WORKING PAPER 1

AVIATION FORECASTS

SEPTEMBER 2021

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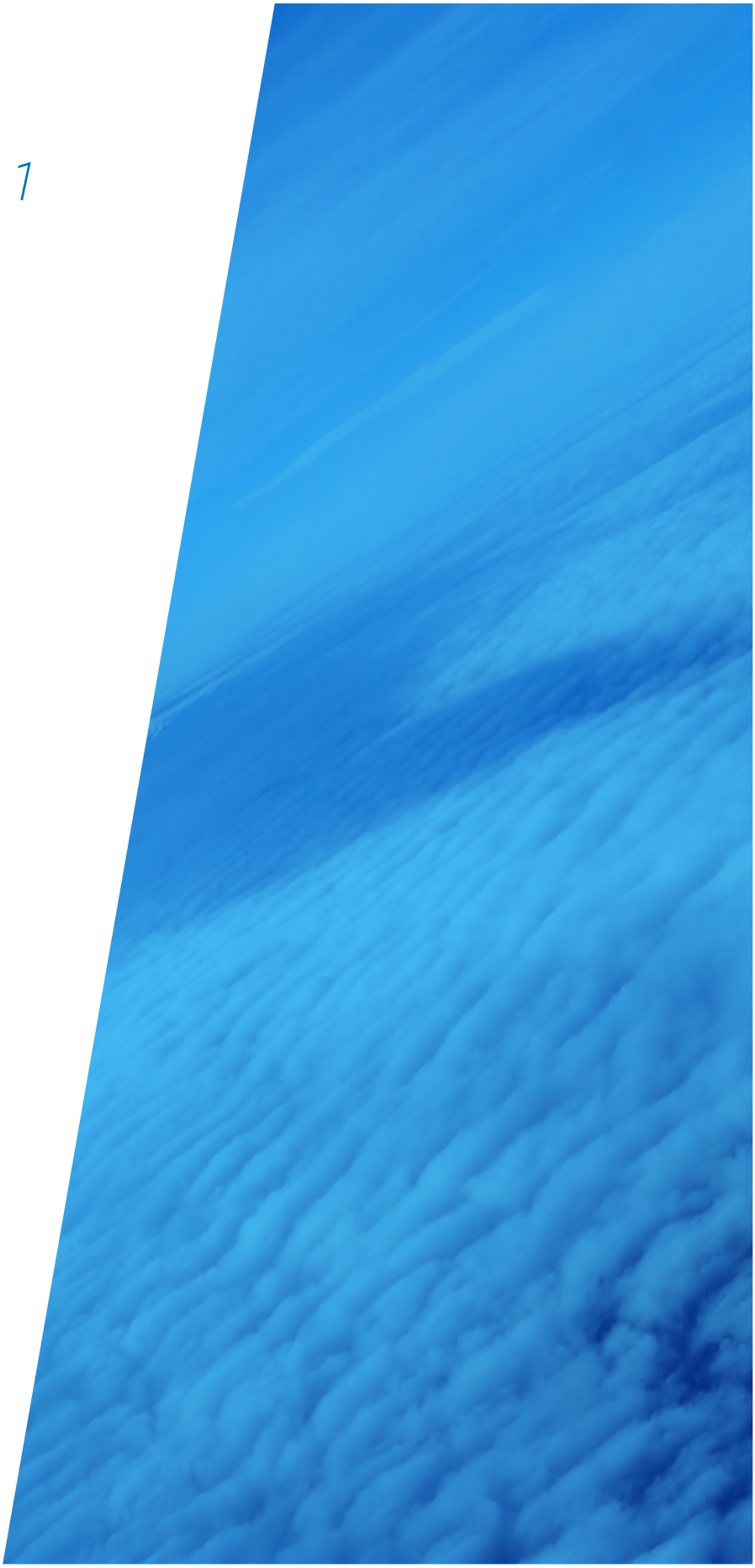

Prepared by RS&H for the Chisholm-Hibbing Airport Authority

RANGE REGIONAL AIRPORT

RS&H

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CHAPTER 1

AVIATION FORECASTS

1.1 INTRODUCTION

A critical element in the planning and development of airport facilities is knowing the levels of aircraft operations and based aircraft that can be expected during a prescribed planning time period. This chapter discusses the projected activity levels of passenger enplanements, aircraft operations, and based aircraft that might be expected within the next 20-year planning horizon. It also describes the methodology used to estimate those volumes. The chapter concludes with recommended passenger enplanements, operations, and based aircraft forecasts that will be used to plan the requirements for future infrastructure and facilities. The forecast is presented in five- and ten-year increments beginning with a base year of 2020 outward to 2025, 2030, and 2040.

The Federal Aviation Administration (FAA) annually prepares its Terminal Area Forecast (TAF) for 264 FAA towered airports, 252 federal contract tower airports, 31 terminal radar approach control facilities, and 2,818 non-towered airports. Range Regional Airport (HIB) is one of these airports, and the 2019 TAF was used as the primary gauge of reference when developing this master plan forecast.

This forecast was prepared at the same time as the evolving impacts of the COVID-19 public health emergency. FAA has advised that forecast approval is based on the methodology, data, and conclusions at the time the document was prepared. However, consideration of the impacts of the COVID-19 public health emergency on aviation activity is warranted to acknowledge the reduced confidence in growth projections using currently available data.

Accordingly, FAA has advised that approval of this forecast does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify federal Airport Improvement Program (AIP) funding for eligible projects.

Per FAA direction, approval of this forecast has been subject to the caveats identified above being inserted as a disclaimer at the beginning of the forecast document and applicable Master Plan chapters.

1.2 AIRPORT SERVICE AREA ANALYSIS

In determining airport demand, it is necessary to examine the demographic and socioeconomic conditions of the airport's service area. An airport service area is a broadly based geographical area around the airport where it is reasonable to assume that a market exists for airport services. In forecasting aviation demand, the socioeconomic characteristics of the service area are examined to identify correlation with previous patterns and forecasted trends as it relates to aviation activity.

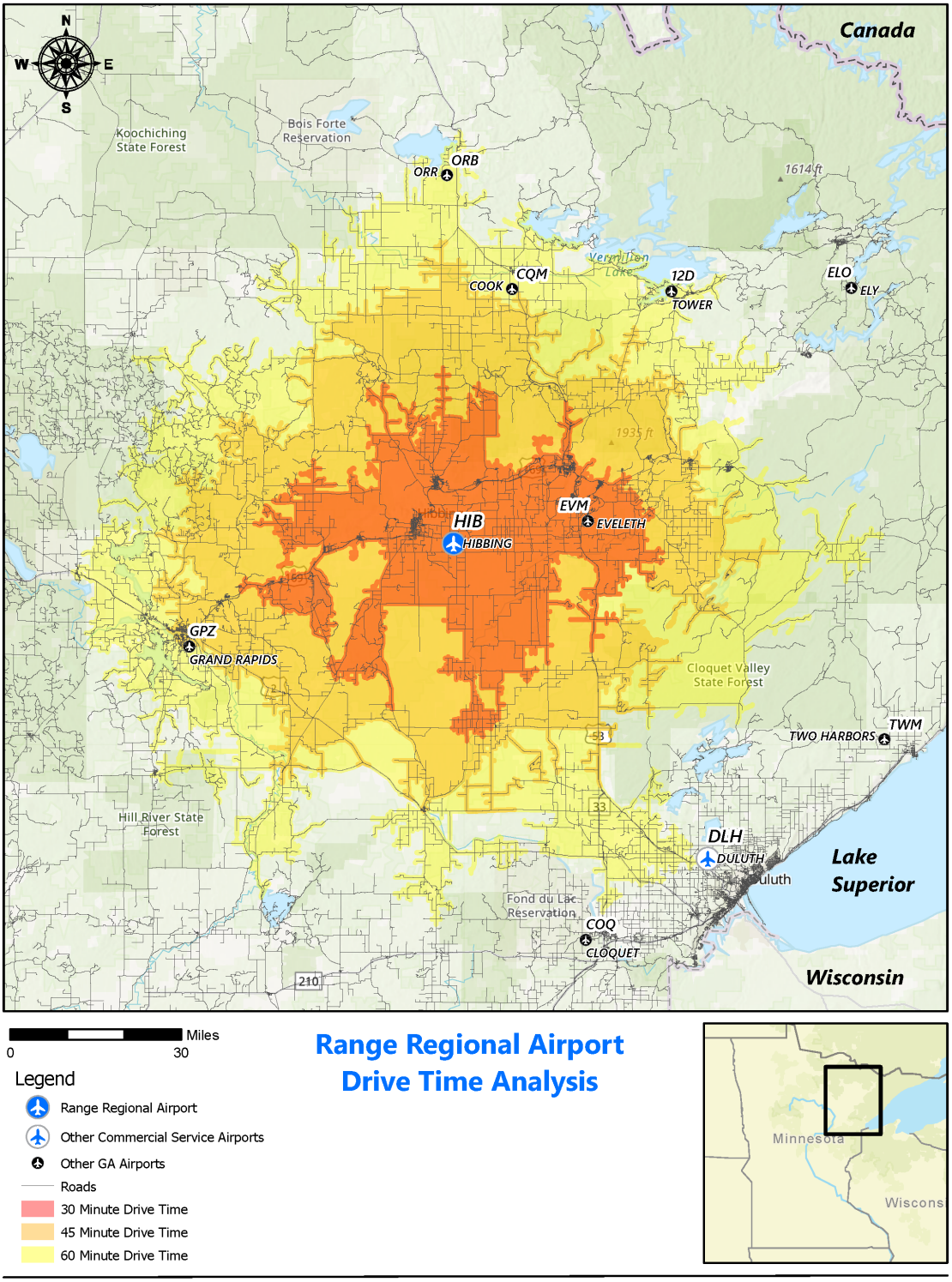
1.2.1 Airport Service Area

For a commercial service airport like HIB, the market for airport services relates to hangars used to store private aircraft, services such as fuel and light maintenance, and travel via commercial airline service. The service area of HIB is broad due to the rural nature of the Airport's setting and the surrounding region. It is estimated the service area roughly extends to areas within an approximate 60-minute drive time from the Airport.

Figure 1-1 illustrates the areas within an approximate 60-minute drive time from HIB. Larger population centers, such as Grand Rapids and the outskirts of Duluth fall within this drive time. This is important to consider regarding both general aviation (GA) hangar and commercial passenger service demand.

