracy greater than 90 percent.

Data obtained from the acoustic counter has been compiled for the full year of monitoring. The tabulated data is provided in **Appendix F**. The data has been reviewed and evaluated to establish the total baseline aviation operations at the airport. Since a qualifying sound event is consistent with a takeoff or a touch-and-go operation, landings would not be accounted for in the measured data. Because an aircraft operation is either a take-off, a landing, or a touch-and-go, the acoustic measured at the airport do not include operations associated with landings. The operations estimated from the acoustic counter data are summarized in **Table 4-3**.

TABLE 4-2

Summary of Based Aircraft by Type, Make & Model

Manufacturer	Model	Number	Cruise Speed	Wing Span
ARC A-I Aircraft				
Beechcraft	35	2	150	32'-10"
	19	1	106	32'-9"
Bellanca/Aeronca/Champion	7 & 11	2	90	33'-5"
Cessna	120/140	2	105	32'-10"
	150/152	7	100	32'-9"
	170/172/175	17	110	35'-10"
	180/182/185	14	119	35'-10"
	206	3	132	35'-10"
	210	1	141	36'-9"
	310	1	167	37'-6"
	337	1	142	38'-2"
Taylorcraft	BC-12	3	100	36'-0"
Mooney	M20	3	144-170	36'-1"
Piper	PA-18	1	100	35'-3"
	PA-20/22	2	100	29'-4"
	PA-28	7	105-143	30'-0"
Experimental	Various	3		
Ultra Light	Challenger II	1	74	31'-6"
ARC A-II Aircraft				
Blanik (Glider)	L-13	1		53'-2"
ARC B-I Aircraft				
Beechcraft	55	1	188	37'-10"
Cessna	340	1	229	38'-1"
Piper	PA-31	1	200	40'-8"
Rotary Aircraft				
Enstrom	280FX	1	75	NA
Schweizer/Hughes	269C/369	3	80	NA
Bell	206B	3	116	NA

NOTE: Total number of based aircraft reported as 68 on 5010 form.

Following publication of the draft Master Plan Update in December 2011, additional operations data was obtained from Red Eagle Aviation and compared to the data from the acoustic counts. Using the Red Eagle data in conjunction with the time-stamp aircraft photography, it was discovered that the acoustic counter had underestimated operations between November 7, 2010 and January 26, 2011and on several days in March; the remaining months of data collection did not appear affected. This anomaly was not discovered during the data collection period even though periodic checks were consistently made on the equipment. It has been concluded that the likely cause of the undercount was from a sporadic failure of the power source due to inclement weather. The acoustic counter is powered by a rechargeable battery; a solar panel charges the battery. During the time frame in which undercounts were found, heavy snowfall and dense cloud cover conditions were common.

Although snow was removed from the solar panel following every significant snowfall event, it is likely that the power source was slowly depleted and conditions were not favorable to allow for the battery to become fully charged during this time frame.

TABLE 4-3

Acoustic Operation Counts, 2010-2011

Month	Acoustic Count	Projected Landings*	Total Operations
September 22-30	388	388	776
October	392	392	784
November**	144	144	288
December**	160	160	320
January**	159	159	318
February	203	203	406
March**	189	189	378
April	465	465	930
May	610	610	1,220
June	776	776	1,552
July	1,231	1,231	2,462
August	1,183	1,183	2,366
September 1-21***	735	735	1,470
Total	*6,635*	*6,635*	*13,270*

* *Projected number of landings assumed to equal number to the number of acoustic counts that represent take-offs.*

** *Power source failure due to winter weather required estimates to be made during the time frame from November 7, 2010 through January 29, 2011 and March 1 2011 through March 30, 2011.*

*** *Counter electronics became damaged on September 1, 2011; data is not available for September 1, 2011 through September 21, 2011. Counts for September 1, 2011 and September 21, 2011 were estimated from the average (35 per day) of the preceding 10 days and the final 8 days of September 2010.*

There are several other sources of data that are available to estimate the operations counts during these three months: Red Eagle flight logs, aircraft photo records, extrapolating data from other winter months, and fuel sales. The following comparisons can be made in evaluating these data sources:

- Red Eagle averaged 4 flights per day in November, 5 per day in December, and 5 per day in February; in comparison to the average acoustic counts of 3, 2, and 3 respectively.
- Motion sensing cameras captured an average of 3 aircraft photos per day in November, less than 1 per day in December, 2 per day in January, and 3 in March. This is less than the Red Eagle flights because of helicopter operations that are rarely captured by the cameras.
- The lowest months of fuel sales were November, December, and January with sales of 2,628, 2,920, and 2,906 gallons respectively. The average monthly fuel sales were 6,891 gallons. In comparison, fuel sales in February and March were 3,700 and 3,450 respectively; and significantly higher for the remaining months.

Combining this information, it is feasible to estimate more realistic aircraft operations for this three month period. Using the total monthly acoustic count for February of 203, operations can be

estimated for the other months by factoring the monthly ratio of fuel sales. For December this calculation would be 203 counts x (2,920 gallons/3,700 gallons) for a total monthly count of 160. Similar calculations were done for most of November and January and all of March. The estimated counts for these four months are provided in **Table 4-3**.

An aircraft operation is defined as a takeoff, a landing, or a touch and go. Aircraft noise is only generated when an aircraft is operating close to full-throttle conditions. This typically occurs during takeoff and climb, cruise, and touch-and-go operations. Aircraft landings, on the other hand, are normally performed near idle conditions and therefore don't produce a noise event and are not recorded. The acoustical count data recorded 6,281 noise events at the airport during a full, one-year time frame. To ensure that the counters were recording the operations that they were intended to record (and not missing operations), visual observations were periodically documented during the data collection period and compared to the counts recorded by the acoustic counter. These visual observations served to verify the validity of the data obtained from acoustic counters. After discovering the undercounts in November, December, January and March, this number was increased to 6,635 by correlating February's counts to these four months through fuel sales.

As described above, the acoustic count number would only include takeoffs and touch-an-go operations; landings are counted since they do not typically include a noise event. Therefore, an estimate must be made to account for landings and be included in the total operations estimate. The Airport Cooperative Research Program (ACRP) has published a document titled "Counting Aircraft Operations at Non-Towered Airports". The ACRP recommends simply doubling the acoustic counts to account for undocumented landings. Based on this methodology, the total estimated operations for the one-year study period were 13,270.