Analysis shows that demand for commercial passenger service around HIB extends beyond the 60-minute drive time. It was determined that only roughly 60 percent of passengers today are coming from within a 35-mile radius from the Airport (of which Grand Rapids is at the outer limits of the 35-mile range). Thus, up to 40 percent of passengers are traveling from areas further out than 35 miles. This factor is further discussed in **Section 1.4.1**.

FIGURE 1-1
DRIVE TIME ANALYSIS



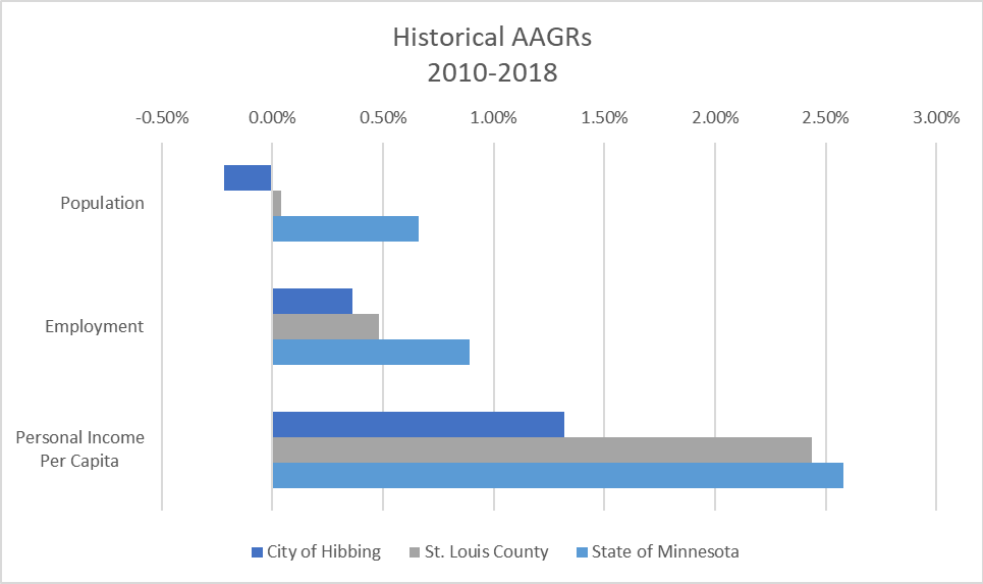
Source: Esri ArcGIS; Prepared by RS&H, 2020

1.2.2 Socioeconomic Characteristics

Consideration of a community's economic character is valuable when comparing the vitality and potential growth for travel and general aviation activity to state and national trends. **Figure 1-2** illustrates a comparison between the City of Hibbing, Saint Louis County, and the State of Minnesota on three metrics; historical growth/decline of population, employment, and personal income per capita (PIPC) between 2010 and 2018. Both the City of Hibbing and Duluth reside within Saint Louis County, with the majority share of the county population residing in Duluth. This factor skews the metrics for Saint Louis County to reflect the characteristics of Duluth. The PIPC growth of Duluth is greater than the City of Hibbing, as it is a metropolitan area that is assumed to have had greater growth of jobs with higher salaries. This explains the higher growth of the County PIPC compared to Hibbing.

Overall, Saint Louis County and the City of Hibbing have seen increased PIPC and employment since 2010. It is estimated the other smaller cities in Saint Louis County adjacent to Hibbing are seeing similar metrics. The population of the City of Hibbing had a very small decline since 2010, dropping from 16,396 to 16,106 by 2018. Over the course of an 8-year period, that level of decline is considered negligible, and points to the population remaining flat.

FIGURE 1-2
SOCIOECONOMIC COMPARISON



Source: US Census Bureau; Prepared by RS&H, 2020

Due to the rural nature of the Arrowhead Region, it is necessary to examine the population trends of multiple counties, as the Airport serves far more than just the City of Hibbing, or even Saint Louis County. **Table 1-1** details the historical and projected population trends for the counties that HIB serves. In discussions with Airport management, surrounding counties were broken up into primary and secondary categories. Primary counties are those where HIB sees the most demand from. Secondary counties have residents that use HIB but not at the level seen from primary counties.

Overall, population in the region is flat, and is projected to remain flat though this study's 20-year planning period. This indicates a stable economy with no predicted swings that could dramatically impact aviation demand at HIB. However, the COVID-19 pandemic has created new patterns for where people reside and work, and this is causing population fluctuations nationwide. The work-from-home (WFH) paradigm is garnering attention during this pandemic, and while some reports are that WFH is forever going to change the way the nation works, other articles report a longing for many to return to the office. Generally, it is expected that the WFH situation will change some work patterns forever, while some will return to pre-pandemic modes. An element for consideration in this forecast is the fact that people are moving out from cities and into suburban and rural areas.

In talking to local real estate professionals in Hibbing, it was reported that some individuals and families have relocated to the Hibbing region from Minneapolis and other large urban centers. Many, if not most of these people are professionals with jobs that allow WFH flexibility, and often provide higher salaries than median income. If this trend continues, it may be expected that the Arrowhead region see bolstered economic activity, especially post-pandemic. This was considered when examining potential future demand for airline travel and how it may relate to increased demand for hangars by those who may wish to move their aircraft to HIB.

TABLE 1-1
COUNTY POPULATION ESTIMATES

	Population Historical		CAGR	Population Projections						CAGR
County	2005	2014	2005-2014	2015	2020	2025	2030	2035	2040	2014-2040
PRIMARY COUNTIES										
Cook County	5,368	5,231	-0.3%	5,261	5,371	5,443	5,482	5,507	5,518	0.2%
Itasca County	44,285	45,639	0.3%	45,884	46,625	47,064	47,246	47,338	47,320	0.1%
Koochiching County	13,773	13,018	-0.6%	12,726	11,931	11,205	10,570	9,995	9,489	-1.2%
Lake County	11,189	10,695	-0.5%	10,617	10,238	9,872	9,536	9,227	8,946	-0.7%
St. Louis County	198,102	200,840	0.2%	201,526	202,271	202,075	201,154	200,050	198,716	0.0%
SECONDARY COUNTIES										
Aitkin County	16,216	15,762	-0.3%	15,660	15,198	14,742	14,314	13,917	13,553	-0.6%
Cass County	28,843	28,570	-0.1%	28394	28134	27906	27740	27647	27600	-0.1%
Carlton County	34,096	35,576	0.5%	35,751	36,305	36,627	36,754	36,811	36,786	0.1%
Lake of the Woods	4,427	3,921	-1.3%	3,872	3,698	3,533	3,383	3,241	3,111	-0.9%
Beltrami County	42,698	45,770	0.8%	46,169	47,604	48,723	49,526	50,158	50,604	0.4%
Hubbard County	18,873	20,596	1.0%	20,719	21,013	21,207	21,307	21,359	21,359	0.1%
Crow Wing County	60,194	63,371	0.6%	63,877	65,189	66,303	67,282	68,296	69,256	0.3%
Arrowhead Region	323,029	326,761	0.1%	276,014	276,436	275,659	273,988	272,117	269,989	-0.7%
Minnesota	5,205,091	5,453,218	0.4%	5,482,435	5,687,161	5,844,466	5,974,304	6,089,935	6,189,207	0.5%

Source: MN State Demographic Center, Metropolitan Council, and U.S. Census Bureau; Prepared by RS&H, 2020
Note: Arrowhead Region includes all Primary Counties plus Carlton County and Atkin County.

1.3 HISTORICAL ACTIVITY AND FORECAST REVIEW

Aviation activity at an airport is defined as the amount of aircraft operations by commercial aircraft, general aviation, military, and the number of passengers that use commercial air service for their transportation needs. This section describes the historical aviation activity data for HIB. The data is used to understand previous trends and patterns at the Airport and their interrelationships with key economic indices. The findings are then used to build the forecast of future aviation activity.

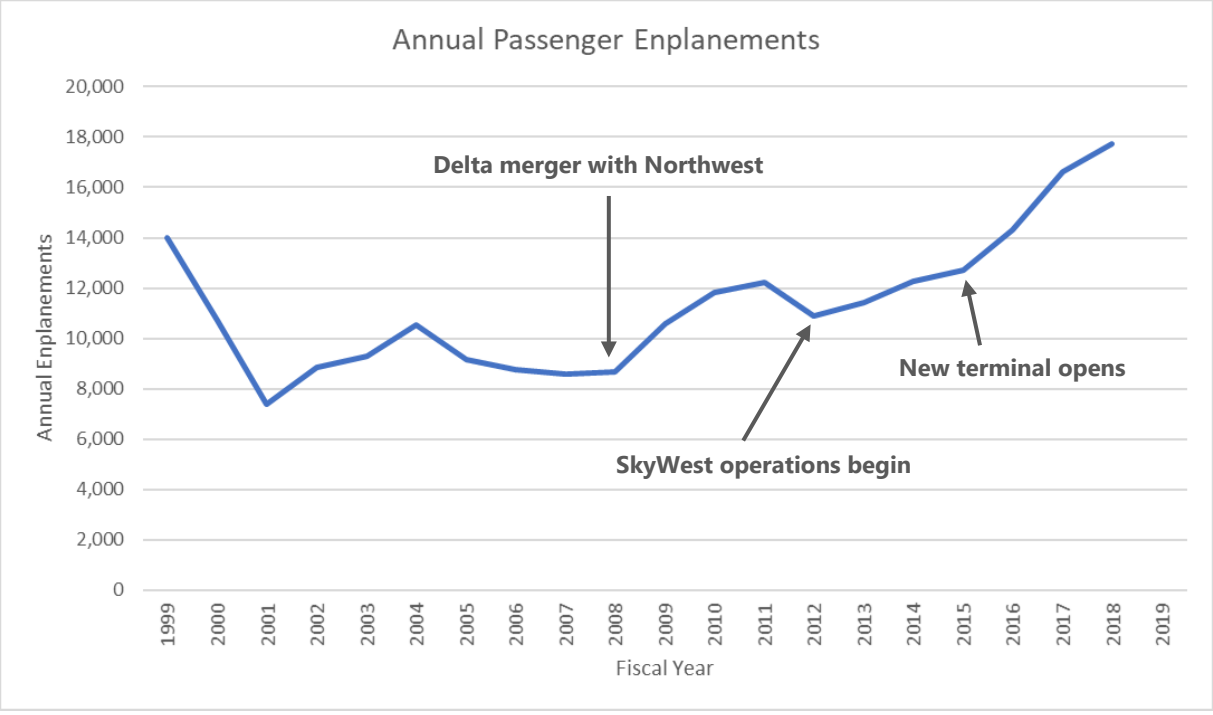
1.3.1 Historical Commercial Passenger Activity

Currently, scheduled passenger service is provided by SkyWest Airlines operating as Delta Connection with flights to and from Minneapolis International Airport (MSP). SkyWest flies this route 12 times weekly using their Bombardier CRJ200 50-seat aircraft. Since the last master plan was completed in 2005, the commercial operator serving HIB changed. In 2005, Mesaba Airlines was operating as Northwest Airlink. Since then, Northwest Airlines merged with Delta Airlines in 2008 and Mesaba merged with Pinnacle Airlines in 2012. In 2012, SkyWest took over the Essential Air Service (EAS) contract to serve HIB.