4.2.1.3 Motion Sensing Cameras

Motion sensing cameras were installed at each runway end to take photographs of aircraft entering or exiting either runway end. Since most aircraft exit the runway mid-field, the photos obtained should accurately capture predominantly the aircraft that depart the airport. The cameras can not count every aircraft operation; however the picture counts can be compared to the acoustical counter counts to verify rough magnitudes of operations and the types of aircraft operating at the airport. More importantly, the pictures can be used to establish the aircraft fleet mix using the airport and approximate the number of operations which occur from itinerant aircraft versus based aircraft.

During the period from September 9, 2010 to September 21, 2011, there were a total of 2,973 aircraft images captured. The following are some of the key observations from these photographs:

- 95% of the aircraft using Kalispell City Airport are categorized as ARC A-I, with Cessna 172's and 182's being the most common.
- 58% of the aircraft photographs were of based aircraft; 42% were of itinerant aircraft.
- 34% of the aircraft photographs were of aircraft owned and operated by Red Eagle Aviation and used for flight instruction.
- 3% of the aircraft are twin-engine aircraft categorized as ARC B-I aircraft, with Piper Chieftan, Aztec, and Beechcraft Baron being the most common.
- 2% of the photographed operations were by helicopters. While rotary wing aircraft are required to use the airport traffic pattern to arrive and depart, it doesn't always happen.

- Only two (2) turbine-engine aircraft were observed during this period, a Beechcraft 99 and a Piper Meridian both of which are categorized as ARC B-I.
- No ARC B-II aircraft were observed during this period.
- No jet aircraft were observed during this period.

4.2.1.4 Fuel Sales

Fuel sales are another tool that is useful for developing aviation forecasts. Although no direct correlation can be made between fuel sales and a specific number of aviation operations, fuel sales are a valuable tool to correlate a forecast model which is only based on one year of acoustic counts at the airport. Fuel sales records for both Avgas and Jet A were obtained from Red Eagle Aviation for the years 2007 through September, 2011. A summary of fuel sales at the Kalispell City Airport is presented in **Table 4-4**.

TABLE 4-4

Summary of Fuel Sales at Red Eagle Aviation

Year	Avgas (Gal.)	Avgas ($/Gal.)	Jet A (Gal.)	Jet A ($/Gal.)
2007-08	72,034	$3.44 Avg.	22,621	$3.99 Avg.
2008-09	67,816	$4.50 Avg.	23,487	$4.50 Avg.
2009-10	62,302	$3.34 Avg.	23,254	$2.66 Avg.
2010-11	58,382	$3.81 Avg.	24,606	$3.16 Avg.

** Reported Fuel Sales Annually from October through September.*

During this 4 year period, Avgas sales have steadily declined between 4,000 and 5,000 gallons each year. Throughout the four year period, Avgas sales are down approximately 19 percent. With the exception of the Avgas price spike in 2008, fuel prices have steadily increased throughout this period. Jet A sales, on the other hand, have remained very consistent while prices, although somewhat erratic, have actually fallen. Both of these trends indicate, as one would expect, that fuel sales are inversely related to fuel price. As price increases, sales decrease which should also serve as a trend for the direction of aircraft operations.

One interesting observation when comparing fuel sales data to the based aircraft inventory, motion sensing camera photos, and the responses to the pilot's survey is that documented Jet A fuel sales are much higher than would be anticipated based on the expected fleet mix using the airport. In reviewing this information, there is only one (1) turbine engine aircraft and no jet aircraft based at the airport, only two (2) turbine aircraft were photographed over the course of the year, and from the pilot's survey, only eight (8) pilots using the airport reported flying turbine engine aircraft.

To evaluate this discrepancy, fuel sales records were obtained from Red Eagle Aviation which included tail numbers of aircraft that purchased fuel. These records show that only 1,438 gallons of Jet A fuel were sold to fixed wing aircraft. Approximately half of the Jet A fuel was purchased for helicopters and the other half was purchased for helicopter activity that occurs elsewhere in the Valley (ie portable tanks are filled and used at other sites for helicopter refueling). Fixed wing aircraft fuel sales included a Pilatus PC 12/45 (590 gallons), a Cessna Citation V (240 gallons), Beech C90 KingAir (160 gallons), and a couple turboprop Pipers (368 gallons). The Airport Manager and FBO have also reported observing several turbine-engine aircraft on the field during the year that were not recorded by the cameras. These include several PC-12's, a Bonanza, a

KingAir B200, and a twin-turbine Otter. There has also been occasional use by turbine-engine aircraft by Homeland Security and the military.

4.2.2 Terminal Area Forecasts and MSASP Inventory and Forecasting Update

The Terminal Area Forecast (TAF) is a forecasting tool used by the FAA to document aviation forecasts at federally funded airports. Information (Query June, 2011) estimates 81 aircraft based at Kalispell City Airport in 2008, remaining constant through 2030. Going back to 1991, the TAF shows the number of based aircraft growing from 64 to a forecast number of 81 in 2008. This represents an average growth rate of one aircraft per year.

The Montana State Aviation System Plan (MSASP) System Forecasting document (1998-1999) estimates 74 aircraft based at Kalispell City Airport in 2010, increasing to 76 aircraft by 2020. This represents an annual growth rate of 0.20 percent in based aircraft over the 10-year period, or one new aircraft every 5-years. Based Aircraft Forecasts from the TAF and MSASP are summarized in **Table 4-5.**

TABLE 4-5

Based Aircraft Forecast From TAF and MSASP

Year	TAF	1998-9 Montana State Aviation System Plan Inventory & Forecast				
		Single-Eng	Multi-Eng	Jet/Rotor	Other	Total
1995	64	-	-	-	-	-
2000	64	59	2	0	5	66
2005	64	63	2	0	6	72
2010	81	65	3	0	6	74
2015	81	66	3	0	6	75
2020	81	67	3	0	6	76
2025	81	-	-	-	-	-
2030	81	-	-	-	-	-

SOURCE: Terminal Area Forecast (Query – June, 2011) and Montana State Aviation System Plan, 1998-9 Inventory and Forecasting Update.

The Terminal Area Forecast separates aircraft operations into several categories including itinerant air carrier, itinerant air taxi, itinerant GA, itinerant military, local GA, and local military. **Table 4-6** summarizes the general aviation operations forecast excerpted from the 2007 TAF for selected years. Copies of the 2011 TAF are included in **Appendix G**. There were no operations from air carrier aircraft predicted at Kalispell City Airport during the planning period.

In comparison, the MSASP (1998-1999) also provides forecasts for general aviation operations. **Table 4-7** summarizes the general aviation operations forecast excerpted from the 1998-1999 System Forecast. All forecast operations are GA aircraft. No passenger, cargo, or military operations are predicted. Copies of the 1989-1999 MSASP are also included in **Appendix G**.

TABLE 4-6
Aircraft Operations Forecast From TAF

Year	Itinerant Air Taxi	Itinerant GA	Itinerant Military	Local GA	Total
1995	6,000	13,500	1,000	12,600	33,100
2000	6,400	14,000	1,000	13,600	35,000
2005	6,400	15,000	2,000	15,000	38,400
2010	6,400	15,000	2,000	18,000	41,400
2015	6,400	15,000	2,000	18,000	41,400
2020	6,400	15,000	2,000	18,000	41,400
2025	6,400	15,000	2,000	18,000	41,400
2030	6,400	15,000	2,000	18,000	41,400

TABLE 4-7
Aircraft Operations Forecast From MSASP System Forecasting

Year	Cargo/ Air Taxi	Itinerant Military	Itinerant GA	Local GA	Total
1998	6,400	1,000	14,000	13,600	35,000
2000	6,715	1,255	14,640	14,220	36,830
2005	6,810	1,260	15,200	14,800	38,070
2010	*6,905*	*1,265*	*15,800*	*15,350*	*39,320*
2015	*7,000*	*1,275*	*16,400*	*15,900*	*40,575*
2020	*7,095*	*1,280*	*16,800*	*16,400*	*41,575*

4.2.3 Pilot's Survey

Beginning in November of 2010 through early January of 2011, a survey of registered pilots in Flathead, Lake, Missoula, Lincoln, and Sanders Counties was conducted. The survey included a variety of questions intended to establish background information on the users of the airport as well as their assessment of existing facilities and needs. Key observations and conclusions of the survey are discussed in Chapter 5 of this report. As the pilot's survey pertains to aircraft operations and aircraft mix, two questions were asked to assess these parameters. Question 6 was included to help determine the critical aircraft using the airport. The questions were intended to determine the number of types of aircraft using the airport and not the number of operations from each type of aircraft. The results of these two questions are summarized in **Table 4-8.**

TABLE 4-8
Summary of Response on Aircraft Using Kalispell City Airport

Aircraft Type	Total Operating	Total Based	Total Itinerant
Single Engine, Piston	442	56	386
Single Engine, Turbine	4	0	4
Multi Engine, Piston	15	4	11
Multi Engine, Turbine	4	0	4
Jet	0	0	0
Helicopter	24	7	17
Other	4	0	4
Total	*493*	*67*	*426*

SOURCE: Kalispell City Airport Pilot's Survey, 2010

4.2.4 Baseline Data Analysis

Based on the multiple sources of information used to analyze and evaluate aircraft operations at the Kalispell City Airport, the baseline for aircraft operations at the Kalispell City Airport is established as follows:

1. Determine total number of operations counted at airport from acoustic counters;
2. Breakdown total operations into local operations and itinerant operations using based aircraft data and photographs;
3. Breakdown total operations into fleet mix using photography from motions sensing cameras;
4. Evaluate pilot's survey and fuel sales data to validate baseline data.

4.2.4.1 Combined Annual Aircraft Operations

There is a significant discrepancy between actual field counts of aircraft operations and the forecast data estimated by the TAF and MSASP. The actual field count of 13,207 operations is far lower than the 41,000 by the TAF and MSASP. The big question is whether the data obtained over the 2010-2011 year is representative of a normal year; or is the lower number of operations an anomaly for the year. There are two potential explanations for this that may explain the discrepancy between the field counts obtained during this study and the forecasts developed in the 1999 Master Plan:

1. The original operations forecast in the 1999 Master Plan was estimated from based and itinerant aircraft operations reported on the FAA form 5010 Airport Master Record. The operations developed for the 5010 are based on national statistics and empirical models. For example, the number of estimated itinerant aircraft operations is the product between the number of based aircraft and a national average of 300 operations per based aircraft. With the current 82 based aircraft, the number of itinerant operations estimated with 300 operations per based aircraft would be 24,600, or nearly twice the total number of operations actually counted at the airport. In this case it is obvious that national statistics are not realistic at this airport and will likely result in significantly higher operations estimates than are actually occurring. **Therefore it can be concluded that the original**

operations estimate and forecast in the 1999 Master Plan were erroneously high and not representative of the actual number of operations occurring at the airport.

2. Poor weather conditions and economic recession were both factors during the 2010-2011 data collection period. Poor weather conditions have a seasonal impact on aviation operations while economic factors tend to have a more long term impact. Current economic factors, impact both baseline and long term forecasts. It would be expected that an economic recession combined with higher fuel prices would result in reduced aviation operations during the data collection period as well as future aviation activity provided the economic climate does not reverse. This distinction is important because it might explain, to a certain degree, some of the difference between the forecasts developed in the original 1999 Master Plan and the operations observed during the data collection period. If these acoustic counts had been performed during a strong economic climate, it is likely that the aviation activity during the past year would be higher. In contrast, unfavorable or abnormal weather conditions observed during the data collection period would result in a temporary decrease in actual aviation operations; essentially only impacting the time frame in which the poor weather occurred. As can be seen from the monthly breakdown of acoustic counts (Table 4-3), there were several months during the winter (November – March) where operations were significantly down. The winter of 2010/2011 was not a good period for VFR operations. Significant snowfall, fog, and clouds allowed for few days that were suitable for VFR flight. As a result, aviation operations were down, as a direct result of weather, during the data collection period. If not adjusted, the baseline data used to develop the forecast will be low and inaccurate. **It can therefore be concluded that the acoustic counts recorded from November, 2010 through March, 2011 are likely lower than what would be expected in an average year.** An adjustment is warranted for these months to correct for an abnormal weather condition. A reasonable approach to make an adjustment to the data for poor weather is to evaluate the data for trends during the winter months and make a reasonable correction to the data to reflect average winter operations. Data collected during these months generally shows that VFR weather restrictions occurred on specific days or stretches of several days. Evaluation of the data shows numerous days where there were no operations. This is likely the result of poor weather minimums for VFR operations. Conversely, days which had VFR minimums showed consistent aviation activity. Thus, a reasonable correction to the data would be to increase the number days during the winter months that would meet minimum VFR conditions during a more typical winter. Between November and March, there were 96 days out of a possible 150 days that operations occurred on the airport (64 percent of the time). Assuming that a more typical winter season might allow for VFR operations at least 75 percent of the month, an adjustment to the operations can be calculated. With an average number of daily acoustic counts on days with VFR conditions calculated to be 9 between November, 2010 and March, 2011 (855 counts/96 days with activity) and assuming that a more normal winter season might provide for VFR conditions at least 75 percent of the month, the estimated increase in winter counts from November through March would be 158 (150 days x 75% x 9 counts/day – 1,013 adjusted counts – 855 recorded counts). The total baseline number of operations should be increased by 316 (158 x 2) to correct for an unseasonably harsh winter for VFR conditions.