As can be seen in **Figure 1-3**, since SkyWest began serving HIB in 2012, enplanements have steadily grown. The growth has been solely related to increased load factors as frequency and total seat capacity remained unchanged. In the span between 2012 and 2019, load factors grew from 35.7 percent to 55.6 percent.[1] It is posited the reliability and on-time performance of SkyWest jet service has continually attracted greater passenger demand. In 2015, HIB also opened a new modern terminal, which appears to have further spurred demand as growth in enplanements accelerated.

In addition to scheduled service, direct charter flights to and from Laughlin, Nevada are offered by Sun Country Airlines. These flights occur approximately every four- to six-weeks and use 737-800 aircraft with 183 seats.

FIGURE 1-3
HIB HISTORICAL ENPLANEMENTS



Source: FAA 2019 TAF; Prepared by RS&H, 2020

[1] SkyWest load factor data does not account for non-revenue passengers, thus all Delta employees flying to/from the Delta Reservation Center in Chisholm, MN for training or other business needs are not counted. Airport management noted that actual load factors can be up to 10 percent higher when counting the Delta employees traveling to and from the reservation center.

Table 1-2 outlines total enplanements at HIB from 1999 to 2019. Over the last decade, between 2009 and 2019, enplanements have seen a compound average annual rate (CAGR) of 7.4 percent growth, with double digit growth in fiscal years 2017 and 2018.

TABLE 1-2
HIB HISTORICAL ENPLANEMENTS

Year	Total Enplanements	Annual Increase/ Decrease
1999	15,358	
2000	13,993	-8.9%
2001	10,721	-23.4%
2002	7,385	-31.1%
2003	8,841	19.7%
2004	9,303	5.2%
2005	10,555	13.5%
2006	9,183	-13.0%
2007	8,744	-4.8%
2008	8,569	-2.0%
2009	8,678	1.3%
2010	10,604	22.2%
2011	11,832	11.6%
2012	12,220	3.3%
2013	10,875	-11.0%
2014	11,431	5.1%
2015	12,271	7.3%
2016	12,700	3.5%
2017	14,293	12.5%
2018	16,634	16.4%
2019	17,753	6.7%

Period	CAGR
1999-2009	-5.55%
2009-2019	7.42%
2012-2019	5.48%

Source: FAA 2019 TAF. FY 2019 estimated; RS&H Analysis, 2020

1.3.2 Annual Aircraft Operations

An aircraft operation is defined as either a takeoff or a landing. Therefore, the typical air carrier flight consists of a landing and a takeoff for a total of two operations. The FAA records annual aircraft operations in the following four categories:

- **Air Carrier** - An air carrier operation involves an aircraft with a seating capacity of more than 60 seats or a cargo payload capacity of more than 18,000 pounds. Additionally, air carrier operations are those carrying passengers or cargo for hire or compensation.
- **Air Taxi** – Air Taxi operations represent scheduled commercial flights, nonscheduled commercial flights, and charter flights with aircraft with 60 seats or fewer or a cargo payload capacity of 18,000 pounds or less. Additionally, air taxi operations are those carrying passengers or cargo for hire or compensation.
- **General Aviation** - General aviation (GA) operations are any type of operation that is not included in one of the previous defined categories. These are typically privately owned aircraft used for training, recreation, business, or personal use.
- **Military** - Military operations include all classes of U.S. military or federal government aircraft.

As shown in **Table 1-3**, the 2019 TAF includes historical airport data and a forecast. The forecast for HIB shows no growth through the planning period, which is typical of airports without an airport traffic control tower (ATCT). Because HIB does not have verified operational data provided by an ATCT facility, historic data is estimated by Airport staff, FAA, and/or State officials. That estimate is then incorporated into the TAF, and, for airports like HIB, no growth forecasts are usually assumed unless a planning study such as this master plan update is provided to FAA.

It is important to note that without an ATCT facility, acoustic counter, or other method to accurately track operations, actual operations counts are qualitative at best. Quantitative data was obtained from fuel sale records and FAA Traffic Flow Management System Counts (TFMSC). TFMSC data only captures flights under an instrument (IFR) flight plan, and thus, is not comprehensive. The fuel records and TFMSC data were used in conjunction with historical records, a comparative analysis of peer airports, and application of industry standards to estimate and validate a baseline level of operations at HIB, as described in the remainder of this section.

TABLE 1-3
FAA TAF HISTORICAL AND FORECAST OPERATIONS

Year	Air Carrier Operations	Air Taxi & Commuter Operations	Itinerant GA Operations	Local GA Operations	Military Operations	Total Operations
2000	0	6,605	6,762	4,508	174	18,049
2001	0	6,605	6,627	4,418	174	17,824
2002	0	6,605	6,627	4,418	174	17,824
2003	0	6,605	6,627	4,418	174	17,824
2004	0	6,605	6,627	4,418	174	17,824
2005	0	5,318	6,627	4,418	174	16,537
2006	0	5,318	6,627	4,418	174	16,537
2007	0	5,318	6,627	4,418	174	16,537
2008	1,095	2,634	10,000	5,003	100	18,832
2009	2,628	2,634	10,000	15,003	100	30,365
2010	2,628	2,634	10,000	15,003	100	30,365
2011	2,628	2,634	10,000	15,003	100	30,365
2012	2,628	2,634	10,000	15,003	100	30,365
2013	2,628	2,634	10,000	15,003	100	30,365
2014	2,628	2,634	10,000	15,003	100	30,365
2015	2,628	2,634	10,000	15,003	100	30,365
2016	2,628	2,634	10,000	15,003	100	30,365
2017	2,628	2,634	10,000	15,003	100	30,365
2018	2,516	2,634	10,000	15,003	100	30,253
Forecast						
2020	2,516	2,634	10,000	15,003	100	30,253
2025	2,516	2,634	10,000	15,003	100	30,253
2035	2,516	2,634	10,000	15,003	100	30,253

Source: FAA 2019 TAF; Prepared by RS&H, 2020

The last planning study to estimate annual operations at HIB was the 2005 Master Plan. **Table 1-4** details the 2005 study's baseline and forecast of annual operations and based aircraft. The 2005 Master Plan estimated that in 2004, it was reasonable to assume there were 235 total general aviation operations per every based aircraft at HIB. The 2005 study also indicated there was a wait list for hangars and assumed that demand would materialize into new hangars being built and based aircraft growth.

TABLE 1-4
2005 MASTER PLAN OPERATIONS AND BASED AIRCRAFT FORECAST

		Itinerant Operations				Local Operations			
	Based AC	Air Carrier	Air Taxi & Commuter	GA	Military	GA	Military	Total Ops	GA Ops/ Based AC
2004	47	0	6,605	6,627	174	4,418	0	17,824	235
2005	47	0	6,605	7,857	174	3,367	0	18,003	239
2010	60	0	6,605	11,002	174	4,715	0	22,497	262
2015	63	0	6,605	12,241	174	5,246	0	24,267	278
2020	65	0	6,605	13,426	174	5,754	0	25,959	295
2025	66	0	6,605	14,519	174	6,223	0	27,521	314
CAGR (2005-2025)	1.6%	0.0%	0.0%	3.8%	0.0%	1.6%	0.0%	2.1%	

Source: 2005 Airport Master Plan; RS&H Analysis, 2020
Note: 2004 data historical. 2005 to 2025 data was forecast.

Operations per based aircraft is a typical planning factor used to estimate the number of operations at an airport. According to FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, a general planning parameter is that airports will have between 250 to 450 operations per based aircraft. The lower end of the range is typically attributed to rural airports, while the high end is attributed to busy reliever airports. Range Regional Airport is in a rural area but is a base for local businesses and aerial firefighting application operations. Additionally, the Airport has an instrument landing system (ILS), and attracts flight training operations from Duluth based flight schools. These factors suggest that HIB may have a greater number of operations per based aircraft than basic rural airports, but not as many as an airport closer to a large metropolitan area like Minneapolis.

In this regard, the FAA 2019 TAF was found to be inconsistent as the last historical year which indicates there were 568 operations per based aircraft at the airport. This is higher than should be expected at HIB. Further analysis was conducted to determine a baseline level of operations to serve as the starting point for the operations forecast.

1.3.2.1 Annual Operations Baseline Analysis

A comparison of commercial passenger service airports in Minnesota was used to help determine a realistic level of annual operations at HIB. **Table 1-5** compares Range Regional Airport to the commercial service airports in the state that do not have ATCT facilities. **Table 1-6** compares HIB to those commercial airports in the state with ATCT facilities. The comparison exercise focuses on the ratio between total annual general aviation operations and based aircraft. It was found that, aside from Bemidji Regional Airport, the other non-towered airports appear to have unrealistic levels of reported annual operations and/or specialized operations occurring at those airports. Therefore, they were discarded from the analysis.