Another available tool for estimating GA operations from the numbers of based aircraft, active aerial applicators, and active flight instructors operating on a given airport is an empirical formula outlined in the 1989 MSASP.

This formula was based on the results of the ramp surveys taken (elsewhere than Kalispell City Airport) in August 1987:

> **GA Operations** = 1,000 + 175 (no. of based aircraft) + 200 (no. of aircraft aerial applicators) + 150 (no. of flight instructors)

Applying this formula to the actual number of based aircraft (82) in 2011 and three (3) flight instructors, yields a GA Operations forecast of 15,800. (Assuming no aerial applicators are based at the Kalispell City Airport during the planning period.) This estimate is surprisingly close to the number of operations arrived at using the acoustic counts and lends supporting credibility to the counts. In consideration of the weather limitation during the 2010 to 2011 it is likely that the field counts would have been nearly the same if the weather had been more conducive to flying during this period.

Forecasts of future levels of aviation activity are the basis for effective decisions in airport planning. These projections are used to determine the need for new or expanded facilities. However, some airport facility needs are more sensitive to forecast numbers than others. For example, runway and taxiway capacity are not nearly as sensitive to variable operations forecasts as apron and aircraft tie-down capacity or hangar development areas. The forecasting efforts undertaken for the Kalispell City Airport through this master planning effort indicate a much lower forecast level of operations than prior planning studies (15,800 versus 40,000 operations). Although a significant difference, it is important to convey that the different forecast of operations would not impact runway and taxiway capacity. The requirements for these facilities are primarily driven by the critical aircraft using the airport. Apron/tie-down areas and hangar storage, on the other hand, are more sensitive to operations. As such, it will be important to periodically review aviation activity and adjust planning requirements accordingly.

Based on this analysis, there is strong supporting data to establish the baseline operations forecast for the Kalispell City Airport at 15,800 per year. This is approximately 19 percent higher than the field counts and would account for the weather limitations observed during the counting period.

4.2.4.2 Local/Itinerant Aircraft Operations

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. Kalispell City Airport is not classified as a reliever airport nor would not meet the FAA's designation as a very busy airport. Estimating 250 operations per based aircraft (for a rural/remote airport) to the 82 of based aircraft at Kalispell City Airport results in a based aircraft operations estimate of 20,500. Since this estimate far exceeds the total operations counts obtained with the acoustic counters, it can be concluded that these statistical averages are not representative of this particular airport.

In order to develop quantify based aircraft and itinerant operations, data obtained from the motion sensing cameras was used to identify if photographed aircraft were based at Kalispell City or not. Most of the aircraft photos taken included the N-numbers of each aircraft. By comparing the N-numbers from the photographs to the based aircraft listing and quantifying the occurrence of each based aircraft operation, an estimate can be made on the proportion of based aircraft use to itinerant

aircraft use. **As indicated in Section 4.2.1.3, approximately 58 percent of the aircraft photographs were of based aircraft; 42 percent being itinerant aircraft.** There is one discrepancy with this data; very few operations from based rotorcraft were photographed. Since helicopters hover as they taxi above the surface and may not use the two runway end taxiways, most of these operations were missed by the cameras. Since there are six helicopters based at Kalispell City Airport and some of them are used for flight training, there would be a significant number of operations from these aircraft. From interviews with Red Eagle Aviation staff, it is estimated that approximately 500 annual operations from helicopters would have been missed by the cameras.

4.2.4.3 Fleet Mix and Critical Aircraft

Planning and design of an airport focuses on the airport's role, number of operations, and "critical" aircraft using the airport. The critical, or design aircraft, is the most demanding aircraft operating at an airport on a regular basis. Typically, a specific type of aircraft must have 500 or more annual operations to qualify as the critical aircraft. In determining the critical aircraft operating at Kalispell City Airport, both based aircraft and itinerant aircraft operations should be evaluated.

Three (3) sources of information were used to develop the fleet mix for Kalispell City Airport: based aircraft inventory, airplane operation photography, and interviews with the Airport Manager and Red Eagle Aviation personnel. Based on this information, the predominant aircraft currently using Kalispell City Airport with at least 500 operations each year would be the ARC B-I group of aircraft. All based aircraft meet the requirements for ARC A-I with the exception of three (3) B-I aircraft (Cessna 340, Beechcraft Baron 55 and a Piper PA-31) and one A-II aircraft (Blanik L13 Glider). Without a manned control tower to document operations by specific aircraft, analytical tools were utilized to estimate the breakdown in fleet mix. Based on the total estimated operations (15,800), the estimated proportion of based aircraft operations (58%) and the total number of based aircraft (82), an average annual number of operations per based aircraft is 112 (15,800 x 0.58 / 82). Thus, a reasonable estimate of operations broken down by fleet mix can be determined by multiplying the number of based aircraft in each ARC by the average number of based aircraft operations.

Review of the aircraft photos were also used to support the fleet mix of aircraft at the Kalispell City Airport. These photos capture both local and itinerant B-I aircraft operating at the airport but do not necessarily document the frequency of the operations. In addition, the photograph record did not capture any Design Group II aircraft on the airport this year, although there is other evidence to support some B-II use. Fuel records indicate usage by a Beech C90 (B-II), a Cessna Citation V (B-II), and a Pilatus PC-12 (C-II). Interviews with airport personnel also confirm that historically, there has been some occasional use of the airport by all of these different types of aircraft. In past years, the USFS will occasionally operate an itinerant KingAir 200 at the airport. Based on these accounts, some provision will be included in the baseline fleet mix to account for some limited amount of B-II operations at Kalispell City Airport. Fuel records were also used to determine the fleet mix of rotorcraft at the airport. Fuel records show approximately 13 percent of the fuel sales were for rotorcraft. Pulling this information together, the estimated operations broken down by ARC and aircraft class for 2011 are summarized in **Table 4-9.**

4.2.4.4 Baseline Data Valuation

The fleet mix established in Table 4-9 provides for a conservative estimate of ARC B-II operations. The 50 estimated itinerant operations per year would correspond to 25 trips from these aircraft each year or 2 trips on average per month. This is consistent with reports from the FBO, Airport Manager, and local users. Fuel sales show that if one of these aircraft were ultimately based out of

the Kalispell City Airport, these operations would increase substantially. The pilot's survey (ref. Table 4-8) was also used in determining the aircraft fleet mix and baseline operations at Kalispell City Airport. Two survey questions were developed to determine the aircraft use at the airport. One question was intended to estimate the type of aircraft flown in and out of the airport; the other question was intended to estimate the type of aircraft based at the airport.

TABLE 4-9

Estimated Aircraft Fleet Mix and Baseline Operations

ARC Design Group	Number of Operations		
	Local*	Itinerant*	Total
A-I (CE-172)	7,525	5,480	13,005
A-II (Blanik L13)**	112	0	112
B-I (CE-340) **	336	243	579
B-II (KingAir C90)	0	50	50
Rotorcraft***	1,191	863	2,054
Total	9,164	6,636	15,800

* *Estimated 58% of total operations are local and 42% are itinerant;*
** *Total estimated from number of based aircraft with 112 annual operations each;*
*** *Total estimated at 13% of total operations*

The information collected from the Pilot's Survey is useful for confirming the fleet mix but has limited value for confirming operations of itinerant and based aircraft. Both questions, specifically asked for the type of plane flown to or based at Kalispell City Airport. Neither question asked for the estimated number of operations flown over the past year for each type of aircraft. Thus, the question has no value regarding frequency of operations. It does however; provide further support for the fleet mix observed at the airport. Most of the respondents indicated their aircraft were single-engine, piston aircraft with occasional use by helicopters and multi-engine, piston. There was also some use by turbine aircraft, both single-engine and multi-engine and other aircraft which most likely include gliders and ultra lights. There were no reported jet aircraft operations by any of the respondents.

4.3 Growth Trends and Aviation Forecast

The second component to developing an aviation forecast is to establish realistic expectations on the rate of growth of aviation at the facility. This evaluation is far more subjective than developing the baseline information and must include consideration of area demographics, population trends, local economic factors, community development plans, airport development plans, airport expansion capability, regulatory requirements, competition from nearby airports, and any other pertinent factors which may impact growth at an airport. One common tool used for forecasting is the regression analysis. A regression analysis uses historic data to establish a trend line which can then be used to "project or forecast" future growth or decline. A regression analysis is a valuable tool provided that the factors that drive future conditions are similar to the factors that established the historical data. Unfortunately it cannot account for future conditions that can significantly impact demand and use. The impact from many factors including future airport expansion, high fuel prices, or an economic recession would not be reflected in a regression analysis. Unfortunately the only way to address airport and time specific impacts are through subjective evaluation.

A regression analysis is a useful starting point for establishing initial projections. Historical data was used to determine baseline growth for based aircraft, local operations, and itinerant operations. Once a linear rate of growth for each of these components was established, local factors were subjectively evaluated to determine if there would likely be an impact to the growth trend and, if so, by how much. Subjective factors evaluated for the Kalispell City Airport included area demographics, local economic outlook, nearby airports, fuel prices, regulatory compliance (low lead fuel), and airport expansion.

4.3.1 Area Demographics and Population

Additional information including area economic and demographic statistics was also evaluated to establish regression trend lines to predict aviation growth through the planning period.

Area population and demographics potentially affect aviation demand. Increasing population and/or business activity typically creates increased demand for infrastructure and transportation services, including aviation. The Kalispell Growth Policy of 2003 included a very comprehensive and detailed analysis of population and demographic trends for the State, County and City of Kalispell. Several key demographic indicators and trends documented in the Growth Policy that may have an impact on aviation forecasts are summarized as follows:

- Documented population increase from 1990 to 2000 was 12.9% for State of Montana; 25.76% for Flathead County; and 19% for the City of Kalispell.
- Projected population increase from 2000 to 2006 was 4.7% for the State of Montana; 14.6% for Flathead County; and 36.6% for the City of Kalispell.
- Flathead County has a projected population increase of 71% between 2000 and 2030.6 Population estimates for the County 91,750 for 2010, 108,910 for 2020, and 127,250 for 2030.
- The City of Kalispell is not expected to continue growing at the high rate of approximately 6% per year but is likely to level off some and grow at an average annual growth rate of 3% up until 2025.
- The rural areas surrounding Kalispell are expected to grow at a slower rate of 1.2% per year up until 2025.

Obviously, the 2003 Growth Policy does not account for the recent recession that has had a significant impact on the Flathead Valley. Looking at data from the more recent 2010 Census, the documented population increase from 2000 to 2010 was 9.7% for State of Montana; 22.1% for Flathead County; and 40% for the City of Kalispell. The documented population increases have actually exceeded the projections developed in the Kalispell Growth Policy, although much of this growth likely occurred prior to the 2008 recession. Since this recession hit in 2008, there has been an observed decline in the construction of new homes in the City of Kalispell and Flathead County. This is likely an indicator that population growth has leveled off or possibly even declined over the past three years. Although not likely a permanent condition, it is a factor that should be accounted for in short term aviation forecasts. It is speculated that the current slow growth rate (or decline) of area wide population is having a similar impact to local aviation. **It is expected that trends in aviation will generally follow the trends in area growth.**

[6] NPA Data Services, Inc.

4.3.2 Nearby Airport Influence

There is one large public airport and two (2) smaller public airports with general aviation service that are close enough in proximity to Kalispell City Airport to have an impact on aviation operations. Glacier Park International Airport is a large, commercial service airport located just eight nautical miles to the northeast. Whitefish Airport and Ferndale Airport are small, public airports with grass strips located within a 20 mile radius of Kalispell City Airport. These three airports have the potential to impact itinerant and based aircraft operations at Kalispell City. Ronan and Polson Airports, which are 29 and 38 nautical miles south-southeast of Kalispell respectively, also somewhat impact airport use, but to a much lesser degree.

4.3.2.1 Glacier Park International Airport

Glacier Park International Airport, operated by the Flathead Municipal Airport Authority, is located six miles northeast of downtown Kalispell and eight nautical miles northeast of the Kalispell City Airport. Glacier Park International Airport is a commercial air service facility with approximately 25% of its air traffic generated from local general aviation; 39% from transient general aviation; 19% from air taxi; 13% from commercial; and 3% from military. The Federal Aviation Administration (FAA) categorizes the airport as a Primary, Non-Hub under the FAA's National Plan of Integrated Airport Systems (NPIAS). The Airport is currently served by three air carrier and commuter airlines: Allegiant Airlines, Horizon Air (Alaska), and SkyWest Airlines (operating United SkyWest and Delta Connection); as well as by several all-cargo airlines: Federal Express and UPS. The airport averages 80 landings and takeoffs per day.