TABLE 1-5
NON-TOWERED AIRPORT OPERATIONS COMPARISON

	Range Regional Airport	Bemidji Regional Airport	Brainerd Lakes Regional Airport	Falls International-Einarson Field	Thief River Falls Regional Airport
Airport Identifier	HIB	BJI	BRD	INL	TVF
EAS Service	Y	Y	Y	Y	Y
Airport Traffic Control Tower	N	N	N	N	N
Airport Demand					
Based Aircraft	38	60	89	20	24
2018 Annual Passenger Enplanements	16,634	29,844	22,010	17,159	4,996
2018 Annual Total Operations	30,253	13,516	37,900	39,900	32,268
2018 Total GA Operations	25,003	9,297	33,000	35,000	30,000
Total GA Ops per Based Aircraft	658	155	371	1,750	1,250
Airport Characteristics					
Primary Runway Length	6,748 x 150	7,004 x 150	7,100 x 150	7,400 x 150	6,504 x 150
Secondary Runway Length	3,075 x 75	5,700 x 150	6,512 x150	2,999 x 75	4,997 x 75

Source: FAA 5010, Airnav.com, Google Maps; RS&H Analysis, 2020
Notes: Last historical FAA year 2018 was used. Yellow indicates operations numbers estimated at non-towered airports.

In examining the commerical service airports with an ATCT, Saint Cloud Regional Airport (STC) was found to be the closest comparible airport to HIB. STC is a towered commerical service airport with enplanement levels near that of HIB. This airport best represents the type and level of operational activity that may be found at HIB. FAA records report that STC had 276 general aviation operations per every based aircraft, with a total of 30,635 annual operations. STC has 96 based aircraft, which is more than double that of HIB. Thus, it can be reasonably expacted that STC will accomodate a greater number of total annual opeations than HIB.

TABLE 1-6
TOWERED AIRPORT OPERATIONS COMPARISON

	Range Regional Airport	Rochester International Airport	Saint Cloud Regional Airport	Duluth International Airport
Airport Identifier	HIB	RST	STC	DLH
EAS Service	Y	N	N	N
Airport Traffic Control Tower	N	Y	Y	Y
Airport Demand				
Based Aircraft	38	62	96	88
2018 Annual Passenger Enplanements	16,634	179,715	21,760	129,486
2018 Annual Total Operations	30,253	42,660	30,635	62,824
2018 Total GA Operations	25,003	25,870	26,505	49,039
Total GA Ops per Based Aircraft	658	417	276	557
Airport Characteristics				
Primary Runway Length	6,748 x 150	9,034 x 150	7,500 x 150	10,591 x 150
Secondary Runway Length	3,075 x 75	7,301 x 150	3,000 x 75	5,719 x 150

Source: FAA 5010, Airnav.com, Google Maps; RS&H Analysis, 2020
Notes: Last historical FAA year 2018 was used. Yellow indicates operations numbers estimated at non-towered airports

Baseline operational scenarios were estimated at HIB using TFMSC data to identify air carrier and commuter operations, and various ratios of general aviation operations to based aircraft. Itinerant military counts were carried forward from the current TAF. The scenarios were then compared to STC operations to gauge plausibility. **Table 1-7** details each scenario and the number of associated annual operations.

Scenario 2, highlighted in green in **Table 1-7**, was carried forward as the baseline for annual operations in this study. That scenario assumes 300 general aviation operations per every based aircraft at HIB (a ratio of 300:1). The 2005 Master Plan estimated that of all general aviation operations at HIB, 70 percent are itinerant, and 30 percent are local. That percentage split of general aviation operations was determined to be properly representative and carried forward. While the ratio of GA operations to based aircraft in Scenario 2 is higher than the 235:1 ratio the HIB 2005 Master Plan assumed, it is estimated that more itinerant activity exists than represented by based aircraft.

Airport management notes that HIB accommodates many transient training operations using the Airport's ILS approach for practice. Cirrus Aircraft is just one of those users. Located in Duluth, Cirrus customers and flight instructors routinely use Range Regional Airport to practice touch-and-go's and instrument approaches. Besides DLH, HIB is the only Part 139 airport in the Iron Range, accommodating near daily medical transport flights, seasonal firefighting operations, and having a tenant specialized in custom paint and refinishing of smaller GA aircraft. These combined factors were considered in carrying forward a baseline ratio of 300:1 general aviation operations per based aircraft.

TABLE 1-7
HIB OPERATIONS BASELINE

		Itinerant Operations					Local Operations					
Airport	**Based AC**	**Air Carrier**	**Air Taxi & Commuter**	**GA**	**Military**	**Total**	**GA**	**Military**	**Total**	**Total GA Ops**	**GA Ops / Based AC**	**Total Ops**
St. Cloud	96	320	584	**12,701**	2,014	15,619	**13,804**	1,212	15,016	**26,505**	276	30,635
HIB 2005 Master Plan	47	0	5,318	**6,627**	174	12,119	**4,418**	0	4,418	**11,045**	235	16,537
Hibbing Scenario 1	38	34	1,466	**6,650**	100	8,250	**2,850**	0	2,850	**9,500**	250	11,100
Hibbing Scenario 2	38	34	1,466	**7,980**	100	9,580	**3,420**	0	3,420	**11,400**	300	13,000
Hibbing Scenario 3	38	34	1,466	**9,310**	100	10,910	**3,990**	0	3,990	**13,300**	350	14,900
Hibbing Scenario 4	38	34	1,466	**10,640**	100	12,240	**4,560**	0	4,560	**15,200**	400	16,800

Source: STC data from FAA 2019 TAF; RS&H Analysis, 2020
Notes: Scenarios based on 70% transient and 30% local split for GA operations

1.3.3 Based Aircraft

The 2005 Master Plan estimated continued growth of based aircraft. **Table 1-8** illustrates the based aircraft forecast of the 2005 Master Plan. Note the forecast estimated business jets would eventually be based at HIB within the planning period. This is likely due to the fact that in the early 2000's there was much enthusiasm for small very light jets (VLJ) becoming a fleet replacement for twin-prop and even single engine aircraft as these jets can be flown by a single pilot. The VLJ category fell out of favor after the 2008/2009 recession. What the industry has seen instead is the continued increase of business jet use, but of larger jets that rely on professional pilots and support staff for those operations.

TABLE 1-8
2005 AIRPORT MASTER PLAN BASED AIRCRAFT FORECAST

Year	Based Aircraft					
	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2004	44	3	0	0	0	47
2005	44	3	0	0	0	47
2010	55	4	0	0	0	59
2015	56	5	2	0	0	63
2020	57	6	2	0	0	65
2025	58	6	2	0	0	66
CAGR (2005-2025)	1.3%	3.4%	15.3%	0.0%	0.0%	1.6%

Source: 2005 Airport Master Plan
Notes: 2004 data historical. 2005 to 2025 data was forecast.

Table 1-9 details historical based aircraft recorded in the 2019 FAA TAF between 2009 and 2018. In October 2020, Airport management completed a based aircraft count, which is used in this study as the baseline for the forecast. As can be seen, based aircraft has declined over the past decade. This is largely due to the bankruptcy and ceased operations of a helicopter school that, in 2009, based up to 9 helicopters. Today, only LifeLink bases a helicopter used for life flights in the region. Additionally, at the time of this writing, 3 hangars weren't under lease and Airport management was increasing efforts to advertise their availability. Additionally, 6 lessees were transitioning between aircraft and had not completed purchase of their new equipment. This condition is atypical, and was determined unrepresentative of long-term trends.

TABLE 1-9
HIB HISTORICAL BASED AIRCRAFT

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2009	40	2	0	10	0	52
2010	40	2	0	10	0	52
2011	42	2	0	6	0	50
2012	40	2	0	6	0	48
2013	40	2	0	6	0	48
2014	40	2	0	6	0	48
2015	40	2	0	1	0	43
2016	40	2	0	1	0	43
2017	40	2	0	1	0	43
2018	40	1	0	1	0	42
2020	37	0	0	1	0	38

Source: FAA 2019 TAF, 2020 based on Airport Records, RS&H Analysis, 2020
Notes: 2019 and beyond are forecast years in the FAA TAF. 2020 serves as the baseline year for this study.

1.3.4 FAA Aerospace Forecast Fiscal Years 2020-2040

Table 1-10 below provides information from the FAA Aerospace Forecasts (2020-2040) for the entire U.S. general aviation fleet by aircraft type. The forecasts indicate a future restructuring of the aviation fleet over time to more complex aircraft. This is a continuation of a trend seen over the last 15 years. In the next 20 years, the total U.S. fleet percentage of piston aircraft is forecast to decline by 1 percent annually, while turboprop and jets are expected to grow at 1.2 and 2.2 percent, respectively. Essentially, the U.S. fleet is seeing a decline in single engine piston aircraft as many of these aircraft are aging to the point they are no longer flown, while the fleet of high-performance business aircraft is increasing as more businesses use them for transportation.

However, in rural areas outside metropolitan areas, these trends are not always as readily apparent. It is more common in these areas to have residents use their own small aircraft as personal transportation since their travel needs are often greater distances than those living in metropolitan areas. While it is estimated that the fleet mix at HIB will change slightly over the next 20 years, it is not expected that the based single engine or multi-engine fleet will decrease.

TABLE 1-10
FAA AEROSPACE FORECAST

Year	Pistons	Tuboprops	Jets	Rotorcraft
2010	155,419	9,369	11,484	10,102
2011*	152,597	9,523	11,650	10,082
2012	143,160	10,304	11,793	10,055
2013	137,655	9,619	11,637	9,765
2014	139,182	9,777	12,362	9,966
2015	141,141	9,712	13,440	10,506
2016	142,638	9,779	13,751	10,577
2017	142,916	9,949	14,217	10,511
2018	143,040	9,925	14,596	9,989
2019*	142,335	9,965	15,035	10,165
Forecast				
2020	141,245	9,995	15,495	10,340
2025	134,730	10,230	17,760	11,225
2030	127,905	10,795	19,970	12,205
2040	115,970	12,595	24,000	14,295
AAGR				
2020-2030	-1.0%	0.8%	2.6%	1.0%
2030-2040	-1.0%	1.2%	2.2%	0.9%
2020-2040	-1.0%	1.2%	2.2%	1.6%

Source: FAA Aerospace Forecast FY2020-2040, Table 28; Prepared by RS&H, 2020
Note: * 2019 estimated from FAA TAF. 2020 serves as the baseline year for this study.

1.3.5 2013 Minnesota State Aviation System Plan

At the time of this writing, MnDOT Aeronautics was in the process of updating the State Aviation System Plan, but no updated forecast documents had been released. Therefore, for this study, the 2013 State Aviation System Plan was examined. That plan includes estimates of operations, passenger enplanements, and based aircraft for the State as a whole, and does not include forecasts specific to HIB.