In addition, two aviation businesses operate on leased airport property including:

- Glacier Jet Center – Full Service FBO
- Rocky Mountain Aircraft Services – Aircraft Maintenance and Avionics

GPI is serviced by two runways, Runway 2/20, a 150-foot wide by 9,007-feet long paved runway with a full-length parallel taxiway, and Runway 12/30, a 75-foot wide by 3,504-foot long paved crosswind runway. Runway 2/20 is rated for heavy aircraft weight 250,000 pounds with dual tandem landing gear, 170,000 pounds with dual wheel landing gear and 80,000 pounds with single wheel landing gear. Runway 12/30 is rated for light aircraft weighing 12,000 pounds or less. GPI has published instrument procedures for ILS, RNAV (GPS and RNP), and VOR approaches on Runways 2 and 30. This airport is also classified as Class D Airspace, with an operating control tower controlling the airspace within 4 nautical miles and 2500 feet above ground level around the airport.

From discussions with local area pilots, review of the responses on the pilot's survey, and observations of usage at GPI and Kalispell City Airport, most private pilots flying smaller A-I aircraft, rotorcraft, and gliders prefer to use Kalispell City Airport rather than GPI. Many of these pilots are not instrument rated and do not benefit from the lower minimums at GPI; many do not like having to communicate with Air Traffic Control, and most prefer the location and convenience that the City Airport offers. Given the all weather capability and long runway at Glacier Park International, GPI is an attractive alternate airport to the larger, twin engine light aircraft (Cessna 310's, Beechcraft Baron's, Piper Seneca's) and jet aircraft. This discriminatory use of each airport by the different types of users is not likely to change in the future, even if the City Airport is upgraded to ARC B-II standards. There would likely be some increased use of the City Airport by pilots of the larger B-II aircraft if it were upgraded but many of these pilots are instrument rated and

would continue to use GPI because of the instrument approach capability. In conclusion, the single engine aircraft that are most commonly seen at Kalispell City Airport are likely to continue using this facility provided the facility is maintained and/or upgraded and aircraft storage remains available. There would likely be a minor increase of usage of B-II aircraft if the facility were upgraded but most of these pilots will continue to use GPI because of its instrument capability.

4.3.2.2 Whitefish and Ferndale Airports

Whitefish and Ferndale Airports are two (2) nearby airports with turf runways. Both airports are public and offer an alternative to local area pilots other than GPI or Kalispell City Airport. Whitefish Airport is a small airport near the City of Whitefish and is owned and operated by the Flathead County Airport Authority (Glacier Park International Airport). It is a small facility with a 75 foot by 2,560 foot turf runway; there are only three (3) based aircraft at this airport. Ferndale Airfield is situated southeast of Big Fork and has a 95 foot by 3,500 foot turf runway; there are 35 based aircraft. Ferndale Airfield also has numerous hangars constructed at the airport with additional capacity for more hangar development. Because both of these facilities have turf runways, their primary attractant is location. Neither of these facilities is likely to draw users away from Kalispell City Airport unless the facilities are not maintained and become a safety hazard.

4.3.3 Forecast Uncertainty and Risk Factors

All forecasts are subject to uncertainty and risk. Actual outcomes could differ from forecast, and the difference could be material. The forecasts developed during this master planning effort are based on information that was available between September 2010 and January 2012. Unexpected events may occur, and some of the underlying forecast assumptions may not materialize. The forecast model focused on key measurable factors that influence air travel demand at the Airport. However, a number of other factors could affect aviation activity and introduce risk and uncertainty into the forecast. Some of these factors are discussed below.

4.3.3.1 Fuel Prices

It would be expected that higher fuel prices would deter aviation activity. This does apparently appear to be the trend. Over the past 4 years, as fuel prices have steadily risen, fuel sales have steadily declined; being down approximately 19 percent over this time frame. Jet A sales, on the other hand, have remained very consistent while prices, although somewhat erratic, have actually fallen. Both of these trends indicate, as one would expect, that fuel sales are inversely related to fuel price. As price increases, sales decrease which should also serve as a trend for the direction of aircraft operations. Since expectations are that fuel prices will continue to increase throughout the planning period, it is possible that there will be a negative impact on aviation forecasts.

4.3.3.2 Regulatory Compliance

One of the primary regulatory concerns with regard to the future of general aviation is an environmental push for national regulation that would abolish low-lead Avgas. The probability of regulation that would prohibit low-lead fuel from being sold and used for aviation in the United States has been driving research to develop alternative aviation fuels for several years. The impact of an alternative fuel to general aviation is not fully known at this time but could have an impact to general aviation activity. Mandated requirements to abolish low-lead fuel and switch to an alternative fuel could require costly conversions of existing piston aircraft engines that would deter many casual pilots. In addition, alternative fuels could cost more to produce which would translate

into higher costs at the pump. Ultimately, most regulation leads to increased restrictions and higher costs to the industry subject to the regulatory oversight. If more stringent regulatory requirements are placed on aviation fuels, it is likely that the impacts to aviation would be negative.

4.3.3.3 Local Economic Outlook

The Flathead Valley and City of Kalispell supports a strong tourist industry. There are limitless outdoor recreation opportunities and spectacular scenery found in the many nearby mountain ranges, National Forest lands, numerous lakes, and Glacier National Park. Much of the business in the community caters directly to the tourist industry. Major employment sectors in the Kalispell area include health care and social assistance, accommodation and food services, construction, and education services. The largest employers in the Kalispell area include Kalispell Regional Medical Center, Plum Creek Timber, Semi-Tool, Flathead Community College, Kalispell School District, and Teletech.

Area economic forecasts generally follow similar trends as population growth. The recent recession has had a noticeable impact on area businesses. Since the recession began, there have been numerous layoffs and high unemployment. Many of the smaller local businesses, especially retail and food service have closed their doors. This sort of economic downturn is not expected to continue indefinitely, however, recovery is expected to be somewhat slower than the rest of the nation and the state. Again, this is a factor will likely have some impact on the forecasts at the Kalispell City Airport. With consideration to historical economic trends, it appears that the City of Kalispell is beginning to experience an economic recovery from the recent recession. This would likely result in slow, initial growth in the economy that should accelerate as the recovery matures.

4.3.3.4 Airport Expansion

The Kalispell City Airport is presently an ARC B-I facility. If the airport were expanded to B-II requirements it would likely attract more B-II aircraft. With its present limitations in runway and taxiway width, many larger aircraft are deterred from using the airport, especially with GPI being an alternate airport in such close proximity. If Kalispell City Airport were upgraded to B-II standards, it would likely attract some of these operations due to its convenience and close proximity to Kalispell's City Center. There is not likely to be much of an impact to smaller, B-I aircraft however. The airport's current facilities are not really a deterrent to these aircraft.