Overall, the 2013 State Aviation System Plan plan forecasted the state would see 1.0 percent average annual growth of based aircraft between 2010 and 2030 and 1.6 percent growth of GA operations. **Table 1-11** details the forecast for based aircraft and GA operations, and includes the correlated GA operations per based aircraft anticipated for each planning year. These numbers are indicative of expectations that more flying will occur for each based aircraft in the future.

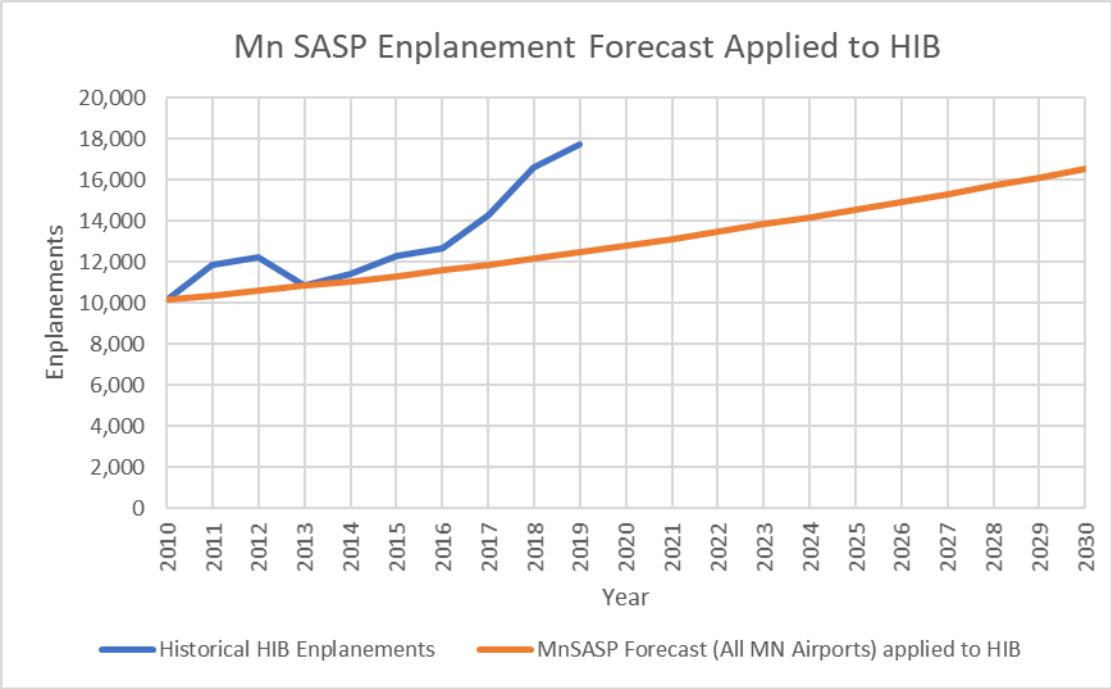
TABLE 1-11
MINNESOTA STATE AVIATION SYSTEM PLAN FORECAST

Year	Based Aircraft	GA Operations	GA Operations per Based Aircraft
2010	5,100	1,743,000	342
2015	5,500	1,870,000	340
2020	5,700	1,978,000	347
2030	6,100	2,388,000	391

Source: 2013 Minnesota State Aviation System Plan, Table 3-2; Prepared by RS&H, 2020

Regarding passenger enplanements, the 2013 Plan forecasted the State's enplanement levels will grow at 2.6 percent per year from 2010 through 2030. **Figure 1-4** shows what that growth rate for enplanements would look like if applied at HIB and compares it to historical data. As shown, HIB enplanement levels outperformed the forecast growth rate for the state as a whole.

FIGURE 1-4
MINNESOTA ENPLANEMENT FORECAST APPLIED TO HIB



Source: 2013 Minnesota State Aviation System Plan, RS&H Analysis, 2021

1.4 AVIATION FORECASTS

This section presents the forecasts for commercial passenger enplanements, operations, and based aircraft at HIB. The development of this forecast took place between 2020 and 2021, though which the COVID-19 pandemic inflicted economic distress globally and dramatically disrupted the aviation industry, especially commercial passenger travel. Throughout 2020, general aviation activity was found far less disrupted than commercial passenger activity, and in some instances flourished. Commercial passenger activity, through dramatically effected, was found to vary in severity based on routes and passenger types. These factors were considered during the development of this forecast.

1.4.1 Commercial Passenger Forecasts

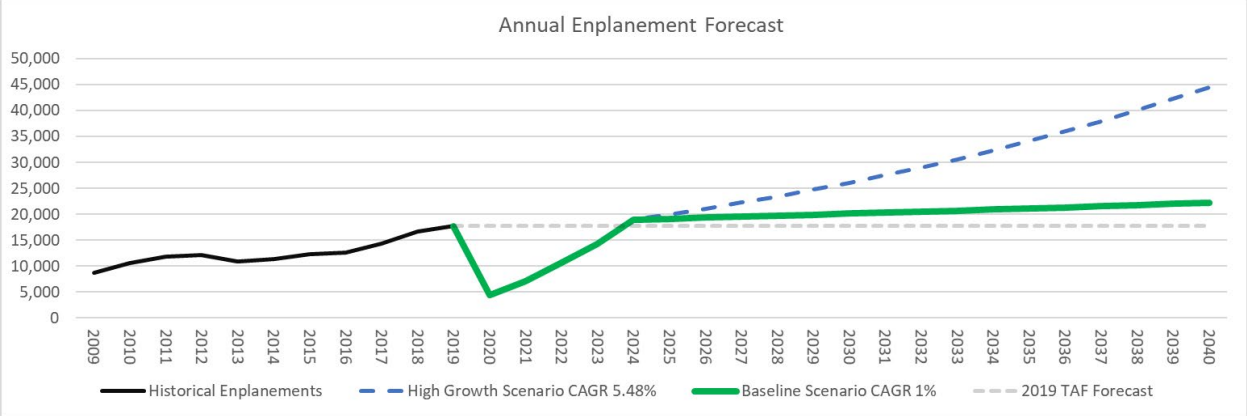
At the time of this writing, Fitch Ratings estimated that passenger airline traffic would return to 2019 levels by 2024.[2] Fitch Ratings is one of the primary sources for rating airport revenue bonds, and thus the company's estimates encompass the position of the airline industry. The Fitch estimate for airline recovery was applied in this forecast. The impacts of COVID-19 are reflected in the estimated passenger enplanements for the base year 2020 of 4,438. That number correlates with the total number of enplanements for FY 2020 assuming a conservative scenario of enplanement levels being 25 percent of the prior year.

[2] "Rebound in Global Travel Will Be Gradual Despite Probable Vaccines ." Fitch Ratings: Credit Ratings & Analysis for Financial Markets. Accessed December 31, 2020. https://www.fitchratings.com/research/corporate-finance/rebound-in-global-travel-will-be-gradual-despite-probable-vaccines-23-11-2020.

In forecasting passenger demand, regression analysis was found impractical as no socioeconomic variables showed correlation with historic enplanement trends at HIB. A baseline forecast was developed using a comparison analysis to Duluth International Airport (DLH). The 2019 TAF forecast for DLH projected one-percent growth year-over-year. A one percent growth rate was also found at HIB over a 20-year span from 1999 to 2019. Thus, one-percent growth post-COVID recovery was found to be a reasonable and potentially conservative baseline growth rate to plan for in this study. The one-percent growth rate was applied to the HIB enplanement forecast from year 2024 though the end of the planning period, as depicted by the green line in **Figure 1-5**.

A high growth scenario was also developed to establish an upper range to be consider for planning purposes. This was based on the average annual enplanement growth rate SkyWest had seen between 2012 and 2019 of 5.48 percent. That annual percentage growth was applied from 2024 onward to estimate the growth of enplanements that would materialize if SkyWest enplanements continued to grow as they were prior to the COVID-19 public health emergency.

FIGURE 1-5
ANNUAL ENPLANEMENT FORECAST



Source: RS&H Analysis, 2020
Notes: 2019 is estimated in FAA 2019 TAF. TAF data varied slightly from Airline Reporting Corporation data for some historical years indicating charter may not have been included in TAF. For 2024, 1,200 charter enplanements related to SunCountry operations were applied above 2019 estimated TAF levels to reconcile the difference. SunCountry enplanements were based on historical 4-year average of roughly 1,200 enplanements annually.

Both the baseline and the high growth scenario forecasts were supported by a regional analysis of air service demand. The regional analysis examined air travel demand within a 35-mile radius from HIB[3]. The analysis used Airlines Report Corporation (ARC) data to identify the total number of people who had booked air travel in 2019 regardless of what airport they used. It was found that nearly 62,000 annual round trips were booked by residents within the 35-mile radius of HIB. Of that, HIB captured 10,256 round trips (one round trip is equal to one enplanement and one deplanement).

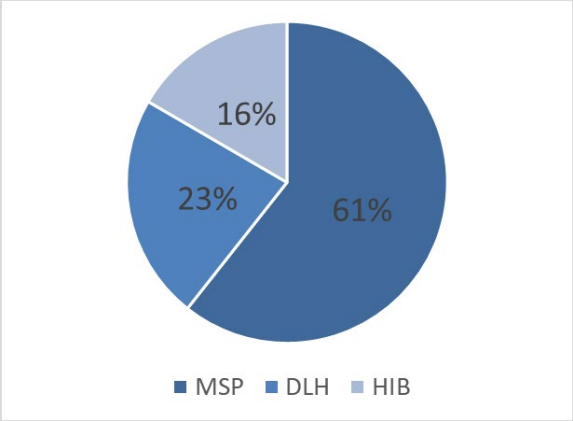
As shown in **Figure 1-6,** 61 percent of residents within the 35-mile radius of HIB used MSP, and 23 percent used DLH. This indicates there is a large amount of demand that could potentially be attracted to

[3] Analysis conducted by Team Insight and Associates, LLC. 2020

HIB. Additionally, it was noted that nearly 40 percent of passengers using HIB live outside the 35-mile core catchment area which indicates additional potential demand with the greater region.

It is recognized that smaller commercial airports like HIB experience demand leakage to hub airports like MSP due to typically lower fares and greater flexibility and frequency of flights. In this case, the average fares for 2019 for MSP were $231, while DLH and HIB were $260 and $263, respectively. This cost difference is not great considering it is roughly a 200-mile drive difference between HIB and MSP. Furthermore, the DLH and HIB fares are comparable. Thus, HIB leakage is likely related to either flight frequency and timing, and/or general awareness of the air service offered at HIB.

FIGURE 1-6
35-MILE RADIUS AIRPORT DEMAND SHARE, 2019



Source: ARC Data, Team Insight, 2020

The regional demand analysis supports both the baseline and high growth scenario forecast and validates these forecasts as viable. **Table 1-12** denotes the potential growth of enplanements over 2019 numbers assuming the Airport could capture back various percentages of the leakage to MSP and DLH. For example, if in 2019 the Airport retained 30 percent of the leaked demand within 35-miles from HIB, total annual enplanements would reach roughly 33,000. The high growth scenario reaches that level of demand in 2036, in the latter half of the planning horizon, further validating that the scenario adequately represents a high range of potential growth.

TABLE 1-12
ENPLANEMENT GROWTH FROM DEMAND CAPTURE WITHIN 35 MILE RADIUS

	10%	20%	30%	40%	50%
MSP	3,742	7,484	11,226	14,968	18,710
DLH	1,402	2,805	4,207	5,609	7,012
Additional Captured Enplanements	5,144	10,289	15,433	20,577	25,722
Total Enplanements (2019)	22,897	28,042	33,186	38,330	43,475

Source: BTS T100 Market Data and ARC Zip Code Market Data Finder Data Year Ending 4th Quarter 2019; Prepared by RS&H, 2020
Note: Total enplanements based upon 2019 TAF estimated 17,753 annual enplanements.

1.4.2 Regional Jet 50-Seat Aircraft

A critical component of this commercial passenger forecast is the future of 50-seat aircraft. The 50-seat Bombardier CRJ-200 is the staple aircraft used by SkyWest to serve smaller communities around the county.[4] However, the CRJ-200 is no longer being manufactured and the SkyWest CRJ-200 fleet age averages 17 years old. One looming question in the airline industry today is what will replace the 50-seat regional jet when the current fleet must be retired. Currently, no aircraft manufacture makes a 50-seat aircraft, and while there has been discussion about airframers creating a new plane, no manufacturer has committed to a new program. United Airlines has reconfigured some CRJ-700 aircraft as a multi-class 50-seater, called the CRJ-550. But the economics of that configuration are questionable for many markets, shown by the fact that United is only using those aircraft on routes from Chicago O'Hare International Airport (ORD) to select city pairings that have high demand from business-class passengers.

Conversations with SkyWest corporate representatives during this Master Plan helped inform the planning team of parameters to consider for long range planning at HIB. SkyWest intends to keep the CRJ-200 in service into the 2030's. The specific dates for retirement beyond 2030 will depend on maintenance costs and part availability for the aircraft at that time. The aircraft considered most likely to replace the CRJ-200 to serve airports like HIB is the Embraer E-175. SkyWest's CRJ-900 and CRJ-700 aircraft could also be used to take over, however, there are only a few CRJ-700's used for Delta Connection service, the CRJ-900's may not be as efficient, and there are far fewer CRJ-900's than the E175 in the SkyWest fleet. It was advised that for planning purposes, the E-175 was the best aircraft to plan for at this time.

An examination of load factors using the CRJ-200 though the baseline forecast was compared to load factors associated with the baseline and high growth scenario forecasts using the CRJ-200 and the E-175. As shown in **Table 1-13**, demand associated with the high growth scenario would require a transition to a larger aircraft from the CRJ-200 and/or greater frequency. The E175, which is a 76-seat aircraft, could accommodate the demand of the high growth scenario though the planning period with the same frequency provided today. Additionally, load factors of the E-175 would reach roughly 70 percent if HIB captured 30 percent of the leaked demand within the 35-mile radius of the airport. A 70 percent load factor represents the typical level of demand necessary to make a flight financially sustainable. Overall, the findings of this analysis confirmed that planning for the E-175 as the future commercial service aircraft to serve HIB is reasonable and prudent for facility planning purposes.

[4] Note the other 50-seat regional aircraft being flown today by regional airlines is the Embraer E-145. Neither SkyWest nor Delta have any in their fleet.

TABLE 1-13
LOAD FACTOR ANALYSIS FOR CRJ-200 AND E-175 AIRCRAFT

Year	Historical Enplanements	Baseline Scenario CAGR 1%	Baseline Growth Scenario LF - CRJ 200	High Growth Scenario CAGR 5.48%	High Growth Scenario LF - CRJ 200	High Growth Scenario LF - E175
2009	8,678					
2010	10,604					
2011	11,832					
2012	12,220					
2013	10,875					
2014	11,431					
2015	12,271					
2016	12,700					
2017	14,293					
2018	16,634					
2019	17,753	17,753		17,753		
2020		4,438	14%	4,438		
2021		7,101	23%	7,101		
2022		10,652	34%	10,652		
2023		14,202	46%	14,202		
2024		17,753	57%	17,753		
2025		**17,931**	**57%**	**18,726**	**60%**	**43%**
2026		18,110	58%	19,752	63%	45%
2027		18,291	59%	20,835	67%	48%
2028		18,474	59%	21,976	70%	50%
2029		18,659	60%	23,181	74%	53%
2030		**18,845**	**60%**	**24,451**	**78%**	**56%**
2031		19,034	61%	25,791	83%	59%
2032		19,224	62%	27,205	87%	62%
2033		19,416	62%	28,696	92%	66%
2034		19,610	63%	30,268	97%	69%
2035		19,806	63%	31,927	102%	73%
2036		20,005	64%	33,677	108%	77%
2037		20,205	65%	35,522	114%	81%
2038		20,407	65%	37,469	120%	86%
2039		20,611	66%	39,522	127%	90%
2040		**20,817**	**67%**	**41,688**	**134%**	**95%**

Source: FAA 2019 TAF, RS&H Analysis, 2020
Note forecasted numbers include only SkyWest enplanements and do not include Sun Country charter enplanements

1.4.3 Based Aircraft Forecasts

The based aircraft forecast for HIB took into consideration historical data, prior studies, national trends, and information gained about the local market climate from discussions with Airport management. Unlike the commercial airline industry, through the COVID-19 pandemic to date, general aviation saw growth in various segments of the industry such as charter demand and sales of light sport aircraft. In some instances, small businesses and individuals turned to general aviation to support their transportation needs while also insulating themselves from health risks associated with closer social interactions.

The general aviation segment of the industry will undoubtably see further changes, with some segments experiencing growth and others decline. For the purposes of this forecast, it is estimated that the general aviation industry, as a whole, will continue to track based on prior trends. Three general factors were used to support this estimate, including:

- Continued increase of high-net worth individuals in the United States with means to own private aircraft.
- Increased usage of general aviation for businesses and individuals leery of airline transport during COVID-19.
- In 2020, many light sport aircraft manufacturers outperformed 2019 sales metrics proving continued demand for small piston aircraft.[5]

To forecast single engine based aircraft at HIB, a share analysis was used based on the 2019 FAA TAF forecast for DLH. Knowing that DLH hangars are full and there is a wait list, it is estimated some demand for hangar space will transfer to HIB. The 2019 FAA TAF currently forecasts 1.7 percent annual growth of based single engine aircraft though the planning period at DLH. This growth rate was applied as a basis for HIB but was reduced slightly to 1.6 percent to provide a more conservative forecast and to account for the unknowns associated with the COVID-19 public health emergency.

As noted in **Section 1.3.3**, HIB currently has hangars awaiting new lessees as well as current tenants between aircraft, resulting in lower-than-typical based aircraft at the Airport. As shown in the based aircraft forecast detailed in **Table 1-14**, it is assumed that 8 additional single engine aircraft would be based at HIB between 2020 and 2025 as the leased hangars would be rented and current tenants purchase their next aircraft. From 2025 through 2030, another 2 single engine aircraft could be expected to be based at HIB as well as one multi-engine aircraft. Finally, from 2030 through 2040, another 5 single engine, 1 multi-engine, and 1 jet could be expected to be based at HIB.

The FAA forecasts the fleet of high-performance multi-engine and jet aircraft to grow nationally though the planning period, as discussed in **Section 1.3.4**. Today, many companies and individuals are far less tied to a specific location to conduct business, which has been further demonstrated during the COVID-19 pandemic. These factors support the need to plan for the potential of high-performance aircraft to be based at airports like HIB that offer a high-level of service and adherence to Part 139 standards. This was

[5] Johnson, Dan. "Up or down? How Flies the LSA Industry in This Strange Year?" General Aviation News, November 2, 2020. https://generalaviationnews.com/2020/11/02/up-or-down-how-flies-the-lsa-industry-in-this-strange-year/.

considered in the development of the based aircraft forecast, and the assumption that HIB would attract a based jet within the planning period.

TABLE 1-14
HIB BASED AIRCRAFT FORECAST

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2020	37	0	0	1	0	38
2021	40	0	0	1	0	41
2022	41	0	0	1	0	42
2023	42	0	0	1	0	43
2024	43	0	0	1	0	44
2025	44	1	0	1	0	**46**
2026	44	1	0	1	0	47
2027	45	1	0	1	0	47
2028	45	1	0	1	0	47
2029	46	1	0	1	0	48
2030	46	2	0	1	0	**49**
2031	47	2	1	1	0	51
2032	47	2	1	1	0	51
2033	48	2	1	1	0	52
2034	48	2	1	1	0	52
2035	49	2	1	1	0	53
2036	49	2	1	1	0	53
2037	50	2	1	1	0	54
2038	50	2	1	1	0	54
2039	51	2	1	1	0	55
2040	51	2	1	1	0	**55**
CAGR (2020-2040)	1.6%	4.7%*		0.0%	0.0%	1.9%

Source: RS&H Analysis, 2021
Note: *CAGR calculated between 2025 to 2040.

1.4.4 Operations Forecasts

As discussed in this chapter, because HIB has no ATCT facility, nor any mechanism in place to track all operations, it is not possible to determine exact historical operations. As such, historical data has been estimated by the planning team and Airport management, and a ratio of general operations to based aircraft of 300:1 was used as a baseline. That ratio of operations to based aircraft was carried forward through the planning period based upon the based aircraft forecast. The percentage split of GA operations between itinerant and local (70 percent and 30 percent respectively) used in the 2005 Master Plan was also carried forward in this forecast.