A similar conclusion would result from an increase in runway length. Kalispell City Airport's current runway length is a deterrent to faster, higher performance aircraft using the airport. If the runway were lengthened, it would be expected that more of the higher performance aircraft would use the airport on a more frequent basis.

4.3.4 Aviation Forecast Trends

4.3.4.1 Based Aircraft Projections

From the past few years of based aircraft counts, the number of based aircraft appears to be growing at a rate of 1 to 3 aircraft per year[7]. Since this rate of growth has been occurring in spite of the poor economic climate, there does not seem to be any other, immediate factors which would cause it to plateau or decline. Over the next 5 years, it is expected that the number of based aircraft will continue to increase by the same amount of 1 to 3 new aircraft each year. Looking further out, there

[7] Ref. Table 4-1

are other factors that may impact based aircraft growth. The primary factor would be the improvement of airport facilities. If the airport were expanded to ARC B-II dimensional standards, it is possible that it might attract new based aircraft from Glacier Park International Airport, provided hangar and tie-down facilities were readily available. It is possible to see a few aircraft relocate from GPI Kalispell City Airport shortly after development; but long term growth in based aircraft is likely to remain consistent.

Using the linear regression tool on the based aircraft data from the TAF (from 1990 to 2010) results in a based aircraft growth rate of one new aircraft every two years (y-intercept=-970; x-coefficient=0.52). This rate of growth is lower than what has actually been observed at the airport over the past few years but it is more realistic and sustainable for the duration of the planning period. Surprisingly, the linear regression method calculates the number of based aircraft in 2011 to be 72 which is consistent with the based aircraft counts (69 full-time and 4 part-time) in December, 2010. There has been, however, a significant increase in based aircraft over the past 12 months. During this time frame, 82 aircraft have been verified based at Kalispell City Airport; an increase of 9 new aircraft over the past 9 months. This increase is believed to be an anomaly as there appears to be no external factors supporting the increase.

Total based aircraft forecasts have been extrapolated using a regression analysis from the available data to predict based aircraft counts through the year 2030. **Table 4-10** summarizes the based aircraft forecast for the planning period. Total based aircraft forecasts were calculated from the regression equation; the breakdown of based aircraft types was subjectively determined utilizing the 5010 data from 2011 as a starting point. An increase in multi-engine aircraft has been projected in 2020 as a result of a possible expansion to B-II design standards at the airport.

TABLE 4-10

Based Aircraft Forecast

Forecast Period	Single Engine	Multi Engine	Jet	Rotor	Other	Total
Current (2012)	70	4	0	7	1	82
Short Term (2012-2017)	71	5	0	8	1	85
Medium Term (2018-2022)	75	6	0	8	1	90
Long Term (2023-2032)	77	8	0	9	1	95

SOURCE: Forecast number of based aircraft for years 2012 through 2032 calculated from regression analysis (y-intercept = -970; x-coefficient = 0.52)

4.3.5 Aircraft Operations Forecast

An aircraft operation is any aircraft movement on a runway such as a landing, a take-off, or a touch-and-go. The number of operations, rather than the number of flights or trips, determines the level of airport activity. No formal log of actual airport operations at the Airport exists.

The Terminal Area Forecast (TAF) is the primary tool used by the FAA for developing aviation forecasts. However, other forecasting tools were used, for comparison purposes to the forecasts in the TAF. In developing aviation forecasts, the FAA provides the following guidance for the forecast review process established under FAA Order 5090.3C:

> "Forecasts supplied by the airport sponsor should not vary significantly (more than 10%) from the FAA's forecast. When a sponsor's forecast does vary significantly

> from the FAA's forecast, the sponsor's methodology should be verified, the forecast coordinated with APO-110, and only after the difference is resolved and the FAA is satisfied that the sponsor's forecast is valid will sponsor's forecast be included in the NPIAS. In the absence of other forecast information, data from FAA's forecast are included in the NPIAS database. When FAA forecast data are not available (usually a proposed airport) the master plan forecast should be validated against FAA's regional forecasts, and if appropriate, coordinated with APO-110."

As noted earlier in this chapter, there is a significant discrepancy from the operations forecast by the TAF and the operations counted over the course of a full year at the airport. Actual aircraft operation counts on-field only report approximately 11,306 operations compared to the 41,400 forecast by the TAF. Since there is no reason to challenge the acoustic counts at the airport, it is likely that the TAF estimates have been over-projecting aircraft operations at this facility. Thus, forecasts developed in this study will be based on the baseline data obtained in the field and adjusted for specific seasonal anomalies as previously described in Section 4.2.4.

The operations data in both the TAF and MSASP do have value for developing trend line information, however. Using the linear regression tool on the aircraft operations data from the MSASP (from 1998 to 2020) results in an operations growth rate of 0.71 percent or approximately 278 operations per year (y-intercept=-518,875; x-coefficient=278). The TAF data provides for a growth rate which is more than double the MSASP rate at 1.55 percent or 553 operations per year (y-intercept=-1,096,440; x-coefficient=566). With a projected population growth rate for Kalispell of approximately 3 percent per year, both projected trends are below the growth rate of the local community; with the estimates from the MSASP being well below the local rate.

Considering the economic factors affecting aviation operations, primarily fuel prices, it is reasonable to conclude that aviation growth trends would be less than population growth trends. The growth trend estimated from the data in the MSASP appears to be very low which does not seem to coincide with recent growth in based aircraft. Therefore, the growth estimated from the data in the TAF should be more reasonable and accurate and will be used for developing the forecasts in this study.

Total aircraft operations forecasts have been extrapolated using a regression analysis from the TAF data to predict total aircraft operations through the year 2032. The regression equation was adjusted to modify the y-intercept in order to meet the baseline operations of 15,800 established for 2011. **Table 4-11** summarizes the operations forecast for the planning period. Total aircraft operations forecasts were calculated from the regression equation beginning with an adjusted operations baseline of 15,800 operations per year. This baseline value is slightly higher than the actual field counts obtained in 2010 and 2011 to account for poor weather conditions during the counting period. Using a y-intercept of -1,122,426 and an x-coefficient of 566 total aircraft operations were established for the planning period [eg. (2023 x 566) – 1,122,426 = 22,592]. The breakdown of local and itinerant operations was based on the ratio of observed aircraft photographed at the airport during the observation period. Sixty-five (65) percent of the operations were estimated to be local while the other 35 percent were itinerant.

TABLE 4-11
Aircraft Operations Forecast

Forecast Period	Local	Itinerant	Total
Current Year (2011)	10,270	5,330	15,800
Short Term (2012-2017)	12,476	6,720	19,196
Medium Term (2018-2023)	14,682	7,910	22,592
Long Term (2023-2032)	17,996	9,690	27,686

SOURCE: Forecast number of operations for years 2012 through 2032 calculated from regression analysis (y-intercept = -1,122,426; x-coefficient = 566) adjusted for baseline operations of 15,800 per year.

4.3.6 Critical Aircraft Forecast

The current forecast of 579 annual operations support a critical aircraft consistent with ARC B-I (operations greater than 500). The number of operations from Design Group II aircraft is estimated to be approximately 160 annually, well below the 500 critical operations needed. However, conditions are changing frequently at this airport and one new based aircraft or itinerant aircraft with substantial operations in the B-II category would be sufficient to warrant ARC B-II standards.

Runway width and length are likely the predominant factors limiting operations from larger and higher performance aircraft at Kalispell City Airport. Standard Operating Procedures require pilots to calculate the required length of runway needed for their particular aircraft at each specific airport and under the expected environmental conditions they will be flying. For higher performance aircraft, the current runway length of 3,600 feet is a deterrent to using this airport so most pilots would choose to use Glacier Park International Airport. This is likely true for larger aircraft also. Although Design Group II aircraft could conceivably operate at Kalispell City Airport, most pilots would prefer the wider runways and navigational amenities available at GPI. It is probable; however, that improvements made to widen and lengthen Runway 13/31 at Kalispell City would increase activity from larger and higher performance aircraft, possibly attracting some of the operations from aircraft presently using Glacier Park International Airport.

A final element to consider in determining the critical aircraft to support future development at Kalispell City Airport is the long range planning goal for this important general aviation facility. Kalispell City Airport is presently very user-friendly to pilots flying small, single-engine aircraft. Improvements that widen and lengthen the existing runway are likely to attract a greater number of operations from both itinerant aircraft and based aircraft in this higher performance aircraft category. This may not be a desirable goal for the Airport Board or current users of the Kalispell City Airport at this time. A significant increase in activity from this group of users may result in competition for limited facilities on the Airport and ultimately diminish Kalispell's moniker as being "small aircraft friendly". It may be advantageous for Kalispell City Airport to continue targeting small aircraft users by planning for development that predominantly benefits this smaller category of aircraft. Glacier Park International Airport would be able to support the aviation needs of more demanding aircraft users. **In summary, the critical aircraft currently operating at Kalispell City Airport with a minimum of 500 annual operations is typical of aircraft in Approach Category B and Design Group I (ARC B-I). However, forecasts indicate that at some time during the 20-year planning period the critical aircraft will increase to Approach Category B, Design Group II (ARC B-II).**

For consideration of heliport facilities at the Kalispell City Airport, a similar evaluation of rotorcraft is required to establish heliport design standards. Heliport design standards are established in AC 150/3590-2B Heliport Design. Based rotary aircraft at the Kalispell City Airport include the Enstrom 280FX, the Schweizer/Hughes 269C/369, and the Bell 206B Jet Ranger. There is also consistent, frequent use by an itinerant Bell UH-1 Iroquois and occasional use by a Bell UH-60 Blackhawk. Although the Blackhawk is the largest of the rotary aircraft using the airport, its use is infrequent and occasional; it does not have sufficient operations to warrant being the critical rotary aircraft using the airport. The Bell UH-1 Iroquois, on the other hand is reportedly seen quite often at the airport and is a regular user of Jet A fuel. **Based on the historical operations of the Bell UH-1, it is the critical rotary aircraft presently using the airport on a regular basis.**

However, planning should account for an increase in design standards to the next level of approach category and design group if possible. The timing or the need to upgrade to Design Group II standards is not as certain. During the past year, very few aircraft meeting Design Group II standards used this airport. Documented operations were well below the 500 annual operations needed to justify a DG-II facility. Historically, there is reported used by these larger aircraft but it does not seem to be consistent year to year. It is very likely though that if the facilities were expanded to DG-II standards that operations from these types of aircraft would increase. What should be expected, however, is that DG-II standards will be warranted sometime within the 20-year planning period and that every effort should be made to protect for those requirements. **Therefore, the Kalispell City Airport should plan development consistent with a future upgrade to DG-II standards.**

4.4 Conclusions

Kalispell City Airport is located in the busiest aviation corridor in the state of Montana; Kalispell to Hamilton. This corridor includes commercial airports Glacier Park International and Missoula International; and general aviation airports Kalispell City, Polson, Ronan, St. Ignatius, Stevensville, and Hamilton. The Kalispell City Airport is servicing primarily small (less than 12,500 lbs) aircraft typical of the Cessna 170 and 180 Series. The critical aircraft is currently consistent with the criteria for ARC B-I aircraft.

Long range planning for the Kalispell City Airport should take into consideration the present mix of users at the Kalispell City Airport and establish development goals which continue to support this group of users. Current aviation trends in Flathead County indicate that Glacier Park International Airport, 8 nautical miles to the north, is able to support aircraft use typical of corporate and business jet aircraft operating without runway length limitations. Glacier Park International Airport is also able to accommodate higher performance or heavier aircraft that exceed the facility requirements at Kalispell City Airport.

Although the most demanding aircraft type presently using the airport on a regular basis (more than 500 operations per year) are airplanes consistent with Approach Category B, Design Group I (ARC B-I), there has been, and will likely be, a continued growth in operations from aircraft typical of Approach Category B, Design Group II (ARC B-II). It is anticipated that Design Group II aircraft will be the critical aircraft sometime during the 20-year planning period. Because of this anticipated change in critical aircraft usage, it is important that the Sponsor plan or protect all airport development so that it is fully capable of meeting the increased design standards for these more demanding aircraft. At the same time, it is not necessary to initially develop the airport to fully meet these higher standards. If properly planned, airport development could be performed in a "staged"

or "phased" approach; increasing standards or runway length only as the need arises. ARC standards for airport design are fully discussed in Chapter 5. ARC standards are summarized in Table 5-3 and keyed to Exhibit 5-1.

In conclusion, the current critical aircraft at Kalispell City Airport are airplanes typical of Approach Category B, Design Group I with forecasts indicating an increase in the critical aircraft to airplanes typical of Approach Category B, Design Group II during the 20-year planning period. Therefore, it is necessary that the Sponsor plan and protect for development at the Kalispell City Airport with facilities that fully meet the ultimate ARC B-II design standards and an ultimate runway length that accommodates 100 percent of small airplanes with 10 or fewer passengers.