Table 1-15 below details the forecast for operations through the next 20 years at HIB. Commercial passenger operations were held flat though the planning period, in correlation with the baseline enplanement forecast. TFMSC data for other air-taxi and commuter operations provided in the baseline scenario were also kept static though the planning period. The increase of total annual operations in this forecast is directly correlated to the forecasted increase of based aircraft.

TABLE 1-15
HIB OPERATIONS FORECAST

		Itinerant Operations					Local Operations					
Airport	Based AC	Air Carrier	Air Taxi & Commuter	GA	Military	Total	GA	Military	Total	Total GA Ops	GA Ops / Based AC	Total Ops
2019 FAA TAF	42	2,516	2,634	10,000	100	15,250	15,003	0	15,003	**25,003**	595	30,253
Baseline Scenario 1	38	34	1,466	**6,650**	100	8,250	**2,850**	0	2,850	**9,500**	250	11,100
Baseline Scenario 2	38	34	1,466	**7,980**	100	9,580	**3,420**	0	3,420	**11,400**	300	13,000
Baseline Scenario 3	38	34	1,466	**9,310**	100	10,910	**3,990**	0	3,990	**13,300**	350	14,900
Baseline Scenario 4	38	34	1,466	**10,640**	100	12,240	**4,560**	0	4,560	**15,200**	400	16,800
FORECAST												
2025	46	34	1,466	**9,660**	100	11,260	**4,140**	0	4,140	**13,800**	300	15,400
2030	49	34	1,466	**10,290**	100	11,890	**4,410**	0	4,410	**14,700**	300	16,300
2040	55	34	1,466	**11,550**	100	13,150	**4,950**	0	4,950	**16,500**	300	18,100

Source: RS&H Analysis, 2021

Overall, total annual operations are not highly relevant for planning purposes until they reach a level where they can affect capacity or trigger the need for enhanced facilities. A single runway with a parallel taxiway can typically accommodate an annual service volume (ASV) of roughly 200,000 annual operations. No data suggests that HIB will experience operational activity close enough to trigger the need to add capacity within the planning period. Thus, at this time, no further analysis is recommended as it relates to annual operations at HIB.

1.5 ULTRA-LOW COST CARRIER (ULCC) POTENTIAL

Sun Country Airlines, considered a ULCC, currently serves HIB with a charter flight every 4 to 6 weeks to Laughlin Nevada. Prior air service studies indicate there is potential for more service based on the 400,000 people that live within 2 hours of HIB. The closest example of a ULCC operating is Allegiant out of STC, which is nearly a three-hour drive from Hibbing. Whether it is Sun Country Airlines who begins new routes with more frequency, Allegiant Airlines, or another ULCC, the potential for more ULCC service within the Arrowhead region is plausible and worth consideration in the Master Plan.

With all the unknown future impacts associated with COVID-19 and the unpredictable nature of ULCCs, no future service by a ULCC was included in this forecast. However, for the facility requirements chapter of this study, it is prudent and necessary that consideration be given to the demands of increased ULCC service. The maximum level of service worth consideration would be up to 2 destinations served by two flights per week by Boeing 737 and/or Airbus A319/320 aircraft. That level of service and choice of equipment is typical of ULCC carriers in markets like HIB and is akin to the Allegiant service out of STC. Annual operations with that level of service would equate to roughly 400 per year.

1.6 CRITICAL AIRCRAFT AND FLEET MIX REVIEW

The FAA requires the identification of the existing and future critical aircraft for airport planning purposes. The critical aircraft is the most demanding aircraft, or grouping of aircraft, using the airport regularly. Regular use is specifically defined in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, as 500 total annual operations, not counting touch-and-go landings. A critical aircraft must be determined for each runway, and sometimes for specific portions of the terminal/hangar area. In regard to HIB, the critical aircraft for Runway 13-31 is different than Runway 4-22.

Three parameters are used to classify the critical aircraft: Aircraft Approach Category (AAC) shown in **Table 1-16**, Airplane Design Group (ADG) shown in **Table 1-17**, and Taxiway Design Group (TDG) shown in **Table 1-18**. The AAC, depicted by a letter, relates to aircraft landing speeds. The ADG, depicted by a Roman numeral, relates to airplane wingspan and height. The TDG, classified by number, relates to the outer-to-outer main gear width and the distance between the cockpit and main gear. These parameters serve as the basis of the design and construction of airport infrastructure.

TABLE 1-16
AIRCRAFT APPROACH CATEGORY

AAC	Approach Speed
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

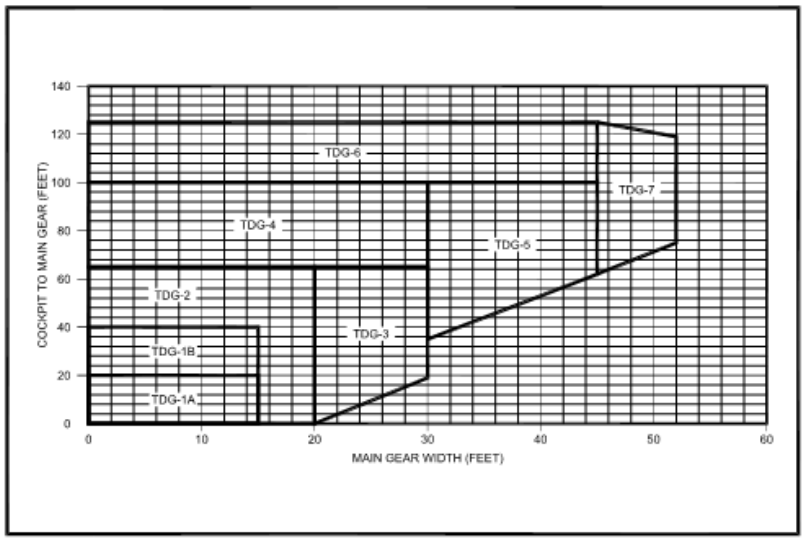
Source: FAA AC 150/5300-13A, Change 1, *Airport Design*

TABLE 1-17
AIRCRAFT DESIGN GROUP

Group #	Tail Height (ft)	Wingspan (ft)
I	< 20'	< 49'
II	20' - < 30'	49' - < 79'
III	30' - < 45'	49' - < 118'
IV	45' - < 60'	118' - < 171'
V	60' - < 66'	171' - < 214'
VI	66' - < 80'	214' - < 262'

Source: FAA AC 150/5300-13A, Change 1, *Airport Design*

TABLE 1-18
TAXIWAY DESIGN GROUP



Source: FAA AC 150/5300-13A, Change 1, *Airport Design*

The 2005 Airport Layout Plan (ALP) listed the Beechcraft King Air as the existing and future critical aircraft for Runway 4-22. That aircraft requires a Runway Design Code (RDC) B-II. For Runway 13-31, the existing critical aircraft listed is the Canadair CL-215, which requires a RDC of C-III. The future critical aircraft for Runway 13-31 was listed as the CL-215 along with the Bombardier CRJ-200, which is a C-II aircraft.

Since the last master plan was conducted, the CL-215, used by the Minnesota Department of Natural Resources (MN DNR) for firefighting operations, were sold by the department in 2015. Today, the MN DNR tanker base at HIB is designated by the Forest Service to support the following large aircraft:

- Arvo RJ85 / Bae-146 C-III Aircraft
- Lockheed C-130 Hercules C-III Aircraft
- Boeing 737-200 C-III Aircraft
- McDonald Douglas MD87 C-III Aircraft

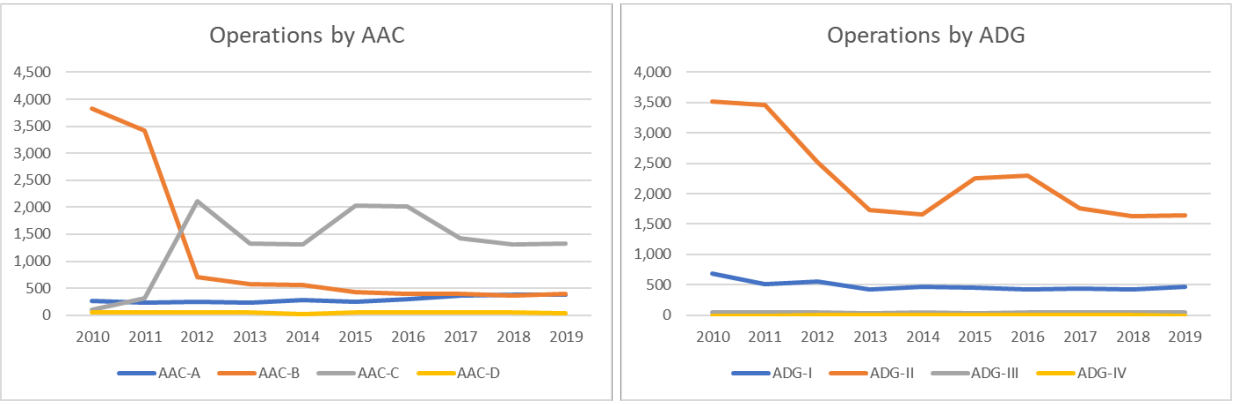
Historical operational data from 2016 to 2020 show consistent usage of the HIB air tanker base by Air Tractor 802, Quest Kodiak, and Cessna 310 aircraft, with a few operations by the Arvo RJ85 in 2020. It was noted that the past 5 years have been relatively slow fire seasons[6] in Minnesota, and thus one reason why larger air tankers were not seen at HIB. Overall, the HIB tanker base is expected to continue to serve ADG III aircraft though the planning period, but operations are not expected to exceed the annual 500 operations "regular use threshold" now held as the standard to designate a design aircraft in AC 150/5000-17.

TFMSC data was used to determine the most demanding aircraft performing 500 or more annual operations at HIB. Note that TFMSC often does not capture Forest Service operations that are conducted

[6] While true as the time it was written, during review of this forecast the 2021 wildfire season in northern Minnesota became one of the worst in decades. It is unknown at this time whether larger tanker aircraft will return to HIB. https://minnesota.cbslocal.com/2021/07/26/driest-ive-ever-seen-it-officials-urge-caution-during-unusually-dangerous-fire-season/

under visual flight rules (VFR). **Figure 1-7** illustrates operations captured by TFMSC data between 2010 and 2019 as it relates to aircraft ADG and AAC. The graphics show a decline in B-II aircraft operations between 2010 and 2012 and a sudden increase in C-II operations in 2012. This is related to the ending of Mesaba Airlines service at HIB using Saab 340 aircraft, and the introduction of SkyWest service using CRJ-200 aircraft. It was determined that the SkyWest CRJ-200 is the most demanding aircraft with regular use at HIB and is the existing critical aircraft for Runway 13-31.

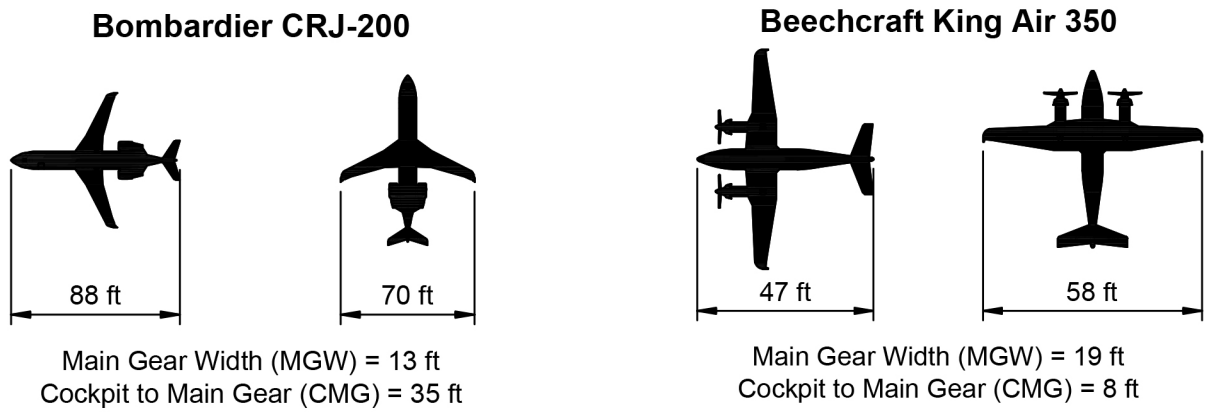
FIGURE 1-7
HIB TFMSC OPERATIONS BY AAC AND ADG



Source: FAA TFMSC, 2021

As can be seen in the TFMSC data shown in **Figure 1-7**, there are many B-II aircraft and smaller that conduct instrument operations into, and out of, HIB. It can be expected that the actual number is much higher since a majority of small aircraft will operate under visual flight rules and therefore not be captured within TFMSC data. With that consideration, the Beechcraft King Air (specifically the King Air 350 or B350) has been carried forward from the previous master plan as the critical aircraft for Runway 4-22, making it a B-II runway. That aircraft is representative of the most demanding aircraft that may require use of the crosswind runway at HIB. Wind rose analyses are completed for each runway on an airport to determine the need for secondary and crosswind runways. **Chapter 2, Inventory and Facility Requirements** provides the wind rose analyses for Runway 13-31 and Runway 4-22. **Figure 1-8** provides details of the determined existing critical aircraft at HIB.

FIGURE 1-8
EXISTING CRITICAL AIRCRAFT



Source: Prepared by RS&H, 2021

Aviation trends and industry forecasts indicate that the fleet representative of the King Air 350 will continue to operate regularly at HIB through the planning period above 500 operations per year. For this reason, the future critical aircraft for Runway 4-22 remains the B350. **Appendix A** discusses further details of the critical aircraft for Runway 4-22.

However, greater consideration was given in this study to the future of the CRJ-200, which is a C-II aircraft and the future critical aircraft for Runway 13-31. As discussed in **Section 1.4.2**, 50-seat commercial aircraft are no longer in production, and the airline industry is currently undecided as to what will replace these aircraft. It was determined that the E-175 is the planned replacement for the SkyWest CRJ-200 sometime within this study's planning period. As such, the future critical aircraft for HIB is the E-175, which is a C-III aircraft. **Figure 1-9** provides details of the determined future critical aircraft at HIB for Runway 13-31.

With regard to how this forecast informs facility requirements analysis for this Master Plan, it is critical to note the range of ADG III aircraft operating at HIB today. Major users of the Airport currently conducting operations with ADG III aircraft include Sun Country, the Forest Service, and various corporate jet operators. These operations are expected to continue though the planning period. **Table 1-19** is a summary of the existing and future critical aircraft for the Airport's two runways.

FIGURE 1-9
FUTURE CRITICAL AIRCRAFT

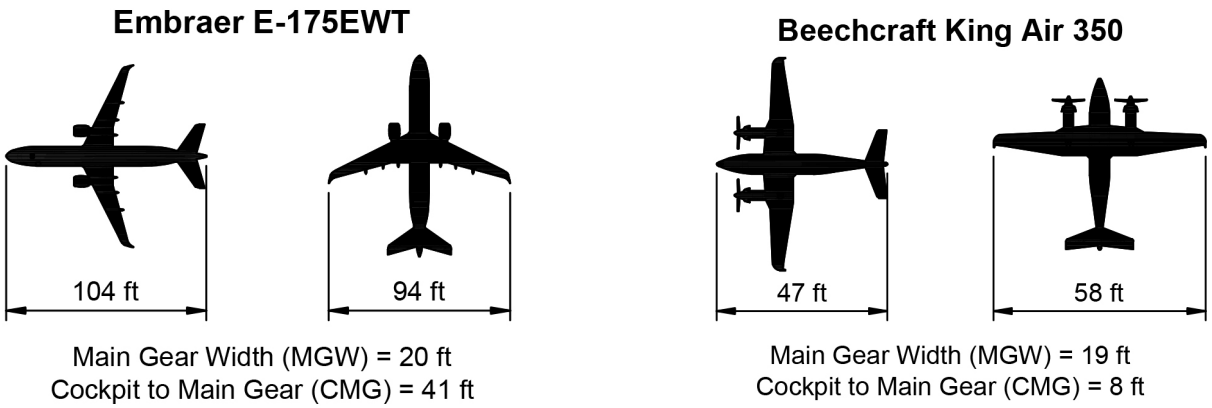


TABLE 1-19
CRITICAL AIRCRAFT SUMMARY TABLE

Runway	Designation	Aircraft	AAC	ADG	TDG
Runway 4-22	Existing	Beechcraft King Air 350	B	II	2
	Future	Beechcraft King Air 350	B	II	2
Runway 13-31	Existing	Bombardier CRJ200	C	II	1B
	Future	Embraer E-175	C	III	3

Source: RS&H, 2021; FAA Aircraft Characteristics Database, 2018

1.7 FORECAST SUMMARY

The summary of aviation forecasts as it relates to passenger enplanements, aircraft operations, and based aircraft is provided in **Table 1-20.**

TABLE 1-20
AVIATION FORECASTS SUMMARY

					Average Annual Compound Growth Rates		
	Base Yr. Level	Base Yr.+5yrs.	Base Yr.+10yrs.	Base Yr.+20yrs.	Base Yr. to +5	Base Yr. to +10	Base Yr. to +20
	2020	2025	2030	2040	2025	2030	2040
Passenger Enplanements							
Air Carrier*	4,438	19,143	20,119	22,224	33.96%	16.32%	8.39%
Operations							
Itinerant							
Air carrier	34	34	34	34	0.00%	0.00%	0.00%
Commuter/air taxi	1,466	1,466	1,466	1,466	0.00%	0.00%	0.00%
General aviation	7,980	9,660	10,290	11,550	3.90%	2.57%	1.87%
Military	100	100	100	100	0.00%	0.00%	0.00%
Local							
General aviation	3,420	4,140	4,410	4,950	3.90%	2.57%	1.87%
Military	0	0	0	0	0.00%	0.00%	0.00%
TOTAL OPERATIONS	13,000	15,400	16,300	18,100	3.45%	2.29%	1.67%
Based Aircraft							
Single Engine	37	44	46	51	3.53%	2.20%	1.62%
Multi Engine	0	1	2	2	NaN	NaN	NaN
Jet Engine	0	0	0	1	0.00%	0.00%	NaN
Helicopter	1	1	1	1	0.00%	0.00%	0.00%
Other	0	0	0	0	0.00%	0.00%	0.00%
TOTAL	38	46	49	55	3.90%	2.57%	1.87%

Source: RS&H Analysis, 2021

Notes: *Base year 2020 is estimated. Actual 2020 numbers anticipated to be 25% to 50% of 2019 historical levels due to COVID. Recovery to 2019 levels anticipated by 2024. NaN indicates "Not a number".

Table 1-21 provides a generalized comparison of the forecast developed for this study with the FAA 2019 TAF forecasts for passenger enplanements and total operations. A master plan forecast is typically considered consistent with the FAA TAF if it differs 10 percent or less in the 5-year planning period, and 15 percent or less in the 10-year planning period. The passenger enplanement and based aircraft forecasts are consistent with the TAF in relation to those parameters.

Moreover, the impacts of COVID-19 are reflected in the estimated passenger enplanements for the base year 2020 of 4,438. That number correlates with the total number of enplanements for FY 2020 assuming a conservative scenario of enplanement levels only 25 percent of the prior year. Irrespective of the 2020 enplanement number, a recovery to 2019 demand levels is estimated to materialize by 2024.

TABLE 1-21
FAA TAF COMPARISON

	Year	Master Plan Forecast	2019 TAF	MPU Forecast/ 2019 TAF % Difference
Passenger Enplanements				
Base yr.	2020	**4,438	*17,753	
Base yr. + 5yrs.	2025	19,143	17,753	7.26%
Base yr. + 10yrs.	2029	20,119	17,753	11.76%
Base yr. + 20yrs.	2039	22,224	17,753	20.12%
Based Aircraft				
Base yr.	2020	38	42	-10.53%
Base yr. + 5yrs.	2025	46	42	8.70%
Base yr. + 10yrs.	2030	49	42	14.29%
Base yr. + 20yrs.	2040	55	42	23.64%

Source: FAA 2019 TAF, RS&H Analysis, 2021
Notes: *2019 estimated in TAF **Base year 2020 is estimated. Actual 2020 numbers anticipated to be 25% to 50% of 2019 historical levels due to COVID-19. Recovery to 2019 levels anticipated by 2024.